

2013 Wholesale Electricity Market Report to the Minister for Energy

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Economic Regulation Authority

WESTERN AUSTRALIA

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EXECUTIVE SUMMARY

The Wholesale Electricity Market (**WEM**) was established in the South West Interconnected System (**SWIS**) as part of the State Government's reform to deregulate the electricity industry in Western Australia. The main objective of this market is to facilitate greater competition and encourage efficient investment in the generation and retail sectors, and ultimately to minimise the cost of electricity supplied to consumers.

Overview of the market

The WEM consists of an energy market and a capacity mechanism. The energy market provides for the trading of energy between Market Participants and includes the Short Term Energy Market (**STEM**) and the Balancing Market. The WEM was designed under the assumption that retailers would cover the majority of their electricity requirements through bilateral contracts with generators. The STEM enables Market Participants to adjust their contract positions on the day prior to the trading day. The Balancing Market adjusts for real time deviations from these contract positions.

The Reserve Capacity Mechanism (**RCM**) exists to ensure continued investment in existing and new capacity. It was adopted primarily to provide sufficient capacity to maintain reliability and meet peak summer demand. As an isolated system, the SWIS cannot rely on any interconnections with other systems, and must therefore have sufficient capacity within itself to satisfy demand and deal with emergency situations.

The operation of the WEM is governed by the *Wholesale Electricity Market Rules* (**Market Rules**). Amongst other things, these Market Rules establish the monitoring and reporting regime on the effectiveness of the market.

Specifically, clause 2.16.11 of the Rules requires that the Economic Regulation Authority (**Authority**) must provide a report to the Minister for Energy, at least annually, on the effectiveness of the market in meeting the specified Wholesale Market Objectives. This report fulfils that requirement for the period 1 July 2012 to 30 June 2013.

The Electricity Industry Act 2004 (**Act**) also requires the Authority to report to the Western Australian Minister for Energy (**Minister**) on the overall effectiveness of the market, once every three years. To avoid overlap and duplication, the Authority seeks to focus on operational matters in this annual report and strategic matters in the triennial report. The next triennial report is scheduled to be delivered to the Minister in 2014.

The role of the Authority is to monitor the market and clearly identify problems or issues that need to be resolved, and to recommend measures to the Minister to improve the effectiveness of the market in achieving the Wholesale Market Objectives.

As set out in previous reports, the Public Utilities Office (**PUO**) and Independent Market Operator (**IMO**) also have important roles in ensuring the effectiveness of the WEM. The role of the PUO focuses on the development of energy policy, including the policy response to issues or problems identified by the Authority. Major reform changes to the WEM that have wide implications for consumers need to be addressed by the PUO.

The role of the IMO focuses primarily on the operation of the market and involves rule administration and rule development, providing continuous refinements to the market, and finding the most efficient means to implement the solutions or policy responses identified by the PUO.

The Authority recognises that the three organisations must be clear about their roles in order to achieve the best outcome for consumers in the SWIS.

Since its first annual report to the Minister for the 2008 year, the Authority has raised a number of concerns in relation to the effectiveness of the market. A summary is set out in Table A1 below. Although some of these concerns have been, or are being, at least partially addressed, there are a number of outstanding issues. The Authority is aware that the Minister for Energy has commissioned a review of the design of the WEM and hopes that these matters will be addressed as part of that review.

Table A1 Issues Raised in Previous Minister's Reports

Issue	Report year issue commented on	Status
Reserve Capacity Mechanism – excess capacity, efficiency of generation mix, no market derived price	2008, 2009, 2012	Improvements have been made within the constraints of the current market design but there has not been a review of whether the overall market design is achieving the best outcome.
Network planning – possible modification of the unconstrained approach, access process	2008, 2009, 2010, 2012	Preliminary work undertaken but has not been progressed.
Review of market governance and transparency – including in bilateral contracting, System Management processes, multiple roles of IMO relating to rule change and administration	2008, 2011	No progress
Day ahead STEM – reduction in timeframe to move closer to real time trading	2008, 2012	Introduction of new competitive balancing market in July 2012 has addressed much of this concern.
For the longer term- consideration of an energy only market	2008	Could be considered as part of WEM review
Regulated Electricity tariffs and lack of retail competition	2008, 2009, 2010, 2012	No progress
Concerns over cost efficiency of dispatch order	2009	Introduction of new Balancing Market in July 2012 addresses much of this concern.
Treatment of intermittent generation – relating to displacement of baseload generation, methodology of calculating capacity credits	2010	Improvements have been made within the constraints of the current market design but there has not been a review of whether the overall market design is achieving the best outcome.
Treatment of DSM – review as to whether should be similar as generators	2010, 2011, 2012	In progress. Rule change RC_2013_10 undertaken by the IMO to harmonise requirements for capacity suppliers.
Capacity credit payments and unavailability of plant – incentives for plant to be available	2011, 2012	In progress. Rule change RC_2013_09 undertaken by the IMO.
Lack of competition for the provision of ancillary services	2012	This is one of the higher ranking issues raised by the Market Advisory Committee to examine over the next few years.

Key Issues

Consistent with the Authority's role, the scope of this report is limited to identifying problems within the WEM and to reporting on the matters that the Market Rules require the Authority to report on.

In this report, the Authority has focused primarily on the operation of the new Balancing and Load Following Ancillary Services (**LFAS**) market arrangements. The Authority has given preliminary consideration to issues arising out of the Verve Energy and Synergy merger in relation to the impact on the effectiveness of the WEM in meeting the Wholesale Market Objectives and has noted some significant outstanding issues identified in previous reports which it considers need addressing as soon as possible. These include:

- a review of the market design in relation to ensuring capacity is available;
- governance arrangements for the WEM; and
- whether the current network access policy of providing unconstrained access should be modified.

Performance of the new Balancing Market

Until 30 June 2012, Verve Energy was the sole provider of balancing services and the WEM operated under a "hybrid" design in terms of dispatch. Under this design, IPPs were required to commit and dispatch their facilities to meet their respective Resource Plans, i.e. 'net dispatch,' whilst Verve Energy's generation portfolio was dispatched to meet residual requirements in the market under the "gross dispatch" regime. IPPs were penalised through the application of charges for deviations from their Resource Plans except when the facilities were dispatched by System Management for system security reasons. System Management managed overall system security by scheduling and dispatching Verve Energy's facilities and resorting to IPP's facilities by issuing Dispatch Instructions, only when Verve Energy's balancing capability was fully utilised.

A new competitive balancing market was introduced on 1 July 2012 enabling all generators to offer balancing services. The objectives of the new market are to:

- enable all balancing facilities to participate in the Balancing Market;
- dispatch the lowest cost combination of facilities made available for Balancing;
- establish a balancing price which is consistent with dispatch;
- seek to ensure timely and accurate Balancing Market pricing and quantity information, including forecasts, and system security information, is provided to all Market Participants; and
- seek to ensure timely and accurate information relevant to the operation and administration of the Balancing Market is provided to affected Rule Participants.

Balancing offers are required to be submitted for all generators, apart from those on an approved planned outage or a forced outage. Balancing offers include the quantity and price at which a Market Participant is willing to be dispatched. Prices offered must be within the Price Cap (i.e. within the maximum and minimum STEM price) and must not be in excess of the Market Participant's reasonable expectation of its short run marginal cost (**SRMC**) when such behaviour relates to market power. Market Participants, other than Verve, are able to revise their offers up to 2 hours prior to the Trading Interval

commencing to reflect changes in market conditions. Verve has further restrictions and different gate closure times.

Under the new balancing market, Verve has continued to be able to offer its facilities on a portfolio basis and is treated as a single Balancing Facility. Verve Energy is able to offer its portfolio in 35 tranches and IPPs can offer 10 tranches for each scheduled generating facility. Intermittent generating units can only be offered as a single tranche and offers include price and an estimate of output. Verve Energy is also able to offer a facility on a stand-alone basis consistent with IPPs but, to date has not.

The IMO uses the balancing offer submissions to develop the Balancing Merit Order (**BMO**) which is ultimately used to determine which facilities are dispatched by System Management.

Any deviation Market Participants are required to make from their Net Contract Position (**NCP**) is treated as a Balancing Market transaction. Market Participants are paid the Final Balancing Price on their Metered Balancing Quantities (**MBQ**), i.e. the difference between actual generation or load and their NCP. This differs from the NEM where settlement is based on total generation and load.

The Authority recognises that the new Balancing Market addresses many of the problems associated with the previous arrangement where Verve Energy was the sole provider of balancing services. The new market results in much greater transparency and provides greater opportunities for IPPs to participate which should lead to a more competitive market. The shorter gate closure, compared with the STEM, enables generators to respond better to changing circumstances which should reduce costs and enhance security.

Some issues were experienced when the market first commenced with the design of the new Market Rules. These mainly related to Market Participants receiving or paying constrained on or off compensation in scenarios where they clearly should not have been and Verve Energy not being eligible to receive LFAS payments even though it was clearly providing those services.

As identified in its annual compliance audit¹ the IMO considered that these issues would cause irreversible outcomes for Market Participants that were affected, so consciously breached the Market Rules to avoid this outcome. The IMO initiated fast track Rule Changes to address these manifest errors, and published full details of the decision taken by it to address the manifest errors.

The annual audit of System Management's compliance with the Market Rules and Market Procedures identified some non-compliance incidents in relation to the Balancing Market. These include instances of System Management dispatching not in accordance with the Balancing or LFAS merit order, or not using the latest information available from the IMO and not providing market data or providing market data late.

The auditor, PA Consulting, considers this increase in incidents reflects the first year of operation of the new Balancing and LFAS market, which has led to System Management having more obligations to meet and therefore more chances of breaching its requirements. PA Consulting also notes that the increased automation of activities (that were previously manually conducted) increases System Management's ability to identify potential breaches, and that better monitoring of System Management's own compliance operation has also resulted in more breaches being reported.

¹ See 4.1.3.1 for further discussion.

Correct dispatch of generators based on the BMO is critical to the effective operation of the Balancing Market. It is also critical for System Management to fulfil its obligation in providing full and near real-time information to the market to enable Market Participants to operate in the new markets efficiently, and to make the optimal commercial decisions using this information.

The Authority notes the comments made by the auditor and is aware that System Management is currently reviewing the findings of the audit and assessing its processes in light of the audit findings. The Authority will review progress on this matter during the 2014 year.

Notwithstanding issues in relation to dispatch, feedback from stakeholders has been positive although further time is needed to make a detailed assessment of how effective the new market arrangements are. The Authority will continue to work with the IMO and System Management to evaluate the market further to ensure it is resulting in the most efficient dispatch of generation. In addition to improvements required in dispatch processes and market information, specific issues the Authority considers need attention include:

- Although there has been an increase in the volumes of generation offered in the price bands between \$0/MW and \$100/MW, significant volumes are still being offered at the minimum and maximum price cap levels. Whilst there are a number of valid reasons for generators to bid in this manner to ensure they are either dispatched or not, the Authority intends to investigate this further to ensure bidding behaviour is incentivised appropriately and resulting in the most efficient outcomes for the market.
- The requirement for a Market Participant not to bid in excess of its reasonable expectation of SRMC when such behaviour relates to market power, is key to ensuring the lowest cost generation is dispatched. The Authority will continue to develop its assessment of what constitutes SRMC and the monitoring tools it uses with the IMO to ensure the SRMC requirement is being complied with.
- Market Participants receive constrained on or constrained off payments if they are dispatched (or not) out of merit. Total compensation for 2012/13 amounted to around \$11 million. Some of these payments relate to network constraints and network outages. The Authority intends to review further whether the current arrangements are working effectively to ensure the most efficient dispatch and minimum cost to the market.
- Since the market commenced, Verve Energy has been able to bid on a portfolio basis. This was a pragmatic approach when it was the sole provider of balancing energy. However, the portfolio approach reduces the transparency of Verve Energy's bids in the balancing market and may be impacting on the ability of the new Balancing Market to deliver the most efficient outcomes for the market.

Performance of new LFAS Market

LFAS provide the primary mechanism in real-time to ensure that supply and demand are balanced. Load following accounts for the difference between scheduled energy and actual load. Load following resources must be able to maintain system frequency. Load following can only be provided by units operating under Automatic Generation Control (AGC). LFAS Up refers to the service of adjusting output upwards to meet demand and LFAS Down refers to the service of adjusting output downwards, when demand falls.

LFAS are also required to ensure frequency is maintained due to variation in output of generators.

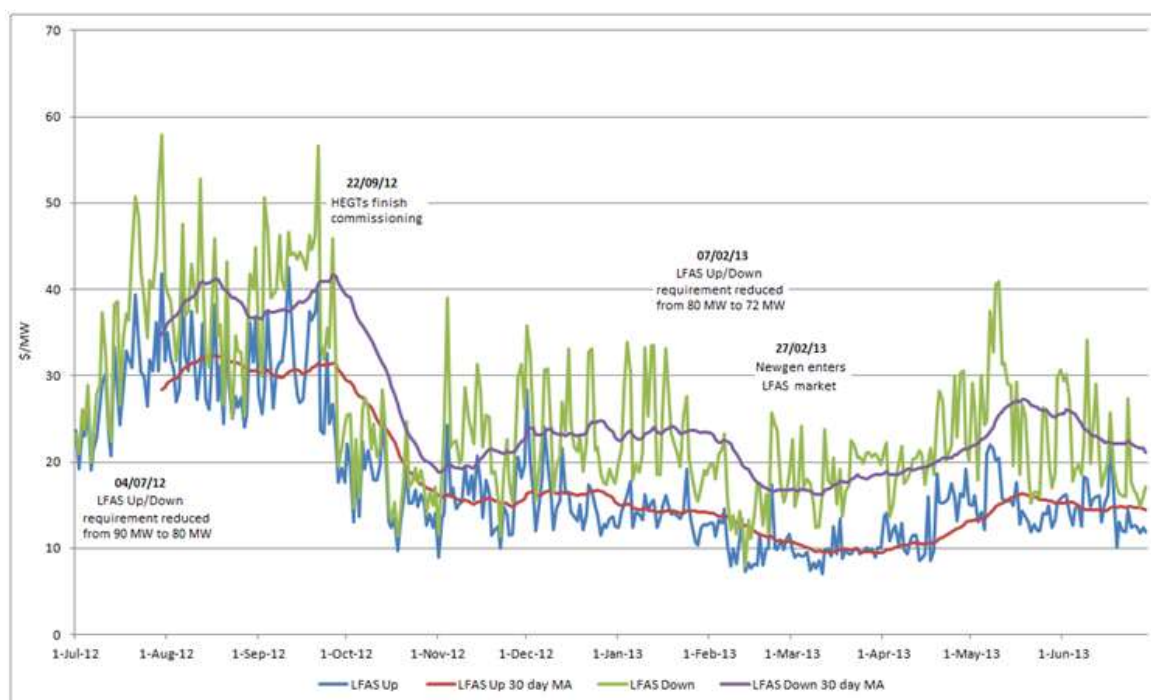
LFAS have been provided since the inception of the WEM, with Verve Energy being contracted to be the sole provider of this service until 30 June 2012. Up to this date, payment for the provision of LFAS was based on a proportion of the Marginal Cost Administered Price (**MCAP**), which was in turn based on prices in the previous Balancing mechanism. A new competitive LFAS market was established on 1 July 2012, with the key elements of this new market being market derived prices rather than administratively derived prices, and participation is open to all IPPs in addition to Verve Energy.

The LFAS requirement is set by System Management and must meet the standard according to section 3.10.1 of the Market Rules. This states that the level must be the greater of 30 MW or the capacity sufficient to cover 99.9% of short term fluctuations in load and output. The current requirement for both LFAS Up and LFAS Down is 72 MW. The Market Rules provide for the LFAS requirement to vary for each period, however currently the requirement set by System Management does not change from Trading Interval to Trading Interval.

The total cost of providing LFAS is passed on to Market Customers and Non-Scheduled Generators, based on the demand of the Market Customer and the output of the Intermittent Generators, as a proportion of the total quantity generated or consumed.

Figure A1 below shows the average daily LFAS prices since the competitive market commenced.

Figure A1: Daily average LFAS prices since market start



As noted in the chart, several key events affecting LFAS have occurred over the twelve months since the competitive market was introduced. These are:

- The LFAS Up and LFAS Down requirement was reduced from 90 MW to 80 MW on 4 July 2012;

- Verve Energy's High Efficiency Gas Turbines (**HEGTs**) became available on 22 September 2012;
- The LFAS Up and LFAS Down requirement was reduced from 80 MW to 72 MW on 7 February 2013;
- NewGen became the first IPP to enter the LFAS market on 27 February 2013.

As can be seen in the chart above, the commencement of the market saw the highest volatility in prices, and the highest average price for both LFAS Up and LFAS Down.

The Authority considers the introduction of a competitive market for LFAS and the increased transparency resulting from it has provided significant benefits in focussing attention and increased understanding of the factors driving LFAS and ancillary service costs generally. Although there appears to have been an increase in LFAS costs, the amounts involved are small relative to the overall cost of energy and, without further investigation, it is not possible to conclude that they were unwarranted.

The Authority recognises that considerable effort has been made by the IMO and System Management to better understand the LFAS requirement and that this work is ongoing. The Authority considers that there are many difficult issues to resolve and it is not possible or sensible to adopt hurried solutions. However, the Authority considers that experience in the NEM, where the quantity of LFAS is lower relative to total demand, highlights potential opportunities to reduce LFAS costs in the WEM, which deserve to be explored.

The Authority considers the work planned by the IMO and System Management should be developed further before committing to significant changes or extending competition to other ancillary services.

Merger of Synergy and Verve Energy

The concerns of the Authority in relation to the implications for the WEM of further increasing the dominance of Verve Energy and Synergy by merging them have been set out in detail in previous reports to the Minister. With the merger now fully committed to by the Government, the Authority has not revisited those views in this Report.

The Authority is responsible for monitoring the effectiveness of the market in meeting the Market Objectives and advising the Minister accordingly, including identifying measures to increase the effectiveness of the market. The Authority's preliminary assessment is that the merger of Verve and Synergy will increase already significant market power issues which will need to be addressed to minimise barriers to effective competition and to ensure efficient dispatch of generation. The Authority notes the Government's intentions to address this through ring fencing and non-discriminatory pricing requirements including regular audits of those requirements. However, these arrangements will not address the existing conflict of interest which arises due to the Government both participating in the market and setting the rules. Furthermore, whilst the ring fencing arrangements may serve to ensure the market power issues in relation to Verve and Synergy do not increase, they would not appear to lessen existing market power issues.

Implementation of the merger, including development of the regulations in relation to ring fencing, transfer pricing and wholesale arrangements, is currently being developed by a Merger Implementation Group appointed by Government. The Authority notes that the Merger Implementation Group is conscious of the potential impact of the merger on the WEM and is seeking to address this in various ways. Until further detail in relation to these is known, as well as some experience with how it operates, it is not possible for the Authority to comment. In particular, it is not clear what, if any implications there may be

for the operation of WEM arising from the creation of a wholesale trading unit in the merged entity.

Review of the capacity mechanism

In its 2012 report, the Authority noted a number of issues in the Reserve Capacity Mechanism (**RCM**) that require attention. These include:

- The cost to the market of the substantial and continued excess capacity that is currently secured under the RCM, albeit the level of excess capacity has reduced since the Authority published its 2012 report;
- The types of capacity attracted to the market and the implications that this mix of capacity has on the cost of electricity to consumers; and
- Perverse market incentives that allow for some Verve Energy units to be unavailable, yet still receive full payments for Capacity Credits.

The Authority recommended that the three highlighted concerns should be investigated to ensure that the Reserve Capacity Mechanism functions more efficiently. The Authority recommended that the Public Utilities Office (**PUO**), as the policy advisor, should take the lead in addressing these policy related strategic issues.

Whilst recognising that the IMO is continuing to progress development of Rule Changes² which may alleviate many of the above issues, the Authority considers that an overall review led by the PUO as described in the 2012 Minister's Report is essential to ensure all of the issues raised are addressed.

Governance arrangements for the WEM

The Authority recognises that the current governance arrangements in the WEM reflect the desire to minimise the implementation and operational costs of the wholesale market while maintaining its efficiency and effectiveness. The small size of the market makes it more difficult to cost effectively adopt structural features adopted by larger markets such as separating the rule making function from market operation and having a standalone system manager.

However, continuing concerns regarding the governance arrangements for the WEM have been raised by stakeholders, including the system manager and network operator, both directly to the Authority and in submissions to proposed rule changes by the IMO. The Authority considers that a review is still urgently required to establish the limitations of the existing arrangements and to identify what improvements could be made. It may be that the current arrangements are fit for purpose. However, undertaking such a review would strengthen confidence in the market, which is even more important with the merger of the two largest participants in the market. The Authority notes that, whilst the PUO is the most appropriate body to undertake the review, it is not entirely independent as it also represents the Government as owner of the largest market participants and the network operator.

² The changes being progressed by the IMO include:

- changes to the RCP proposed by the RCMWG (not yet in formal rule change process)
- Harmonisation of demand-side and supply –side capacity resources proposed by RCMWG (RC_2013_10 released for consultation in August 2013)
- Incentives to improve availability of scheduled generators (RC_2013_09 released for consultation in June 2013)

Unconstrained access

The WEM design is based on an unconstrained network access concept, which allows generators to have full access to the network during times of peak electricity demand, even after a single credible network fault. An unconstrained network approach facilitates simpler operation of the power system and market because of the absence of dynamic physical constraints.

In its 2010 Report to the Minister, the Authority noted that the current unconstrained network access approach in the SWIS does not enhance the Market Objectives for the following reasons:

- Unconstrained network access does not fully promote economically efficient supply of electricity because it is likely to cause investment in assets that are likely to have low utilisation. Whilst there is a contribution to reliability, the incremental increase in reliability is unclear and it may be difficult to justify if considered against the increased costs;
- The requirement for unconstrained network access creates a barrier to competition, as new entrant generators must pay a proportion of the costs of the next network augmentation. As the network is considered to be close to its capacity, this cost can be high even for small increments of generation; and
- It is not clear that the requirement for unconstrained network access minimises the long term cost of supply, in the sense that the requirement may provide more reliability than customers are willing to pay for through increased electricity prices.

The Authority recommended that a full and detailed review be undertaken of the costs, benefits and possible implementation issues relating to a move towards a constrained network access framework. This review would need a very clear set of objectives, be well resourced with full and open consultation and proper consideration of all the relevant interactions within the WEM design.

The Authority notes that such a review is yet to be undertaken. This is of particular concern given the increasing prevalence of interruptible supplies being offered by Western Power. Whilst such supplies are likely to deliver more efficient network connection costs, the interaction with the operation of the WEM also needs to be considered, particularly in relation to the assessment of capacity credits and constrained on/off payments. A piecemeal and uncoordinated adoption of constrained network access is unlikely to result in an optimal overall solution.

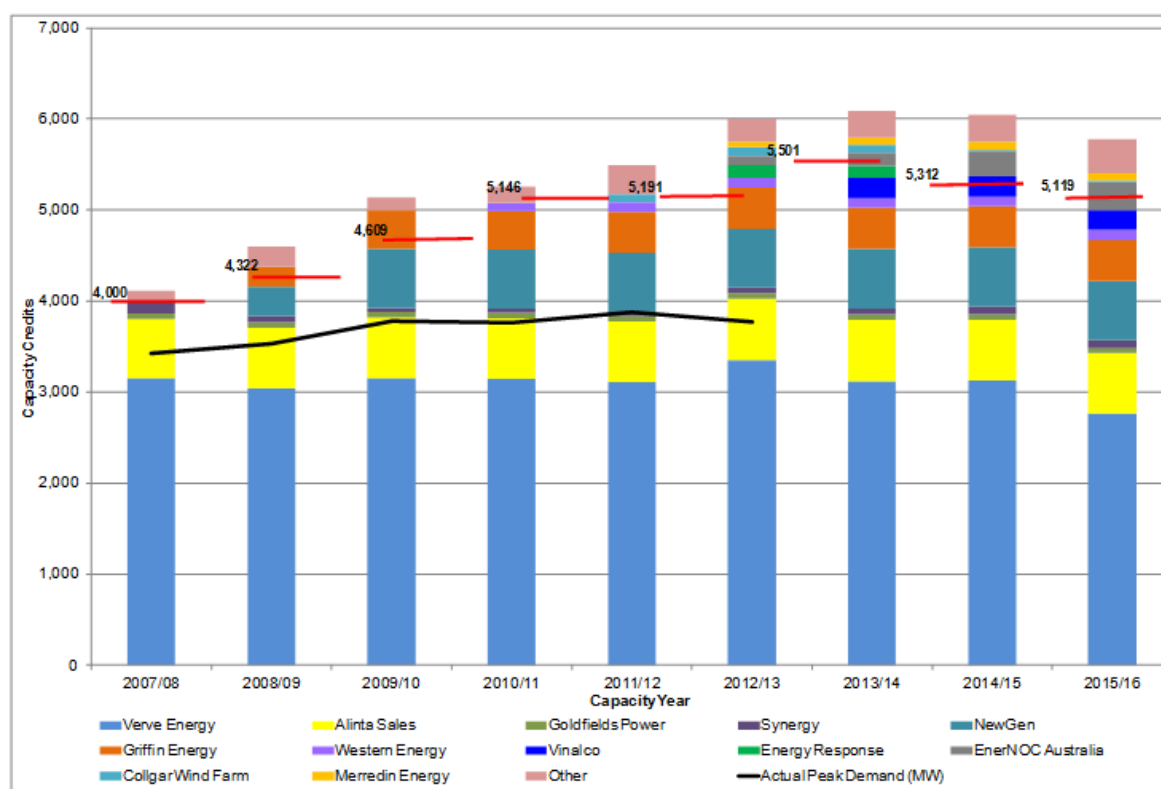
Overview of outcomes in the WEM

The following section provides a brief overview of outcomes in the RCM and energy market of the WEM, from market commencement in September 2006 to the end of June 2013.

The Reserve Capacity Mechanism

The RCM has secured more than sufficient capacity for each Capacity Year up to 2015/16. Figure A2 below provides a summary of the Capacity Credits assigned to participants in each Capacity Year, as well as the RCR for that year (shown as the horizontal red line for each Capacity Year).

Figure A2 Capacity Credits assigned to Market Participants for the 2007/08 to 2015/16 Capacity Years



Note: In the figure above, the red horizontal lines with the corresponding value represent the Reserve Capacity Requirement (RCR) in each Capacity Year. The black line represents the actual peak demand measured in Operational System Load Estimate.

As can be seen in the chart above, after years of steadily increasing requirements for capacity, a decline is projected for the 2014/15 and 2015/16 capacity years. This reflects a number of factors including downwards revisions to the demand forecast, reductions in the reserve margin and a reduction in the volumes required for load following. The level of certified capacity has also declined, particularly as a result of the retirement of Kwinana C at the end of 2014/15, resulting in a reduction in excess capacity in 2015/16.

The chart also shows that Capacity Credits assigned to new entrants have continued to increase as a proportion of total capacity credits in 2015/16. However, this reflects the decline in capacity credits attributable to Verve Energy (excluding Vinalco) rather than any recent increase in IPP capacity. There has been no significant increase in IPP capacity since 2012/13 when Merredin Energy was certified for 70 MW. Furthermore, the level of capacity credits certified for Collgar Windfarm reduced by 70 MW in 2014/15 reflecting a modification of the methodology for calculating the level of generation it provides at peak times.

The chart shows 110 MW being introduced in 2013/14 by Vinalco. This relates to the Muja AB plant which is currently being refurbished and became wholly owned by Verve Energy in April 2013.³ The Authority notes half of this capacity only became available six months into the 2012/13 Capacity Year and the remaining half is still not operational. For the 2015/16 Capacity Year, it is expected that Verve Energy (including Muja A and B formerly owned by Vinalco) will provide approximately 53 per cent of the total SWIS certified capacity, compared to approximately 90 per cent when the WEM commenced.

³ Prior to this the facility belonged to a joint venture 50 per cent owned by Verve Energy and 50 per cent owned by a private company Inalco Energy Pty Ltd.

Bilateral trade

The energy market in the WEM continues to be dominated by bilateral trades, which accounted for approximately 80 to 85 per cent of the total energy traded between Market Participants.

The Short Term Energy Market (STEM)

The STEM is a day-ahead market where a Market Participant can trade energy around its bilateral position.

The figures below illustrate, respectively, average daily peak and off-peak STEM Clearing Prices for each Trading Day from market commencement up to 30 June 2013. These figures also show 30-day, 90-day, and annual moving average prices.

Figure A3 Daily Average STEM Clearing Price
(Peak Trading Intervals, 21 September 2006 to 30 June 2013)

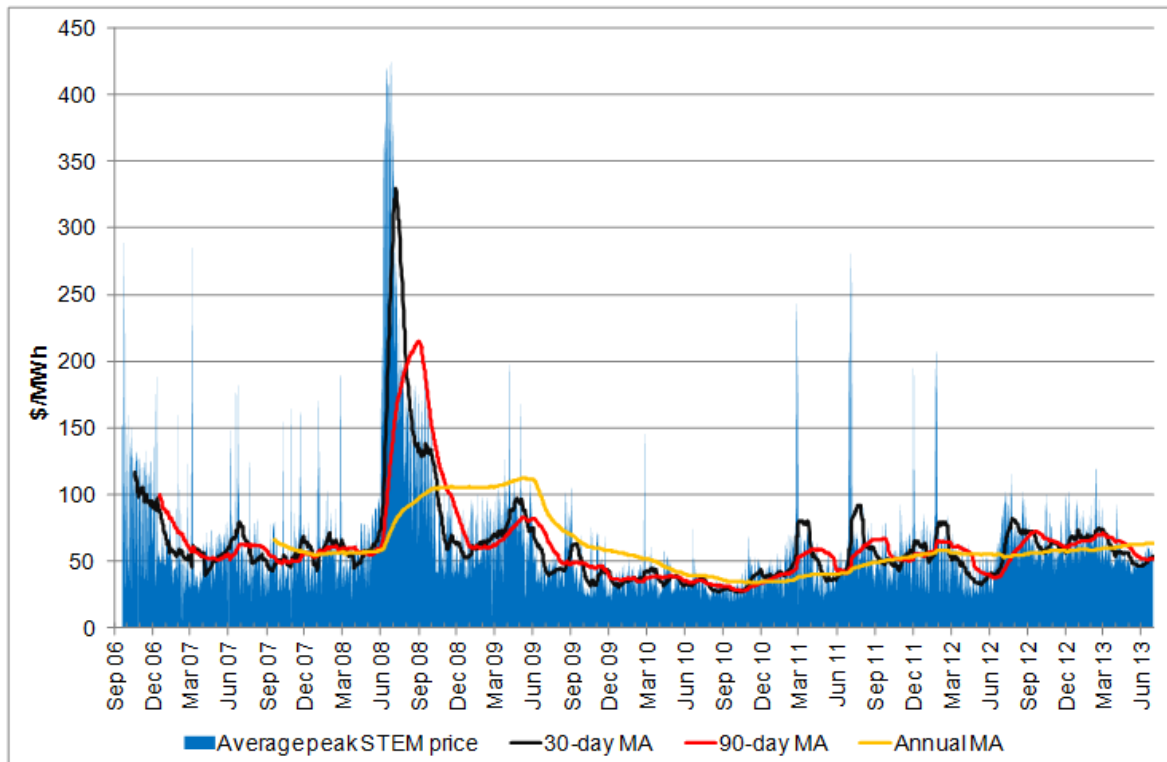
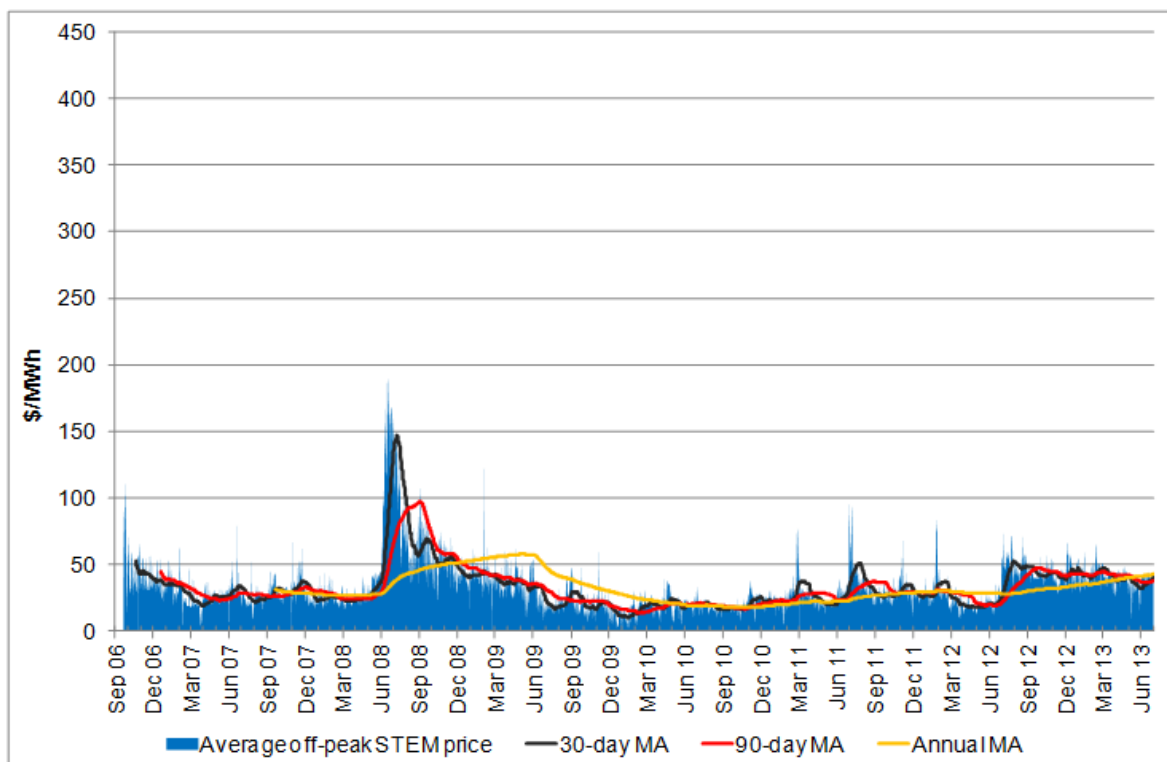


Figure A4 Daily average STEM Clearing Price
(Off-Peak Trading Intervals, 21 September 2006 to 30 June 2013)

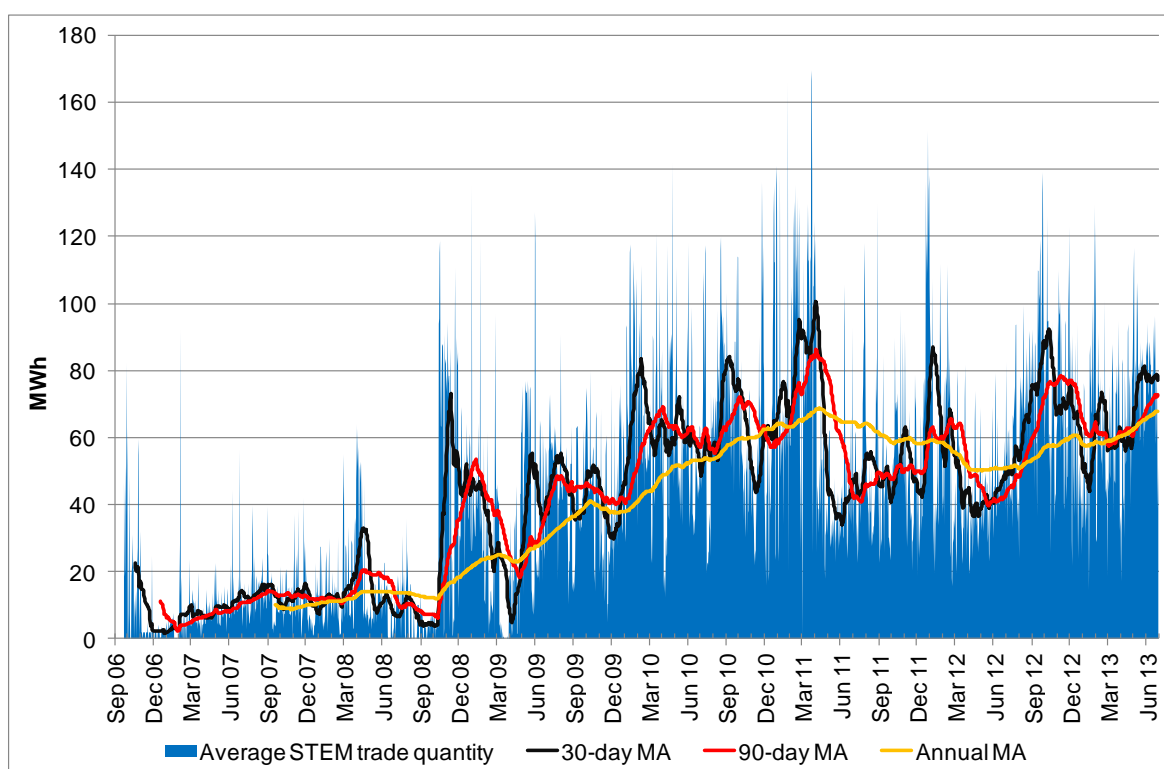


Following a period of high prices immediately after market commencement, prices in the STEM were relatively stable in 2007 and in 2008 prior to the Varanus Island incident (which occurred in June 2008).⁴ The incident resulted in significant gas supply curtailment due to which prices in the STEM increased considerably, reaching a daily average in excess of \$400/MWh during Peak Trading Intervals and a daily average of close to \$200/MWh during Off-Peak Trading Intervals. The prices then trended down until 2010 before starting to increase again. The introduction of the Carbon Tax in July 2012 has contributed to that increase. In the current Reporting Period the average Peak Trading Interval STEM Clearing Price was \$63.44/MWh, and the average Off-Peak Trading Interval STEM Clearing Price was \$42.80/MWh compared with \$52.10/MWh and \$26.55/MWh respectively in the previous Reporting Period.

The figure below illustrates daily average quantities traded in the STEM from market commencement until 30 June 2013.

Figure A5 Daily average quantities traded in the STEM

(21 September 2006 to 30 June 2013)



As can be seen in the chart above, the historical volume traded in the STEM remained relatively low until the commencement of the 2008/09 Capacity Year (in October 2008). The steep change at the commencement of the 2008/09 Capacity Year was largely attributable to the entry of NewGen's Kwinana facility and Griffin Power's first unit at Bluewaters in that year. Increased STEM trade volume carried on into the 2009/10 and 2010/11 Capacity Years and eased down in 2011/12 before increasing again in 2012/13.

⁴ The incident was caused by the rupture of a corroded pipeline and subsequent explosion at a processing plant on Varanus Island on 3 June 2008. The plant, operated by Apache Energy, which normally supplied a third of the State's gas, was shut down for almost two months while a detailed engineering investigation and major repairs were carried out. Gas supply from the plant partially resumed in late August 2008. By mid-October, gas production was running at two-thirds of normal capacity, with 85 per cent of full output restored by December 2008.

The major buyers in the STEM in the current Reporting Period were Verve Energy, followed by Alinta, ERM Power Retail, Synergy, Griffin Power and NewGen. Synergy was the largest STEM seller, followed by Alinta Sales, Verve Energy and Griffin Power 2.

Volumes were high in the first four months of the current Reporting Period and during April 2013 which coincided with major Planned Outages. Large STEM quantities were also observed in Off-Peak periods in the last week of January 2013 between Verve Energy and Synergy which the Authority considers may be the result of Synergy off-loading over nominated quantities during off-peak periods from its Vesting Contract with Verve Energy.

The Authority notes that the STEM is currently the only mechanism available for Market Customers to adjust their bilateral positions through a market, rather than through bilateral contract negotiations and re-negotiations as the balancing market is only open to Market Generators.

Despite its limitations, the Authority considers the STEM continues to provide a useful platform for bilaterally contracted parties to adjust their positions closer to real time.

The Balancing Market

As outlined above, a new competitive Balancing Market was introduced on 1 July 2012 which replaced the previous arrangements whereby Verve Energy was the sole provider. Figure A6 and Figure A7 below illustrate, respectively, the daily average Peak and Off-Peak balancing prices from market commencement to 30 June 2013.

Figure A6 Daily average Balancing prices
(Peak Trading Intervals, 21 September 2006 to 30 June 2013)

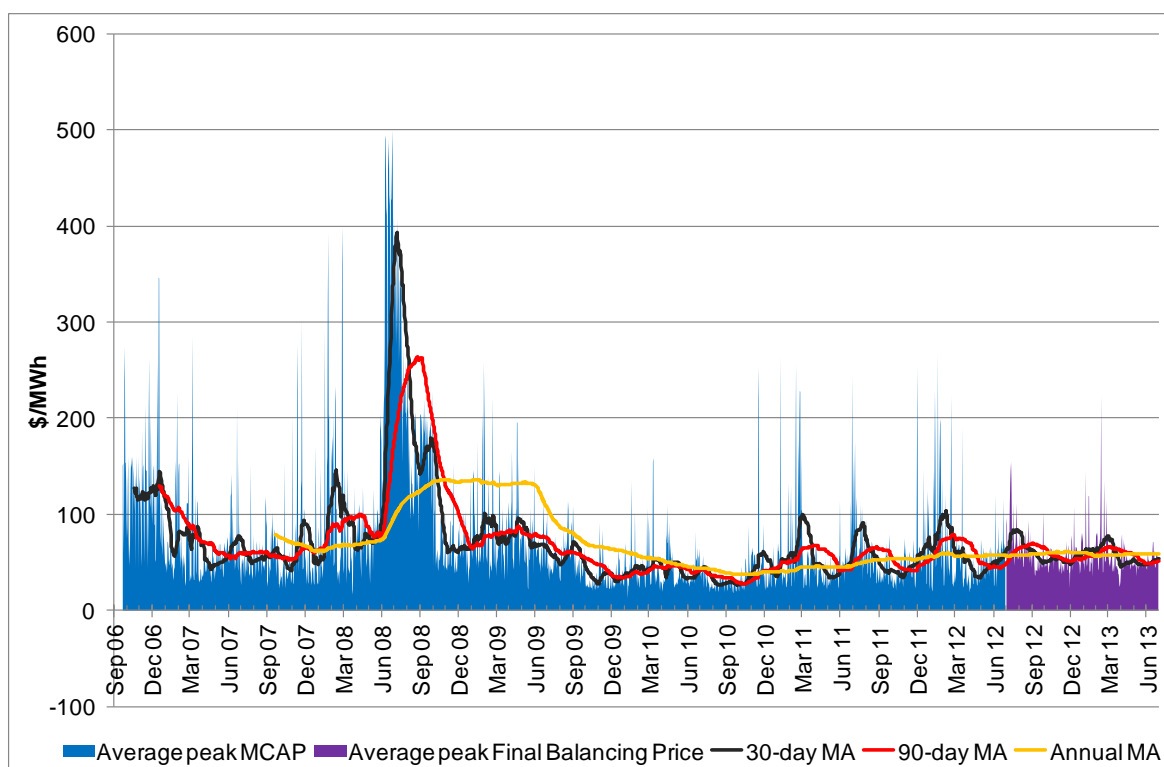
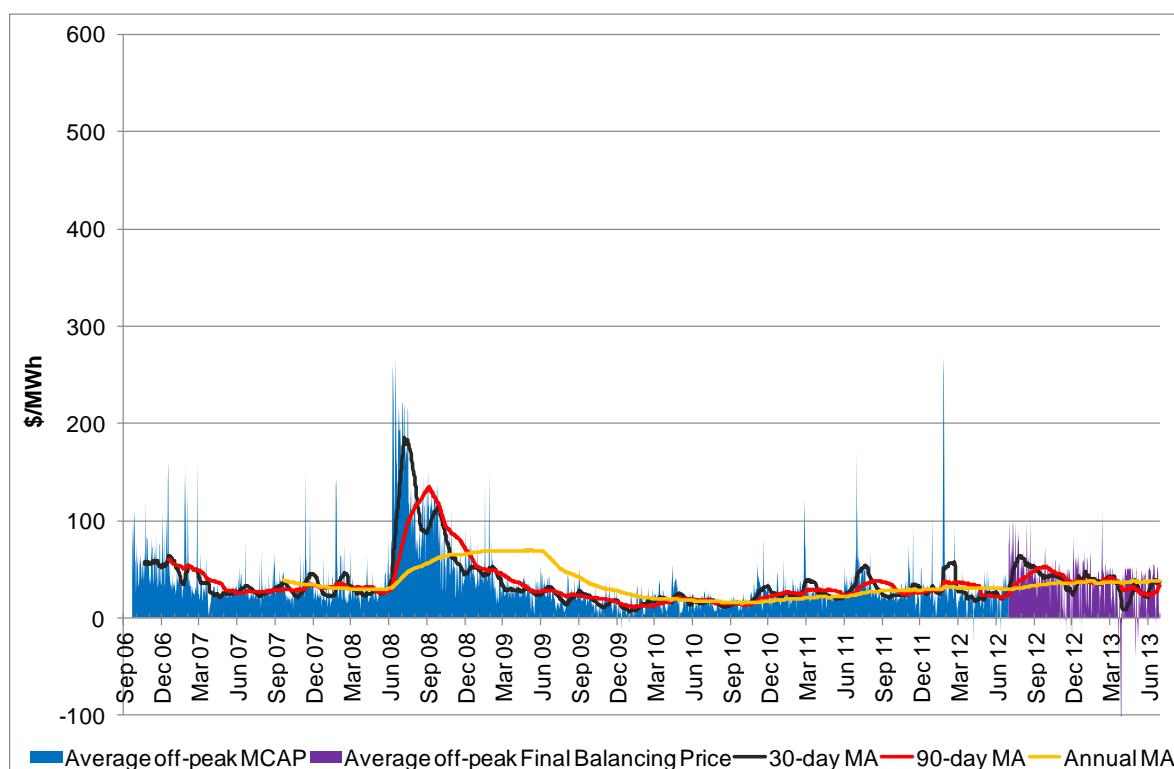


Figure A7 Daily average Balancing prices
(Off-Peak Trading Intervals, 21 September 2006 to 30 June 2013)



The balancing price in blue in these figures represents the Marginal Cost Administered Price (**MCAP**) for the period 21 September 2006 to 30 June 2012 when Verve Energy was the default provider of balancing services and was paid the MCAP for providing any balancing energy deviations. From 1 July 2012, when IPP Market Participants were able to compete to provide balancing services, prices are based on the Balancing Merit Order (**BMO**) produced by the IMO.

The balancing prices since market commencement to 30 June 2013 have followed similar patterns to the STEM prices.⁵ Following a period of high prices immediately after market commencement, both Peak and Off-Peak Balancing prices were relatively stable until June 2008 when the Varanus Island incident occurred. Following that event, and the subsequent curtailment of gas supplies, Balancing prices increased significantly in June 2008 and remained at elevated levels for a number of months. Balancing prices have returned to lower levels since that time, with average prices at or below those experienced before the 2008 Varanus Island incident. The balancing price reached the Maximum STEM Price in late June 2011 to early July 2011 due to a large volume of Planned Outages approved by System Management in accordance with the Market Rules, coupled with some unexpected Forced Outages of plant.⁶ The balancing price also reached the Maximum STEM Price in December 2011, January 2012 and February 2012 i.e., during

⁵ MCAP was set by deemed demand estimate (Relevant Quantity) intersecting the day ahead STEM Portfolio Supply Curve. MCAP would increase or decrease relative to the STEM.

⁶ As a result, Dispatch Instructions were issued by System Management for Out-of-Merit dispatching of IPP facilities at 'pay as bid' prices in order to mitigate high risk system operating state for security purposes. Since market commencement in 2006 to 30 June 2012, Verve Energy was the sole provider of balancing energy. Under this arrangement, System Management would only dispatch IPP facilities for balancing purposes in the event that Verve Energy's facilities were unable to provide the balancing energy required. IPP facilities that were dispatched out of the dispatch merit order were paid at their bid prices rather than the MCAP. Some high MCAP events were also observed in the first week of August 2011 and in November 2011 due to the high level of Planned Outages.

periods of high summer demand (demand ranged between 3,000 MW to 3,880 MW) as a result of very high temperatures. In this old balancing market arrangement the lowest balancing price reached was negative \$53.39/MWh at 2:00 am on 10 June 2012 (which was the lowest balancing price observed since market commencement). This negative balancing price value was attributed to overnight low demand, falling under 1,300 MW, and very high Intermittent Generation (242 MW).

Average balancing prices increased for both peak and off-peak periods compared with the 2011/12 year, however the increase was less than that observed in the STEM. The average prices in the Balancing Market were lower than those in the STEM. All prices will have been affected by the Carbon Tax introduced on 1 July 2012.

	2011/12 \$/MWh	2012/13 \$/MWh	Change \$
Balancing			
Off-Peak	27.91	38.19	10.28
Peak	55.08	58.21	3.13
STEM			
Off-Peak	26.55	42.80	16.25
Peak	52.10	63.44	11.34

Peak Balancing Prices did not reach the cap during the December 2012 to March 2013 summer period as frequently as the MCAP in the December 2011 to March 2012 summer period.

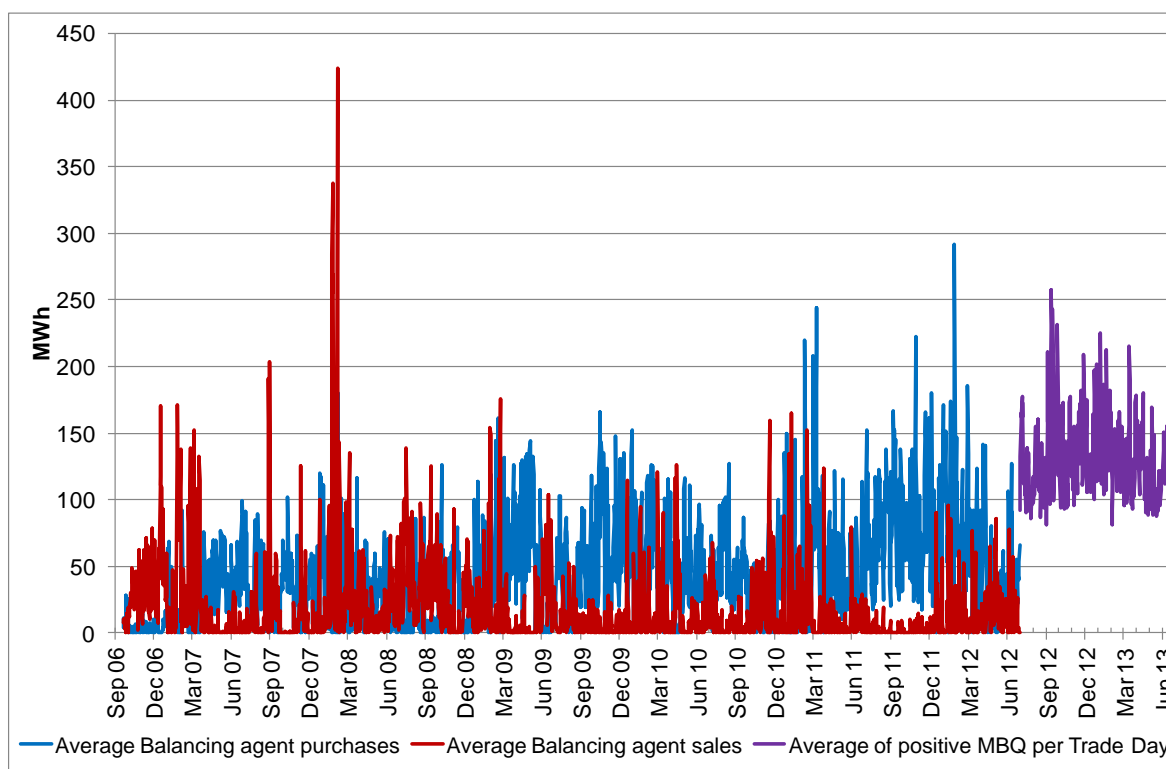
However, the number of negative prices observed since the new Balancing Market commenced have increased, particularly during the Off-Peak period. The Authority is continuing to investigate the circumstances which are resulting in this outcome.

The Authority notes that the magnitude of the negative prices has also increased which is likely to reflect the increase in the Minimum Price Cap from -\$314 to -\$1,000 when the new Balancing Market commenced.

With the introduction of the competitive balancing market it is not possible to do a like for like comparison in relation to volumes. Figure A8 below illustrates the daily average quantity per Trading Interval purchased and sold in Balancing by Verve Energy as the sole balancing agent (from market commencement until 30 June 2012).⁷

⁷ The daily average quantity per Trading Interval bought was calculated as the total quantity purchased by Verve Energy each day divided by 48 Trading Intervals. Similarly, the daily average quantity per Trading Interval sold was calculated as the total quantity sold by Verve Energy each day divided by 48 Trading Intervals.

Figure A8 Daily average quantities traded in Balancing⁸
(21 September 2006 to 30 June 2013)



In the new balancing market, generators offer their gross available capacity in the Balancing Market. Any deviations they are required to make from their Net Contract Position (**NCP**)⁹ is treated as a Balancing Market transaction. The deviation quantities for a participant are called the Metered Balancing Quantity (**MBQ**). The purple line in the chart above represents the daily average of total positive deviations from NCP by all participants per Trading Interval. As the real-time supply equals demand, the total negative deviations from NCP will match the total positive deviations from NCP.

Total volumes traded in the balancing market increased in 2012/13 compared with 2011/12. As a proportion, the Balancing Market now makes up 9.9 per cent of total volumes traded in the WEM compared with 6.4 per cent in 2011/12.

Competition in the contestable electricity market

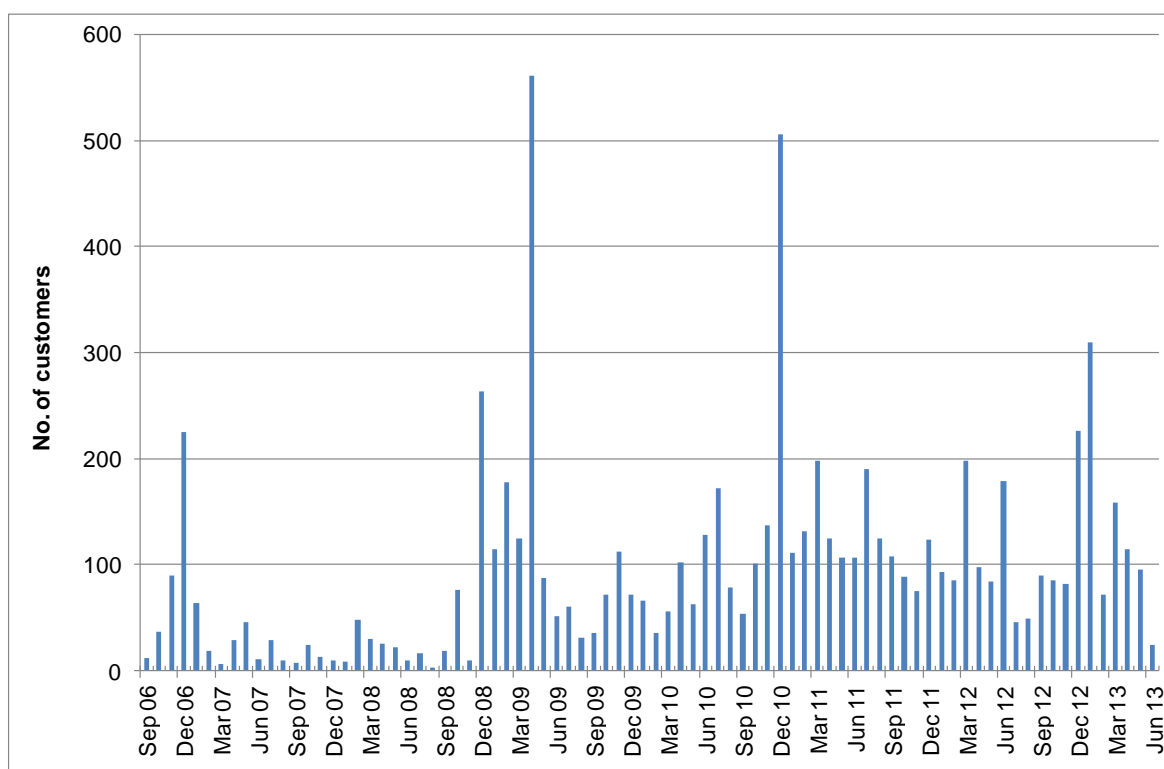
During the current Reporting Period there were no changes to the existing arrangement whereby Synergy is the sole supplier of electricity to customers that use less than 50 MWh of electricity per annum in the SWIS. The dominance of Synergy and the lack of specific plans to extend competition in the retail electricity market has been a concern raised by the Authority since the market commenced.

Figure A9 below illustrates the level of customer transfer between retailers in the contestable section of the electricity market in the SWIS.

⁸ Data sourced from the IMO website: 'Balancing Quantity (MWh)' for the period 21 September 2006 – 30 March 2011 from the *Balancing Information - 6 Month Summary* webpage <http://imowa.com.au/n4841.html>; and 'Balancing Trade Estimate' for the period 31 March 2011 – 30 June 2012 is sourced from the *Weekly Market Report* webpage <http://imowa.com.au/market-data-weekly-market-report>

⁹ The NCP reflects a generator's net bilateral and STEM contractual position.

**Figure A9 Number of customers changing retailer per month
(September 2006 to June 2013)**



As can be seen in the chart above, at the commencement of the WEM in 2006, there was a progressive increase in the monthly customer transfer number which reached 225 customers in December 2006. Customer transfer numbers then moderated and remained relatively low throughout 2007 and for the majority of 2008. The general trend between December 2008 and December 2010 was a steady increase in the number of customers changing retailers, which likely reflects the Government's decision to increase tariffs in 2009. Notably, customer transfer numbers spiked in April 2009 (561 customers) and again in December 2010 (506 customers).

Customer transfer numbers appeared to have stabilised since December 2010 with approximately 5 per cent of customers switching supplier in 2012/13 compared with 6 per cent in 2011/12 and 7 per cent in 2010/11. The chart above highlights the seasonal fluctuation that appears to occur, with the end of the year generally seeing the majority of customer transfers. For example, the switching levels were much higher in December 2012 and January 2013 compared with other months during the 2012/13 year with over 500 customers switching in the two month period compared with the 2012/13 monthly average of 112.

Introduction

1 Background

1.1 Reporting requirements for the Report to the Minister

The *Wholesale Electricity Market Rules (Market Rules)*¹⁰ require the Economic Regulation Authority (**Authority**) to provide to the Western Australian Minister for Energy (**Minister**) a report (**Report to the Minister**) on the effectiveness of the Wholesale Electricity Market (**WEM**) in meeting the Wholesale Market Objectives (**Market Objectives**),¹¹ at least annually.¹²

This report fulfils the Authority's requirements under the Market Rules for the period from 1 July 2012 to 30 June 2013.

According to clause 2.16.12 of the Market Rules, the Authority's report to the Minister must contain (but is not limited to) the following:

- a summary of the information and data compiled by the Independent Market Operator (**IMO**) and the Authority under clause 2.16.1;
- the 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:
 - the Reserve Capacity market;
 - the market for bilateral contracts for capacity and energy;
 - the Short Term Energy Market (**STEM**);
 - Balancing;
 - the dispatch process;
 - planning processes;
 - the administration of the market, including the Market Rule change process; and
 - Ancillary Services.
- an assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market; and

¹⁰ See State Law Publisher website, Electricity Industry (Wholesale Electricity Market) Regulations 2004: Wholesale Electricity Market Amending Rules (September 2006), [http://www.slp.wa.gov.au/gazette/GAZETTE.NSF/searchgazette/43EDE36827EBE11F482571ED0023C9C5/\\$file/gg161.pdf](http://www.slp.wa.gov.au/gazette/GAZETTE.NSF/searchgazette/43EDE36827EBE11F482571ED0023C9C5/$file/gg161.pdf)

¹¹ The Market Objectives are: (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 SWIS, 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 SWIS; and (e) to encourage the taking of measures to manage the amount of electricity used and when it is used.

¹² Pursuant to clause 2.16.11 of the Market Rules, the report must be produced at least annually, or more frequently where the Authority considers that the WEM is not effectively meeting its Market Objectives.

- any recommended measures to increase the effectiveness of the market in meeting the Market Objectives to be considered by the Minister.

Details of the Authority's reporting requirements and where these requirements are addressed in this report are provided in Appendix 1.

1.2 Process

As part of the preparation process for the 2013 Report to the Minister, the Authority released a Discussion Paper¹³ seeking public submissions on issues impacting the effectiveness of the WEM on 2 September 2013.

The Authority also posted a notice on the Authority's website advising of the release of the Discussion Paper and invited interested parties to make submissions to the Authority by 14 October 2013. A list of stakeholders who made submissions in response to the Authority's Discussion Paper is provided in Appendix 2. The Authority sought permission to publish submissions from the respective stakeholders. Where permission for publication of a submission was provided, the submission is made available on the Authority's website.¹⁴

In preparing this Report to the Minister, and in forming the views set out in it, the Authority has considered the comments raised in the submissions provided to the Authority.

In accordance with the Market Rules, the IMO has provided the Authority with data and analysis relating to the WEM, which is summarised in Section 5 of this Report to the Minister. In forming the views set out in this report, the Authority has considered the data and the analysis provided by the IMO.

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 that has confidential or sensitive information aggregated or removed.

Information that is classified as confidential under Chapter 10 of the Market Rules has been identified by the Authority and has been aggregated or removed in this public version.

1.4 Structure of this report

This report is structured as follows:

- Section 2 sets out the Authority's assessment of specific events, behaviour or matters that impacted on the effectiveness of the market and the Authority's

¹³ See ERA website, Discussion Paper – 2013 Wholesale Electricity Market Report to the Minister for Energy – 16 November 2012, <http://www.erawa.com.au/cproot/10962/2/20121119%20-%20D99560%20-%20Discussion%20Paper%202012%20Wholesale%20Electricity%20Market%20Report%20to%20the%20Minister%20for%20Energy.pdf>

¹⁴ See ERA website, Annual Wholesale Electricity Market Report to the Minister for Energy web page, <http://www.erawa.com.au/markets/electricity-markets/annual-wholesale-electricity-market-report-to-the-minister-for-energy/>

recommended measures to increase the effectiveness of the market in meeting the Market Objectives;

- Section 3 provides a summary of the Authority's monitoring activities on the effectiveness of the market in meeting the Market Objectives;
- Section 4 sets out the Authority's assessment of the operational effectiveness of the market, including the effectiveness of the IMO and System Management in carrying out their functions; and
- Section 5 provides a summary of the data identified in the Market Surveillance Data Catalogue (**MSDC**) and the analysis of that data undertaken by the IMO and the Authority.

Part A

2 Effectiveness of the Wholesale Electricity Market

Clause 2.16.12(c) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of any specific events, behaviours or matters that have influenced or detracted from the effectiveness of the Wholesale Electricity Market (**WEM**). Clause 2.16.12(d) of the Market Rules requires that the Report to the Minister also contains any recommended measures to increase the effectiveness of the market in meeting the Market Objectives. This section sets out the Authority's assessment and recommendations.

The WEM was established to facilitate competition and encourage efficient investment in the generation and retail sectors, thus ultimately working to minimise the cost of electricity supplied to consumers. Whilst the Authority recognises that the market has evolved since its inception, the Authority has put forward its view in previous reports to the Minister, that there are a number of issues that are limiting the progression to a competitive electricity market. These include:

- concerns that the market continues to be dominated by Verve Energy and Synergy, which in the absence of a clear policy framework for increasing retail competition severely limits the prospect of entry and expansion of new retailers;
- issues in relation to the Reserve Capacity Mechanism including the mix and level of capacity procured and the level of plant availability;
- potential for conflict of interest under the current market governance arrangement; and
- concerns that the current unconstrained network access approach does not enhance Market Objectives.

In relation to the first bullet point, the Authority has previously recommended that a road map setting out clear milestones for achieving a competitive energy market should be developed. In relation to the final three bullet points, the Authority has previously recommended that these areas should be subject to a comprehensive review.

The WEM is composed of two key components; an energy market and a capacity mechanism. The energy market deals with the trading of energy between Market Participants and includes Bilateral Contracts, the Short Term Energy Market (**STEM**) and the Balancing Market. The WEM was designed under the assumption that retailers would cover the majority of their electricity requirements through Bilateral Contracts with generators. The STEM enables Market Participants to adjust their contract positions by buying or selling energy on the day before the energy will be delivered. The Balancing market enables generators to make further adjustments closer to the actual time of dispatch.

The purpose of the capacity mechanism is to provide incentives for continued investment in existing and new capacity to meet system security and adequacy requirements. The South West Interconnected System (**SWIS**), covered by the WEM, is an isolated system. In other words, it cannot rely on any interconnections with other systems and must

therefore have sufficient capacity within itself to satisfy demand and deal with emergency situations in supply.¹⁵

The energy market in the WEM has undergone significant changes with the commencement of the competitive Balancing market which became operational on 1 July 2012. The intent behind the establishment of the competitive Balancing market was to provide opportunities for Independent Power Producers (**IPPs**) to participate in the provision of energy for the purposes of balancing the market. Prior to the change, under the provisions of the Market Rules and the pre-existing market structure, Verve Energy played the exclusive role of providing the balancing energy to the market.

Another newly established market is that for the provision of the Load Following Ancillary Services (**LFAS**), which also came into effect on 1 July 2012. Again, the establishment of this market now enables IPPs to compete with Verve Energy to provide these services.¹⁶

The section below summarises the Authority's assessment of the effectiveness of the current WEM arrangements.

2.1 Balancing Market

When the market was established in 2006, the design was based on a conservative approach which aimed to minimise the risks associated with the reform process by undertaking an evolutionary rather than revolutionary approach to market design. The original WEM design took account of:

- The fact that the SWIS is a small, geographically isolated system which is not interconnected with any other electricity jurisdiction;
- A desire to reduce risk and encourage private investment;
- A desire to maintain as much as possible, existing Bilateral contracts;
- The initial industry structure was characterised by a small number of market participants, with limited diversity and number of generating plants;
- A number of existing participants were small in size and were expected to be financially vulnerable;
- The significance of the reliability objective to Government; and
- Minimising the implementation and operational costs of the wholesale market while maintaining its efficiency and effectiveness.

The original market model consisted of:

- A bilateral contract market;
- A binding day ahead Short Term Energy Market (**STEM**);
- Balancing and ancillary services mechanisms; and
- A Reserve Capacity Mechanism.

¹⁵ Interconnected systems have the added security due to diversity of demand; that is, the benefit gained from different parts of the interconnected system peaking at different times, allowing for sharing of the resources between the interconnected systems.

¹⁶ Verve Energy was the sole provider of this service since market commencement.

Until 30 June 2012, Verve Energy was the sole provider of balancing services and the WEM operated under a “hybrid” design in terms of dispatch. Under this design, IPPs were required to commit and dispatch their facilities to meet their respective Resource Plans, i.e. ‘net dispatch,’ whilst Verve Energy’s generation portfolio was dispatched to meet residual requirements in the market under the “gross dispatch” regime. IPPs were penalised through the application of charges for deviations from their Resource Plans except when the facilities were dispatched by System Management for system security reasons. System Management managed overall system security by scheduling and dispatching Verve Energy’s facilities and resorting to IPP’s facilities by issuing Dispatch Instructions, only when Verve Energy’s balancing capability was stretched.

After the market commenced, efforts were initially focussed on refining the Market Rules to ensure that they worked as intended. Following this work, attention shifted to focus on the future development of the Market. As set out in the Market Rules Evolution Plan Issues Paper in June 2009, it was considered that the original market design did not provide mechanisms to handle unexpected events between the clearing of the STEM and real time and that this appeared to create a number of issues which impacted on both Verve Energy and other market participants:

- under the day ahead mechanism, balancing prices did not always reflect the final dispatch and this was impacting on the balancing generator - Verve Energy during the one day lag;
- IPPs did not have the flexibility to move generation between their own units or purchase from another generator within the dispatch day without incurring penalties for deviating from their resource plan; and
- there appeared to be a desire to allow IPPs to contribute towards balancing more effectively where this makes sense economically.

After further consultation, Market participants ranked an improved Balancing Mechanism as the number one priority. A Market Rules Evolution Plan was developed by the IMO and a new competitive balancing market was designed, with stakeholder involvement, over the next few years.

The new competitive balancing market was introduced on 1 July 2012 enabling all generators to offer balancing services. Transitional arrangements applied until 5 December 2012 when all the new systems became available. Balancing facilities are defined as Market Generators’ (other than Verve’s) scheduled and non-scheduled generating facilities. The objectives of the Balancing Market are to:

- enable all balancing facilities to participate in the Balancing Market;
- dispatch the lowest cost combination of facilities made available for Balancing;
- establish a balancing price which is consistent with dispatch;
- seek to ensure timely and accurate balancing pricing and quantity information, including forecasts, and system security information, is provided to all Market Participants; and
- seek to ensure timely and accurate information relevant to the operation and administration of the Balancing Market is provided to affected Rule Participants.

Balancing offers are required to be submitted for all generators, apart from those on an approved planned outage or forced outage. Balancing offers include the quantity and price at which a Market Participant is willing to be dispatched. Prices offered must be

within the Price Cap (i.e. between the maximum and minimum STEM price) and must not be in excess of the Market Participant's reasonable expectation of its short run marginal cost when such behaviour relates to market power. Market Participants other than Verve are able to revise their offers up to 2 hours prior to the Trading Interval commencing to reflect changes in market conditions. Verve has further restrictions and different gate closure times.

Under the new balancing market, Verve has continued to be able to offer its facilities on a portfolio basis and is treated as a single Balancing Facility. Verve Energy is able to offer its portfolio in 35 tranches and IPPs can offer 10 tranches for each scheduled generating facility. Intermittent generating units can only be offered as a single tranche and offers include price and estimated output. Verve Energy is also able to offer a facility on a stand-alone basis consistent with IPP's but, to date, has not.

The IMO uses the balancing offer submissions to develop the Balancing Merit Order (**BMO**) which is used to determine which facilities are dispatched by System Management.

Any deviation Market Participants are required to make from their Net Contract Position (**NCP**) is treated as a Balancing Market transaction. Market Participants are paid the Final Balancing Price on their Metered Balancing Quantities (**MBQ**), i.e. the difference between actual generation or load and their NCP. This differs from the NEM where settlement is based on total generation and load.

Implementing the new balancing and LFAS markets has required significant costs to be incurred. The Allowable Revenue submissions received by the Authority from the IMO and System Management in November 2012 identified total capital expenditure of \$10.55 million in relation to the IMO's Market Evolution Program (**MEP**), and \$13.352 million in relation to System Management's new IT system, SMARTS. The majority of this expenditure was incurred prior to July 2012. This does not include costs incurred by participants to meet the new market requirements. In 2011 the IMO commissioned an assessment of the expected benefits and costs of allowing market participation in the WEM to provide balancing services. The assessment was carried out by Sapere Research Group (**Sapere**). Sapere estimated ongoing benefits of between \$7.8 million and \$9.6 million per annum and identified the following directly measurable benefits:

- Lower cost energy balancing capacity as a result of lower cost IPP plant being dispatched before Verve plant in the merit order.
- The shorter gate closure and ability of IPPs to respond to events would increase the capacity bid into the balancing market with the benefit being that the additional capacity would result in lower clearing prices in some periods.
- Encourages and allows generators to return to the market earlier from planned outages in the event of major pricing events such as another generator tripping out unexpectedly.
- Reduces the amount of cycling of baseload plant.¹⁷

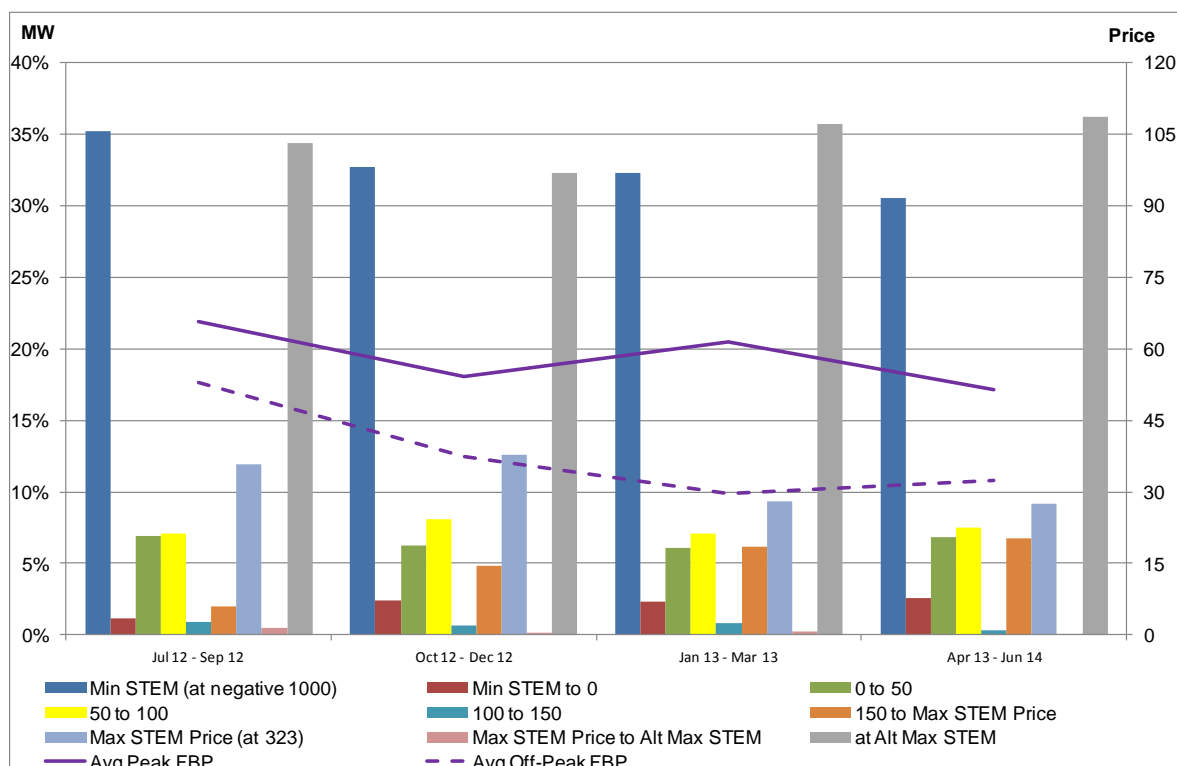
Sapere prepared an update of this work in October 2013 which estimated the actual benefits achieved during the first twelve months of trading under the new balancing market. The report concluded that benefits of \$14.6 million had been achieved which it noted was \$5 million higher than the level expected in the original study.

¹⁷ Base load plant are designed to run more or less at a flat load and incur additional costs if required to turn off and then restart in response to changes in demand.

Sapere's analysis shows that prior to the introduction of the balancing market, much of the available IPP capacity was offered in at extreme prices to ensure either dispatch with certainty or non dispatch with certainty. Following the introduction of the balancing market Sapere's analysis shows there has been an increase in IPP generation made available in the price bands between \$0/MW and \$100/MW.

The chart below shows the proportion of capacity offered in price ranges as per the seasons defined in the WEM rules. The average Peak and Off-Peak Balancing Prices are also shown.

Figure 1 Proportion of Capacity Offered in Price Ranges by quarter and quarterly Average Peak and Off-Peak Final Balancing Price



The Authority notes that in the first quarter of the new market about 35 per cent of the total capacity was offered at the Minimum STEM Price (i.e., at negative \$1,000). The capacity offered at negative \$1,000 decreased slightly in subsequent quarters, but overall remained above 30 per cent. Generators rationally offer capacity at negative prices to keep operating at minimum generation levels to avoid significant start up shut down costs.

Although not defined in WEM rules on what exactly the Minimum STEM Price should be, the IMO set the Minimum STEM Price at negative \$1,000 at the start of the New Competitive Balancing Market. Historically, Minimum STEM Price has ranged between negative \$159 and negative \$314. The Authority notes that the IMO decided to set the Minimum STEM Price to negative \$1000 in response to the concerns raised by Market Participants during the Market Evolution Program (MEP), about the possibility of too much capacity being offered into the new Balancing Market at the Minimum STEM Price. Market Participants were concerned that this could result in the dispatch order frequently having to be decided using the tie-breaker process (allocating random numbers) for generators each day, producing economically inefficient outcomes. By increasing the allowed offering range up to negative \$1000, the IMO proposed to encourage greater differentiation in offering from generators, and in particular to encourage some facilities to

offer above this price in low demand periods and so prevent the need for some baseload plants to shut down overnight.

Although the Final Balancing Price did not reach negative \$1,000 during the current Reporting Period, the Authority notes that market participants have offered significant amount of capacity at negative \$1000 and not utilised the offer range between \$0 and negative \$1,000. The Authority notes that over the year some participants began moving offers away from the price floor and cap.

The first quarter of the reporting period coincided with new market commencement, peak winter demand period and large Planned Outages.

Constrained-On and Constrained-Off Compensation in the New Balancing Market

In the period prior to 1 July 2012, Market Participants would be penalised for any upwards or downward deviation in real-time from their previous day's declared NCP. Upwards Deviation Administered Price (**UDAP**) and Downwards Deviation Administered Price (**DDAP**) were used to settle deviations outside a tolerance¹⁸ for non-Verve Energy Scheduled Generators (excluding those subject to a test) that deviated from their Resource Plans without instruction from System Management.¹⁹ These administered penalties were incurred by IPPs if circumstances changed between the previous day's declared NCP and the real-time dispatch (like changes in forecast load, facility outages etc).

With the commencement of the new Balancing Market, the administered penalties UDAP and DDAP on IPPs were removed. System Management is required to dispatch all participants based on the BMO. Any generator that is dispatched out-of-merit by System Management receives compensation. A generator receives Constrained On compensation if more energy is dispatched from that generator than its Balancing Submission indicated when compared to the Balancing Price (for example, a situation like Forced Outage when another generators covers up for lost generation). The new market also compensates a generator, a Constrained Off payment, if more energy could have been dispatched from a Facility (or the Verve Energy Balancing Portfolio) when its Balancing Submission is compared to the Balancing Price (a situation like Transmission Line failure when a generator could not generate as expected).

The magnitude of the compensation payment is affected by the price at which the generator bid. In some instances, negative price bids of -\$1,000 can lead to a significant compensation payment in cases where a generator is not dispatched.

Total payments for the 2012/13 year amounted to around \$11 million. These costs are recovered from Market Customers. The Authority notes that a number of such payments may relate to potential non compliance by System Management in its dispatch processes as highlighted in its compliance audit report. Others relate to network constraints and outages. The Authority notes that these issues can result in significant costs to the market and will be investigating this further with the IMO and System Management. The Authority is aware that some matters have already been dealt with and further work is planned by the IMO and System Management.

There are currently a number of potential rule changes under consideration which will further refine the operation of the energy market. These include:

¹⁸ As provided for under clause 6.17.9 of the Market Rules.

¹⁹ UDAP was set at a discount to MCAP to discourage upward deviations without instruction from System Management and DDAP was set at a premium to MCAP to discourage downward deviations without instruction from System Management.

- removal of the requirement to submit Resource Plans;
- potential changes to the STEM, including changes to timeframes and making participation optional;
- changes to gate closure times; and
- changes to the timeframes and requirements for Bilateral Submissions.

2.1.1 Stakeholder Submissions

A submission from Alinta raised concerns about Verve Energy's ability to bid its plant as a portfolio, which it considers is likely to be restricting competition in the Balancing Market and leading to inefficient dispatch and resulting in:

- Poor operating decisions in the short term; and
- Poor investment decisions in the long term.

Alinta considers it a priority to shift Verve Energy to bidding its facilities separately. Alinta considers it is too soon to draw clear conclusions about the net benefits of the reforms to the balancing market but indicates interest in ongoing refinement including moving to 5 minute gate closures.

A submission from Bluewaters considers that the new balancing market has been a successful reform and offers examples of benefits that Bluewaters has actually achieved in practice. It supports the IMO's current workplan to further refine the balancing market (e.g. shorter gate closures).

Community Electricity also considers that the new balancing market has been extremely successful. It suggests from a comparison of the carbon-adjusted balancing prices in 2011/12 and 2012/13 that it appears that the balancing market has delivered significant price reductions. It also suggests there is "greater liquidity around the balancing point", which reduces volatility and risk.

System Management's submission notes that it has observed no adverse impacts from the change and that it now has a greater range of facilities to meet the difference between forecast demand requirements and actual load. System Management would like to see public reporting of constrained on and constrained off payments in the interests of transparency.

2.1.2 Authority's View

The Authority recognises that the new Balancing Market addresses many of the problems associated with the previous arrangements. The new market results in much greater transparency and provides greater opportunities for IPP's to participate which should lead to a more competitive market. The shorter gate closures, compared to the day-ahead STEM) enable generators to respond better to changing circumstances which should reduce costs and enhance security.

Some issues were experienced when the market first commenced with the design of the new Market Rules. These mainly related to Market Participants receiving or paying constrained on or off compensation in scenarios where they clearly should not have been

and Verve Energy not being eligible to receive LFAS payments even though it was clearly providing those services.

As identified in its annual compliance audit²⁰ the IMO considered that these issues would cause irreversible outcomes for Market Participants that were affected, so consciously breached the Market Rules to avoid this outcome. The IMO initiated fast track Rule Changes to address these manifest errors, and published full details of the decision taken by it to address the manifest errors.

The annual audit of System Management's compliance with the Market Rules and Market Procedures identified some non-compliance incidents in relation to the Balancing Market. These include instances of System Management dispatching not in accordance with the Balancing or LFAS merit order, or not using the latest information available from the IMO and not providing market data or providing market data late.

The auditor, PA Consulting, considers this increase in incidents reflects the first year of operation of the new Balancing and LFAS market, which has led to System Management having more obligations to meet and therefore more chances of breaching its requirements. PA Consulting also notes that the increased automation of activities (that were previously manually conducted) increases System Management's ability to identify potential breaches, and that better monitoring of System Management's own compliance operation has also resulted in more breaches being reported.

Correct dispatch of generators based on the BMO is critical to the effective operation of the Balancing Market. It is also critical for System Management to fulfil its obligation in providing full and near real-time information to the market to enable Market Participants to operate in the new markets efficiently, and to make the optimal commercial decisions using this information.

The Authority notes the comments made by the auditor and is aware that System Management is currently reviewing the findings of the audit and assessing its processes in light of the audit findings. The Authority will review progress on this matter during the 2014 year.

The Authority notes the generally positive feedback from stakeholders and agrees that further time is needed to make a detailed assessment of how effective the new market arrangements are. The Authority will continue to work with the IMO and System Management to evaluate the market further to ensure it is resulting in the most efficient dispatch of generation. Specific issues the Authority considers need attention include:

- Although there has been an increase in the volumes of generation offered in the price bands between \$0/MW and \$100/MW, significant volumes are still being offered at the minimum and maximum price cap levels. Whilst there are a number of valid reasons for generators to bid in this manner to ensure they are either dispatched or not, the Authority intends to investigate this further to ensure bidding behaviour is incentivised appropriately and resulting in the most efficient outcomes for the market.
- The requirement for a Market Participant not to bid in excess of its reasonable expectation of SRMC when such behaviour relates to market power, is key to ensuring the lowest cost generation is dispatched. The Authority will continue to develop its assessment of what constitutes SRMC and the monitoring tools it uses with the IMO to ensure the SRMC requirement is being complied with.

²⁰ See 4.1.3.1 for further discussion.

- Market Participants receive constrained on or constrained off payments if they are dispatched (or not) out of merit. Total compensation for 2012/13 amounted to around \$11 million. Some of these payments relate to network constraints and network outages. The Authority intends to review further whether the current arrangements are working effectively to ensure the most efficient dispatch and minimum cost to the market.
- Since the market commenced, Verve Energy has been able to bid on a portfolio basis. This was a pragmatic approach when it was the sole provider of balancing energy. However, the portfolio approach reduces the transparency of Verve Energy's bids in the balancing market and may be impacting on the ability of the new Balancing Market to deliver the most efficient outcomes for the market.

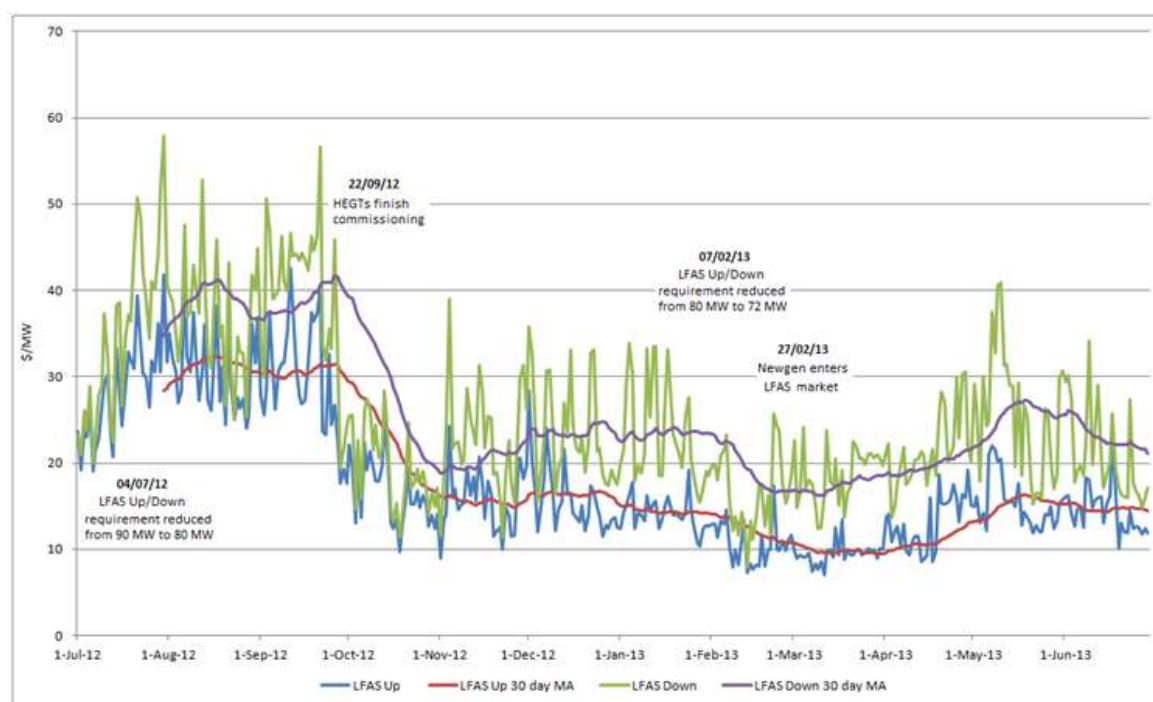
2.2 LFAS Market

Load Following Ancillary Services (**LFAS**) provide the primary mechanism in real-time to ensure that supply and demand are balanced. Load following accounts for the difference between scheduled energy and actual load. Load following resources must have the ramping capability to pick up the load ramp between scheduling steps as well as maintain the system frequency. Load following can only be provided by units operating under Automatic Generation Control (**AGC**). LFAS Up refers to the service of adjusting output upwards to meet demand and LFAS Down refers to the service of adjusting output downwards, when demand falls. LFAS is also required to deal with frequency fluctuations.

LFAS has been provided since the inception of the WEM, with Verve Energy being contracted to be the sole provider of this service until 30 June 2012. Up to this date, payment for the provision of LFAS was based on a proportion of the Marginal Cost Administered Price (**MCAP**), which was in turn based on prices in the previous Balancing mechanism. A new competitive LFAS market was established on 1 July 2012, with the key elements of this new market being market derived prices rather than administratively derived prices, and participation is open to all IPPs in addition to Verve Energy.

The LFAS requirement is set by System Management and must meet the standard according to section 3.10.1 of the Market Rules. This states that the level must be the greater of 30 MW or the capacity sufficient to cover 99.9% of short term fluctuations in load and output. The current requirement for both LFAS Up and LFAS Down is 72 MW. Although permitted under the Market Rules, the requirement set by System Management does not change from Trading Interval to Trading Interval.

The total cost of providing LFAS is passed on to Market Customers and Non Scheduled Generators, based on based on the demand of the Market Customer and the output of the Intermittent Generators, as a proportion of the total quantity generated or consumed.

Figure 2: Daily average LFAS prices since market start

As noted in the chart, several key events affecting LFAS have occurred over the twelve months since the competitive market was introduced. These are:

- The LFAS Up and LFAS Down requirement was reduced from 90 MW to 80 MW on 4 July 2012;
- Verve Energy's High Efficiency Gas Turbines (**HEGTs**) became available on 22 September 2012;
- The LFAS Up and LFAS Down requirement was reduced from 80 MW to 72 MW on 7 February 2013;
- NewGen became the first IPP to enter the LFAS market on 27 February 2013.

As can be seen in the chart above, the commencement of the market saw the highest volatility in prices, and the highest average price for both LFAS Up and LFAS Down.

There are several possible reasons for the initial increase in prices when the new market commenced. These include:

- Initially it was a market without competition;
- The carbon price impact on SRMC as at 1 July 2012, thus resulting in higher prices;
- Potentially the previous administered price understated the SRMC of providing LFAS.

Following the introduction of Verve Energy's HEGTs there was a sizeable reduction in prices and further reductions following a reduction in the LFAS requirement and NewGen's entry to the market.

Overall, it is clear that the introduction of the HEGTs, competition and the reduction in MW requirement has successfully reduced the cost of providing LFAS. In terms of "market

share,” based on the payment received for providing LFAS, for the period between NewGen entering the market and the end of the Reporting Period, NewGen had approximately 22 per cent, with Verve Energy having the remaining 78 per cent.

The LFAS requirement in the WEM appears to be conservative when compared to those of the NEM. The Authority notes that in the NEM, the load following requirement is set at 120 to 130 MW for the majority of intervals, which, in light of the size of the system, compares favourably with the 72 MW requirement applied in the WEM. Furthermore, when the South Australian region becomes islanded from the rest of the NEM, the system operator sets a local requirement for 70 MW of load following to be available from South Australian generation plant. South Australia’s total generation capacity is slightly less than that of the WEM. However it has 25 per cent wind penetration (by capacity), compared with less than 9 per cent for the WEM.

There are several possible reasons why the NEM’s load following requirement is able to be kept relatively low. In the NEM, the system operator apportions load following costs on a “causer pays” basis, which provides an incentive for generators and loads to minimise the extent to which they allow their output or demand to vary from expected levels. The system operator also adjusts the load following requirement to different levels depending on the anticipated demand for load following. Another important factor appears to be the fact that the NEM has a 5 minute dispatch cycle, whereas the WEM dispatches are determined on the basis of half hour forecasts. Shorter dispatch cycles mean that the market is able to better match demand and supply, thus reducing the size of the shortfall/surplus that load following plant must balance.

The Authority notes that investigative work currently being undertaken jointly by the IMO and System Management covers these potential options.

2.2.1 Stakeholder Submissions

As part of the Discussion Paper for the 2012 WEM Annual Report to the Minister for Energy, Participants were invited to comment on issues that were impacting on the efficient operation of the new LFAS market. Overall, the feedback from stakeholders primarily dealt with concern with the excessive costs of providing the LFAS. The reasons given for this were:

- Belief that the amount being procured is highly conservative;
- A lack of transparency as to whether the most efficient facilities were providing this service; and
- A lack of competition for the first eight months of market operation and only limited competition subsequent to that (with only one participant joining Verve in providing this service).

Summary of submissions in relation to 2013 Discussion Paper

In its submission to the 2013 Discussion Paper, Alinta expressed concern at the increase in LFAS costs, which it attributed to:

- restricted competition to provide LFAS;
- lack of transparency that would permit assessment of whether the most efficient plant were providing LFAS (it considers Verve Energy’s portfolio obscures this); and

- too much LFAS being procured (Alinta favoured dynamic assessment of LFAS requirements).

In its submission, Bluewaters agrees in principle with a competitive, cost-reflective LFAS service model. However, it notes the cost of LFAS has risen considerably on average from September 2012 to August 2013. Bluewaters is disappointed that the cost benefit analysis failed to identify the actual underlying cost of LFAS prior to introduction of the new market and notes that this makes it difficult to now assess the success of the reform. Bluewaters would support further LFAS reforms to reduce costs including:

- shorter LFAS gate closures (i.e. less than current 6 hours ahead);
- better tailoring the LFAS requirement in each interval through improved load and wind forecasting;
- moving to a causer pays model;
- shorter balancing cycles; and
- seeking clearer delineation and measurement of LFAS signals as opposed to balancing movements; automatic governor response; spinning reserve response.

Community Electricity's submission considers the new LFAS market is performing well, considering the complexity of the reform. It notes the initial absence of competition but expects to see new entrants into the LFAS market as technical and system issues are resolved.

Community Electricity supports the work of the IMO to address high LFAS costs, in particular:

- Reducing the LFAS quantity in some periods.
- Relaxing the technical rules requirements around frequency stability.
- Reducing LFAS gate closure times.
- More frequent dispatch intervals.
- Better forecasting of intermittent generation.
- Introduction of causer pays and the IMO process for bringing this about

Community Electricity expects that the IMO will resolve these issues quickly and notes that previous estimates of the LFAS costs attributable to intermittent generation have proven to be too high.

System Management's submission notes that it has observed no adverse impacts from the change and that it now has a greater range of facilities to provide load following service. System Management is working with the IMO to minimise the quantity of LFAS called for in each interval. It sees no barriers to new entrants and prefers rule or procedure changes to individual agreements with LFAS providers.

Increasing Competition in Other Ancillary Services

Bluewater's submission considers there's a case for a spinning reserve market, but that more work is required first to better predict the effect of potential reforms.

Community Electricity's submission considers a Spinning Reserve market to be "a natural extension of the LFAS market" and notes that this is already part of the IMO's Market Rules Evolution Plan. It also notes that a market for Load Rejection Reserve might be added readily as well.

System Management's submission notes that investigating increasing competition in other Ancillary Services should be pursued as part of the Market Evolution Plan. It considers that if other ancillary services were made competitive, it would be necessary to ensure there are clear definitions in the market rules that allow the balancing and individual ancillary services to be entirely distinct and separate.

2.2.2 Authority's View

The Authority considers the introduction of the new market and the increased transparency resulting from it has provided significant benefits in focussing attention and increased understanding of the factors driving LFAS and ancillary service costs generally. Although there appears to have been an increase in LFAS costs, the amounts involved are small relative to the overall cost of energy and, without further investigation, it is not possible to conclude that they were unwarranted.

The Authority recognises that considerable effort has been made by the IMO and System Management to better understand the LFAS requirement. The Authority considers that there are many difficult issues to resolve and it is not possible or sensible to adopt hurried solutions. However, the Authority considers that experience in the NEM highlights potential opportunities to reduce LFAS costs in the WEM, which deserve to be explored. These opportunities include the use of shorter dispatch windows and providing incentives to minimise variation by apportioning costs on a "causer pays" basis, both of which are being investigated by the IMO and System Management.

The Authority considers the work planned by the IMO and System Management should be developed further before committing to significant changes including extending competition to other Ancillary Services.

2.3 Merger of Verve Energy and Synergy

On 10 April 2013 the State Government announced plans to merge Western Australia's state owned electricity generator, Verve Energy and retailer Synergy. A single board of directors was installed on 1 July 2013. On 16 October 2013 the Electricity Corporations Amendment Bill 2013 was introduced to Parliament and passed on 12 December. The Bill primarily establishes regulation making and Ministerial powers that will be used to create:

- Segregation arrangements including ringfencing, transfer pricing and information restrictions which will govern the separation of certain functions of the merged entity from other functions.
- Wholesale arrangements which will govern how the merged entity acquires and supplies electricity in the wholesale market including mechanisms by which third parties would buy or sell "standard products" from/to the merged entity.

2.3.1 Stakeholder Submissions

Community Electricity's submission considers that the two entities were already effectively merged by close contractual ties and that potentially the only effect of the formal merger is to complicate relationships with third parties. It considers that the decision making of Synergy / Verve Energy has been poorly integrated, noting in particular that:

- The Displacement Mechanism of the Vesting Contract has contributed to excess capacity; and
- The underwriting by Synergy of the Collgar Wind Farm is a major contributor to the overnight turndown problem.

Community Electricity notes Synergy's declining market share as evidence of increasing competition in the retail market and points to increased activity of energy brokers as evidence of a growing trend towards churning away from Synergy. It suggests that Synergy is effectively being driven out of the contestable market but sees little prospect for new market entrants at the moment other than through private purchase of part or all of the merged Synergy/Verve Energy. Community Energy also suggests that some of the non contestable customer base could be made available to IPPs to supply.

2.3.2 Authority's View

The concerns of the Authority in relation to the implications for the WEM of further increasing the dominance of Verve Energy and Synergy by merging them have been set out in detail in previous reports to the Minister. With the merger now fully committed to by the Government, the Authority has not revisited those views in this Report.

The Authority is responsible for monitoring the effectiveness of the market in meeting the Market Objectives and advising the Minister accordingly, including identifying measures to increase the effectiveness of the market. The Authority's preliminary assessment is that the merger of Verve and Synergy will increase already significant market power issues which will need to be addressed to minimise barriers to effective competition and to ensure efficient dispatch of generation. The Authority notes the Government's intentions to address this through ring fencing and non-discriminatory pricing requirements including regular audits of those requirements. However, these arrangements will not address the existing conflict of interest which arises due to the Government both participating in the market and setting the rules. Furthermore, whilst the ring fencing arrangements may serve to ensure the market power issues in relation to Verve and Synergy do not increase, they would not appear to lessen existing market power issues.

Implementation of the merger, including development of the regulations in relation to ring fencing, transfer pricing and wholesale arrangements, is currently being developed by a Merger Implementation Group appointed by Government. The Authority notes that the Merger Implementation Group is conscious of the potential impact of the merger on the WEM and is seeking to address this in various ways. Until further detail in relation to these is known, as well as some experience with how it operates, it is not possible for the Authority to comment. In particular, it is not clear what, if any implications there may be for the operation of WEM arising from the creation of a wholesale trading unit in the merged entity.

2.4 Reserve Capacity Mechanism

In its 2012 report, the Authority noted that over \$2 billion has been invested in the WEM since market commencement, and there is robust competition between generators, with ultimate benefits for consumers. However, as with all other electricity markets, there are areas where improvements could be made to achieve more efficient outcomes. In particular, the Authority considered that there are a number of issues in the Reserve Capacity Mechanism (**RCM**) that require attention. These include:

- The cost to the market of the substantial and continued excess capacity that is currently secured under the RCM;

- The types of capacity attracted to the market and the implications that this mix of capacity has on the cost of electricity to consumers; and
- Perverse market incentives that allow for some Verve Energy units to be unavailable, yet still receive full payments for Capacity Credits.

The Authority recommended that the three highlighted concerns should be investigated to ensure that the Reserve Capacity Mechanism functions more efficiently. The Authority recommended that the Public Utilities Office (**PUO**), as the policy advisor, should take the lead in addressing these policy related strategic issues. Whilst the Authority recognised that the IMO has responsibility to address a number of specific operational matters relating to the Authority's concerns and was doing so in its existing work program, the Authority considered market reform issues that have wide implications and are more strategic in nature should be addressed by the PUO, with the assistance of the IMO.

The Authority also noted that a key driver for much of these inefficiencies is likely to be the administered price setting mechanism for capacity in the market and that it would be investigating this further as part of its review of the Maximum Reserve Capacity Price (**MRCP**) methodology.

The 2013 Statement of Opportunities (**SOO**) published by the IMO in June sets out the Reserve Capacity Requirement (**RCR**) for 2015/16. Following the five yearly review of the IMO's demand forecasting procedures which was completed in 2012, the 2013 demand forecast, which underlies the 2015/16 RCR, includes a number of new features as set out in the IMO's SOO.

The 2015/16 RCR is 5,119 MW which is 189 MW lower than the 2014/15 requirement of 5,308 MW. The reduction arises from a number of factors including a downwards revision of the demand forecast, a reduction in the reserve margin and a reduction in the volumes required for load following. Table 1 below summarises the changes to the RCR.

Table 1 Comparison of 2014/15 and 2015/16 Reserve Capacity Requirements

2014/15 Reserve Capacity Requirement	5,308 MW
Reduction in reserve margin from 8.2% to 7.6%	-30 MW
Response to IRCR mechanism*	-56 MW
Increased 2014/15 solar PV forecast*	-28 MW
Reduced economic growth forecasts*	-61 MW
Adjustment to temperature-sensitive load model*	-97 MW
Other calibrations to forecasting model*	-12 MW
Year-on-year load growth, 2014/15 to 2015/16*	+115 MW
Change to Load Following Requirement	-20 MW
2015/16 Reserve Capacity Requirement	5,119 MW

Reproduced from Table B of IMO Electricity Statement of Opportunities – June 2013.

*Includes contribution of 7.6% reserve margin.

The IMO is currently developing Rule Change Proposals to implement changes to the Reserve Capacity Price formula and implementation of a dynamic Reserve Capacity refund regime which it considers will result in more efficient capacity prices.

Mix of Capacity

The Market Objectives include the economically efficient production and supply of electricity and the minimisation of the long-term cost of electricity to consumers. This requires the use of the most efficient mix of capacity types to meet demand, which in turn relies on having appropriate incentives in the market to attract investment in the capacity mix that delivers the most efficient outcomes. Since 2009/10, growth in liquid fuel generation and DSM capacity has outstripped growth in all other capacity types.²¹ As stated in its 2012 Minister's Report, the Authority acknowledges the valuable roles that these capacity types play in the successful working of the market by providing low capital cost resources to address tight generation supply during critical peaks. However, the Authority raised concerns that the current Market Rules are unlikely to result in an optimal mix of capacity types and creates the potential for inefficient outcomes in the market.

The Reserve Capacity Mechanism Working Group (**RCMWG**) was established in February 2012 to assess the issues highlighted by the Lantau Group in its report "Review of RCM: Issues and Recommendations". This report was commissioned by the IMO Board to analyse the effectiveness and efficiency of the RCM. The RCMWG focussed on four areas:

- the Reserve Capacity Price;
- harmonisation of Demand Side and Supply Side Resources;
- Reserve Capacity Refunds; and
- Individual Reserve Capacity Requirement (IRCR).

As part of the deliberations of the RCMWG, consideration has been given to harmonising rules relating to supply side and demand side capacity resources including:

- Increasing the current minimum availability and dispatch requirements for DSM;
- Requiring telemetry services to be installed by DSP's to provide real time data to System Management; and
- Fuel requirements for generators.

These issues are all being addressed in RC_2013_10 which was released for the first round of public consultation in August 2013 and with a Draft Report expected to be published in December 2013.

Availability of Capacity

In its 2012 Report to the Minister, the Authority raised concerns that there are perverse market incentives that have led to a number of Verve Energy's units being unavailable for extended periods of time. These units have been assigned Capacity Credits and received full payment for these Capacity Credits, even though they were on planned outage for extended periods. The Authority was particularly concerned that planned outages have coincided with times of tight supply, leading to price spikes. Moreover, the facilities on planned outage have included a number of base-load generators and mid merit gas units, which would typically have resulted in lower clearing prices if they had been dispatched.

The Authority identified three possible causes of the high rates of planned outage that have been observed in the WEM during recent years. These were:

²¹ Refer to Figure 13, page 30, of the 2013 SOO for an illustration of the change in SWIS load characteristics and capacity mix over time in each Capacity Year from 2007/08 to 2014/15.

- the design of the reserve capacity refund payments that are paid by generators when generation facilities are unavailable;
- a limited ability of the Independent Market Operator (IMO) to prevent poor performing generators operating in the market; and
- a limited ability of the IMO to monitor and enforce performance standards.

The Authority considered that incentives to maximise plant availability in the market needed to be reviewed and supported the IMO's recent undertaking of a review of current generator availability and incentives to improve performance.

However, the Authority also noted that the issue of plant availability appeared to be a matter associated with Verve Energy's units in particular, and considered that the inefficient outcomes may also be attributable to certain aspects of the arrangements in the contract between Verve Energy and Synergy, assigned by the State Government in 2010.

Accordingly, the Authority recommended that the PUO, as a representative of the owner of the two entities, undertake a review of the contractual arrangements between Verve Energy and Synergy to ensure that the contract does not provide perverse incentives that result in inefficient market outcomes. The Authority notes that the availability of Verve plant has improved in 2012/13.

A Rule Change Proposal has now been developed (RC_2013_09) which includes:

- permitting the IMO more flexibility in assigning a quantity of Certified Reserve Capacity to Scheduled Generators displaying excessive outage rates over a 36 month period;
- specifying a range of factors to be considered by the IMO in making its decision, adding certainty, structure and transparency;
- progressively tightening the combined planned and forced outage rate thresholds that trigger this clause from 30 percent to 20 percent over five years, commencing in 2016, with provision for review in 2018;
- imposing an upper limit on the number of Trading Intervals in any 36 month period for which a generator can claim a reduction of its Reserve Capacity Obligation Quantities (**RCOQ**) due to planned outages;
- granting discretionary power to the IMO to require both performance and performance improvement reports from Market Participants concerning Facilities with excessive Planned Outage rates, regardless of the availability of total system capacity;
- deleting a number of clauses that have become redundant due to the cap on Planned Outages for which a reduction in RCOQ quantities may be claimed.

A Draft Rule Change Report was published on 28 November 2013 with a provisional commencement date of 1 May 2014.

In relation to Verve Energy's plant, a significant retirement has been announced since the publication of the 2012 Minister's Report. On 27 June 2013 the Minister for Energy publicly announced that the closure of the 37-year old Kwinana Stage C Facilities (i.e., 361.5 MW) would occur by October 2015, representing the final step in phasing Kwinana

Power Station out of service.²² On 25 June 2013, the Minister for Energy announced in Parliament that the refurbishment of the 47-year old Muja Power Station Stages A and B, units 1 and 2 (110 MW) would be suspended.²³ However, it was subsequently decided to continue with the refurbishment and both units have been given capacity credits for the 2015/16 year.

2.4.1 Stakeholder Submissions

Both Western Power and System Management noted that the PUO has not carried out the RCM review recommended in the Authority's 2012 report.

Alinta's submission considers that improvements are possible to the design of the RCM to deliver optimal capacity mix. It argues that generators should be differentiated based on reliability, since:

- the current RCM doesn't differentiate between different types of generators; and
- dual fuel facilities and facilities with additional storage capabilities offer special reliability benefits that should be rewarded

Alinta also argues there are significant differences in the costs and risks faced by DSM providers and DSM's contribution to long term supply security, in particular:

- DSM makes only small up-front investment and takes limited risk as a result, since they can withdraw from the market "at any time" and can choose not to participate by paying capacity refunds
- If DSM providers think they are likely to be dispatched and the price paid for capacity is relatively low, they may choose not to participate
- It is more attractive to participate in an oversupplied market and less attractive when supply of capacity is tight
- The incentive/ability to exit from the market makes for a limited contribution to long term energy security
- By contrast generators sink large amounts of capital, which will remain in the system providing capacity over the long term.

Alinta considers that even after the proposed changes to the RCM to equalise the treatment of DSM providers, DSM will still receive the following special treatment:

- Not liable for market fees
- Reduced availability requirements compared to generators
- Does not bid into the balancing merit order
- Does not have its performance appropriately measured

Alinta submits that the price paid to DSM should take account of both its cost structure and the value it provides relative to alternatives.

Community Energy's submission raises concerns regarding the lack of reliability of Verve Energy's generation facilities.

²² Kwinana Stages A and B were closed in September 2010 and December 2008, respectively.

²³ Muja Power Station Stages A and B units 3 and 4 were already producing electricity.

2.4.2 Authority's View

Whilst recognising that the IMO is continuing to progress development of Rule Changes which may alleviate many of the above issues, the Authority considers that a comprehensive and holistic review of the current market design of the RCM in its entirety led by the PUO as described in the 2012 Minister's Report is required to ensure the long term evolution of the market and the realisation of efficient economic outcomes.

The Authority also notes that, in its review of the MRCP methodology provided to the Minister on 1 October 2013, the Authority highlighted that the purpose of the MRCP is to address market power issues in the event of a capacity auction being required and recommended that this should be clearly stated in the Market Rules. Currently the MRCP is also used to derive the Reserve Capacity Price (RCP). However, the Authority considers that, as the MRCP is a price cap to mitigate market power, it is not appropriate to also use it as a benchmark for determining the price for capacity and should not be used for sending investment signals to investors for building new capacity or pricing capacity payments for existing generators.

2.5 Governance

Market Governance has been an area of concern raised by Market Participants and by the Authority previously. In its 2011 Report to the Minister, the Authority discussed in detail the matter of the dual roles conferred on the IMO under the existing WEM governance arrangements. These arrangements require the IMO to determine whether to approve amendments to the Market Rules and also to administer and comply with the Market Rules. The Authority recommended that the existing governance arrangements in the WEM be reviewed to determine whether they remain appropriate for the ongoing development of the market.

2.5.1 Stakeholder Submissions

Alinta's submission raises concerns with the potential for conflict of interest in the current market governance arrangements, due to the IMO having control over Market Rule amendments, market operation and Rule enforcement. It supports separation of these functions and calls for the recommendations of the 2011 Minister's Report to be revisited. It considers that a review of the market should consider streamlining functions – such as by combining some or all of the functions of System Management and the IMO.

Submissions from both System Management and Western Power note that the previous ERA recommendation for the PUO to review market governance in regards to the IMO's potential conflict of interest does not appear to have been progressed.

2.5.2 Authority's View

The Authority recognises that the current governance arrangements in the WEM reflect the desire to minimise the implementation and operational costs of the wholesale market while maintaining its efficiency and effectiveness. The small size of the market makes it more difficult to cost effectively adopt structural features adopted by larger markets such as separating the rule making function from market operation and having a standalone system manager.

However, continuing concerns regarding the governance arrangements for the WEM have been raised by stakeholders, including the system manager and network operator, both

directly to the Authority and in submissions to proposed rule changes by the IMO. The Authority considers that a review is still urgently required to establish the limitations of the existing arrangements and to identify what improvements could be made. It may be that the current arrangements are fit for purpose. However, undertaking such a review would strengthen confidence in the market, which is even more important with the merger of the two largest participants in the market. The Authority notes that, whilst the PUO is the most appropriate body to undertake the review, it is not entirely independent as it also represents the Government as owner of the largest market participants and the network operator.

2.6 Network Access

The WEM design is based on the unconstrained network access concept, which allows generators to have full access to the network during times of peak electricity demand, even after a single credible network fault. An unconstrained network approach facilitates simpler operation of the power system and market because of the absence of dynamic physical constraints.

In its 2010 Report to the Minister, the Authority noted that the current unconstrained network access approach in the SWIS does not enhance the Market Objectives for the following reasons:

- Unconstrained network access does not fully promote economically efficient supply of electricity because it is likely to cause investment in assets that are likely to have low utilisation. Whilst there is a contribution to reliability, the incremental increase in reliability is unclear and it may be difficult to justify if considered against the increased costs;
- The requirement for unconstrained network access creates a barrier to competition, as new entrant generators must pay a proportion of the costs of the next network augmentation. As the network is considered to be close to its capacity, this cost can be high even for small increments of generation; and
- It is not clear that the requirement for unconstrained network access minimises the long term cost of supply, in the sense that the requirement may provide more reliability than customers are willing to pay for through increased electricity prices.

The Authority recommended that a full and detailed review be undertaken of the costs, benefits and possible implementation issues relating to a move towards a constrained network access framework. This review would need a very clear set of objectives, be well resourced with full and open consultation and proper consideration of all the relevant interactions within the WEM design.

The Authority notes that such review is yet to be undertaken. This is of particular concern given the increasing prevalence of interruptible supplies being offered by Western Power. Whilst such supplies are likely to deliver more efficient network connection costs, the interaction with the operation of the WEM also needs to be considered particularly in relation to the assessment of capacity credits and constrained on/off payments.

2.7 Other matters raised in submissions

A number of matters were raised in Community Energy's submission which the Authority has not been able to address in this report. These include:

- a proposal to increase competition by auctioning small blocks of the total demand currently served by Synergy whilst leaving responsibility for billing customers with Synergy;
- it considers that many contestable customers are being supplied under subsidised regulated tariffs by Synergy and that the L1 regulated tariff offers an additional discount for certain levels of consumption;
- it suggests that all Synergy customers supplied under gazetted tariffs should be audited;
- issues with the current Design of Gazetted Retail Tariffs and Network Reference Tariffs;
- potential benefits which could be achieved by making metering services contestable;
- difficulties which would arise if Western Australia were to join the NEM including the cost and that energy prices may increase.

The Authority notes a number of valid issues have been raised, although some of these fall outside the scope of this report. The Authority will give further consideration to those matters which fall in the scope of the Report in 2014.

Part B

3 Monitoring the effectiveness of the Wholesale Electricity Market

Clause 2.16.11 of the Market Rules requires that the Report to the Minister provides an assessment on the effectiveness of the market in dealing with matters identified in clauses 2.16.9 and 2.16.10 of the Market Rules. This chapter addresses the Authority's reporting requirements under clause 2.16.9.

Under clause 2.16.9 of the Market Rules the Authority is responsible for monitoring the effectiveness of the market in meeting the Market Objectives, and that the Authority must investigate any market behaviour that has resulted in the market not functioning effectively. The Authority, with the assistance of the IMO, must monitor:

- Ancillary Services Contracts and Balancing Support Contracts;
- instances of inappropriate and anomalous market behaviour, including but not limited to bidding in the STEM and Balancing, as well as declarations for availability, ancillary service and fuel type;
- market design problems or inefficiencies; and
- problems with the structure of the market.

This section sets out the Authority's assessment on the effectiveness of the market in dealing with matters identified in clause 2.16.9 of the Market Rules and is structured as follows:

- Section 3.1 reports on Ancillary Services Contracts;
- Section 3.2 reports on inappropriate and anomalous market behaviour;
- Section 3.3 reports on market design problems or inefficiencies; and
- Section 3.4 discusses issues surrounding the structure of the market.

3.1 Ancillary Services Contracts and Balancing Support Contracts

3.1.1 Ancillary Services Contracts

Ancillary Services are required to maintain power system security and reliability through the control of key technical characteristics, such as frequency and voltage, which ensures that electricity supplies are of acceptable quality.²⁴ There are five defined types of Ancillary Services applicable in the SWIS, which are Spinning Reserve, Load Following, System Restart, Load Rejection Reserve and Dispatch Support.²⁵ System Management is required to estimate the technical requirements for Ancillary Services, based upon standards set out in the Market Rules. Pursuant to its obligations under clause 3.11.11 of the Market Rules, System Management must prepare a report each year, which comprises three parts:

²⁴ The Technical Rules for the South West Interconnected Network is the basis for the setting of operating parameters in WEM.

²⁵ These Ancillary Services are defined in section 3.9 of the Market Rules, and are also described on the IMO's website, <http://www.imowa.com.au/ancillary-services-types>

- quantities of each of the Ancillary Services provided in the preceding year, including Ancillary Services provided under Ancillary Service Contracts, and the adequacy of these quantities;
- total cost of each of the categories of Ancillary Services provided, including Ancillary Services provided under Ancillary Service Contracts, in the preceding year; and
- Ancillary Service requirements for the coming year and the Ancillary Services plan to meet those requirements.

System Management is required to source Ancillary Services on a least cost basis, either from Verve Energy (the default provider) or from Independent Power Producers (IPPs). The IMO recovers the costs of the Ancillary Services from Market Participants through the market settlement process.

Spinning Reserve

Verve Energy has been the sole default provider of the Spinning Reserve Ancillary Service²⁶ since market commencement. Verve Energy receives a payment from the market, which is calculated as the Balancing price multiplied by a margin value that is determined by the Authority under the Market Rules.²⁷ The Spinning Reserve Ancillary Service cost is recovered from Market Generators. Verve Energy, besides being the provider, is also responsible for a large portion of the Spinning Reserve Ancillary Service cost.

In its 2013 Ancillary Service Report,²⁸ System Management has estimated that the maximum Spinning Reserve level that may be required for the 2013/14 year is 70 per cent of the quantity of the largest contingency, which is the Collie power station. This gives a maximum Spinning Reserve level of 240 MW. The Spinning Reserve requirement is the needed Spinning Reserve level minus any LFAS Up requirement. Hence the minimum level required is approximately 168 MW. This service can be provided by such facilities as synchronised generation and interruptible loads.²⁹

Load Following

Clause 3.10.1 of the Market Rules specifies the criterion for determining the level of LFAS³⁰. The LFAS requirement for 2013/14 has been based on a level sufficient to maintain system frequency between 49.80 Hz and 50.20 Hz for at least 99.9% of each month. System Management had expected a LFAS requirement of 80 MW in 2013 in response to the new intermittent generator at Mumbida entering service, however frequency diversions at this facility have shown that 72 MW of LFAS is sufficient. This is System Management's forecast requirement for the 2013/14 year.

²⁶ Spinning Reserve is reserve that is synchronised to the system that can respond almost immediately and provide frequency or voltage support for a short duration.

²⁷ The margin values are determined for each financial year. For the 2011/12 financial year, these values are set at 43 per cent for Margin-Off Peak and 25 per cent for Margin Peak which covers Verve Energy's costs for the provision of spinning reserve ancillary service and load following ancillary service.

²⁸ http://www.imowa.com.au/docs/default-source/publications-and-reporting/ancillary-services/2013_ancillary_service_report_final.pdf?sfvrsn=2

²⁹ For 2012/13, 42 MW of Spinning Reserve will be provided by interruptible load supplied by one market participants. The remaining Spinning Reserve will be supplied by synchronising additional Verve Energy generators.

³⁰ Generators providing LFAS are run in a manner that allows for the generators' output to be rapidly changed to balance real-time fluctuations between load and generation.

Verve Energy was the sole default provider of the Load Following Ancillary Service (LFAS) from market commencement until February 2013 when the first offer of service from NewGen was accepted in the new competitive LFAS market.

Verve Energy and NewGen receives a payment from the market for the provision of LFAS. Payments for LFAS costs are shared between Market Customers and Intermittent Generators.

System Restart

System Management requires at least three generating stations to provide System Restart Ancillary Services³¹. These generators should be situated at different locations so as to reduce the risk of system restart failure. As a result, System Management require restart capability in the three electrical sub networks of North Metropolitan, South Metropolitan and South Country.

System Management has obtained three System Restart services through either public tender or through negotiation in the case of public tender being unsuccessful. Currently there are no existing or proposed facilities in the South Country region, however System Management are investigating sites for installation of new facilities for this service.

For the 2013/14 year, the System Restart service will be provided by Verve Energy's gas turbines at Kwinana and Pinjar, as well as Western Energy's gas turbines at Donaldson Road. The expected cost for the System Restart service for 2013/14 is \$508,000.

Payments for these contracts are collected via the R value of the Cost_LR parameter³² defined in the Market Rules. Under clause 3.13.3C of the Market Rules, the Authority is responsible for determining the Cost_LR parameter. The Authority published its determination on the Cost_LR parameter for the 2013/14, 2014/15 and 2015/16 financial years in March 2013.³³

Load Rejection Reserve

The Load Rejection Reserve service³⁴ is determined by the extent of load lost during a network fault. The requirement for 2013/14 is a sufficient reserve to maintain system frequency below 51.0 Hz, returned to less than 50.5 Hz after a two minute period and then returning to the 49.8 Hz to 50.2 Hz range within a fifteen minute period. In its 2013/2014 Ancillary Service Report, System Management has set the Load Rejection Reserve requirement at 120 MW, which was unchanged from the previous year.

³¹ System Restart Ancillary Services are provided by generators capable of starting up without the need to use power from the power system and are also able to energise the power system to enable other generators to be started up.

³² The Cost_LR parameter covers the payment to a Market Generator for the costs of providing the Load Rejection Reserve and System Restart Ancillary Services, and specific Dispatch Support Ancillary Services.

³³ The R values determined by the Authority are \$42,315 per month for the 2013/14 financial year, \$43,373 per month for the 2014/15 financial year and \$44,457 per month for the 2015/16 financial year. See http://www.erawa.com.au/cproot/11212/2/20130318%20-%20Determination%20of%20the%20Ancillary%20Service%20Cost_LR%20Parameter.pdf

³⁴ In providing Load Rejection Ancillary Services, generators shut down quickly in the event of lost load, such as when a transmission line trips, in order to keep the power system stable.

Verve Energy currently provides Load Rejection Reserve Ancillary Service as part of its ancillary obligations under clause 3.11.7A of the Market Rules. Verve Energy's portfolio will be able to be used to provide this service.

The L value of the Cost_LR parameter provides for the compensation of the cost associated with the provision of this service. System Management has not sought a cost allocation for the L value because it does not have information demonstrating that the provision of this service is at a particular annual unremunerated cost to any Market Participant. Hence the value has been set at nil since market commencement and has been set at this value for the 2013/14, 2014/15 and 2015/16 financial years.

Dispatch Support

Verve Energy's facilities at Mungarra, West Kalgoorlie and Geraldton are currently contracted to supply Dispatch Support Ancillary Services. System Management has noted that it does not expect to require additional dispatch support arrangements for 2013/14.

3.2 Inappropriate and anomalous market behaviour

The Market Rules require that the Authority, with the assistance of the IMO, must monitor instances of inappropriate and anomalous market behaviour, including behaviour related to market power and the exploitation of shortcomings in the Market Rules or Market Procedures.

The Authority, with the assistance of the IMO, is continuing its observation of the behaviour of participants in the new competitive Balancing market and LFAS market, as well as in the STEM. The behaviour of participants is being actively monitored by the Authority, in conjunction with the IMO, to ensure generators offer their electricity at prices that are reflective of their expected short run marginal cost (**SRMC**) for generating the electricity.³⁵ This continued monitoring has not revealed any inappropriate or anomalous market behaviour during this Reporting Period.

3.3 Market design problems or inefficiencies

The design of the WEM was influenced by the characteristics of the Western Australian energy market and the legacy of the industry. The Authority notes that the WEM has evolved significantly since its inception, in particular, with the implementation of the competitive Balancing and LFAS market from 1 July 2012.

In the past, stakeholders have expressed concerns that the complexity of the WEM, including the Market Rules that govern the RCM and energy market, as well as contractual arrangements between the State-owned corporations, can be barriers to new entry to the market.

As raised in previous reports, the Authority considers there are some issues in relation to market design problems or inefficiencies including:

- unconstrained network access;
- dominance of Verve and Synergy; and
- limited retail competition.

³⁵ Refer to clause 2.16.9 of the Market Rules for details.

3.4 Issues surrounding the structure of the market

The WEM operates in the broader context of:

- the network and its operations within the Technical Rules;
- a market structure with continued dominance by Verve Energy and Synergy; and
- regulated electricity tariffs; and
- limited retail competition.

These elements will affect the operation of the WEM and market outcomes. Advances in generation technology including distributed generation, intelligent network applications and energy storage will also influence the operation of the WEM.

3.4.1 Network access

The WEM design is based on the unconstrained network access concept, which allows generators to have full access to the network during times of peak electricity demand, even after a single credible network fault.³⁶ An unconstrained network approach facilitates simpler operation of the power system and market because of the absence of dynamic physical constraints.³⁷

In its 2010 Report to the Minister, the Authority noted that the current unconstrained network access approach in the SWIS does not enhance the Market Objectives for the following reasons:

- Unconstrained network access does not fully promote economically efficient supply of electricity because it is likely to cause investment in assets that are likely to have a low utilisation. Whilst there is a contribution to reliability, the incremental increase in reliability is unclear and it may be difficult to justify if considered against the increased costs,
- The requirement for unconstrained network access creates a barrier to competition, as new entrant generators must pay a proportion of the costs of the next network augmentation. As the network is considered to be close to its capacity, this cost can be high even for small increments of generation, and
- It is not clear that the requirement for unconstrained network access minimises the long term cost of supply, in the sense that the requirement may provide more reliability than customers are willing to pay for through increased electricity prices.

The Authority recommended that a full and detailed review be undertaken of the costs, benefits and possible implementation issues relating to a move towards a constrained network access framework. This review would need a very clear set of objectives, be well resourced, with full and open consultation, and proper consideration of all the relevant

³⁶ There are various definitions of the concept of unconstrained network access and the terms 'unconstrained access' or 'firm access' are often used.

³⁷ 'Physical constraints' are limitations on the operation of a network asset, a group of assets or a whole area of the network due to performance requirements across a range of factors including power quality, security of supply, safety and power system stability.

interactions within the WEM design. The Authority notes that such review is yet to be undertaken by the PUO.

Network access in the SWIS is governed by *the Electricity Networks Access Code 2004 (Access Code)*. The Authority notes that the Access Code has not been reviewed since it came into force in 2005. The Authority is aware that the PUO previously initiated its review of the operation of the Access Code but decided not to proceed with the review until after the Authority's assessment of Western Power's proposed changes to its access arrangement in accordance to the requirements of the Access Code was concluded. The Authority released its final decision on 29 November 2012. The PUO indicated that it would publish an issues paper on the Access Code review after this date.³⁸ This issues paper is yet to be released at the time this report is finalised. The Authority considers that the Access Code review could be considered together with the move to constrained network operation.

3.4.2 Dominance of Verve Energy and Synergy

As noted above, the concerns of the Authority in relation to the implications for the WEM of further increasing the dominance of Verve Energy and Synergy by merging them have been set out in detail in previous reports to the Minister. With the merger now fully committed to by the Government, the Authority has not revisited those views in this Report.

3.4.3 Regulated electricity tariffs and retail competition

In its 2010 Report to the Minister, the Authority noted that cost-reflective tariffs are essential for ensuring that the market continues to operate efficiently. Setting electricity tariffs that are not cost-reflective limits the ability of customers to make efficient consumption and expenditure decisions.

The Authority also considers that enhanced retail competition is required for the future efficient operation of the WEM. The Authority continues to recommend that a clear framework for increasing retail competition be established, which may include setting cost-reflective retail tariffs and the introduction of full retail contestability.

In its previous Reports to the Minister, the Authority suggested that there is a need for a road map to be developed and that the development of that agenda for the future should be led by the PUO (as the key policy body) but it should consult widely with all stakeholders including the IMO and the Authority. The Authority noted two very important issues that need to be kept in mind when looking at future changes to the market. First, and perhaps most important, the terms of reference for the road map must specify the fundamental requirement for full cost reflectivity to be included. One of the drivers behind reform of energy markets in WA was to remove cross subsidies and this should remain a key driver going forward. Second, given the size of the WA market, any proposals for change should be subjected to a thorough cost/benefit analysis. The benefits of any proposed change will need to outweigh the costs.

The Authority is aware that the *Strategic Energy Initiative* document published by the former Office of Energy (now known as the PUO) in March 2011³⁹ has included a short term action item to implement a plan to extend customer choice of electricity supplier to

³⁸ See PUO website: <http://www.finance.wa.gov.au/cms/content.aspx?id=14552>

³⁹ See [http://www.parliament.wa.gov.au/publications/tailedpapers.nsf/displaypaper/3813100cb1e5bc616f7914cc48257855000f71a1/\\$file/3100-15.03.11.pdf](http://www.parliament.wa.gov.au/publications/tailedpapers.nsf/displaypaper/3813100cb1e5bc616f7914cc48257855000f71a1/$file/3100-15.03.11.pdf)

customers using less than the current contestability threshold of 50 MWh per annum, including strategies to achieve FRC in the electricity market. The Authority notes further progress is yet to be seen in this regard.

4 Review of the effective operation of the Wholesale Electricity Market

Clause 2.16.11 of the Market Rules requires that the Report to the Minister provides an assessment on the effectiveness of the market in dealing with matters identified in clauses 2.16.9 and 2.16.10 of the Market Rules. Whilst the Authority's reporting requirements under clause 2.16.9 are provided in Chapter 3, this chapter addresses the Authority's reporting requirements under clause 2.16.10.

Under clause 2.16.10 of the Market Rules the Authority must review the effectiveness of:

- the Market Rule change process and Procedure change process;
- the compliance monitoring and enforcement measures in the Market Rules and Regulations;
- the IMO in carrying out its functions under the Regulations, the Market Rules and Market Procedures; and
- System Management in carrying out its functions under the Regulations, the Market Rules and Market Procedures.

In addition, clause 2.16.12(b) of the Market Rules requires that the Report to the Minister contains the 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:

- the Reserve Capacity market;
- the market for Bilateral Contracts for capacity and energy;
- the STEM;
- Balancing;
- the dispatch process;
- planning processes; and
- the administration of the market, including the Market Rule change process.

This section sets out the Authority's assessment of the effective operation of the WEM, including (where relevant) an outline of stakeholders' comments. This section is structured as follows:

- Section 4.1 reports on the effectiveness of the administration of the WEM, including a discussion on the Market Rule and Procedure change processes, the compliance monitoring and enforcement measures, and the effectiveness of the IMO and System Management in carrying out their functions;
- Section 4.2 reports on the Reserve Capacity market;
- Section 4.3 reports on the market for Bilateral Contracts for capacity and energy;
- Section 4.4 reports on the STEM;
- Section 4.5 reports on the Balancing mechanism;
- Section 4.6 reports on the dispatch process; and
- Section 4.7 reports on the planning process.

4.1 Review of the effectiveness of the administration of the Wholesale Electricity Market

4.1.1 *The effectiveness of the Rule Change Process and the Procedure Change Process*

Among other matters, clause 2.16.10 of the Market Rules requires the Authority to review the effectiveness of the change process for the Market Rules and Procedures. This requirement is repeated in clause 2.16.12(b)(vii) of the Market Rules.

The Authority considers the Rule Change and Procedure Change processes are effective overall. However, the Authority notes that market governance has been an area of concern raised by Market Participants and by the Authority previously. The concerns are related to the IMO being the body to determine whether to approve amendments to the Market Rules and also to administer and comply with the Market Rules. This recommendation is still current and relevant and has not yet been addressed. The Authority recommends that the existing governance arrangements in the WEM be reviewed as part of the PUO's broad review of the WEM design and arrangements.

Rule Change Process

Under clause 2.5 of the Market Rules, any person, including the IMO may formulate a Rule Change Proposal by completing a Rule Change Proposal form. The IMO may subject a Rule Change Proposal to the Fast Track Rule Change Process or the Standard Rule Change Process.⁴⁰ The Fast Track Rule Change Process takes about one month, while the Standard Rule Change Process takes six months or longer.

The IMO received 20 Rule Change Proposals during the current Reporting Period (i.e. between 1 July 2012 and 30 June 2013). As at November 2013, of the 20 Rule Change Proposals that were submitted during the Reporting Period, 16 proposals had commenced, one remained under development, one awaiting commencement and two were rejected.

The Authority considers that three Rule Change Proposals in particular have material implications for the market. The Authority's discussion of these Rule Change Proposals is provided below.

1. Transparency of Outage information (RC 2012 11)

This Rule Change Proposal⁴¹ introduced new standards for the disclosure of information relating to Planned, Forced and Consequential Outages for Scheduled and Non-Scheduled Generators. These new standards aimed to improve transparency in the market. Specifically, this Rule Change Proposal sought to create provisions to ensure all information on Planned, Forced and Consequential Outages are published and available to Market Participants. Improved information transparency as a result of this Rule Change should serve to better achieve the Wholesale Market Objectives. Greater transparency of Outages in real time should also allow Market Generators to react to market signals appropriately, which will ultimately result in improved economic efficiency in the supply

⁴⁰ Refer to clause 2.6 of the Market Rules for the Fast Track Rule Change Process and clause 2.7 for the Standard Rule Change Process.

⁴¹ For details on the Rule Change Proposals, see IMO website, http://www.imowa.com.au/rules/rule-changes/wem-rule-changes/commenced/rule-change-rc_2012_11

and production of electricity in the SWIS and more efficient electricity prices for consumers.

The proposed amendments were in response to recommendations made by PA Consulting⁴² as part of the IMO's five-year review of the Outage Planning Process.⁴³

The IMO held two rounds of consultation, and submissions from Alinta Energy, Community Electricity, Perth Energy, Synergy, System Management and Verve Energy generally expressed support for this Rule Change.

Market Participants were of the view that improved transparency of Outages will provide benefits including: increase in Balancing pricing efficiency and risk management; promotion of more efficient competition; and making the market more dynamic in its response to short term capacity constraints flowing from Outages which may result in cost savings.

Verve Energy raised issues regarding the provision of commercially sensitive information in that it may suffer a loss of competitive advantage if certain outage information in regard to its facilities is disclosed. The IMO was of the view that Verve Energy did not have evidence that supported its claims, and notes that no other Market Participants viewed the outage information being proposed to be made transparent as having commercial value that could outweigh the benefits to the market. Verve Energy also raised issues regarding the potential reduction in the quality of outage information provided from Market Participants to System Management as a result of increased transparency. The IMO considered it highly unlikely that a Market Participant would jeopardise the success of its Planned Outage request by providing substandard levels of information in its Outage Plan.

System Management expressed concerns in regard to the scope and costs of the Rule Change, and requirements that might be placed on System Management to determine and enter outage data on behalf of Market Participants. As a result of the high cost estimate by System Management, complexity and a long timeframe for implementation of the original Rule Change Proposal, changes were made to the original Rule Change proposal which resulted in: limiting the Outage information being disclosed to only Scheduled Generator and Non-Scheduled Generator outage information (the original Rule Change proposal included the provision of transmission outage information); and limiting the obligation on System Management to provide Outage information to the IMO to only those instances where the Outage information has already been entered into System Management's computer interface system.

The Authority is of the view that the IMO has followed the due process required under clause 2.5 and 2.7 of the Market Rules for developing and implementing this Rule Change Proposal. In particular, the Authority considers that the IMO has undertaken appropriate and adequate consultation with stakeholders, and has considered views expressed by stakeholders in reaching its decision.

This Rule Change commenced operation on 1 October 2013. The Authority considers this a significant Rule Change for the ongoing development of the WEM, and it understands that this Rule Change forms part of an ongoing work program by the IMO to increase the transparency and availability of information in the WEM.

⁴² Five Year Outage Planning Review - Final Report, PA Consulting, see IMO website, http://www.imowa.com.au/docs/default-source/rules/other-wem-consultation-docs/2011/outage_planning_review_final_report_v4-0.pdf?sfvrsn=2

⁴³ Pursuant to clause 3.18.18 of the Market Rules, at least once in every five years, the IMO, with the assistance of System Management, must conduct a review of the outage planning process against the Market Objectives. The IMO engaged PA Consulting to undertake this review.

2. Selection of the 12 peak Trading Intervals used for calculation of IRCR (RC 2013 11)

Currently, the Individual Reserve Capacity Requirement (**IRCR**) obligations⁴⁴ are allocated to Market Customers based on the median of metered demand from the 12 peak Trading Intervals from the four Trading Days in the previous Hot Season with the highest daily consumption. It has been identified that the current method for selecting the top 12 Trading Intervals for IRCR calculation is not necessarily aligned with the peak energy consumption.

In RC_2013_11⁴⁵, the IMO proposed to amend Appendix 5 of the Market Rules⁴⁶ to select the 12 peak Trading Intervals from the four Trading Days in the previous Hot Season with the highest maximum demand, rather than the four Trading Days in the previous Hot Season with the highest daily consumption for the purpose of calculating the IRCR. The proposed amendments were one of several recommendations contained in a report prepared by Sapere Research Group for the Reserve Capacity Mechanism Working Group Work Stream 4: Individual Reserve Capacity Requirements.

The Authority notes that during the MAC Pre Rule Change Proposal discussions, Synergy suggested an alternative methodology which was to maintain the current methodology of selecting the 12 Trading Intervals from the four Trading Days with the highest daily consumption, but to restrict the selection of the Trading Days to Business Days only.

The IMO then undertook an analysis to compare the ranking of Trading Days by daily consumption (current methodology), with the ranking of Trading Days by maximum demand (proposed methodology) using data over the past six years. The analysis showed that in each of the six years, the current methodology selected a Trading Day which had a lower maximum demand than the four Trading Days which recorded the highest maximum demand Trading Intervals. Based on this analysis, the IMO considered that the proposed methodology is more likely to select Trading Intervals that are most representative of each Market Customer's likely contribution to system peak load. Therefore, in response to Synergy's suggestion, the IMO did not consider it material whether or not the IRCR methodology selected Business Days, provided it selected the Trading Intervals most representative of each Market Customer's likely contribution to peak system load.

The IMO held two rounds of public consultation, and submissions were received from Community Electricity, Perth Energy and Alinta Energy. Community Electricity and Perth Energy supported the Rule Change Proposal. Alinta Energy was concerned that the market has not investigated alternative methodologies to allocate capacity costs that would enable a more timely and accurate calculation to be undertaken, and also methodologies that would prevent the potential for gaming in the market. Alinta Energy also suggested that the IMO defer the Rule Change until there is greater clarity on the scope of the broader WEM design review to be directed by the Minister for Energy.

This Rule Change was approved on the grounds that it would better serve Wholesale Market Objectives (d) and (e); and has the general support of the RCMWG and the MAC, and two of the three submissions received. The Rule Change commenced operation on 23 September 2013.

⁴⁴ The IRCR obligation is a way of allocating the costs of Reserve Capacity Requirement to Market Customers.

⁴⁵ For details on the Rule Change Proposal, see IMO website, http://www.imowa.com.au/rules/rule-changes/wem-rule-changes/commenced/rule-change-rc_2013_11

⁴⁶ The IMO also proposed some minor amendments to Appendix 5 and Appendix 5A to clarify how the system demand in a Trading Interval is measured.

The Authority is of the view that the IMO has followed the due process required under clause 2.5 and 2.7 of the Market Rules for developing and implementing this Rule Change Proposal. The Authority considers that the IMO has undertaken appropriate and adequate consultation with stakeholders, and has considered views expressed by stakeholders in reaching its decision. In particular, the Authority is satisfied that the IMO has addressed Synergy's concerns by undertaking an analysis to compare the ranking of Trading Days by daily consumption, with the ranking of Trading Days by maximum demand to determine Trading Intervals that are most representative of Market Customer's likely contribution to system peak load. The Authority is also satisfied that the IMO has considered Alinta Energy's concerns in its Rule Change Report.

3. Consideration of network constraints for certified reserve capacity (RC 2012_20)

This Rule Change Proposal⁴⁷ seeks to amend clause 4.11.1 of the Market Rules so that where two or more Facilities share a DSOC, the total quantity of Certified Reserve Capacity assigned to those Facilities must not exceed the Declared Sent Out Capacity (**DSOC**). The proposed amendments only apply in situations where multiple Facilities are covered by a single Arrangement for Access and share a common connection point on the network under that contractual arrangement.⁴⁸ The party holding the access contract with the Network Operator is the effective "owner" of the shared DSOC. The proposed amendments require this party to divide the DSOC between the relevant Facilities for the purposes of certification.⁴⁹

This Rule Change will ensure system reliability and security is maintained, and that the Certified Reserve Capacity to a Generation Facility assigned by the IMO is aligned with network access arrangement for the Facility to export energy into the transmission and distribution network.

The IMO held two rounds of public consultation, and submissions received from Community Electricity, Perth Energy, System Management and Synergy supported the Rule Change Proposal on the grounds that it would promote power system security and reliability. Collgar Wind Farm expressed that it would support the proposal if a "first in best dressed" allocation methodology is used in the certification of Reserve Capacity.

The Authority notes that Collgar expressed concerns regarding how the proposed amendments apply in situations where multiple Facilities are covered by a single Arrangement for Access and in particular share a common DSOC under that contractual arrangement. The Authority also notes that Synergy considered the proposed Rule Change provides no guidance to the IMO in responding to the range of circumstances that it may face in assigning Certified Reserve Capacity to Facilities sharing a connection point, and it suggested that the IMO develop steps in the Market Procedure for Certification of Reserve Capacity that it must follow when this situation arises.

The Authority is of the view that the IMO has followed the due process required under clause 2.5 and 2.7 of the Market Rules for developing and implementing this Rule Change Proposal. The Authority considers that the IMO has undertaken appropriate and adequate consultation with stakeholders, and has considered views expressed by stakeholders in reaching its decision. In particular, the Authority is satisfied that the IMO

⁴⁷ For details on the Rule Change Proposal, see IMO website, http://www.imowa.com.au/rules/rule-changes/wem-rule-changes/commenced/rule-change-rc_2012_20

⁴⁸ Although the Facilities are covered by a single access contract, the Facilities may be registered to different Market Generators under the Market Rules.

⁴⁹ It would be a commercial decision for the contract holder to decide how the DSOC is to be allocated.

has considered and addressed Collgar's and Synergy's concerns appropriately in its Rule Change Report. The Rule Change commenced operation on 1 July 2013.

Procedure Change Process

Pursuant to clause 2.10 of the Market Rules, the IMO or System Management may initiate the Procedure Change Process by developing a Procedure Change proposal and Rule Participants may notify the IMO.

During the current Reporting Period, the IMO submitted five Procedure Change Proposals into the formal Procedure Change Process, all of which have commenced.⁵⁰ System Management submitted two Procedure Change Proposals during the Reporting Period, one of which has been rejected and a revised version of the Procedure Change Proposal that was rejected is currently under development.

4.1.2 *The compliance monitoring and enforcement measures in the Market Rules and Regulations*

Among other matters, clause 2.16.10 of the Market Rules requires the Authority to review the effectiveness of the compliance monitoring and enforcement measures in the Market Rules and Regulations.

Compliance monitoring and enforcement requirements are defined under clauses 2.13 to 2.16 of the Market Rules with specific obligations on the IMO, System Management and the Authority.

Compliance monitoring and enforcement measures undertaken by the IMO

Clause 2.13.2 of the Market Rules provides that the IMO must monitor other Rule Participants' behaviour for compliance with the Market Rules and Market Procedures, in accordance with the Monitoring Protocol. The IMO is required to investigate potential breaches of the Market Rules and take enforcement action where appropriate, which can include applying to the Electricity Review Board (**ERB**) for fines or other orders. Under clause 2.15.3, the Monitoring Protocol must specify:

- the IMO's monitoring processes for assessing compliance by Rule Participants with the Market Rules and Market Procedures;
- a process for System Management to demonstrate compliance with the Market Rules, Market Procedures and audit processes, where the IMO requires such demonstration or an audit;
- a process for Rule Participants to report alleged breaches of the Market Rules and Market Procedures;
- processes for investigating alleged breaches;
- guidelines for the IMO when issuing warnings about alleged breaches to Rule Participants; and
- the procedure for bringing proceedings in respect of specified Market Rule breaches before the ERB.

⁵⁰ All submitted Procedure Changes by the IMO or System Management are listed on the IMO's website. See IMO website, <http://www.imowa.com.au/procedure-changes>

The IMO has been producing biannual reports on enforcement action taken to the ERB pursuant to clause 2.13.26 of the Market Rules. During the period 21 September 2012 to 20 September 2013 no new proceedings were brought before the ERB by the IMO.⁵¹

The Authority notes that the IMO's compliance team has continued to actively monitor the major Market Generators' bidding behaviour since commencement of the new Balancing and LFAS markets. The Authority considers that these new markets are still relatively new, and that it is critical that the IMO's compliance team continues to enhance its knowledge in these markets. The Authority is of the view that the IMO's compliance team has been effective in identifying and analysing potential anomalous behaviour and outcomes in the new Balancing and LFAS markets thus far.

The IMO's compliance with the Market Rules is audited once a year by the Market Auditor.⁵² Pursuant to the Market Rules, the IMO requires that System Management either demonstrate compliance with the Market Rules and Market Procedures or undergo an audit by the Market Auditor. Each year since market commencement, System Management has elected to undergo an audit by the Market Auditor.

Compliance monitoring and enforcement measures undertaken by System Management

Clause 2.13.6 of the Market Rules provides that System Management must monitor Rule Participants' behaviour for compliance with the provisions of the Market Rules referred to in clause 2.13.9 of the Market Rules⁵³ and the Power System Operation Procedures developed by System Management. System Management must report any alleged breaches of the provisions of the Market Rules referred to in clause 2.13.9 of the Market Rules or the Power System Operation Procedures to the IMO, in accordance with the Monitoring and Reporting Protocol.⁵⁴

For example, clause 2.13.9 of the Market Rules requires System Management to monitor Rule Participants for breaches of clause 7.7.6(b) of the Market Rules which states that a Market Participant must confirm receipt of the Dispatch Instruction or Operating Instruction and advise if it cannot comply or cannot fully comply with the Dispatch Instruction or Operating Instruction.

⁵¹ IMO website, six-monthly compliance reports September 2012 to March 2013, and March 2013 to September 2013, <http://www.imowa.com.au/six-monthly-compliance-reports>

⁵² The Market Auditor is an auditor appointed by the IMO to conduct at least annual audits of: the compliance of the IMO's internal procedures and business processes with the Market Rules; the IMO's compliance with the Market Rules and Market Procedures; and the IMO's market software systems and processes for software management. In addition, the Market Rules require that the IMO must at least annually require System Management to demonstrate compliance with the Market Rules and Market Procedures by providing such records as are required to be kept under the Market Rules or any Market Procedures, or subject System Management to an audit by the Market Auditor to verify compliance with the Market Rules and Market Procedures. In accordance with this requirement, the IMO has subjected System Management to an annual audit by the Market Auditor each year since market commencement.

⁵³ Pursuant to clause 2.13.9 of the Market Rules, System Management must monitor Rule Participants for breaches of clauses 3.4.6 and 3.4.8; clauses 3.5.8 and 3.5.10; clauses 3.6.5 and 3.6.6B; clauses 3.16.4, 3.16.7 and 3.16.8A; clauses 3.17.5 and 3.17.6; clause 3.18.2(f); clauses 3.21A.2, 3.21A.12, and 3.21A.13(a); clauses 3.21B.1 and 3.21B.2; clause 4.10.2, where System Management is instructed by the IMO under clause 4.25.13; clause 7.2.5; clause 7.5.5; clause 7.7.6(b); clauses 7.10.1, 7.10.3 and 7.10.6A; and clause 7.11.7.

⁵⁴ IMO website, Power System Operation Procedure: Monitoring and Reporting Protocol, http://www.imowa.com.au/docs/default-source/rules/system-management/ppcl0012/ppcl0012_final_proposed_amended_procedure.pdf?sfvrsn=2

Clause 2.13.9 of the Market Rules requires System Management to monitor Market Participants' compliance with Dispatch Instructions and Operating Instructions.⁵⁵ A Market Participant must comply with the most recently issued Dispatch Instruction, Operating Instruction or Dispatch Order applicable to the Registered Facility for the Trading Interval. A Market Participant must inform System Management as soon as practicable where it cannot comply or fully comply with a Dispatch Instruction or an Operating Instruction. A Market Participant must also comply with a request made under clause 7.10.5(c) by System Management for an explanation for deviations in a manner that is not within the Tolerance Range determined under the Market Rules.

Clause 2.13.9 also requires System Management to monitor Market Participants' and Network Operators' compliance with directions that System Management issues in any Dispatch Advisory under clause 7.11.6(f) or directions under clause 7.11.6B.⁵⁶

As part of System Management's reporting obligations, under clause 7.12.1 of the Market Rules, System Management must provide a report once every three months on the performance of the market with respect to the dispatch process.⁵⁷ This report must include details of:

- the incidence and extent of issuance of Operating and Dispatch Instructions;
- the incidence and extent of non-compliance with Operating and Dispatch Instructions;
- the incidence and reasons for the issuance of Dispatch Instructions to Balancing Facilities Out of Merit, including for the purposes of clause 7.12.1, issuing Dispatch Orders to the Verve Energy Balancing Portfolio in accordance with clause 7.6.2';
- the incidence and extent of transmission constraints;
- the incidence and extent of shortfalls in Ancillary Services, involuntary curtailment of load, High Risk Operating States and Emergency Operating States, together with:
 - a summary of the circumstances that caused each such incident; and
 - a summary of the actions that System Management took in response to the incident in each case.
- the incidence and reasons for the selection and use of LFAS Facilities under clause 7B.3.8.

System Management has fulfilled this requirement under the Market Rules, and has produced four status reports on the performance of the market with respect to the dispatch process covering the period from 1 July 2012 to 30 June 2013 during this Reporting Period.

Each year since market commencement, System Management has been subject to an audit by the Market Auditor, pursuant to the Market Rules.

Compliance monitoring undertaken by the Authority

Pursuant to clause 2.16.9 of the Market Rules, the Authority, with the assistance of the IMO, must monitor Ancillary Service Contracts that System Management enters into and

⁵⁵ Clause 7.10.1, 7.10.3, and 7.10.6A of the Market Rules.

⁵⁶ Clause 7.11.7 of the Market Rules.

⁵⁷ See the IMO website, http://www.imowa.com.au/system_management_reports

the criteria and process that System Management uses to procure Ancillary Services from other persons; inappropriate and anomalous market behaviour; market design problems or inefficiencies; and problems with the structure of the market.

In relation to inappropriate and anomalous market behaviour, the Authority must monitor whether:

- prices offered by a Market Generator in its Portfolio Supply Curve reflect the Market Generator's reasonable expectation of the Short Run Marginal Cost (**SRMC**) of generating the relevant electricity;
- prices offered by a Market Generator in its Balancing Submission exceeds the Market Generator's reasonable expectation of the SRMC of generating the relevant electricity; and
- prices offered by a Market Generator in its LFAS Submission exceeds the Market Generator's reasonable expectation of the incremental change in SRMC incurred by the LFAS Facility in providing the relevant LFAS.

If the Authority determines the above to be the case upon an investigation⁵⁸, the Authority must request that the IMO refer the matter to the ERB for a civil penalty to be imposed on the relevant Market Participant.⁵⁹

The Authority and the IMO have utilised a SRMC modelling tool to assist in the monitoring of prices offered by a Market Generator in its Portfolio Supply Curve to assess whether these prices reflect the Market Generator's reasonable expectation of the SRMC of generating the relevant electricity. The Authority has issued information requests to Market Generators that have the potential to exercise market power, for the necessary data and information as inputs into the SRMC model. The IMO manages the operation of the SRMC model, which involves reviewing the modelled results in order to determine whether the prices submitted with Market Generators' Portfolio Supply Curves reflect the reasonable expectation of the SRMC of generating the relevant electricity. The Authority and the IMO regularly review these results in monitoring the compliance of Market Generators in the prices offered in their Portfolio Supply Curves. To date, the Authority has not determined that any Market Generator has breached this Market Rule.

The Authority and the IMO are in the process of incorporating the Balancing and LFAS markets into the SRMC modelling tool, in order to assist in the monitoring of prices offered by Market Generators in these markets. In addition, the Authority and the IMO have also been reviewing bidding behaviour by Market Generators and prices that are offered by Market Generators in their Balancing and LFAS submissions, in order to assess whether these prices exceed the Market Generator's reasonable expectation of the SRMC of generating the relevant electricity and the incremental change in SRMC incurred by the LFAS Facility, respectively. The Authority and the IMO liaise on a regular basis in relation to these reviews and are continuing to refine this process. To date, the Authority has not determined that there have been breaches by any Market Generator.

⁵⁸ Clause 2.16.9E of the Market Rules.

⁵⁹ Clause 2.16.9H of the Market Rules.

4.1.3 *The effectiveness of the Independent Market Operator and System Management*

Among other matters, clause 2.16.10 of the Market Rules requires the Authority to review the effectiveness of both the IMO and System Management in carrying out their respective functions under the Regulations, the Market Rules and Market Procedures.

The Authority notes the matters raised in the 2013 audit reports into the IMO's and System Management's compliance with the Market Rules which are discussed below.⁶⁰ The Authority also notes stakeholders' views on the effectiveness of the IMO and System Management in carrying out their respective functions in submissions. Overall, the Authority considers that both the IMO and System Management continue to effectively carry out their respective functions required under the Regulations, Market Rules and Market Procedures.

4.1.3.1 *The Independent Market Operator*

Clause 2.1.2 of the Market Rules provides that the functions of the IMO are:

- to administer the Market Rules;
- to operate the Reserve Capacity Mechanism, the STEM, the LFAS Market, and the Balancing Market;
- to settle such transactions as it is required to under the Market Rules;
- to carry out a Long Term PASA study and to publish the Statement of Opportunities Report;
- to do anything that the IMO determines to be conducive or incidental to the performance of the IMO's functions;
- to process applications for participation, and for the registration, deregistration and transfer of facilities;
- to release information required to be released by the Market Rules;
- to publish information required to be published by the Market Rules;
- to develop amendments to the Market Rules and replacements for them;
- to develop Market Procedures, and amendments and replacements for them, where required by the Market Rules;
- to make available copies of the Market Rules and Market Procedures, as are in force at the relevant time;
- to monitor other Rule Participants' compliance with the Market Rules, to investigate potential breaches of the Market Rules, and if thought appropriate, initiate enforcement action under the Regulations and the Market Rules;
- to support the Authority in its market surveillance role, including providing any market related information required by the Authority;
- to support the Authority in its role of monitoring market effectiveness, including providing any market related information required by the Authority; and

⁶⁰ The IMO has appointed PA Consulting to be the Market Auditor each year since 2007. PA Consulting's audit reports are available on the IMO's website: http://www.imowa.com.au/market_compliance_audit

- to carry out any other functions conferred, and perform any obligations imposed, on it under the Market Rules.

In submissions to the Authority's Discussion Paper, stakeholders commented on the performance of the IMO in particular contexts.

In relation to market governance, Alinta Energy notes that it remains concerned the current market governance framework has the potential for conflicts of interest to arise, due to the IMO's roles of amending the Market Rules, operating the WEM and enforcing the Market Rules. Alinta Energy notes that these three functions are often separated in effective markets to remove any potential conflict of interest and to create full transparency. Alinta Energy is of the view that the current market governance arrangements should be reviewed as recommended by the Authority in its 2011 Minister's Report.

Community Electricity considers that the IMO has done well in implementing the new Balancing Market. It is also of the view that the LFAS market is performing well and that the IMO has been vigorously dealing with issues associated with the LFAS market.

Clause 2.14.3 of the Market Rules sets out the requirements for the audit of the IMO. It stipulates that 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; and
- c) the IMO's market software systems and processes for software management.

In its 2013 audit report of the compliance of the IMO's internal procedures and processes with the Market Rules, and the IMO's compliance with the Market Rules and Market Procedures, PA Consulting found that, except for specific instances of non-compliance incidents, the IMO has generally complied with its obligations under the Market Rules and Market Procedures.⁶¹ The audit noted 47 incidents of non-compliance of which 14 were classified as material. PA Consulting considers an item to be material if it could affect decisions made by Market Participants, affect the outcome of the market or affect the financial position of one or more Rule Participants.

The audit noted an increase in non-compliance incidents over last year's level (last year there were 20 incidents of non-compliance of which seven were material). However, the auditor considers that this increase is to be expected given that this audit year was the first full year in which the new Balancing and LFAS market have been in operation.

The audit also noted that six of the material and one of the immaterial non-compliance incidents were caused by manifest errors in the new Market Rules following the introduction of the new Balancing and LFAS markets. These were conscious decisions made by the IMO to breach the specific clauses in order to avoid outcomes that would have been inconsistent with the Market Objectives. The majority of these manifest errors related to Market Participants receiving or paying constrained on or off compensation in scenarios where they clearly should not have been. Another manifest error related to Verve Energy not being eligible to receive LFAS payments even though Verve Energy was providing LFAS.

⁶¹ http://www.imowa.com.au/f189,1613045/Audit_1.pdf

The Authority understands that some of these manifest errors would cause irreversible outcomes for Market Participants that were affected, which had led the IMO to consciously breach the Market Rules to avoid this outcome. The Authority also notes that the IMO has initiated fast track Rule Changes to address these manifest errors, and published full details of the decision taken by it to address the manifest errors.

The remaining eight material non-compliance incidents were beaches in Chapter 9 of the Market Rules which deals with settlements in the market. PA Consulting is satisfied that all breaches have actions associated with them to ensure similar incidents do not recur.

The audit notes that there continues to be a general improvement in the quality of the IMO's internal procedures used by staff to discharge their obligations under the Market Rules and Market Procedures. However, a number of these internal procedures are draft procedures that are yet to be formally approved. The auditor considers that except for these deficiencies, the IMO's internal procedures comply with the Market Rules in all material respects.

In its audit report of the compliance of the IMO's market software systems and processes for software management, PA Consulting notes that it has observed 13 non-material⁶² incidents of non-compliance. This is in contrast to a small number of non-material non-compliance incidents identified in last year's audit. The higher number of non-compliance incidents relate to the significant system changes made for the introduction of the new Balancing and LFAS market. The audit notes that the IMO has continued to improve its software management processes. The auditor considers that the IMO's processes for software management generally comply with the Market Rules in all material respects.

The Authority is generally satisfied with the IMO's performance in effectively carrying out its functions prescribed in the Market Rules and Market Procedures.

4.1.3.2 *System Management*

Clause 2.2.1 of the Market Rules provides that System Management has the function of operating the SWIS in a secure and reliable manner. The other functions of System Management in relation to the WEM are:

- to procure adequate Ancillary Services where Verve Energy cannot meet the Ancillary Service Requirements;
- to assist the IMO in the processing of applications for participation and for the registration, de-registration and transfer of facilities;
- to develop Market Procedures, and amendments and replacements for them, where required by the Market Rules;
- to release information required to be released by the Market Rules;
- to monitor Rule Participants' compliance with Market Rules relating to dispatch and Power System Security and Power System Reliability; and
- to carry out any other functions or responsibilities conferred, and perform any obligations imposed, on it under the Market Rules.

Clause 2.14.6 of the Market Rules sets out the requirements for the audit of System Management. It stipulates that in accordance with the Monitoring Protocol, the IMO must

⁶² These non-compliance incidents were non-material as the market outcomes were not affected.

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.

In its audit report of System Management's compliance with the Market Rules and Market Procedures, PA Consulting found 104 non-compliance incidents of which 40 were material. This represents an increase from last year's non-compliance incidents whereby PA Consulting found 28 breaches of which 10 were material.

PA Consulting considers this increase reflects the first year of operation of the new Balancing and LFAS market, and this has led to System Management having more obligations to meet and therefore more chances of breaching its requirements. PA Consulting is of the view the automation of activities that were previously manually conducted also provides more chances for System Management to identify potential breaches, and that better monitoring of System Management's own compliance operation has also resulted in more breaches being reported.

The Authority notes two areas of non-compliance identified in the 2013 audit report for System Management are particularly concerning as these relate to System Management's core roles in the WEM.

The first area of non-compliance relates to the implementation of market dispatch. 15 of the material breaches relate to System Management dispatching not in accordance with the Balancing or LFAS merit order, or not using the latest information available from the IMO. The audit notes that System Management does not have tools in place to allow easy and systematic identification of such situations, and considers investment in tools and further analysis would provide improvements in this area. The Authority notes that this is a critical issue as it reflects on the integrity of the market which affects Market Participants' confidence in the market, and that this issue was also raised in the 2012 audit report. The Authority is aware that System Management is currently reviewing the audit report and the implications for its processes. The Authority is of the view that System Management should take PA Consulting's suggestion on board to improve compliance in this area. That is, System Management should conduct on-going analysis and invest in tools for the purpose of promptly identifying dispatch issues.

The second area of non-compliance relates to the development and publication of critical market information. 20 of the material breaches relate to System Management either not providing market data or providing market data late. With the relatively recent implementation of the new Balancing and LFAS market, the Authority considers that it is critical for System Management to fulfil its obligation in providing full and near real-time information to the market. This is important as it allows Market Participants to operate in the new markets efficiently, and to make the optimal commercial decisions using this information. The Authority is of the view that it is crucial there is a high level of information transparency as market outcomes may be different in instances where critical information is not provided. The Authority notes the audit report states that continual improvements are being made by System Management in this area.

The remaining five material non-compliance incidents relate to three breaches in Chapter 3 of the Market Rules on system security and reliability and two breaches in Chapter 7 of the Market Rules on dispatch. Specifically, the Chapter 3 breaches relate to incorrect approval of Opportunistic Maintenance requests, incorrect assumptions used in System Management's outage management system, and incorrect usage of data in calculating outages. The Chapter 7 breaches relate to System Management issuing dispatch instructions based on incorrect information and treating a non-scheduled facility as a scheduled facility.

The Authority notes that Community Electricity in its submission expresses that System Management has done well in its role in the new Balancing market. It also considers that the LFAS market has been performing well having regard to its complexity and considerable challenges presented to System Management.

With the exceptions of the concerns raised above, the Authority is generally satisfied with System Management's performance in effectively carrying out its functions prescribed in the Market Rules and Market Procedures. The Authority will continue to monitor System Management's performance in carrying out dispatch and its provision of full and near real-time information to the market as well as ensuring that recommendations from the audit are implemented.

4.2 The Reserve Capacity Mechanism

Clause 2.16.12(b)(i) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the Reserve Capacity Mechanism (**RCM**).

The RCM has been in operation since 2005. The primary objective of the RCM is to ensure that there is sufficient generation and DSM capacity to meet system reliability and adequacy requirements.

The Authority notes that there has been sufficient capacity secured under the RCM to meet forecast capacity requirements, with the number of Capacity Credits⁶³ assigned to participants exceeding the Reserve Capacity Requirement (**RCR**) in each of the Capacity Years since its inception. There are other positive market outcomes that have flowed, at least in part, from the RCM:

- a significant increase in the Capacity Credits assigned to new entrants, where the share of capacity provided by IPPs has grown from approximately 12 per cent in 2005/06 to approximately 48 per cent in 2014/15; and
- there have been no reported instances of curtailment of electricity supply due to capacity shortages since market commencement.⁶⁴

However, the Authority has noted the rapid increase in the amount of Capacity Credits allocated to peaking capacity (mostly DSM and diesel generation capacity) over recent

⁶³ The RCM is built around the concept of a Capacity Credit, which is a notional unit of one mega watt (MW) of Certified Reserve Capacity provided by a generator or DSM provider. Capacity Credits have value and can be traded either bilaterally between Market Participants or with the IMO. In return for receiving Capacity Credits, generators are required to offer their capacity into the market at all times (unless undergoing scheduled maintenance on a Planned Outage).

⁶⁴ However, as noted in the Executive Summary, whilst there are no instances of reported curtailment of electricity supply due to capacity shortages, the Authority notes that this comes at a significant cost to customers.

Reserve Capacity Cycles⁶⁵ and the associated costs for procuring these Capacity Credits. The Authority has also noted the existence of substantial excess capacity in the market, i.e. capacity procured by the IMO in excess of the RCR. The Authority is concerned that if such a trend were to continue, the efficiency of the market could be adversely affected. The market could move away from the optimal capacity mix that minimises the long-term cost of electricity supplied to consumers. The Authority notes there has been a declining trend in Expressions of Interest and the level of Capacity Credit allocations has declined in 2014/15 and 2015/16. These matters are discussed in more detail in Section 2 of this report.

4.3 The market for Bilateral Contracts for capacity and energy

Clause 2.16.12 (b) (ii) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the market for Bilateral Contracts for capacity and energy.

Bilateral Contracts are confidential to the contracting parties. The market is informed through informal and individually formed market intelligence. The formal information will be received by the IMO at the time for settlement by way of STEM submissions for energy and Capacity Credit Allocation submissions for Reserve Capacity. In both cases only the quantities are provided to the IMO. Other terms in the contracts such as price, length of the contracts and other conditions will be known only to the contracting parties. In contrast, a market could be organised to allow greater transparency albeit around more standardised contract terms.

Bilateral Contracts in capacity and energy, separately or combined, play an important role in supporting new investments. This tends to happen for the larger investments requiring outside financing, giving the financiers greater cash flow certainties. The challenge is the lack of depth in the Bilateral Contract market in the WEM, given the concentrated market structure. This is particularly the case when the credit worthiness of the counter party is important to the financiers.

This lack of depth in the Bilateral Contract market may have contributed to the composition of new capacity coming into the market in recent Reserve Capacity Cycles. Smaller capacity additions are relatively easier to bring about than larger capacity additions which require larger borrowings and the support of a bilateral contract for risk mitigation purposes.

As noted in its previous Reports to the Minister, the Authority has an interest in ensuring that the Bilateral Contract market is working effectively, particularly in terms of facilitating new entry in the generation sector and the retail sector. The Authority notes that the merger of Verve Energy and Synergy will have a significant impact on the bilateral market which will need to be taken into account in the future monitoring of this market.

⁶⁵ Clause 4.1 of the Market Rules defines the Reserve Capacity Cycle and the events comprising a single Reserve Capacity Cycle. A Reserve Capacity Cycle covers a period of four years. Year 1 of a Reserve Capacity Cycle is the calendar year in which the Reserve Capacity Auction is scheduled to be held and Capacity Credits are allocated to capacity providers for the Capacity Year two years in advance. The Reserve Capacity Cycle is repeated for each Capacity Year.

4.4 The Short Term Energy Market

Clause 2.16.12(b)(iii) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the STEM.

The STEM is a day-ahead market where a Market Participant can trade energy around its bilateral position. The Authority considers that STEM Clearing Prices have generally reflected the balance of supply and demand and, in doing so, have provided useful price signals to Market Participants. The Authority has also noted the active trading activities in the STEM and the upward trend in the quantity traded since market commencement. Section 5.2.1 provides more detailed discussion on the STEM outcomes since market commencement, including STEM Clearing Prices, trade quantities, and Bids and Offers.

As noted in previous reports, the STEM has certain limitations. Firstly, the time for gate-closure of STEM Submissions is up to 44 hours in advance and no re-bidding into the STEM is allowed. This arrangement can be too restrictive considering the dynamic nature of changes in electricity supply and demand conditions. Secondly, the STEM Clearing Prices may not reflect the system marginal price in that the STEM does not capture the total forecast system supply as certain generation capacity is not accounted for in the STEM. This is because Intermittent Generator participation in the STEM is optional. Their absence effectively under-states supply and thus could result in higher clearing prices. While forecasting wind generation will be a challenge, particularly with the up to 44 hours STEM cycle, the impact may become more significant as more wind generation capacity is being added to the system.

Despite its limitations, the Authority considers the STEM continues to provide a useful platform for bilaterally contracted parties to adjust their positions closer to real time. The Authority notes that the STEM is currently the only mechanism available for Market Customers to adjust their bilateral positions through a market, rather than through bilateral contract negotiations and re-negotiations. The new Balancing market that commenced on 1 July 2012 only allows Market Generators to adjust their pre-committed positions.

The Authority notes the merger of Verve Energy and Synergy will likely significantly reduce the volumes of energy traded in the STEM. It is not clear at this stage what the implications for the market will be. The Authority will continue to monitor developments in this area.

4.5 Balancing

Clause 2.16.12(b)(iv) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the Balancing mechanism.

Energy Balancing refers to the process for meeting supply and consumption deviations from contracted bilateral and STEM positions in each Trading Interval. At the commencement of the WEM, Verve Energy was assigned the role as the default provider of the Balancing service. Under this arrangement, there was only limited opportunity for IPPs to provide Balancing. The IPPs would only be called upon by System Management to provide Balancing energy when Verve Energy's capacity to provide the service was stressed. At such times, the IPPs would be issued Dispatch Instructions by System Management to increase or decrease generation output from their pre-committed positions and these deviations were settled on a 'pay-as-bid' price basis.⁶⁶

⁶⁶ 'pay-as-bid' prices are specified in the Standing Data submitted by IPPs to the IMO.

The operation of the Balancing mechanism required that Verve Energy, as the default balancer, maintained a large enough generation portfolio to provide balancing services, without involving the IPP facilities. While this mechanism provided a simplified market design, it also introduced various constraints to the market in achieving more efficient operational outcomes. IPPs were locked into their Resource Plans one day in advance. There were no opportunities for making changes even when plant conditions assumed at the time of making STEM Submissions were no longer true. This had significant commercial implications for the IPPs.

The new competitive balancing market introduced on 1 July 2012 has enabled all generators to offer balancing services. Transitional arrangements applied until 5 December 2012 when all the new systems became available. Balancing facilities are defined as Market Generators' (other than Verve's) scheduled and non-scheduled generating facilities.

Balancing offers are required to be submitted for all generators, apart from those on an approved planned outage and forced outages. Balancing offers include the quantity and price at which a Market Participant is willing to be dispatched. Prices offered must be within the Price Cap (i.e. between the maximum and minimum STEM price) and must not be in excess of the Market Participant's reasonable expectation of its short run marginal cost when such behaviour relates to market power. Market Participants are able to revise their offers up to 2 hours prior to the Trading Interval commencing to reflect changes in market conditions.

Under the new balancing market, Verve has continued to be able to offer its facilities on a portfolio basis and is treated as a single Balancing Facility. Verve Energy is able to offer its portfolio in 35 tranches and IPP's can offer 10 tranches for each scheduled generating facility. Intermittent generating units can only be offered as a single tranche and offers include price and an estimate of output. Verve Energy is also able to offer a facility on a stand-alone basis consistent with IPP's but, to date, has not.

The IMO uses the balancing offer submissions to develop the Balancing Merit Order (**BMO**) which is ultimately used to determine which facilities are dispatched by System Management.

Any deviation Market Participants are required to make from their Net Contract Position (**NCP**) is treated as a Balancing Market transaction. Market Participants are paid the Final Balancing Price on their Metered Balancing Quantities (**MBQ**), i.e. the difference between actual generation or load and their NCP. This differs from the NEM where settlement is based on total generation and load.

Section 5.2.2 provides more detailed discussion on the Balancing Mechanism and new Balancing Market outcomes since market commencement, including clearing prices, trade quantities, and Bids and Offers.

As discussed earlier, the Authority recognises that the new Balancing Market addresses many of the problems associated with the previous arrangements. The new market results in much greater transparency and provides greater opportunities for IPP's to participate which should lead to a more competitive market. The shorter gate closures, relative to the STEM, enable generators to respond better to changing circumstances which should reduce costs and enhance security.

Some issues were experienced when the market first commenced with the design of the new Market Rules. These mainly related to Market Participants receiving or paying constrained on or off compensation in scenarios where they clearly should not have been

and Verve Energy not being eligible to receive LFAS payments even though it was clearly providing those services.

As identified in its annual compliance audit⁶⁷ the IMO considered that these issues would cause irreversible outcomes for Market Participants that were affected, so consciously breached the Market Rules to avoid this outcome. The IMO initiated fast track Rule Changes to address these manifest errors, and published full details of the decision taken by it to address the manifest errors.

The annual audit of System Management's compliance with the Market Rules and Market Procedures identified some non-compliance incidents in relation to the Balancing Market. These include instances of System Management dispatching not in accordance with the Balancing or LFAS merit order, or not using the latest information available from the IMO and not providing market data or providing market data late.

The auditor, PA Consulting, considers this increase in incidents reflects the first year of operation of the new Balancing and LFAS market, which has led to System Management having more obligations to meet and therefore more chances of breaching its requirements. PA Consulting also notes that the increased automation of activities (that were previously manually conducted) increases System Management's ability to identify potential breaches, and that better monitoring of System Management's own compliance operation has also resulted in more breaches being reported.

Correct dispatch of generators based on the BMO is critical to the effective operation of the Balancing Market. It is also critical for System Management to fulfil its obligation in providing full and near real-time information to the market to enable Market Participants to operate in the new markets efficiently, and to make the optimal commercial decisions using this information.

The Authority notes the comments made by the auditor and is aware that System Management is currently reviewing the findings of the audit and assessing its processes in light of the audit findings. The Authority will review progress on this matter during the 2014 year.

The Authority notes the generally positive feedback from stakeholders and agrees that further time is needed to make a detailed assessment of how effective the new market arrangements are. The Authority will continue to work with the IMO and System Management to evaluate the market further to ensure it is resulting in the most efficient dispatch of generation. Specific issues the Authority considers need attention include:

- Although there has been an increase in the volumes of generation offered in the price bands between \$0/MW and \$100/MW, significant volumes are still being offered at the minimum and maximum price cap levels. Whilst there are a number of valid reasons for generators to bid in this manner to ensure they are either dispatched or not, the Authority intends to investigate this further to ensure bidding behaviour is incentivised appropriately and resulting in the most efficient outcomes for the market.
- The requirement for a Market Participant not to bid in excess of its reasonable expectation of SRMC when such behaviour relates to market power, is key to ensuring the lowest cost generation is dispatched. The Authority will continue to develop its assessment of what constitutes SRMC and the monitoring tools it uses with the IMO to ensure the SRMC requirement is being complied with.

⁶⁷ See 4.1.3.1 for further discussion.

- Market Participants receive constrained on or constrained off payments if they are dispatched (or not) out of merit. Total compensation for 2012/13 amounted to around \$11 million. Some of these payments relate to network constraints and network outages. The Authority intends to review further whether the current arrangements are working effectively to ensure the most efficient dispatch and minimum cost to the market.
- Since the market commenced, Verve Energy has been able to bid on a portfolio basis. This was a pragmatic approach when it was the sole provider of balancing energy. However, the portfolio approach reduces the transparency of Verve Energy's bids in the balancing market and may be impacting on the ability of the new Balancing Market to deliver the most efficient outcomes for the market.

4.6 The dispatch process

Clause 2.16.12(b)(v) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the dispatch process.

Chapter 7 of the Market Rules defines the dispatch process in the WEM. For the reporting period to 30 June 2012, the WEM operated under a 'hybrid' design in terms of dispatch. Under this design, IPPs committed and dispatched their facilities to meet their respective Resource Plans, i.e. 'net dispatch,' whilst Verve Energy generation portfolio was dispatched to meet residual requirements in the market under the 'gross dispatch' regime. IPPs were penalised through the application of UDAP and DDP for deviations from their Resource Plans except when the facilities were dispatched by System Management for system security reasons. System Management managed overall system security, scheduling and dispatching Verve Energy's facilities and resorting to IPPs' facilities by issuing Dispatch Instructions, only when Verve Energy's balancing capability was stretched.

The Authority considers the dispatch process operated by System Management was effective in meeting the system security objective. However, the 'hybrid' dispatch approach in the original market design may not necessarily deliver the minimum cost dispatch and hence, may impact on the efficiency of the market.

The new competitive Balancing Market introduced on 1 July 2012 is used to determine actual dispatch in the WEM. Market Participants provide balancing submissions for each Trading Interval, specifying prices at which their facilities may be dispatched and by how much. The IMO uses these prices to construct the Balancing Merit Order (**BMO**), used by System Management for real time dispatch.

System Management uses the most recent BMO to determine and issue dispatch instructions to generators to meet the expected demand trend during the Trading Interval. System Management may only depart from the BMO if that is necessary to maintain system security and reliability criteria, and it may issue Dispatch Instructions to Demand Side Programmes or Dispatchable Loads if necessary.

After the Trading Day, the IMO determines a Balancing price for each Trading Interval from the final BMO and actual generation requirements. Generators receive (pay) this price for any quantity above (below) their Net Contract Position (**NCP**) and Market Customers pay (receive) this price for any quantity above (below) their NCP. Generators dispatched out of merit are eligible for constrained on or off compensation. If a Facility in the Non-Balancing Dispatch Merit Order was dispatched by System Management, it receives (pays) a pay-as-bid price for deviations below (above) the relevant Resource Plan level.

The Authority notes that the new competitive Balancing market has brought a fundamental change to the dispatch regime in the WEM. The Authority considers that the new dispatch process has been effective in delivering system security and reliability and ensures efficient dispatch of lowest cost generators. However, the Authority notes the high number of breaches by System Management relating to dispatch in the new Balancing market identified in the 2013 audit report into System Management's compliance with the Market Rules (see detailed discussion in section 4.1.3). The Authority is of the view that it is paramount System Management takes PA Consulting's suggestions on board to improve compliance in this area in order to continually achieve the Market Objectives.

4.7 Planning processes

Clause 2.16.12(b)(vi) of the Market Rules requires that the Report to the Minister contains the Authority's assessment of the effectiveness of the planning processes.

The planning processes envisaged in the Market Rules are carried out in three levels of planning:

- long term planning, which is conducted annually;
- medium term planning, which is undertaken each month; and
- short term planning, which is carried out each week.

Each of the above planning processes involves a forecasting study, also known as the Projected Assessment of System Adequacy (**PASA**).

Under the Market Rules, the Long Term PASA is undertaken by the IMO in order to determine the Reserve Capacity Target for each year in the ten-year period of the Long Term PASA Study Horizon. The results are presented in the IMO's Statement of Opportunities report, which is published on the IMO's website each year.⁶⁸

System Management is required to undertake the Short Term PASA and the Medium Term PASA.⁶⁹

Overall, the Authority considers that the Short, Medium and Long Term PASA studies are operating as intended.

Short Term PASA

Under clause 3.17 of the Market Rules, the Short Term PASA study must consider each six-hour period of a three week planning horizon (the Short Term PASA Planning Horizon). System Management must carry out a Short Term PASA study every Thursday and provides the results to the IMO for publication on the Market website.

The Short Term PASA assists System Management in assessing:

- the availability of capacity holding Capacity Credits in each six-hour period during the Short Term PASA Planning Horizon;

⁶⁸ A report prepared in accordance with clause 4.5.13 presenting the results of the Long Term PASA study, including a statement of required investment if Power System Security and Power System Reliability are to be maintained.

⁶⁹ The Short Term PASA is conducted in accordance with clause 3.17 of the Market Rules, while the Medium Term PASA is conducted in accordance with clause 3.16 of the Market Rules.

- the setting of Ancillary Service Requirements in each six-hour period during the Short Term PASA Planning Horizon; and
- final approvals of Planned Outages.

The Authority considers the Short Term PASA provides useful information for Market Participants to refine their operational plans based on the information presented in the Short Term PASA. The Authority notes that the implementation of the new competitive Balancing market has provided Market Participants with more dynamic, close to real time, information that compliments the weekly Short Term PASA.

The Authority notes the audit report prepared by PA Consulting (who was engaged by the IMO to conduct the 2013 Annual Compliance Audit) has identified three non-compliance incidents whereby System Management did not provide Short Term PASA results to the IMO by 4:30pm every Thursday. The Authority notes that these non-compliance incidents were classed as non-material as balancing forecasts and previous Short Term PASA projections were available, so the unavailability of information was unlikely to have caused participants to act differently.

Medium Term PASA

System Management must carry out a Medium Term PASA study by the 15th day of each month and provide it to the IMO for publication on the Market website. Under clause 3.16 of the Market Rules, this study must consider each week of a three year planning horizon, starting from the month following the month in which the Medium Term PASA study is performed.

The Medium Term PASA study provides assistance to System Management with respect to:

- setting ancillary Service Requirements over the year;
- outage planning for Registered Facilities; and
- assessing the availability of Facilities providing Capacity Credits, and the availability of other capacity.

Long Term PASA

In relation to the Long Term PASA, the Authority is aware of concerns raised by Market Participants with respect to the accuracy of the demand forecasts that underpin the setting of the Reserve Capacity Target. Since the commencement of the WEM, forecasts have been prepared for the IMO by the National Institute of Economic and Industry Research (NIEIR).

As noted in the Authority's 2012 Minister's Report, the IMO appointed ACIL Tasman to undertake a review of the SWIS demand forecasting processes, which analysed the performance of the demand forecasts published by the IMO and made recommendations in relation to the forecasting process. In its final report,⁷⁰ ACIL Tasman identified a number of areas where additional analysis and amendments to the current methodology could lead to a more robust and improved methodology. These were:

⁷⁰ See the IMO website, http://www.imowa.com.au/docs/default-source/Reserve-Capacity/forecast_review_of_the_swis- final_report.pdf?sfvrsn=2

- NIEIR's models tend to under-predict Western Australian Gross State Product (**GSP**) and population growth. Improvements to the methodology should be identified to remove this downward bias.
- NIEIR should adopt the use of simulation based weather normalisation methods as the basis for the maximum demand forecasts as soon as it is suitable to do so.
- NIEIR and the IMO should consider producing electricity consumption forecasts conditional on different weather scenarios in a way that is similar to the approach taken for system maximum demand.
- NIEIR and the IMO should conduct further analysis of the energy output of solar PV systems in the SWIS, in light of the differences between NIEIR's forecasts and alternative sources.
- NIEIR and the IMO should undertake a detailed ex-post evaluation of forecast performance with a focus on:
 - Errors in the forecast model inputs such as GSP and population growth.
 - Structural issues within the models, which may lead to less accurate forecasts.
 - Identifying factors that the models may be failing to capture, such as new behavioural or technological trends and policy changes.
- The ex-post forecast evaluation should be conducted annually and that it be required under the Market Rules.
- NIEIR should recalibrate its models every year using the latest available information.
- A process of data quality assurance should be implemented to ensure that any data used in the forecasting process is free from errors, reliable, complete and timely.
- The Market Procedures should be altered to require the timely acquisition of data requested from other organisations to facilitate the generation of the forecasts.
- NIEIR should take additional steps to improve the transparency of its processes, both of its models calculations between the input assumptions and the generated outputs and any judgements made during the forecasting processes and the underlying rationale behind them.
- The IMO should adopt a more critical stance in evaluating new block loads by:
 - Applying probability weights to its block load forecasts.
 - Heavily discounting or excluding altogether those loads that are expected to come online after three years or more.
 - Giving careful consideration to the degree of uncertainty associated with new mining loads and that these be reflected in the probability weights.

- Making some adjustments for the level of coincidence at the time of the system peak and an appropriate coincidence factor be applied to the forecasts block loads.
- The IMO should put its contract to provide energy consumption and maximum demand forecasts out to competitive tender on a regular basis, at least every three years.

Following ACIL Tasman and various submitting parties' recommended amendments to the Market Rules and Market Procedure, the IMO prepared a Rule Change Proposal to amend the Market Rules and Market Procedure as follows:

- The Market Rules be amended to require that the Statement of Opportunities (**SOO**) contains the results of the ex-post evaluation of forecasts;
- The Market Rules be amended to reconcile its forecasts with those produced by Western Power; and
- The Market Procedure be amended to commence at the same time as any Amending Rules. These amendments will include requirements on Rule Participants for the timely provision of data to facilitate the generation of the forecasts.

The Authority notes that the 2013 Statement of Opportunities included enhanced analysis of the performance of previous forecasts and a comparison with forecasts from Western Power's Annual Planning Report for the first time.

In November 2012, the IMO had also completed a five-year review of the Planning Criterion in the SWIS.⁷¹ The Planning Criterion is an input to determination of the Reserve Capacity Requirement (**RCR**). The IMO appointed Market Reform to undertake the review and to recommend an appropriate Planning Criterion.

Market Reform's review covered an examination of existing planning standards in the SWIS in light of the actual performance of generators, demand growth and economic analysis of reserve margin.⁷² It presented the following conclusions in its report:

- The use of a reserve margin over and above the 10% Probability of Exceedance (PoE) peak demand forecast is appropriate as it captures peak demand volatility, which is a particularly material issue in the SWIS.
- The unserved energy component of the Planning Criterion should be dropped.
- The cost-benefit analysis conducted by Market Reform identified that the optimal reserve margin should be lowered from 8.2% to 7.58%.
- A sudden outage of gas supply cannot be covered under the Planning Criterion. Market Reform's analysis found that a significant gas supply outage can lead to significant plant outages that are beyond the level covered by the Planning

⁷¹ See IMO website, IMO Final Report: 5-Yearly Review of Planning Criterion, http://www.imowa.com.au/docs/default-source/Reserve-Capacity/planning_criterion_review_2012_final_report.pdf?sfvrsn=2

⁷² Market Reform, Review of the Planning Criterion used within the SWIS Final Report, 10 October 2012, http://www.imowa.com.au/docs/default-source/Reserve-Capacity/imo_planning_criterion_review_-_final_report_2012-10-10.pdf?sfvrsn=2

Criterion. Therefore, such a contingency “cannot and should not be addressed through back-up measures in the power system planning arena”.

The IMO developed Rule Change Proposal RC_2012_21: Five-yearly Review of the Planning Criterion⁷³ to implement the recommendations resulting from the five-yearly review of the Planning Criterion. The IMO’s recommendations were that:

- the form of the current Planning Criterion be retained;
- the reserve margin be lowered from 8.2% to 7.6%; and
- the unserved energy component of the Planning Criterion be retained due to its role in the determination of the Availability Curve.

As a result of this Rule Change, clause 4.5.9(a) of the Market Rules was amended to lower the reserve margin from 8.2% to 7.6%.

Outage Planning

Pursuant to clause 3.18.18 of the Market Rules, at least once in every five years, the IMO, with the assistance of System Management, must conduct a review of the outage planning process against the Market Objectives. The IMO engaged PA Consulting to undertake this review. The final report prepared by PA Consulting was published on the IMO’s website on 10 October 2011.⁷⁴ In its report, PA Consulting concluded that the outage planning process is generally functioning well and that wholesale changes are not required. However, PA Consulting considered some fine-tuning would be required to address issues identified in four main areas. These included:

- the reserve margin criteria for evaluating outage plans and approving outages in the short-term;
- the interaction between generation and transmission outage planning;
- outage approval timelines and constraints; and
- information disclosure, given that the Market Rules and the Power System Operating Procedures (**PSOP**) are silent on System Management’s obligations with respect to information disclosure.

In relation to information disclosure, PA Consulting recommended that the IMO, in conjunction with System Management, develop changes to the Market Rules and Market Procedures to establish System Management’s obligations for disclosure of information on Planned Outages. Following this recommendation, the IMO submitted Rule Change Proposal (RC_2012_11): Transparency of Outage Information⁷⁵ on 30 July 2012. This Rule Change commenced on 1 October 2013. A more detailed discussion on this Rule Change is included in Section 4.1.1 “The effectiveness of the Rule Change Process and the Procedure Change Process” in this report.

⁷³ See IMO website, RC_2012_21 Final Rule Change Report, http://www.imowa.com.au/docs/default-source/rules/commenced/rc_2012_21_final_rule_change_report_v3.pdf?sfvrsn=2

⁷⁴ See <http://www.imowa.com.au/5yearoutageplanningreview>

⁷⁵ See IMO website, RC_2012_11 Final Rule Change Report, http://www.imowa.com.au/docs/default-source/rules/rc_2012_11_final_rule_change_report_final.pdf?sfvrsn=2

The IMO is currently progressing the second phase of recommendations with a concept paper (CP_2013_04) presented at the August 2013 MAC and a PRC (PRC_2013_15) presented at the December 2013 MAC.

5 Summary of the Market Surveillance Data Catalogue

Clause 2.16.12(a) of the Market Rules requires that the Report to the Minister contains a summary of the information and data compiled by the IMO under Clause 2.16.1 of the Market Rules. Clause 2.16.1 specifies the IMO's responsibility for collecting and compiling the data identified in the Market Surveillance Data Catalogue (**MSDC**), analysing the compiled data, and providing both the data and analysis to the Authority.⁷⁶

The required summary of the MSDC data and analysis for the period from 1 July 2012 to 30 June 2013 (**Reporting Period**) is set out in this section and Appendix 3 of this report.⁷⁷

To support the discussion of the MSDC data and analysis for the Reporting Period, where relevant, the Authority has:

- drawn on MSDC data and analysis from previous periods to show trends that have taken place since market commencement on 21 September 2006;
- drawn on other market data that is not included as part of the MSDC data and analysis;⁷⁸ and
- reported on a Capacity Year basis which covers a period of 12 months, commencing on 1 October (8 AM) and ending on 1 October (8 AM) of the following calendar year, when reporting on aspects of the Reserve Capacity Mechanism.

5.1 Reserve Capacity Mechanism

5.1.1 *Number of participants in each Reserve Capacity Auction*

Clause 2.16.2(b) of the Market Rules requires that the MSDC identifies the number of participants in each Reserve Capacity Auction.⁷⁹

Under clause 4.15.1 of the Market Rules, the IMO may cancel the Reserve Capacity Auction if no Certified Reserve Capacity is made available for auction and the IMO considers that the Reserve Capacity Requirement (**RCR**) will be met without an auction. As there has been sufficient capacity to meet the RCR in each Reserve Capacity Cycle so far, the IMO has not called the Reserve Capacity Auction.

⁷⁶ The data that is to be included in the MSDC is set out in Clause 2.16.2 of the Market Rules, and analysis of the data that the IMO must undertake is set out in Clause 2.16.4 of the Market Rules.

⁷⁷ This Reporting Period is different from the previous Reports to the Minister prepared by the Authority, i.e., previous report to the Minister reported on the MSDC data and analysis items from 1 August to the following 30 Jun. It excluded July 2012, due to the commencement of the Competitive New Balancing Market from 1 July 2012. Historically the reporting period on the MSDC data and analysis items was from 1 August to the following 31 Jul.

⁷⁸ In such cases, this is pointed out in the relevant discussion in support of the summary of such other market data.

⁷⁹ The process for determining the Reserve Capacity Price for a Reserve Capacity Cycle and the quantity of Reserve Capacity scheduled for the IMO for each Market Participant under Clause 4.19.

5.1.2 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 held to date, no auction offers can be reported.

5.1.3 Prices in each Reserve Capacity Auction

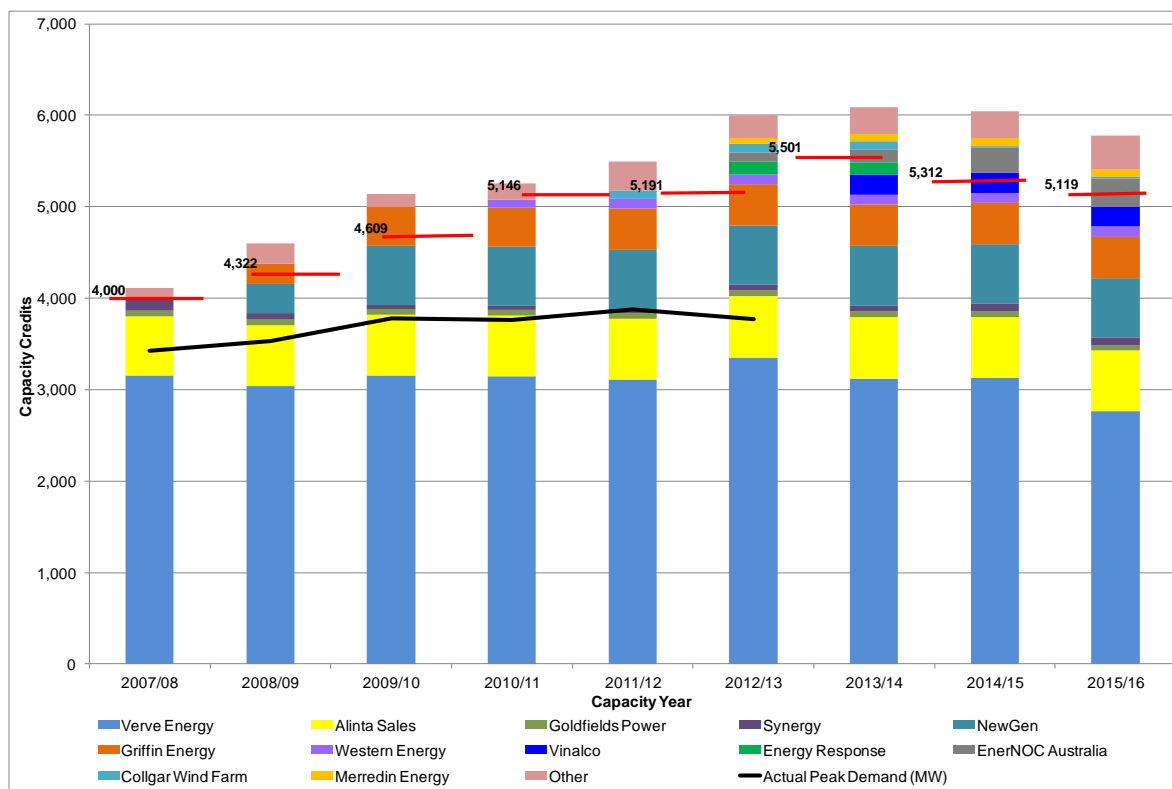
Clause 2.16.2(c) of the Market Rules requires that the MSDC identify clearing prices in each Reserve Capacity Auction. To date, there has been no requirement for the IMO to run a Reserve Capacity Auction. Hence, no price outcomes can be reported.

5.1.4 Capacity Credits assigned

Although not required under the Market Rules, this section provides data on Capacity Credits assigned to Market Participants.

Figure 3 below shows the Capacity Credits assigned to Market Participants for the 2007/08 to the 2015/16 Capacity Years, as well as the RCR for that year (shown as the red horizontal line for each Capacity Year) and the actual demand measured based on maximum Operational System Load Estimate (shown as the black line).

Figure 3 Capacity Credits assigned to Market Participants for the 2007/08 to 2015/16 Capacity Years



Note: In the figure above, the horizontal dashes with the corresponding value represent the Reserve Capacity Requirement in each Capacity Year.

The chart above shows that in each Capacity Year the number of Capacity Credits assigned to participants (in aggregate) has exceeded the RCR. The excess of Capacity Credits assigned to participants has ranged from a low of approximately 2.2 per cent in the 2010/11 Capacity Year to a high of approximately 15 per cent in the 2013/14 Capacity Year, with an average of 8.5 per cent over the eight Capacity Years from 2007/08 to 2015/16.

For the 2015/16 Capacity Year, 5,683 MW of Capacity Credits have been assigned to participants compared with the RCR of 5,119 MW. This indicates excess capacity of 564 MW (approximately 11 per cent).

The number of generators registered in the market has increased from nine in 2006 to 36 for the 2015/16 Capacity Year. Table 11 in Appendix 3 provides a list of Market Generators and Market Customers registered at 6 October 2009, 14 October 2010, 3 October 2011, 10 December 2012 and 30 September 2013.

5.1.5 *Maximum Reserve Capacity Price and Reserve Capacity Price*

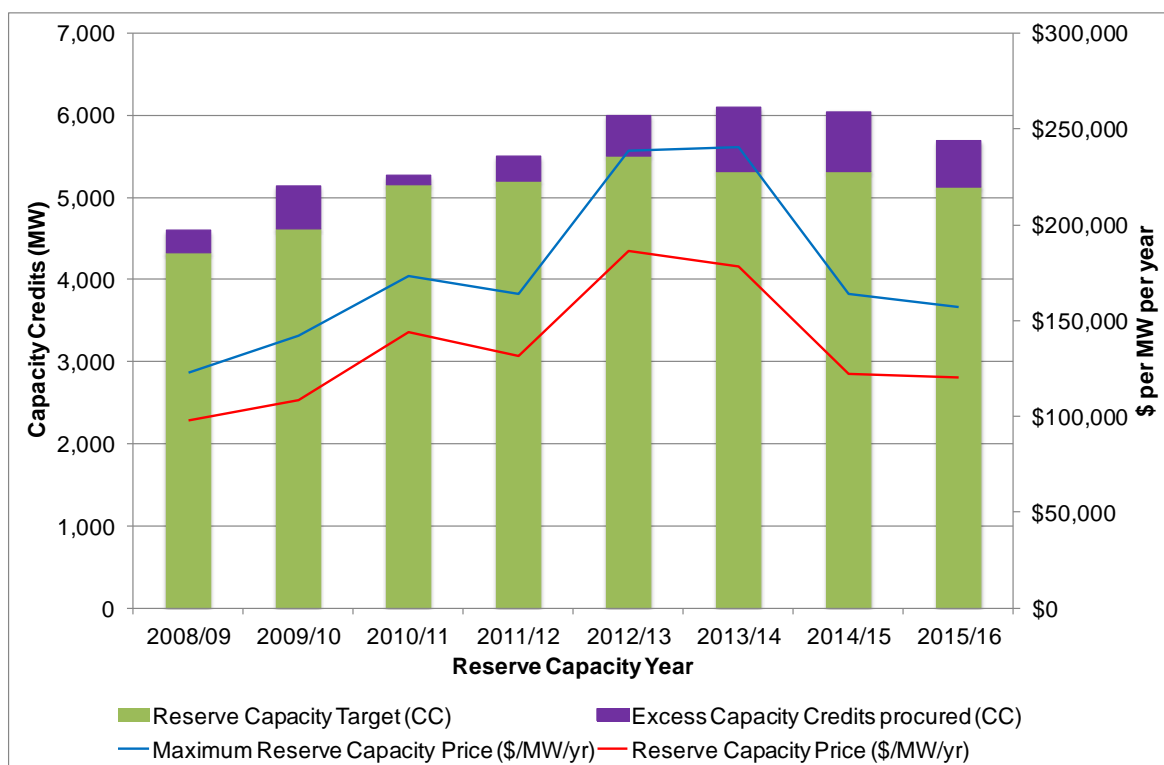
Although not required under the Market Rules, this section provides data on the Maximum Reserve Capacity Price (**MRCP**) and the Reserve Capacity Price (**RCP**).

The MRCP is the price cap that is set administratively for capacity offers into the Reserve Capacity Auction. Under the Market Rules, the IMO is required to develop a Market Procedure documenting the methodology and processes for determining the MRCP and publish the MRCP for each Reserve Capacity Cycle after it has received approval from the Authority on its proposed MRCP value.

The RCP is the price for settlement of payments to capacity procured by the IMO. If the Reserve Capacity Auction was run for the Reserve Capacity Cycle, the RCP would be set by the clearing price of the auction. Without an auction, the RCP is set administratively, in accordance with the formula specified under clause 4.29.1 of the Market Rules. Since there has been no Reserve Capacity Auction held by the IMO to date, the RCP has been a calculated value, based on the RCP formula for each Reserve Capacity Cycle.

Figure 4 below shows the MRCP, RCP, Reserve Capacity Target and excess Capacity Credits (i.e., in excess of the Reserve Capacity Requirement) procured for each Capacity Year from 2008/09 to 2015/16.

Figure 4 The Reserve Capacity Target, excess Capacity Credits, Maximum Reserve Capacity Price and Reserve Capacity Price from the 2008/09 Capacity Year to the 2015/16 Capacity Year



As can be seen from the chart above, The RCP is the price for settlement of payments to capacity procured by the IMO. If the Reserve Capacity Auction was run for the Reserve Capacity Cycle, the RCP would be set by the clearing price of the auction. Without an auction, the RCP is set administratively, in accordance with the formula specified under clause 4.29.1 of the Market Rules. Since there has been no Reserve Capacity Auction held by the IMO to date, the RCP has been a calculated value, based on the RCP formula for each Reserve Capacity Cycle.

Figure 4 below shows the MRCP, RCP, Reserve Capacity Target and excess Capacity Credits (i.e., in excess of the Reserve Capacity Requirement) procured for each Capacity Year from 2008/09 to 2015/16.

Figure 4 the MRCP has fluctuated noticeably over the period from the 2008/09 Capacity Year to the 2014/15 Capacity Year. The large increase in the MRCP in the 2012/13 Capacity Year was primarily due to an estimate provided by Western Power for the shared transmission connection cost, which was approximately 350 per cent higher than the estimated value provided by Western Power for the 2011/12 MRCP.⁸⁰ Western Power's shared transmission connection cost estimate for the 2013/14 MRCP was of a similar magnitude to its estimate for the 2012/13 Capacity Year, resulting in a similar MRCP value for the 2013/14 Capacity Year.

The MRCP value for the 2014/15 Capacity Year reduced by approximately one third in comparison to the 2013/14 Capacity Year, i.e., from \$240,600 per MW per year for the 2013/14 Capacity Year to \$163,900 per MW per year for the 2014/15 Reserve Capacity. This reduction is mainly attributable to changes in the calculation methodology as a result

⁸⁰ That is, for the overall least expensive location. See IMO web site, Final Reports for the 2011/12 MRCP (shared connection cost of \$10.158m) and 2012/13 MRCP (shared connection cost of \$46.801m), available from <http://www.imowa.com.au/mrcp> and http://www.imowa.com.au/mrcp_archive

of the revised MRCP Market Procedure, which came into effect in October 2011.⁸¹ One issue historically has been the significant variation in values and the subsequent impact on investment planning. The MRCP and RCP for the 2015/16 Capacity Year have remained fairly similar to the previous Capacity Year.

The RCP followed similar patterns to the MRCP over the same period. This is because the RCP has been determined with reference to the MRCP, based on the formula defined in the Market Rules (i.e., because no capacity auction has ever been held since market commencement).

5.1.6 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 these 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.

Table 2 below sets out, for each Facility, the average across all Trading Intervals of the capacity subject to outages, relative to the Facility's maximum generating capacity, for four periods i.e., the 2008/09 through 2012/13 Capacity Years.

The most notable Forced Outage rates were displayed by the four Vinalco Muja facilities. These were all substantially high with Muja G1 (99.5 per cent), Muja G2 (99.5 per cent), Muja G3 50.2 per cent) and Muja G4 (38.2 per cent). Aside from these four facilities, the Forced Outage rate for generation was low. Across all generation plant, the Forced Outage rate increased from 1.6 per cent in the previous reporting period to 3.6 per cent in the current reporting period. Excluding the four Vinalco facilities, the Forced Outage rate was 1.1 per cent for the reporting period.

Across all generation, the Planned Outage rate decreased fractionally from 9.3 per cent in 2011/12 to 7.9 per cent in the 2012/13 period. This current figure includes Planned Outage rates of 6.1 per cent and 11.4 per cent for the Vinalco Muja G3 and Muja G4 facilities respectively, which weren't operational in the previous reporting period.

Of the twenty six facilities which have maximum generating capacity greater than 100 MW, fifteen displayed an improvement in their Planned Outage rate. Out of Verve Energy's sixteen facilities with generating capacity greater than 100 MW, excluding their Kwinana GT2 and Kwinana GT3 facilities which did not record a Planned Outage in the previous period, eleven had lower Planned Outage rates than the previous reporting period. The most notable improvement was seen in Muja G6 facility (decreasing from 40.3 per cent in 2011/12 to 23.5 per cent in 2012/13) and Muja G8 facility (decreasing from 15.2 per cent in 2011/12 to 6.6 per cent in 2012/13). Verve Energy's Kwinana G5 reduced its Planned Outage rate to 3.0 per cent (23.0 per cent in 2011/12) however its Forced Outage rate increased from 0.4 per cent in 2011/12 to 8.4 per cent in the current period. Several of Verve Energy's facilities displayed a deterioration in Planned Outage rates, most notably Kemerton GT11 (increasing from 3.2 per cent in 2011/12 to 13.1 per cent in 2012/13) and Muja G5 (increasing from 13.9 per cent in 2011/12 to 33.2 per cent in 2012/13).

⁸¹ The Market Procedure for determining the MRCP was amended via the Procedure change process following a review and consultation process spanning 16 months from May 2010 to October 2011. For further information see the IMO website: (i) Procedure Change: PC_2011_06 web page, http://www.imowa.com.au/PC_2011_06; and (ii) Maximum Reserve Capacity Price Working Group web page, <http://www.imowa.com.au/MRCPWG>

For Verve Energy's remaining generation, ten out of the seventeen facilities displayed a deterioration in their Planned Outage rates.

Several IPPs that had facilities with high Planned Outage rates noted in the previous Minister's report displayed a much improved performance in the current period. These include NewGen Kwinana (4.5 per cent compared to 15.5 per cent previously), Griffin Bluewaters 1 (12.5 per cent compared to 14.2 per cent previously) and Alcoa Wagerup (21.6 per cent compared to 29.5 per cent previously). Amongst other facilities, improvement was also seen in Alinta's Pinjarra U2 facility, from an 11.6 per cent Planned Outage rate in 2011/12 to 1.7 per cent in the current reporting period. Higher Planned Outage rates were seen in Griffin Power 2's Bluewaters 2 facility (up from 4.5 per cent in 2011/12 to 8.7 per cent) and NewGen's Neerabup facility (up from 2.7 per cent in the previous reporting period to 6.1 per cent in the current period).

For Verve Energy's facilities across the current period, the Planned Outage rate reduced from 11.9 per cent to 10.8 per cent however the Forced Outage rate increased from 0.9 per cent to 1.5 per cent. For IPPs, there was an overall improvement for both the Planned and Forced Outage rates across the current period, with the Planned Outage rate reducing from 5.9 per cent to 4.6 per cent and the Forced Outage rate reducing from 0.9 per cent to 0.5 per cent. Outage rates for Vinalco's facilities were excluded from these calculations.

Table 2 Ratio of quantities subject to outages to maximum generating capacity for the 2009/10 to the 2012/13 Capacity Years

Participant	Resource Name	Max Gen (MW) 2009/10 Cap Year	Forced 2009/10 Cap Year	Planned 2009/10 Cap Year	Max Gen (MW) 2010/11 Cap Year	Forced 2010/11 Cap Year	Planned 2010/11 Cap Year	Max Gen (MW) 2011/12 Cap Year	Forced 2011/12 Cap Year	Planned 2011/12 Cap Year	Max Gen (MW) 2012/13 Cap Year	Forced 2012/13 Cap Year	Planned 2012/13 Cap Year
Alcoa	ALCOA_WGP	25.0	2.4%	4.6%	25.0	5.1%	10.3%	25.0	4.1%	29.5%	25.0	3.2%	21.6%
Alinta	ALINTA_PNJ_U1	145.0	0.1%	3.6%	145.0	0.2%	14.0%	145.0	0.1%	4.3%	145.0	0.0%	6.1%
Alinta	ALINTA_PNJ_U2	145.0	0.0%	6.3%	145.0	0.1%	7.0%	145.0	0.2%	11.6%	145.0	0.3%	1.7%
Alinta	ALINTA_WGP_AGG				380.0	0.0%	0.8%						
Alinta	ALINTA_WGP_GT	190.0	1.1%	0.6%	190.0	1.3%	1.8%	190.0	0.0%	2.1%	190.0	0.4%	2.5%
Alinta	ALINTA_WGP_U2	190.0	1.0%	1.2%	190.0	0.0%	2.9%	190.0	0.4%	1.7%	190.0	1.2%	3.3%
Alinta	ALINTA_WWF							89.1	0.0%		89.1	0.0%	
Blair Fox Pty Ltd	BLAIRFOX_KARAFIN_WF1										5.0		
Blair Fox Pty Ltd	BLAIRFOX_WESTHILLS_WF3										5.0		
Denmark Community	DCWL_DENMARK_WF1										1.4		
EDWF Manager	EDWFMAN_WF1	80.0	0.0%	0.1%	80.0	0.0%	0.0%	80.0		0.0%	80.0	0.3%	0.0%
Goldfields Power	PRK_AG	68.0	0.0%	1.5%	68.0	1.4%	6.1%	68.0		0.5%	68.0		0.3%
Greenough River	GREENOUGH_RIVER_PV1										10.0		
Griffin Power	BW1_BLUEWATERS_G2	217.0	1.7%	9.2%	217.0	1.2%	10.1%	217.0	5.8%	14.2%	217.0	2.3%	12.5%
Griffin Power 2	BW2_BLUEWATERS_G1	217.0	4.2%	2.4%	217.0	2.4%	8.7%	217.0	1.6%	4.5%	217.0	0.2%	8.7%
COLLGAR	INVESTEC_COLLGAR_WF1							200.0	0.1%		206.0	0.0%	0.3%
Landfill Gas & Power	CANNING_MELVILLE	3.0	0.0%	0.0%	3.0	0.0%	0.0%	1.2			1.0		
Landfill Gas & Power	RED_HILL	3.3	0.0%	0.0%	3.3	0.0%	0.0%	4.0			3.8		
Landfill Gas & Power	KALAMUNDA_SG										1.3		
Landfill Gas & Power	TAMALA_PARK	4.5	0.1%	0.0%	4.5	0.0%	0.0%	5.0			4.8		
Merredin Energy	NAMKKN_MERR_SG1										82	1.4%	4.5%
Mt Barker Power	SKYFRM_MTBARKER_WF1										2.4		
Mount Heron	MHPS										1.4		
Mumbida Wind Farm	MWF_MUMBIDA_WF1										55.0		
NewGen Neerabup	NEWGEN_NEERABUP_GT1	342.0	0.1%	3.3%	342.0	0.0%	6.0%	342.0	0.1%	2.7%	342.0	0.0%	6.1%
NewGen Kwinana	NEWGEN_KWINANA_CCG1	324.0	0.7%	3.2%	324.0	0.9%	2.3%	324.0	0.2%	15.5%	324.0	0.3%	4.5%
Perth Energy	ATLAS										1.1		
Perth Energy	ROCKINGHAM										4.0		
Perth Energy	SOUTH_CARDUP										3.4		
Western Energy	PENERGY_KWINANA_GT1				116.0	0.1%	0.2%	116.0	1.9%	3.2%	116.0	0.3%	2.4%
Southern Cross	STHRNCRS_EG	23.0	0.7%	1.4%	23.0	0.0%	0.0%	23.0	0.7%	1.4%	23.0	3.0%	2.8%

Participant	Resource Name	Max Gen (MW) 2009/10 Cap Year	Forced 2009/10 Cap Year	Planned 2009/10 Cap Year	Max Gen (MW) 2010/11 Cap Year	Forced 2010/11 Cap Year	Planned 2010/11 Cap Year	Max Gen (MW) 2011/12 Cap Year	Forced 2011/12 Cap Year	Planned 2011/12 Cap Year	Max Gen (MW) 2012/13 Cap Year	Forced 2012/13 Cap Year	Planned 2012/13 Cap Year
TESLA	TESLA_GERALDTON_G1							9.9		0.5%	9.9		27.4%
TESLA	TESLA_KEMERTON_G1										9.9		9.1%
TESLA	TESLA_NORTHAM_G1										9.9		4.7%
TESLA	TESLA_PICTON_G1							9.9	0.3%	3.6%	9.9		1.6%
Tiwest	TIWEST_COG1	37.7	0.0%	4.6%	37.7	1.2%	3.1%	36.0	0.1%	3.7%	39.7	1.2%	2.1%
Verve Energy	ALBANY_WF1	21.6	0.0%	0.0%	21.6	0.0%	0.2%	21.6		0.0%	21.6		0.0%
Verve Energy	COCKBURN_CCG1	236.6	0.0%	5.3%	236.6	0.0%	17.5%	236.6	1.0%	4.8%	236.6	0.2%	2.8%
Verve Energy	COLLIE_G1	318.0	0.3%	9.1%	318.0	0.6%	14.7%	318.0	3.6%	11.7%	318.0	0.2%	9.0%
Verve Energy	GERALDTON_GT1	20.8	0.2%	2.2%	20.8	0.4%	0.3%	20.8	0.0%	4.2%	20.8	0.9%	11.4%
Verve Energy	GRASMERE_WF1							13.8		0.0%	13.8		0.1%
Verve Energy	KALBARRI_WF1										1.6		
Verve Energy	KEMERTON_GT11	154.0	0.0%	3.4%	154.0	0.0%	4.2%	154.0	0.1%	3.2%	154.0	0.0%	13.1%
Verve Energy	KEMERTON_GT12	154.0	0.0%	3.4%	154.0	0.0%	15.7%	154.0		0.1%	154.0	0.5%	1.3%
Verve Energy	KWINANA_G1	111.5	0.1%	28.7%	111.5	5.2%	9.7%						
Verve Energy	KWINANA_G2	111.5	3.1%	30.3%	111.5	4.9%	16.9%						
Verve Energy	KWINANA_G5	177.0	1.0%	31.8%	177.0	0.0%	53.6%	177.0	0.4%	23.0%	180.0	8.4%	3.0%
Verve Energy	KWINANA_G6	177.0	0.0%	53.5%	177.0	2.5%	49.6%	177.0	1.4%	25.9%	184.0	2.3%	24.0%
Verve Energy	KWINANA_GT1	20.8	2.2%	22.8%	20.8	0.0%	21.9%	20.8		2.0%	20.8	0.1%	19.5%
Verve Energy	KWINANA_GT2							100.1	0.1%		100.1	2.5%	12.0%
Verve Energy	KWINANA_GT3							100.1	0.1%		100.1	3.8%	12.6%
Verve Energy	MUJA_G5	185.0	0.7%	48.4%	185.0	15.8%	18.7%	185.0	0.5%	13.9%	195.7	1.2%	33.2%
Verve Energy	MUJA_G6	185.0	1.1%	28.0%	185.0	0.4%	20.5%	185.0	4.1%	40.3%	190.8	1.0%	23.5%
Verve Energy	MUJA_G7	211.0	1.6%	8.6%	211.0	0.0%	42.9%	211.0	0.1%	5.5%	211.0	2.7%	4.3%
Verve Energy	MUJA_G8	211.0	1.0%	4.8%	211.0	1.9%	18.5%	211.0	0.4%	15.2%	211.0	4.5%	6.6%
Verve Energy	MUNGARRA_GT1	37.2	0.3%	2.7%	37.2	0.0%	5.4%	37.2	1.9%	0.4%	37.2		8.9%
Verve Energy	MUNGARRA_GT2	37.2	0.6%	5.4%	37.2	0.1%	0.7%	37.2	0.2%	6.4%	37.2	0.1%	1.6%
Verve Energy	MUNGARRA_GT3	38.2	1.5%	0.6%	38.2	1.5%	10.9%	38.2	0.0%	0.5%	38.2	1.1%	17.1%
Verve Energy	PINJAR_GT1	37.2	0.4%	1.1%	37.2	0.0%	7.4%	37.2	0.0%	0.1%	37.2	0.0%	5.3%
Verve Energy	PINJAR_GT10	116.0	0.2%	11.8%	116.0	0.4%	10.4%	116.0	0.5%	27.9%	116.0	0.3%	21.7%
Verve Energy	PINJAR_GT11	123.0	0.0%	65.1%	123.0	0.1%	49.3%	123.0	0.1%	19.9%	123.0	0.2%	10.7%
Verve Energy	PINJAR_GT2	37.2	0.0%	1.1%	37.2	0.2%	5.2%	37.2		1.4%	37.2		9.6%
Verve Energy	PINJAR_GT3	38.2	0.0%	10.3%	38.2	0.3%	0.1%	38.2		12.7%	38.2		0.2%

Participant	Resource Name	Max Gen (MW) 2009/10 Cap Year	Forced 2009/10 Cap Year	Planned 2009/10 Cap Year	Max Gen (MW) 2010/11 Cap Year	Forced 2010/11 Cap Year	Planned 2010/11 Cap Year	Max Gen (MW) 2011/12 Cap Year	Forced 2011/12 Cap Year	Planned 2011/12 Cap Year	Max Gen (MW) 2012/13 Cap Year	Forced 2012/13 Cap Year	Planned 2012/13 Cap Year
Verve Energy	PINJAR_GT4	38.2	0.0%	20.4%	38.2	0.0%	1.7%	38.2		6.7%	38.2	0.2%	0.2%
Verve Energy	PINJAR_GT5	38.2	0.2%	8.4%	38.2	0.4%	7.8%	38.2	1.0%	1.0%	38.2		6.0%
Verve Energy	PINJAR_GT7	38.2	0.0%	29.9%	38.2	0.1%	0.2%	38.2	0.4%	5.9%	38.2	0.0%	0.3%
Verve Energy	PINJAR_GT9	116.0	0.1%	9.4%	116.0	0.0%	27.3%	116.0	0.1%	16.7%	116.0	0.2%	5.9%
Verve Energy	PPP_KCP_EG1	79.2	7.7%	1.9%	85.7	0.0%	4.7%	85.7	0.0%	0.5%	85.7	0.9%	8.8%
Verve Energy	WORSLEY_COGEN_COG1	119.0	1.0%	2.3%	116.4	1.8%	17.1%	116.4		3.5%	116.4	0.5%	2.7%
Verve Energy	WEST_KALGOORLIE_GT2	38.2	0.0%	0.0%	38.2	0.1%	4.3%	38.2	1.0%	0.1%	38.2	0.2%	18.5%
Verve Energy	WEST_KALGOORLIE_GT3	24.6	0.0%	0.0%	24.6	0.0%	3.5%	24.6		19.7%	24.6	1.2%	5.5%
Vinalco Energy	MUJA_G1										55.0	99.5%	
Vinalco Energy	MUJA_G2										55.0	99.5%	
Vinalco Energy	MUJA_G3										55.0	50.2%	6.1%
Vinalco Energy	MUJA_G4										55.0	38.2%	11.4%
Waste Gas	HENDERSON_RENEWABLE_IG1	3.2	0.3%	0.0%	3.2	0.0%	0.0%	3.0	0.2%		3.0	0.2%	
Total (MW) and averages (%)		5,268.3	0.7%	10.3%	5,768.2	1.0%	10.7%	5685.6	1.6%	9.3%	6134.6	3.6%	7.9%

*Capacity Year starts 1 October and ends 30 September the following year. Maximum Generating Capacity of each facility was sourced from IMO's website. Planned and Forced Outages include full and partial ex-post outages for each facility for the Reporting Period. Blanks in the above table for some facilities denote no Outages to be reported.

5.2 Energy markets

5.2.1 *Short Term Energy Market*

Clause 2.16.2(c) of the Market Rules requires that the MSDC identify clearing prices in each STEM Auction. There are also requirements under clause 2.16.4 of the Market Rules 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 Energy 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 of the Market Rules.

5.2.1.1 *Short Term Energy Market Clearing Prices*

STEM Clearing Prices are summarised separately for Peak Trading Intervals (occurring between 8 am and 10 pm) and Off-Peak Trading Intervals (occurring between 10 pm and 8 am). 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 3 sets out the mean and standard deviations of peak and off-peak clearing prices from:

- 21 September 2006 (market commencement) to 30 June 2013;
- 1 August 2010 to 31 July 2011 (i.e. the previous Reporting Period);
- 1 August 2011 to 30 June 2012 (i.e. the current Reporting Period); and
- 1 July 2012 to 30 June 2013.

It can be seen that, for peak period, the mean STEM Clearing price during the current Reporting Period increased by 22 per cent compared to the corresponding price in the previous Reporting Period. The mean STEM Clearing Price for the off-peak period increased significantly by 61 per cent compared to the previous Reporting Period. Clearly, mean STEM prices for this Reporting Period were higher than the long term average, i.e. from market commencement to 30 June 2013.

Table 3 Mean and standard deviations of STEM Clearing Prices (\$/MWh)

Trading Intervals	21 Sep 06 - 30 Jun 13		1 Aug 10 - 31 Jul 11		1 Aug 11 - 30 Jun 12		1 Jul 12 - 30 Jun 13	
	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
Off-Peak	33.12	25.87	25.68	15.28	26.55	13.79	42.80	11.90
Peak	62.21	50.17	46.63	34.24	52.10	28.84	63.44	18.24

Figure 5 and Figure 6 illustrate, respectively, average daily peak and off-peak STEM Clearing Prices for each Trading Day from 21 September 2006 (market commencement) up to 30 June 2013, as well as 30-day, 90-day and annual moving average prices.

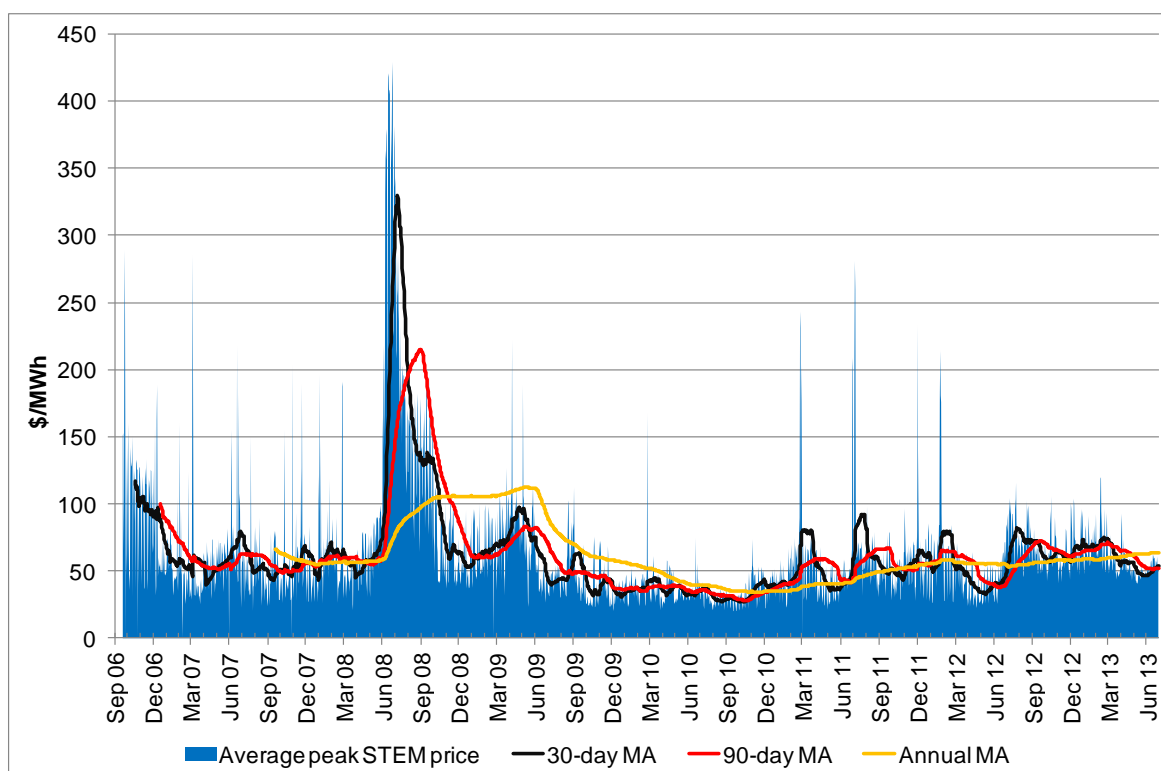
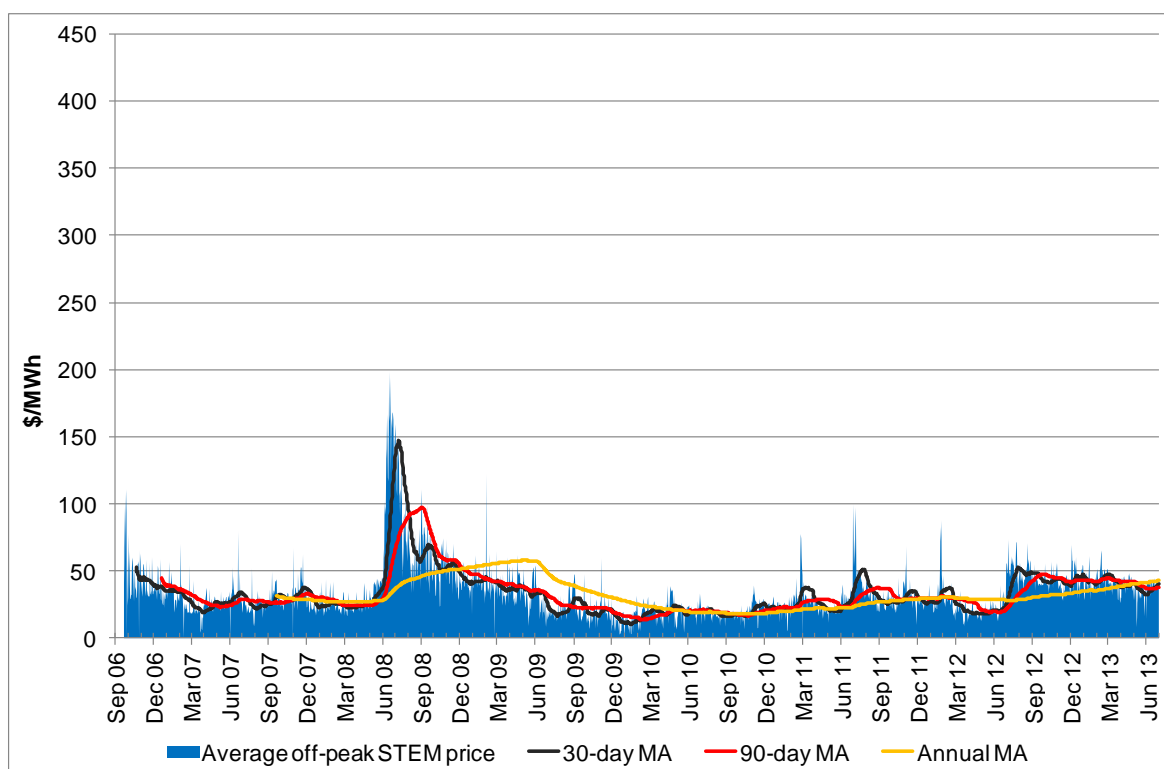
Figure 5 Daily Average STEM Clearing Prices (Peak Trading Intervals)

Figure 6 Daily Average STEM Clearing Prices (Off-Peak Trading Intervals)

Following a period of high prices immediately after market commencement, STEM Clearing Prices were relatively stable in 2007 and 2008, prior to the Varanus Island incident (which occurred in June 2008).⁸² Following the incident and the subsequent curtailment of gas supplies, prices increased significantly, peaking at a daily average in excess of \$400/MWh during Peak Trading Intervals and a daily average of close to \$200/MWh during Off-Peak Trading Intervals. The average peak and off-peak prices have been at lower levels each Reporting Period since that event in June 2008. It is observed that the average clearing price for the peak and the off-peak periods during the current Reporting Period increased notably compared to the corresponding prices in the previous two Reporting Periods. The introduction of the Carbon Tax in July 2012 has contributed to that increase.

During the Reporting Period, significantly higher average peak and off-peak period prices were observed during the month of July and August. The higher average prices at the start of the Reporting Period were attributed by factors like the absence of lower priced STEM Offer quantities due to a high level of Planned Outages, significant change in market dynamics due to the beginning of New Balancing Market and Market Participants including Carbon Price in their STEM Offers. The average peak period prices reduced in October and November, but increased notably during the peak summer period (from December to mid- March). However, the STEM Price did not reach the Maximum STEM Price (energy price limit) during the peak summer period compared to 26 instances in the previous summer period.

⁸² The incident was caused by the rupture of a corroded pipeline and subsequent explosion at a processing plant on Varanus Island on 3 June 2008. The plant, operated by Apache Energy, which normally supplied a third of the State's gas, was shut down for almost two months while a detailed engineering investigation and major repairs were carried out. Gas supply from the plant was partially resumed in late August 2008. By mid-October 2008, gas production was running at two-thirds of normal capacity, with 85 per cent of full output restored by December 2008.

The maximum STEM Price during peak periods was \$195.05/MWh at 4:30 pm on 25 July 2012 with the STEM Clearing quantity of 61.261 MWh. Griffin Power purchased the majority of these quantities, due to its Bluewaters_1 facility being unavailable for generation (on Forced Outage from 23 to 27 July 2012). The high price was also attributed by the absence of lower priced STEM Offer quantities (due to Planned Outages of Verve Energy's facilities which also included a major coal facility). The STEM Price during peak periods reached \$179.24/MWh from 12:00 pm to 2:30 pm on 13 February 2013, with the STEM clearing quantity about 60.00 MWh. Verve Energy purchased all the clearing quantities, whilst Alinta was the major seller. The forecasted demand was significantly high as 12 and 13 February 2013 were consecutive Trading Days with highest average demand.

The lowest STEM Clearing Prices observed in off-peak periods during the current Reporting Period occurred in early May 2013. These were primarily due to periods of low overnight load forecast coinciding with a relatively large volume of low priced quantities available from base-load Scheduled Generators. The lowest STEM Clearing Price reached was negative \$14.24/MWh at 3:30 am on 8 May 2013.

5.2.1.2 Volatility of Short Term Energy Market Clearing Prices

The Market Rules require the Authority to publish statistical analysis of the volatility of prices in the STEM Auctions. Figure 7 and Figure 8 show the mean and standard deviation (as well as maxima and minima), by month, of STEM Clearing Prices for Peak and Off-Peak Trading Intervals, from market commencement up to 30 June 2013.

Figure 7 indicates that peak STEM Clearing Prices during the current Reporting Period were relatively volatile in July 2012 and in February 2013 compared with other months during the Reporting Period. Figure 8 indicates off-peak STEM Clearing Prices during the current Reporting Period were slightly volatile in July 2012, August 2012 and October 2012. The Authority notes that the volatility in peak and off-peak STEM Clearing Prices has reduced significantly compared to the previous Reporting Period.

Figure 7 Summary statistics for STEM Clearing Prices in Peak Trading Intervals (per calendar month)

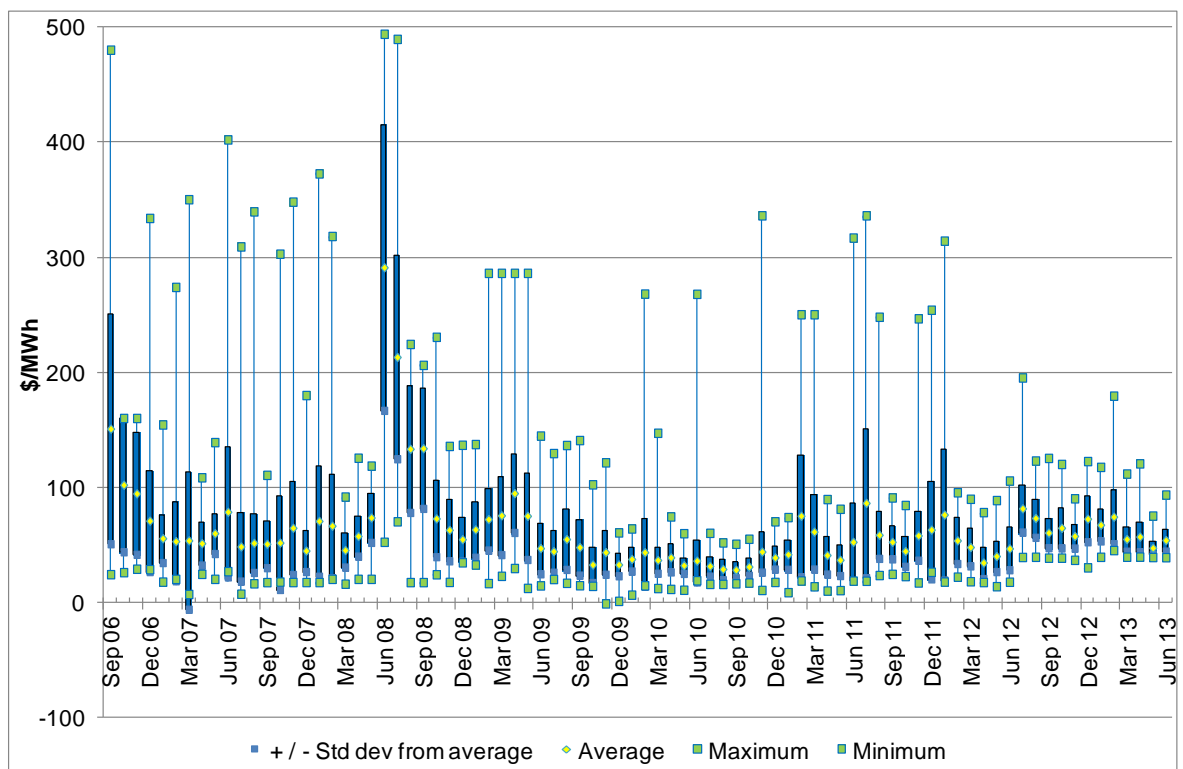
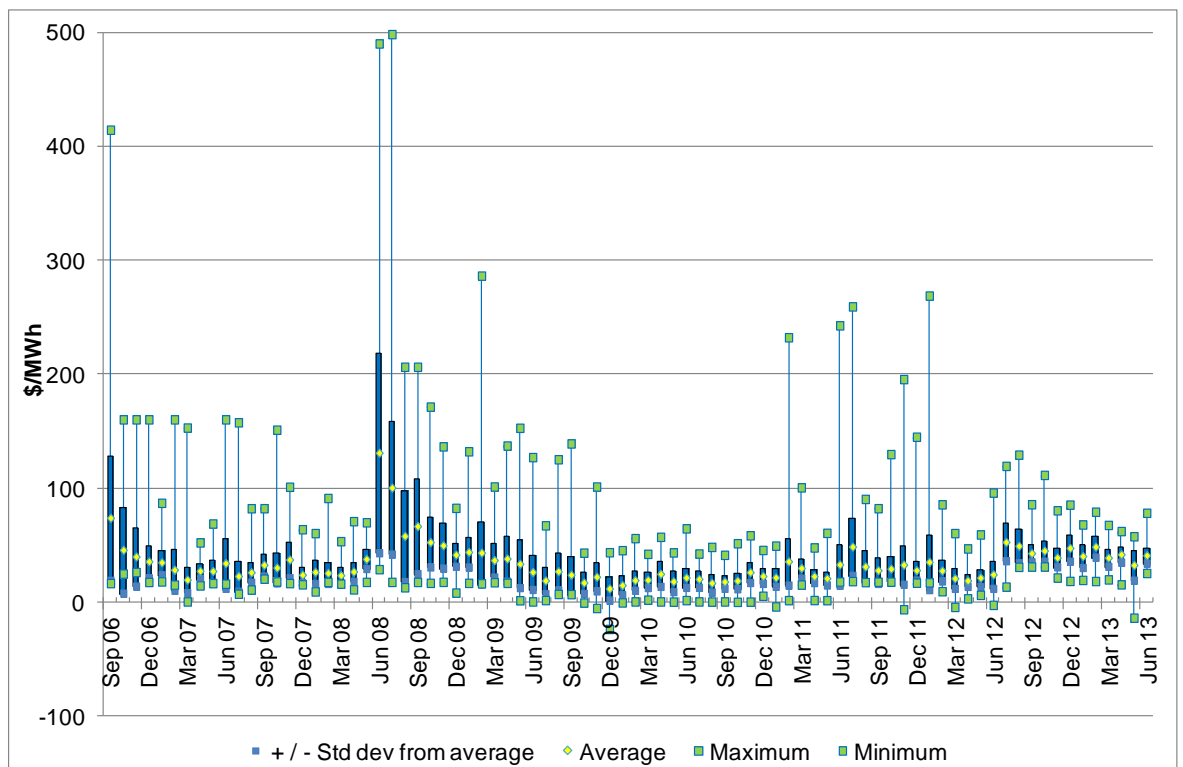


Figure 8 Summary statistics for STEM Clearing Prices in Off-Peak Trading Intervals (per calendar month)



5.2.1.3 *High prices in the Short Term Energy Market*

Clause 2.16.4 of the Market Rules requires an examination of both the incidence 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 Clearing Prices are at the Energy Price Limits.⁸³ There are two Energy Price Limits set out in the Market Rules that act as a cap on high prices.

- The Maximum STEM Price sets the price cap for generators using fuel types other than liquid fuel. This price is determined based on the IMO's estimate of the short run marginal cost of the highest cost generating unit in the SWIS fuelled by natural gas. The Market Rules specify that the IMO must review the Maximum STEM Price annually. For the current Reporting Period, the Maximum STEM Price was \$323/MWh,⁸⁴ compared with \$314/MWh in the previous Reporting Period.⁸⁵
- The Alternative Maximum STEM Price sets the price cap for generators running on liquid fuel. This price is determined based on the IMO's estimate of the short run marginal cost of the highest cost generating unit in the SWIS fuel by distillate. The Market Rules specify that the IMO must review the Alternative Maximum STEM Price annually and the price is adjusted monthly to reflect changes in oil prices and the Consumer Price Index (CPI). During the current Reporting Period, the Alternative Maximum STEM ranged between \$510/MWh (for October 2012) and \$547/MWh (for July 2012).⁸⁶

Figure 9 and Figure 10 illustrate the proportion of peak and off-peak Trading Intervals during which STEM Clearing Prices were at the Maximum STEM Price and Alternative Maximum STEM Price.

Figure 9 shows that, since 2008, the highest incidence of both off-peak and peak STEM Clearing Prices reaching the Maximum STEM Price occurred between June and September 2008, which coincided with the Varanus Island incident. STEM Clearing Prices also reached the Maximum STEM Price during Peak Trading Intervals between March 2009 and May 2009 and during three Peak Trading Intervals, twice on 3 November 2010 and once on 6 July 2011. In the previous Reporting Period STEM Clearing Prices reached the Maximum STEM Price during 26 Peak Trading Intervals in January 2012,⁸⁷ eight intervals on 25 January 2012, 11 on 26 January 2012 and seven on 28 January

⁸³ The Energy Price Limits comprise of the Maximum STEM Price, the Alternative Maximum STEM Price and the Minimum STEM Price. Refer to clause 6.20 of the Market Rules for more details.

⁸⁴ The Maximum STEM Price of \$336/MWh applicable for the period from 1 October 2010 to 1 November 2011 has been the highest since the market commenced, with the lowest being \$153.73/MWh in September 2006.

⁸⁵ The final Maximum STEM Price value was delayed and came to effect on 1 November 2011.

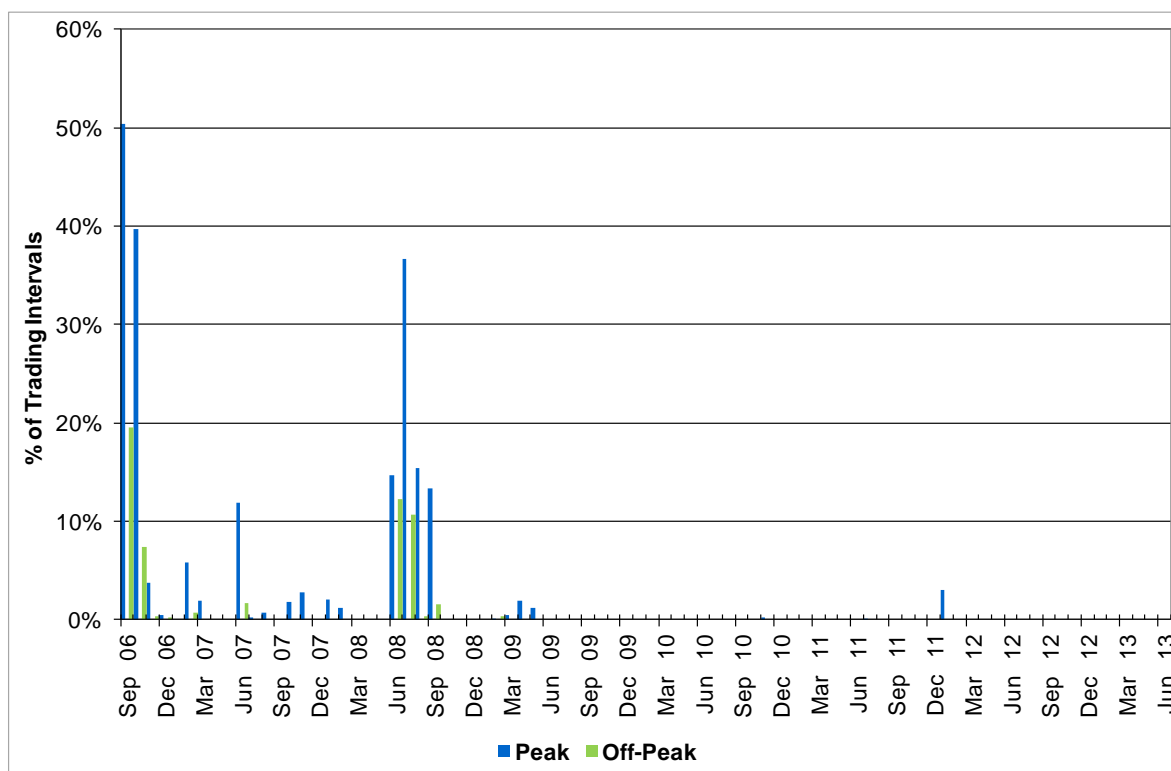
⁸⁶ Since market commencement, the Alternative Maximum STEM Price has been as low as \$380/MWh (during March 2007 and April 2007) and as high as \$779/MWh (during September 2008).

⁸⁷ The STEM Clearing Price reached the Maximum STEM Price during the 1.30 pm to 4.00 pm, 9.00 pm and 9.30 pm Trading Intervals on 25 January 2012; during the 12:30 pm to 5:30 pm Trading Intervals on 26 January 2012; and during the 1:30 pm to 4:30 pm on 28 January 2012. These high prices were due to a combination of factors including: a high maximum temperature range between 41.1°C and 42.1°C. The Load Forecast was significantly high for the high prices Trading Intervals and it averaged 1631 MWh. Griffin's Bluewaters 2 facility was on a partial Planned Outage (40 MW) from 8.00 am on 21 January to 9.30 pm on 25 January; and on a full Planned Outage (216 MW) from 10.00 pm on 25 January to 12.30 am on 29 January. As a result, Griffin Power 2 bid to buy quantities of energy (between 20 MWh to 40 MWh) as a price taker, presumably to cover its bilateral position during peak summer period. It was also observed that due to high Load Forecast Verve Energy had contracted quantities exceeding 1,000 MWh to meet the scheduled demand in peak Trading Intervals, with no quantities offered below \$314/MWh (the Maximum STEM Price) in its STEM Offer side. There were no major Verve Energy's Planned Outages observed on these high price Trading Days.

2012. In the current Reporting Period, the STEM Price did not reach the Maximum STEM Price⁸⁸.

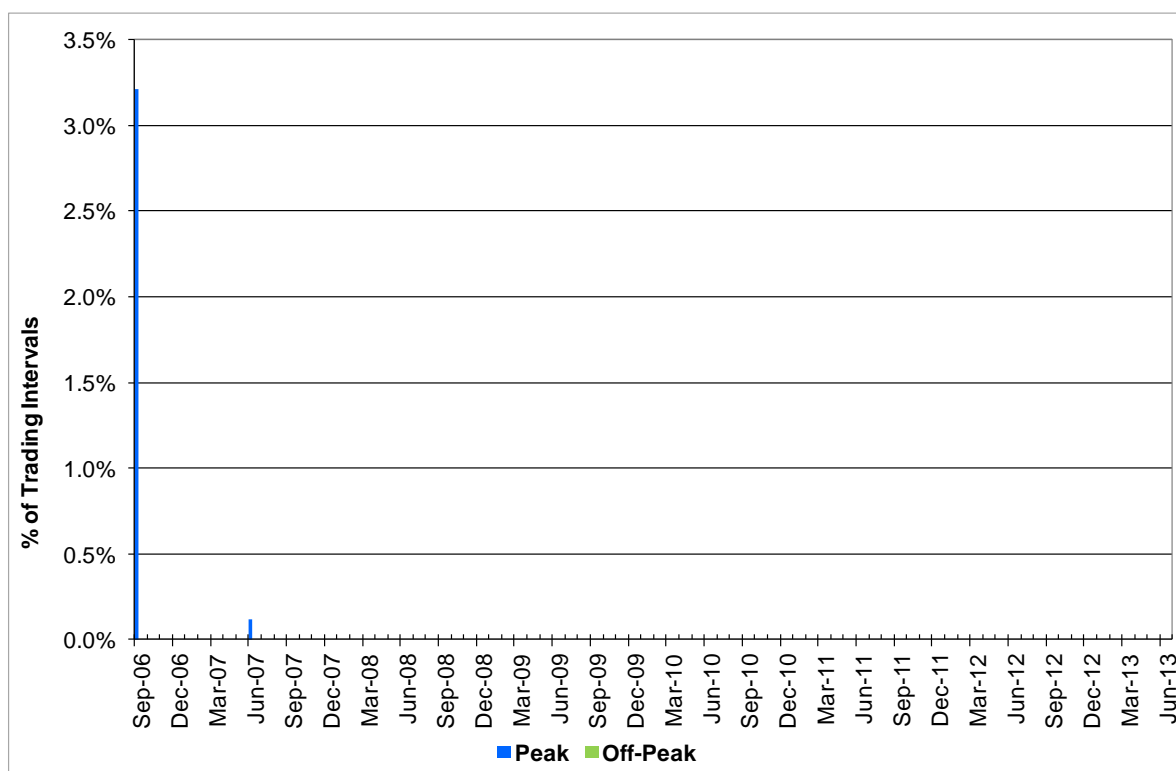
Figure 10 shows that STEM Clearing Prices only reached the Alternative Maximum STEM Price during Peak Trading Intervals in September 2006 and June 2007. Since then, STEM Clearing Prices have not reached the Alternative Maximum STEM Price.

Figure 9 Proportion of Trading Intervals STEM Clearing Prices at Maximum STEM Price (per calendar month)



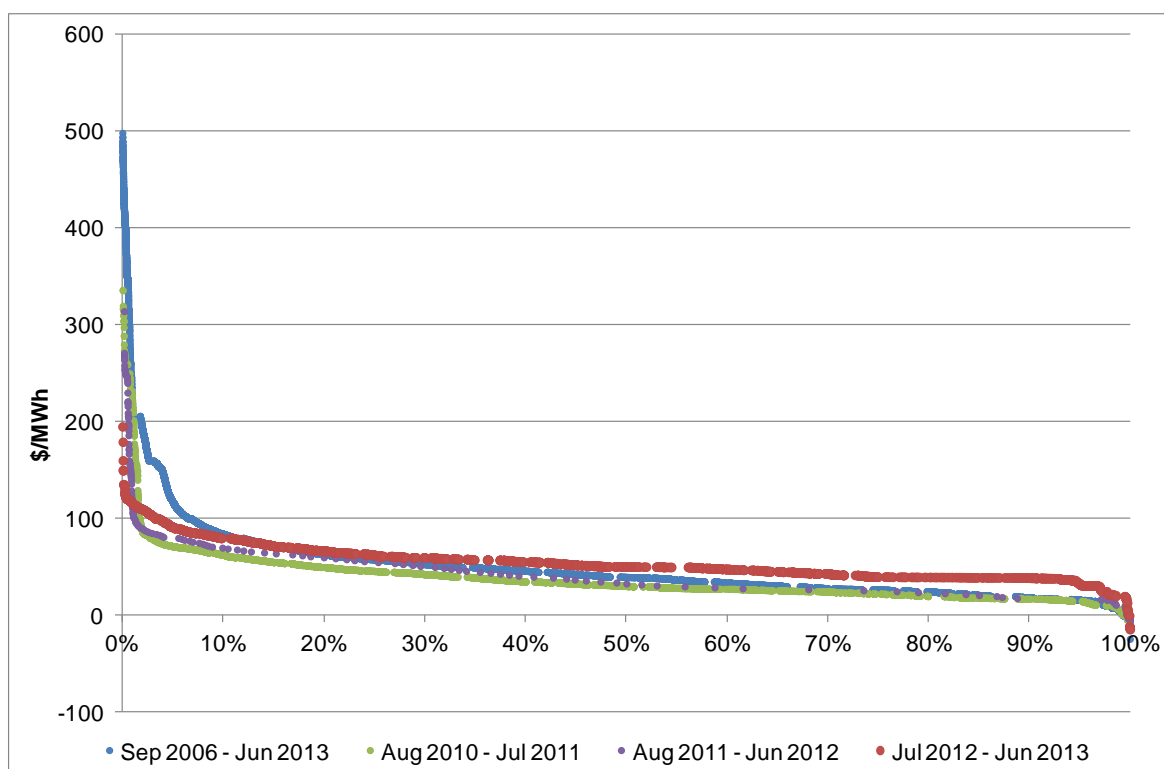
⁸⁸ The highest STEM Clearing Price was \$179.24/MWh from 12:00 pm to 2:30 pm on 13 February 2013.

Figure 10 Proportion of Trading Intervals STEM Clearing Prices at Alternative Maximum STEM Price (per calendar month)



Another way of examining the incidence of high prices is to plot a price duration curve. Figure 11 sets out the price duration curves for STEM Clearing Prices, covering all Trading Intervals from 21 September 2006 (market commencement) to 30 June 2013, and comparing the curve for the current Reporting Period with the curves from the previous two Reporting Periods (August 2010 to July 2011 and August 2011 to June 2012) and the current Reporting Period.

Figure 11 shows that STEM Clearing Prices were between \$0.00/MWh and \$100.00/MWh for approximately 96.33 per cent of Trading Intervals during the current Reporting Period, with a fairly even distribution of prices within this range. The prices ranged between \$100.00/MWh and \$195.05/MWh for 3.61 per cent of Trading Intervals, and were negative, between \$0.00/MWh and -\$14.24/MWh, for 0.06 per cent of Trading Intervals. It can be seen from the red line that the price duration curve for the current Reporting Period is higher than the price duration curve for last two Reporting Periods (purple and green) for about 80 per cent of the duration. The lowest STEM Clearing Price reached was negative \$14.24/MWh at 3:30 am on 8 May 2013. In the previous Reporting Period, negative price instances were higher as the prices fell between -\$6.00/MWh and \$0.00/MWh for approximately 0.21 per cent of Trading Intervals.

Figure 11 Comparison of price duration curves for STEM Clearing Prices

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. In previous Reports to the Minister the Authority highlighted that a simple correlation between capacity and prices will fail to capture other factors that can influence STEM Clearing Prices, such as bidding behaviour and demand conditions, and that more detailed analysis was required to understand the key determinants of high prices in the STEM⁸⁹. For these reasons, correlations between STEM Clearing Prices and quantities offered are not included in this report. Clause 2.16.4(g) of the Market Rules requires the IMO to explore the key determinants for high prices in the STEM, Balancing and LFAS markets. As noted in previous Reports to the Minister, the Authority is continuing to work with the IMO to develop an appropriate econometric model⁹⁰ for undertaking the analysis required under clause 2.16.4(e) and clause 2.16.4(g) of the Market Rules.

5.2.1.4 Short Term Energy Market Offers and 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 determines STEM Offers and STEM Bids for each Market Participant, and for each Trading Interval that 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

⁸⁹ For example see ERA website, *Annual Wholesale Electricity Market Report for the Minister for Energy – 21 December 2007*, pp. 18-20, http://www.erawa.com.au/cproot/6444/2/20080319_Annual_Wholesale_Electricity_Market_Report_for_the_Minister_for_Energy_2007.pdf

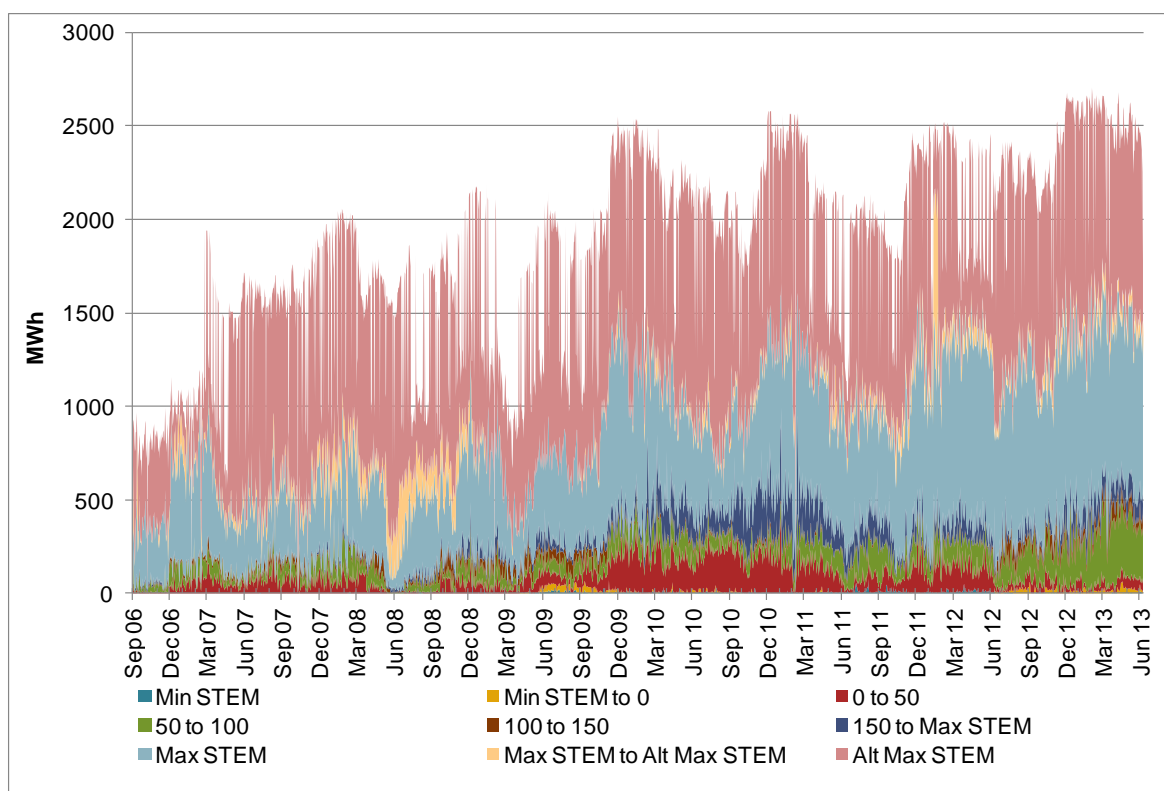
⁹⁰ This model estimates the numerical relationships between WEM variables such as temperature, load forecasts, energy prices, plant availability and fuel curtailments.

then converting this into STEM Offers and STEM Bids, relative to the Market Participant's Net Bilateral Position.

Short Term Energy Market Offers

STEM Offers reflect an increase in generation or a decrease in consumption. Figure 12 illustrates the daily average quantity of STEM Offers per Trading Interval for all Market Participants from market commencement until 30 June 2013.

Figure 12 Daily average quantity of STEM Offers (MWh per Trading Interval)



The majority of energy has consistently been offered at prices equal to the Maximum STEM Price and the Alternative Maximum STEM Price.⁹¹ Smaller volumes tend to be offered at prices below the Maximum STEM Price. The extent of offers below the Maximum STEM Price varies significantly over time.

As previously reported there were notable quantities available in STEM Offers in the price range of \$0/MWh to \$50/MWh from November 2009 until June 2012. The quantities in this price range have been minimal in the current Reporting Period, whilst a notable increase has been observed in the quantities offered in the price range of \$50/MWh to \$100/MWh. The Authority considers the increase in STEM Offers quantities in the price range of \$50/MWh to \$100/MWh is a result of inclusion of Carbon Tax by Market Participants from 1 July 2012.

⁹¹ In constructing the STEM Offers and STEM Bids, a Market Customer's demand that is covered in a Bilateral Contract is defined as a STEM Offer. Since the value of electricity for end users is high, as evidenced in the high maximum spot price of \$12,500/MWh in the National Electricity Market, Market Customers normally price reductions in their demand to reflect the high value for that electricity. In the WEM, this high priced demand becomes STEM Offers at the Alternative Maximum STEM Price. Thus, large quantities offered at the Alternative Maximum STEM Price are to be expected in the STEM.

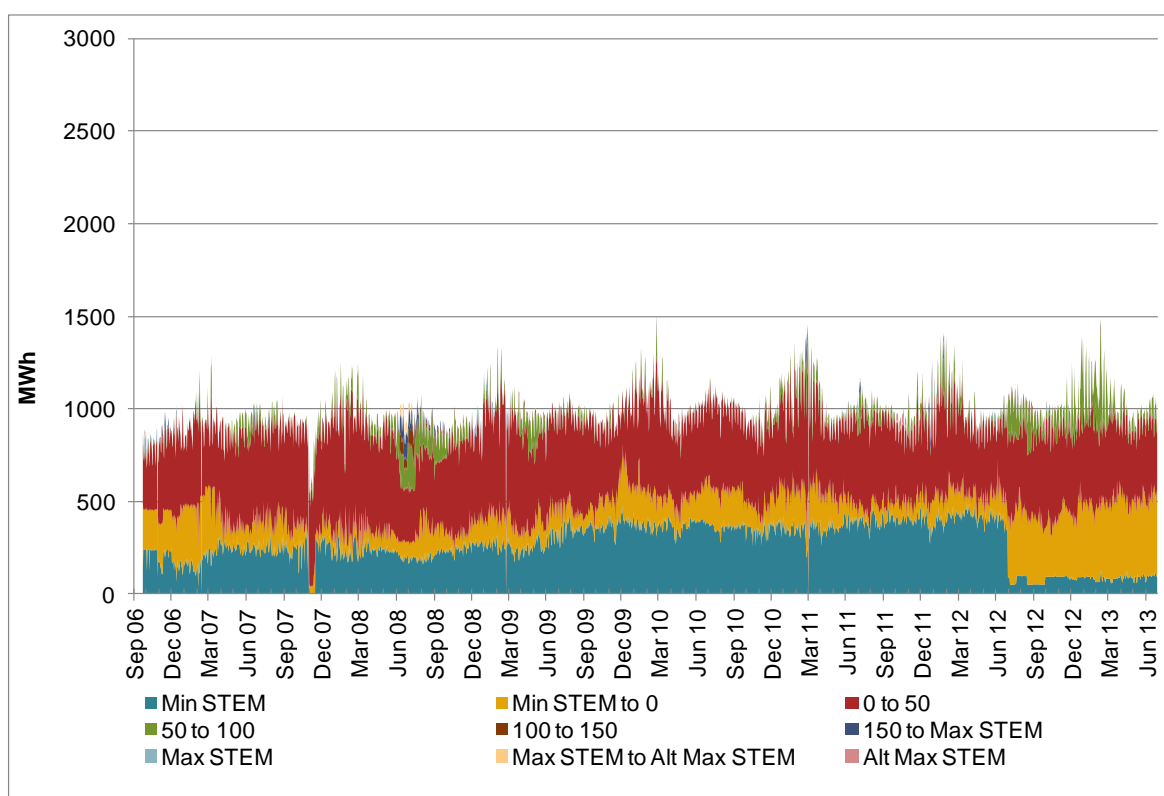
STEM Offers for each Market Participant are set out separately in Figure 36 to Figure 56 in Appendix 3. These figures show clear differences in the volumes and prices at which Market Participants have offered quantities into the STEM since market commencement. A discussion of notable changes in Market Participants' STEM Offers during the current Reporting Period is also included in Appendix 3.

Verve Energy continues to account for the largest volumes of STEM Offers, with an average of 33 per cent of the total offer volumes during the current Reporting Period (compared to 32 per cent of the total offer volumes in the previous Reporting Period). Verve Energy offered 67 per cent of its total STEM Offer volumes between the price range \$150/MWh and Maximum STEM Price (inclusive), with 22 per cent between the price range \$50/MWh and \$100/MWh. Synergy, as a retailer, accounted for 29 per cent of the total offer volumes during the current Reporting Period compared with 33 per cent in the previous Reporting Period.

Short Term Energy Market Bids

STEM Bids reflect a decrease in generation or an increase in consumption. Figure 13 illustrates the daily average quantity of STEM Bids per Trading Interval for all Market Participants, from market commencement until 30 June 2013.

Figure 13 Daily average quantity of STEM Bids (MWh per Trading Interval)



By design, the high level of Market Customer's bilateral commitment (in terms of its demand) will result in the volume of STEM Bids being lower than the volume of STEM Offers. This is evident in a comparison of Figure 12 and Figure 13.

As can be seen in Figure 13, significant quantities of energy have consistently been bid into the STEM at Minimum STEM Price, and between Minimum STEM Price and \$50/MWh. In the STEM's design this outcome would be expected, given that it covers

quantities already contracted and represents must-run⁹² and lower cost capacities (such as coal fired generators), which can be expensive to shutdown and restart. Quantities have been bid at higher prices only infrequently. In the current Reporting Period notable quantities have been bid between the price range \$50/MWh and \$100/MWh.

STEM Bids for each Market Participant are set out separately in Figure 58 through Figure 73 in Appendix 3.

Similar to the STEM Offers, Verve Energy accounted for the largest volumes of STEM Bids, approximately 60 per cent, for the current Reporting Period compared to 57 per cent in the previous Reporting Period.

5.2.1.5 Short Term Energy Market traded quantities

Although not required under the Market Rules, this section provides information on STEM traded quantities.

Table 4 shows the annual average of STEM traded quantities among Market Participants (cumulative MWh per Trading Interval) for six yearly periods since market commencement, as well as an overall average from market commencement to 30 June 2013.

Table 4 Average STEM traded quantities (MWh per Trading Interval)

	1 Aug 07 - 31 Jul 08	1 Aug 08 - 31 Jul 09	1 Aug 09 - 31 Jul 10	1 Aug 10 - 31 Jul 11	1 Aug 11 - 30 Jun 12	1 Jul 12 - 30 Jun 13	Average
STEM traded quantities	13.75	32.31	53.60	64.39	50.56	67.82	42.39

Note: 'Average quantities' are for the overall period, i.e., 21 September 2006 to 30 June 2013.

Figure 14 and Figure 15 show the daily average volume bought and sold in the STEM, respectively, for all Market Participants, from market commencement to 30 June 2013.

The historical volume traded in the STEM remained relatively low until the commencement of the 2008/09 Capacity Year in October 2008. Since then traded volumes have increased substantially, which is largely attributed to the entry of NewGen and Griffin Power in that Capacity Year. Increased STEM trade volume carried on during the last two Reporting Periods and was driven primarily by a number of IPP's seeking to sell energy in the STEM, including Alinta, Griffin Power and NewGen. As seen in Figure 14, the major buyers in the STEM in the current Reporting Period were Verve Energy, closely followed by Alinta, ERM Power Retail, Synergy, Griffin Power and NewGen.

Figure 15 shows that during the current Reporting Period Synergy was the largest STEM seller, followed by Alinta Sales, Verve Energy and Griffin Power 2.

⁹² Generator co-located with, and providing steam to, an industrial plant.

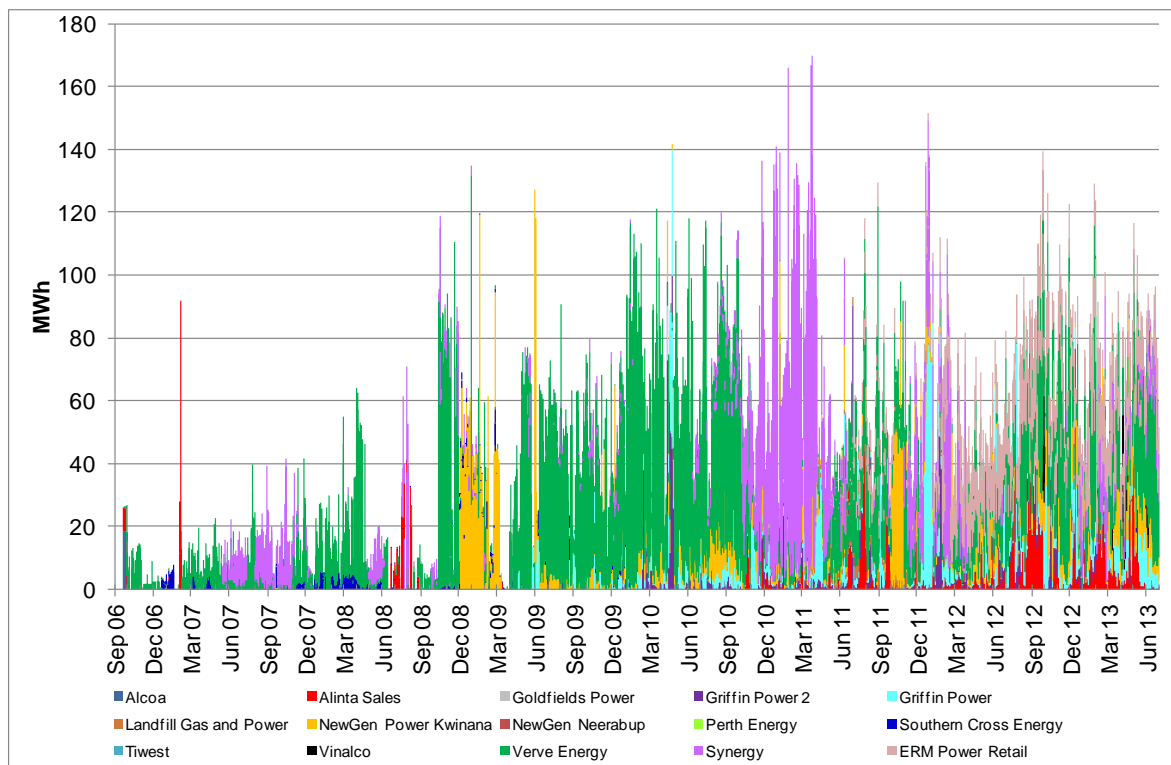
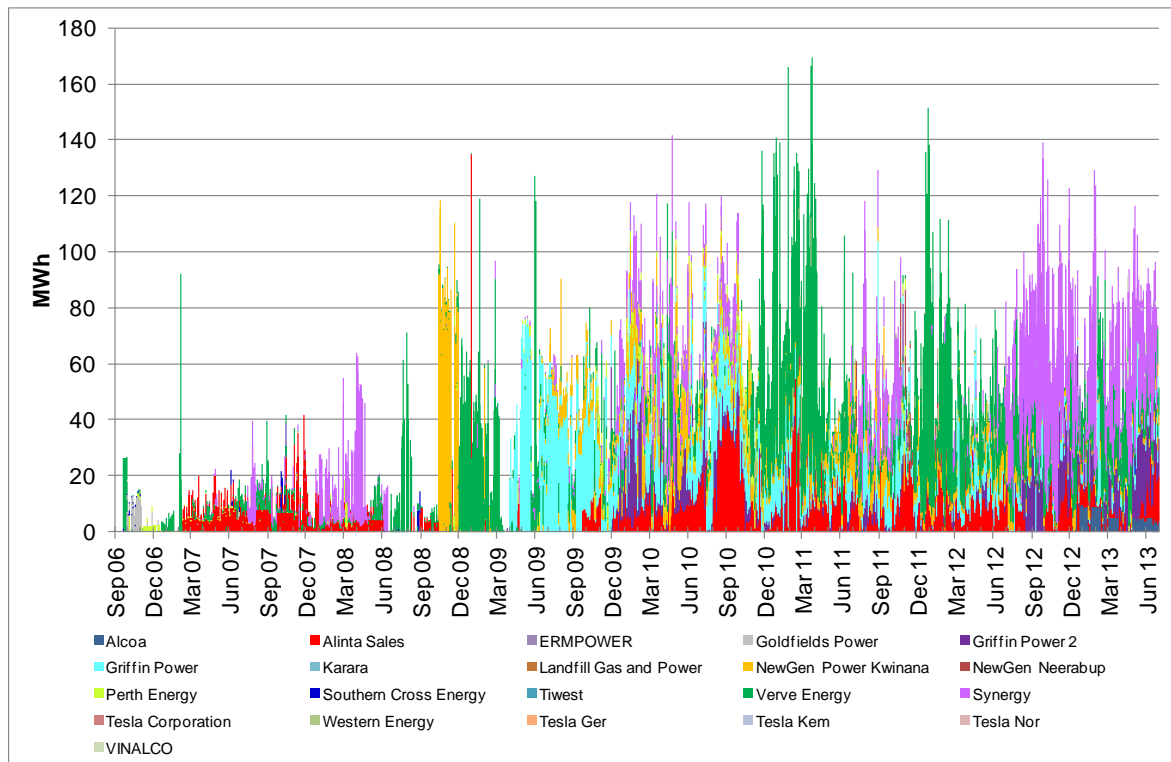
Figure 14 Daily average quantities bought in the STEM (MWh)**Figure 15 Daily average quantities sold in the STEM (MWh)**

Figure 75 in Appendix 3 shows average daily STEM Clearing Quantities for each Trading Day from 21 September 2006 (market commencement) to the end of the current Reporting Period (30 June 2013), as well as 30-day, 90-day and annual moving average quantities. The average STEM Clearing Quantity for each Trading Day was high for the first four months of this Reporting Period and during April 2013, which coincided with major Planned Outages. Large STEM quantities being traded in Off-Peak periods in the last week of January 2013 were observed between Verve Energy and Synergy. The Authority considers that this could be the result of Synergy off-loading over nominated quantities back in STEM during off-peak periods from its Vesting Contract with Verve Energy. The Authority notes that, once the merger takes full effect on 1 January 2014, this type of activity will cease.

5.2.2 *Balancing*

Clause 2.16.2(g) of the Market Rules (from 1 July 2012) requires that the MSDC includes the Balancing Submissions, associated Balancing Price-Quantity Pairs and Ramp Rate Limits.⁹³ The Authority notes that there have been significant changes to the Balancing regime in the WEM as a result of the implementation of the new Competitive Balancing market since 1 July 2012. Clause 2.16.2(hC) of the Market Rules (from 1 July 2012) requires that the MSDC includes any substantial variations in Balancing Prices, Non-Balancing Facility Dispatch Instruction Payments or Balancing Quantities relative to recent past behaviour. This section is provided mainly to fulfil the Authority's obligations for the current Reporting Period from 1 July 2012 to 30 June 2013 under the new Competitive Balancing Mechanism. The Authority has also included the historic data related to the Old Balancing Market i.e., pre-1 July 2012.

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 of the Market Rules.

5.2.2.1 *Balancing prices*

Balancing enables Market Participants to adjust their Net Contract Position (**NCP**) so that supply equals demand in real-time. System Management, as a Dispatch Operator, will match supply and demand in the system. Since market commencement in 2006 to 30 June 2012, Verve Energy was the sole provider of Balancing. Under this arrangement, System Management would dispatch Verve Energy's facilities for balancing purposes in

⁹³In the period pre 1 July 2012, Clause 2.16.2(d) of the Market Rules required that the MSDC includes the Balancing Data prices and other Standing Data prices used in Balancing.

real-time and Verve Energy would get paid the MCAP for providing any balancing energy deviations⁹⁴.

From 1 July 2012, IPP Market Participants have been able to compete to provide balancing services. Final Balancing Prices are based on the Balancing Merit Order (**BMO**) produced by the IMO. The BMO includes all balancing facilities' (i.e. all scheduled and non-scheduled generating facilities apart from those on an approved planned outage) price-quantity offers at which that facility is willing to be dispatched. The Final Balancing Prices are published with 48 hours after completion of a Trading Day.

Table 5 sets out the mean and standard deviations of the peak and off-peak MCAP or Final Balancing Price for the following three periods:

- mean and standard deviations of the peak and off-peak MCAP/ Final Balancing Price from 21 September 2006 (i.e., market commencement) to 30 June 2013;
- mean and standard deviations of the peak and off-peak MCAP from 1 August 2011 to 30 June 2012 (i.e., the previous Reporting Period).
- mean and standard deviations of the peak and off-peak Final Balancing Price 1 July 2012 to 30 June 2013 (i.e., the current Reporting Period).

The patterns of Balancing prices broadly reflect the pattern of STEM Clearing Prices, with higher and more volatile prices during peak periods.

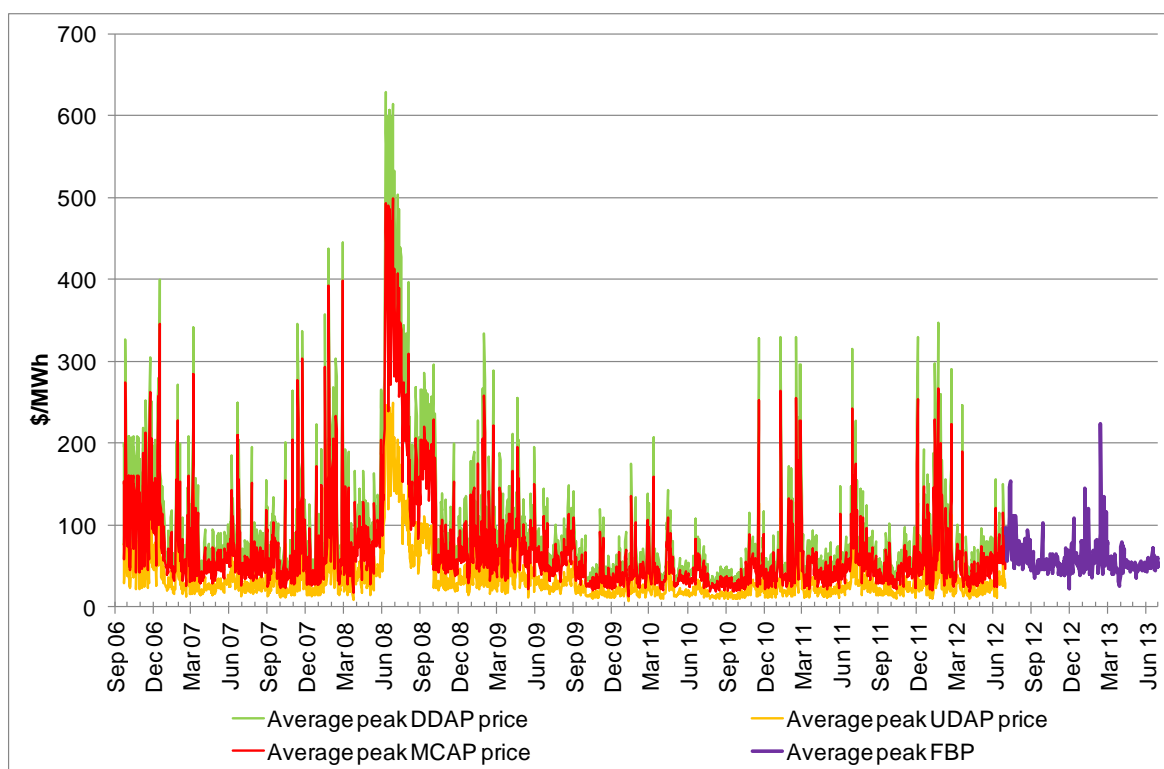
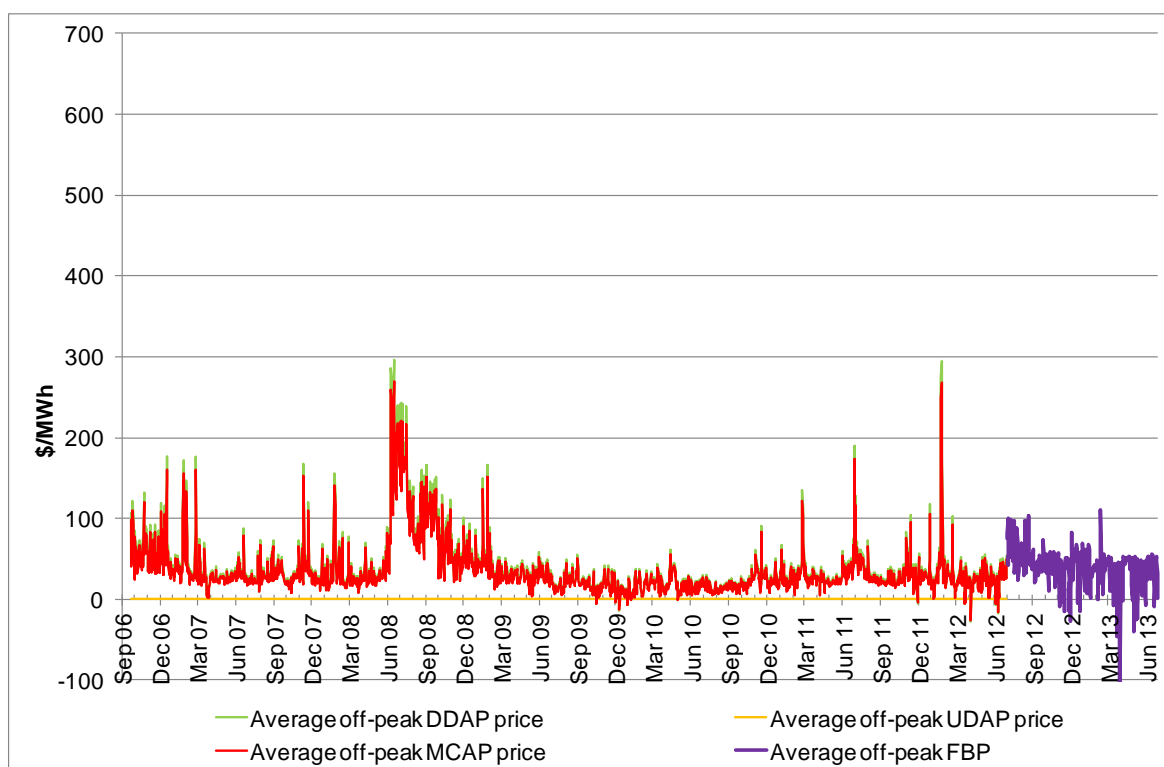
Table 5 Mean and standard deviations of Balancing Prices (\$/MWh)

		21Sep06-30Jun13		1Aug11-30Jun12		1Jul12-30-Jun13	
	Trading Interval	Mean	Std Dev	Mean	Std Dev	Mean	Std Dev
MCAP/Final Balancing Price	Off-Peak	35.33	39.76	27.91	31.18	38.19	36.07
	Peak	70.20	70.40	55.08	47.43	58.21	30.66

Figure 16 and Figure 17 illustrate average daily peak and off-peak period Balancing Prices for each Trading Day, from market commencement to 30 June 2013⁹⁵.

⁹⁴IPP's were required to commit and dispatch their facilities to meet their respective day ahead Resource Plans, i.e. 'reflective of NCP'. They were penalised through the application of UDAP and DDAP for deviations from their Resource Plans except when the facilities were dispatched by System Management for system security reasons.

⁹⁵ The UDAP and the DDAP are not applicable for the current reporting period.

Figure 16 Daily Average Balancing prices (Peak Trading Intervals, \$/MWh)**Figure 17 Daily Average Balancing prices (Off-Peak Trading Intervals, \$/MWh)**

Following a period of high prices immediately after market commencement, both Peak and Off-Peak Balancing prices were relatively stable until June 2008 when the Varanus Island incident occurred. Following that event, and the subsequent curtailment of gas supplies, Balancing prices increased significantly in June 2008 and remained at elevated levels for a number of months. Balancing prices have returned to lower levels since that

time, with average prices at or below those experienced before the 2008 Varanus Island incident.

The balancing price reached the Maximum STEM Price in late June 2011 to early July 2011 due to a large volume of Planned Outages approved by System Management at that time, coupled with some unexpected Forced Outages of plant. The balancing price also reached the Maximum STEM Price in December 2011, January 2012 and February 2012 i.e., during periods of high summer demand (demand ranged between 3,000 MW to 3,880 MW) as a result of very high temperatures. In the old balancing market arrangement the lowest balancing price reached was negative \$53.39/MWh at 2:00 am on 10 June 2012 (which was the lowest balancing price observed since market commencement). This negative balancing price value was attributed to overnight low demand, falling under 1,300 MW, and very high Intermittent Generation (242 MW).

As can be seen in Figure 16, average peak period MCAP prices were notably higher on a number of Trading Days during the summer period from December 2011 to February 2012.⁹⁶ As can be seen in Figure 17, average off-peak period MCAP prices were high in late January 2012. Negative average MCAP prices in off-peak periods were observed in early April 2012 and early June 2012⁹⁷.

The pattern of Balancing prices during peak and off-peak periods is similar to the pattern of STEM Clearing Prices. This similarity is shown in Figure 76 and Figure 77 in Appendix 3, which compare 30-day and 90-day moving averages of peak STEM and Balancing prices, respectively.

As with peak periods, a strong relationship between off-peak Balancing prices and STEM Clearing Prices can be seen more clearly in Figure 78 and Figure 79 in Appendix 3, which compare the 30-day and 90-day moving averages of off-peak STEM and Balancing prices, respectively. Figure 80 and Figure 81 in Appendix 3 show annual moving average STEM and Balancing prices for off-peak and peak periods, respectively.

Following introduction of the competitive balancing market the Authority notes there appears to have been an increase in average prices during Off-Peak Trading Intervals and that the incidence of negative prices has increased in both Peak Trading and Off-Peak Trading Intervals.

Figure 18 shows that Peak Balancing Prices did not reach the cap (Maximum STEM Price) during the December 2012 to March 2013 summer period as frequently as the MCAP in the December 2011 to March 2012 summer period. However the average Peak Trading Interval MCAP for the period 1 July 2011 to 30 June 2012 was \$57.18/MWh, which is similar to the average Peak Trading Interval Final Balancing Price for the period 1 July 2012 to 30 June 2013 of \$58.21/MWh.

Figure 19 compares Off-Peak Balancing prices from 1 July 2011 to 30 June 2013. The Authority notes very few Trading Intervals with negative Balancing prices occurred during the period 1 July 2011 to 30 June 2012. Under the old balancing market the lowest

⁹⁶MCAP reached \$314.00/MWh (the Maximum STEM Price) in December 2011, January 2012 and February 2012. The majority of these high MCAP events occurred during periods of high summer demand (ranged between 3,000 MW to 3,880 MW) as a result of high temperature and a number of these high MCAP events were triggered by unit's Forced Outages.

⁹⁷The negative MCAP value during April 2012 and June 2012 was attributed to overnight low demand and very high Intermittent Generation. The lowest MCAP during the current Reporting Period reached negative \$53.39/MWh at 2:00 am on 10 June 2012, which was the lowest MCAP observed since market commencement.

MCAP observed since market commencement was negative \$53.39/MWh at 2:00 am on 10 June 2012.

Figure 18 Peak Trading Intervals Final Balancing Prices (1 July 2011 to 30 June 2013)

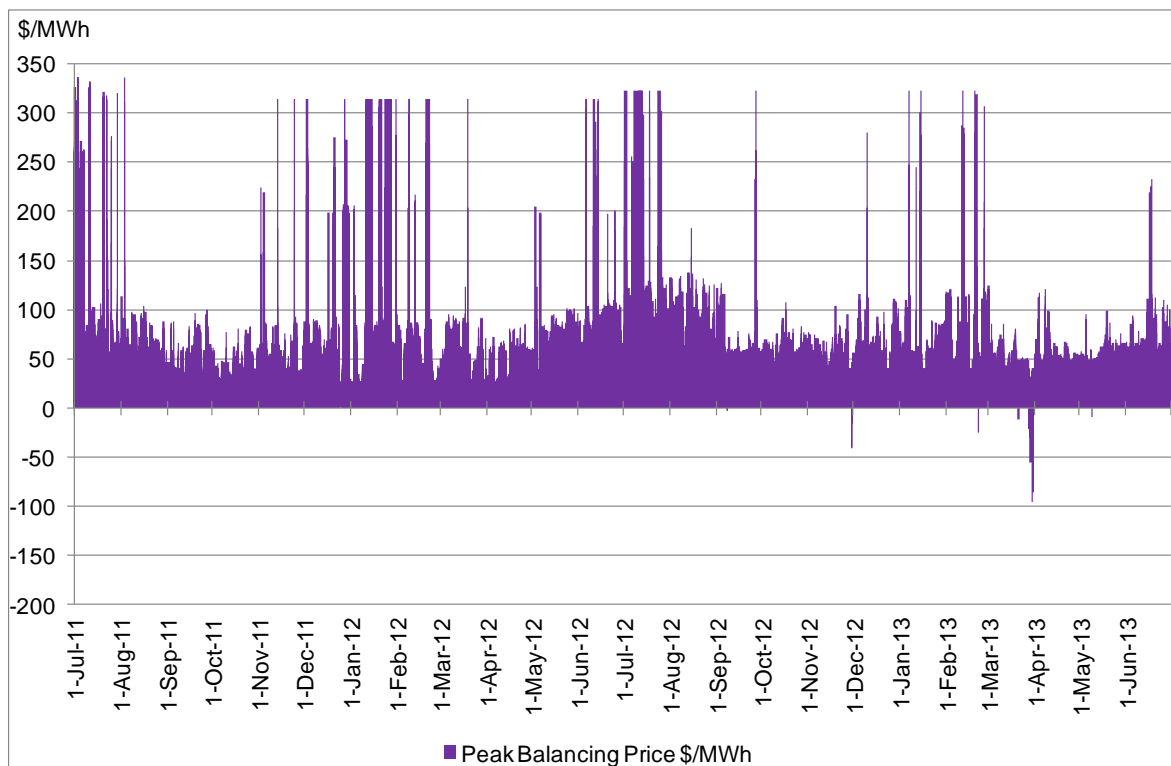
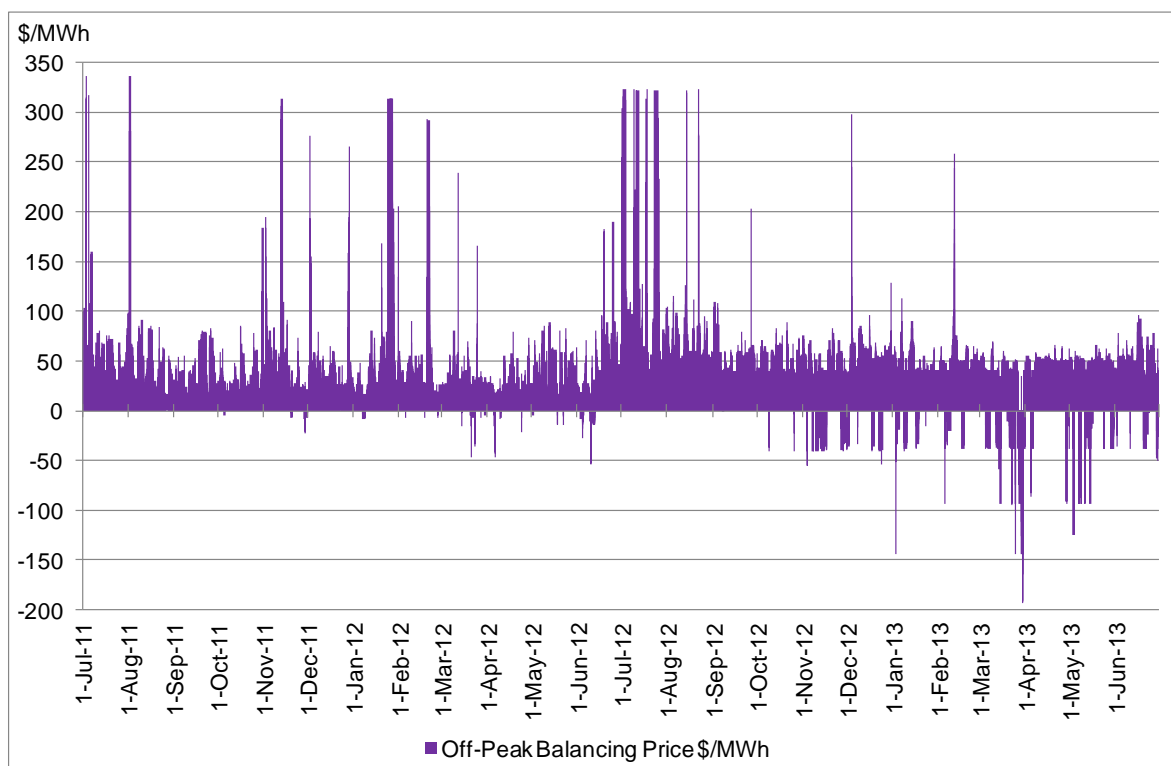


Figure 19 Off-Peak Trading Intervals Final Balancing Prices (1 July 2011 to 30 June 2013)



5.2.2.2 Volatility of Balancing prices

Volatility in Balancing prices is more accurately analysed by determining means and standard deviations. The means and standard deviations (as well as the maxima and minima) from market commencement to 30 June 2013 of MCAP/ Final Balancing prices are illustrated in Figure 20 and Figure 21. The charts indicate that there were fewer incidences of maxima prices compared to the previous reporting year, but increased incidences of minima prices.

Figure 20 Summary statistics for MCAP/ Final Balancing Price during Peak Trading Intervals (per calendar month)

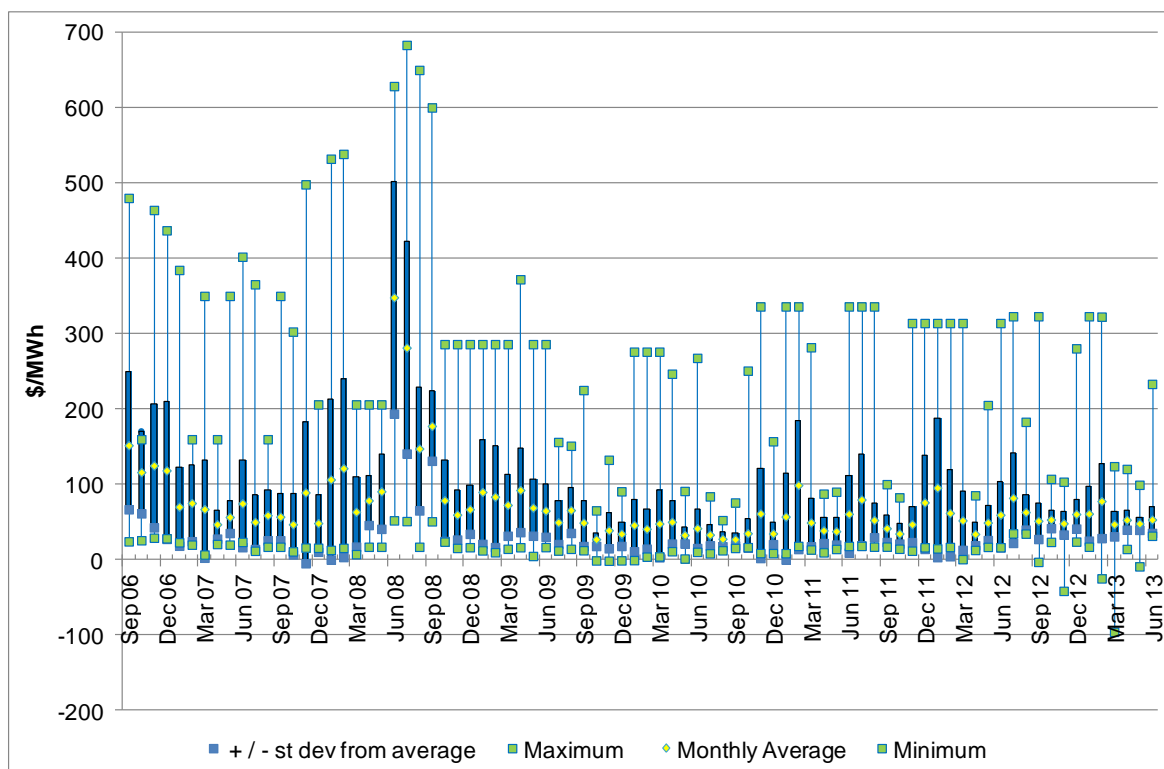
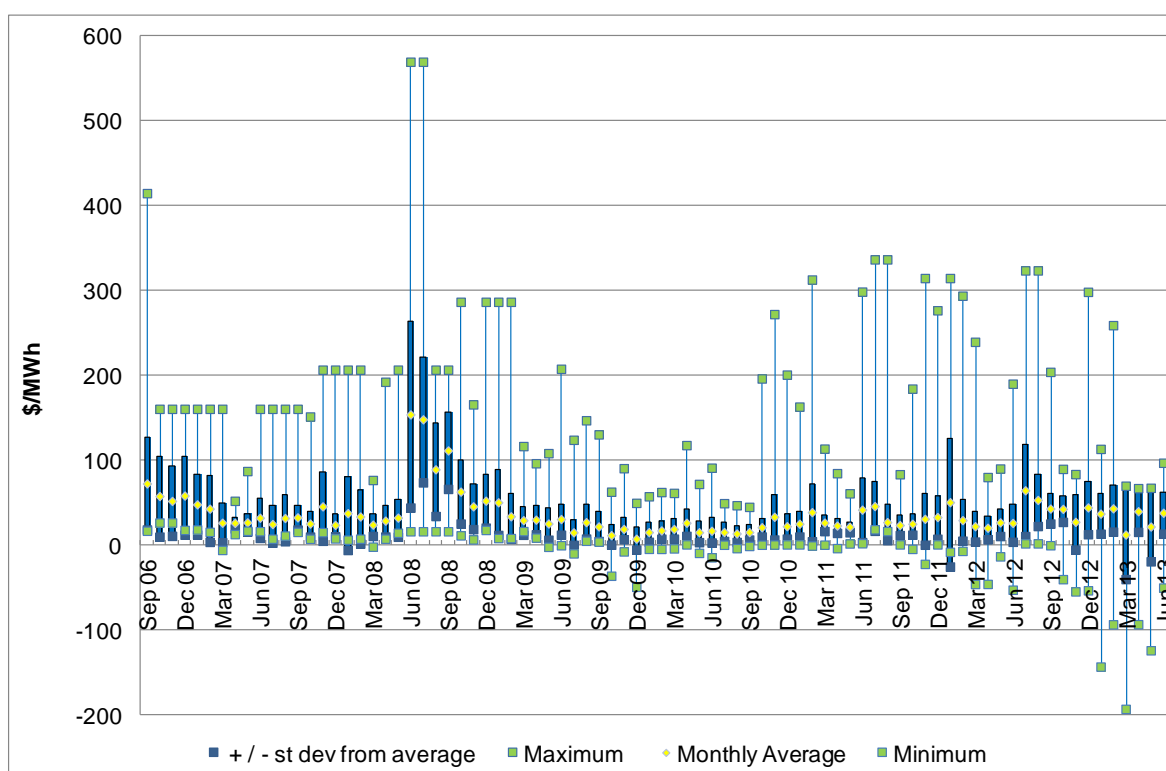


Figure 21 Summary statistics for MCAP/ Final Balancing Price during Off-Peak Trading Intervals (per calendar month)



5.2.2.3 High Balancing prices

The Market Rules require an examination of both the incidence and causes of high Balancing prices. As with STEM Clearing Prices, the incidence of high Balancing prices is examined by considering the proportion of time that Balancing prices are at the Energy Price Limits and by considering the price duration curve for Balancing prices.

Figure 22 illustrates the proportion of Peak Trading Intervals and Off-Peak Trading Intervals during which MCAP/ Final Balancing prices were at the Maximum STEM Price. This shows that MCAPs were regularly at the Maximum STEM Price during Peak Trading Intervals in the summer months of the first years of the market, and also from June 2008 to September 2008 during the Varanus Island interruption. In the previous Reporting Period MCAP reached the Maximum STEM Price for about 11 per cent of total number of Peak Trading Intervals in January 2012⁹⁸, compared to about 1 per cent in the summer period of 2009/10 and 2010/11 Reporting Periods. In the current Reporting Period the Final Balancing Price reached the Maximum STEM Price at the commencement of New Balancing Market i.e., for about 1.5 per cent of total number of Peak Trading Intervals in July 2012. These price spikes occurred during peak evening intervals (5:00 pm and 5:30 pm) and early morning intervals (7:00 am to 7:30 am). The Authority notes that these price spikes were triggered by significant Planned Outages and incorrect/ under-forecasting of load by System Management for the market. A number of intervals recorded the actual load being higher than the Forecast Load by 250 MW to 300 MW.

⁹⁸ The majority of these events occurred during periods of high summer demand (ranging between 3,000 MW to 3,880 MW) as a result of very high temperatures and some events triggered by Forced Outages of plant. In the same month MCAP reached the Maximum STEM Price for six per cent of the total Off-Peak Trading Intervals.

About 1000 MW of cheap coal and gas capacity was recorded on Planned Outage during July 2012. About 0.4 per cent of total number of Peak Trading Intervals in January 2013 also recorded Final Balancing Price at the Maximum STEM Price. These price spikes were a result of significant summer demand (exceeding 3500 MW) and a drop in wind generation. The Authority also noted that the overall plant availability was high.

Comparing Figure 9 and Figure 22, it is clear that in the current Reporting Period the STEM Price never reached the Maximum STEM Price, whilst the Final Balancing Price reached the Maximum STEM Price for a small number of intervals.

Figure 22 Proportion of Trading Intervals MCAPs at Maximum STEM Price (per calendar month)

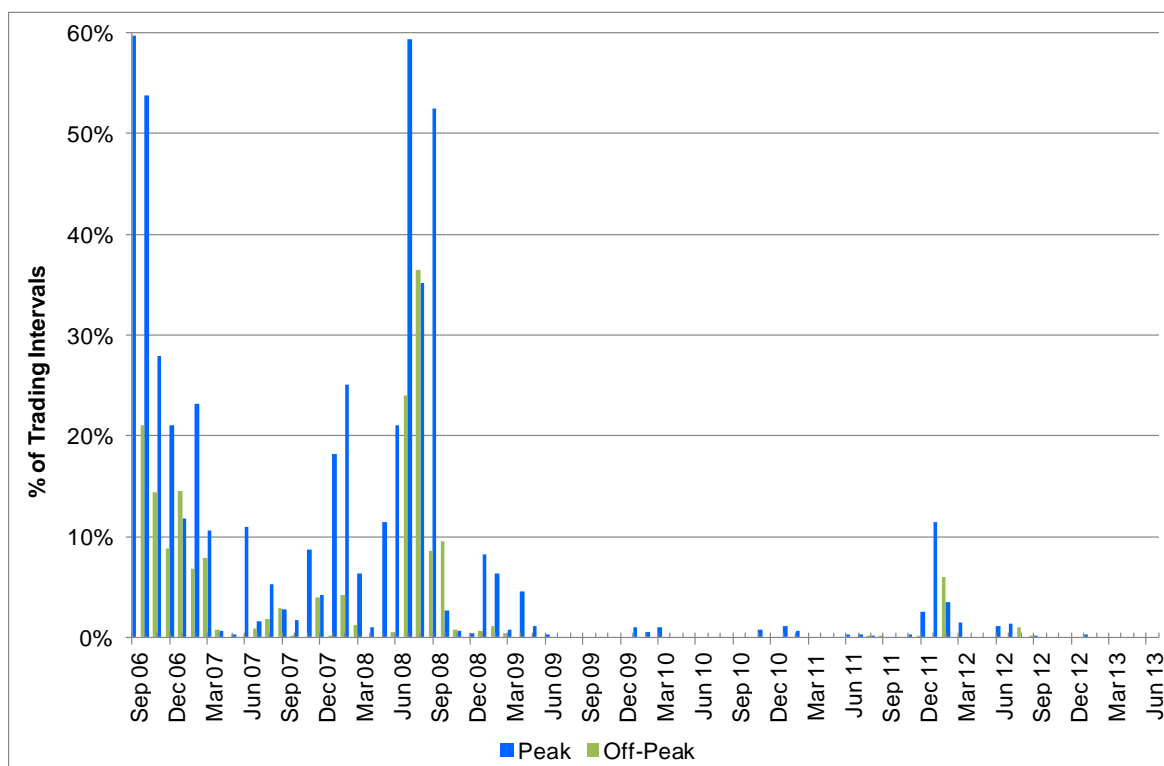
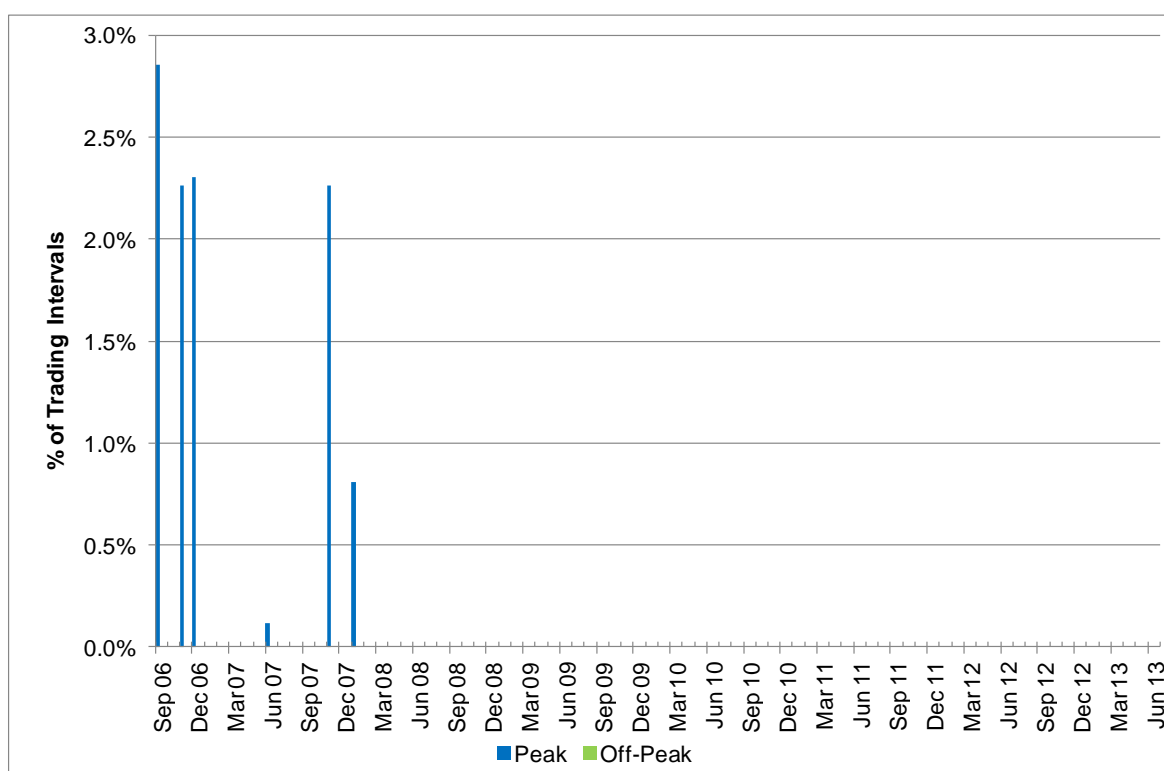


Figure 23 illustrates the proportion of peak and off-peak periods during which MCAPs were at the Alternative Maximum STEM Price. As was the case in the previous Reporting Period, there were no instances of Final Balancing Price reaching the Alternative Maximum STEM Price in the current Reporting Period. The last time the MCAP reached the Alternative Maximum STEM Price was in January 2008.

Figure 23 Proportion of Trading Intervals MCAPs at Alternative Maximum STEM Price (per calendar month)



The MCAP/ Final Balancing Price duration curve follows the price duration curve for STEM Clearing Prices relatively closely, although high MCAP/ Final Balancing Price occur more frequently than high STEM Clearing Prices. About 50 per cent of the time the STEM Clearing Prices and MCAPs appear to overlap each other, whilst the STEM Clearing Prices are under or over the MCAP/ Final Balancing Price for the remaining period. A notable divergence between the MCAP/ Final Balancing Price and STEM Clearing Prices is at around \$100/MWh, i.e. STEM Clearing Prices are less likely to be above \$100/MWh than are MCAP/ Final Balancing Price. This reflects the prior observation that MCAP/ Final Balancing Price tend to be at the Maximum STEM Price more frequently than STEM Clearing Prices. A notable divergence is the MCAP/ Final Balancing Price falling between \$0/MWh and negative \$200/MWh for 1.6 per cent of duration compared to only 0.2 per cent of STEM Clearing Price under \$0/MWh.

Figure 24 Price duration curves for STEM Clearing Prices and Balancing Prices (21 September 2006 to 30 June 2013)

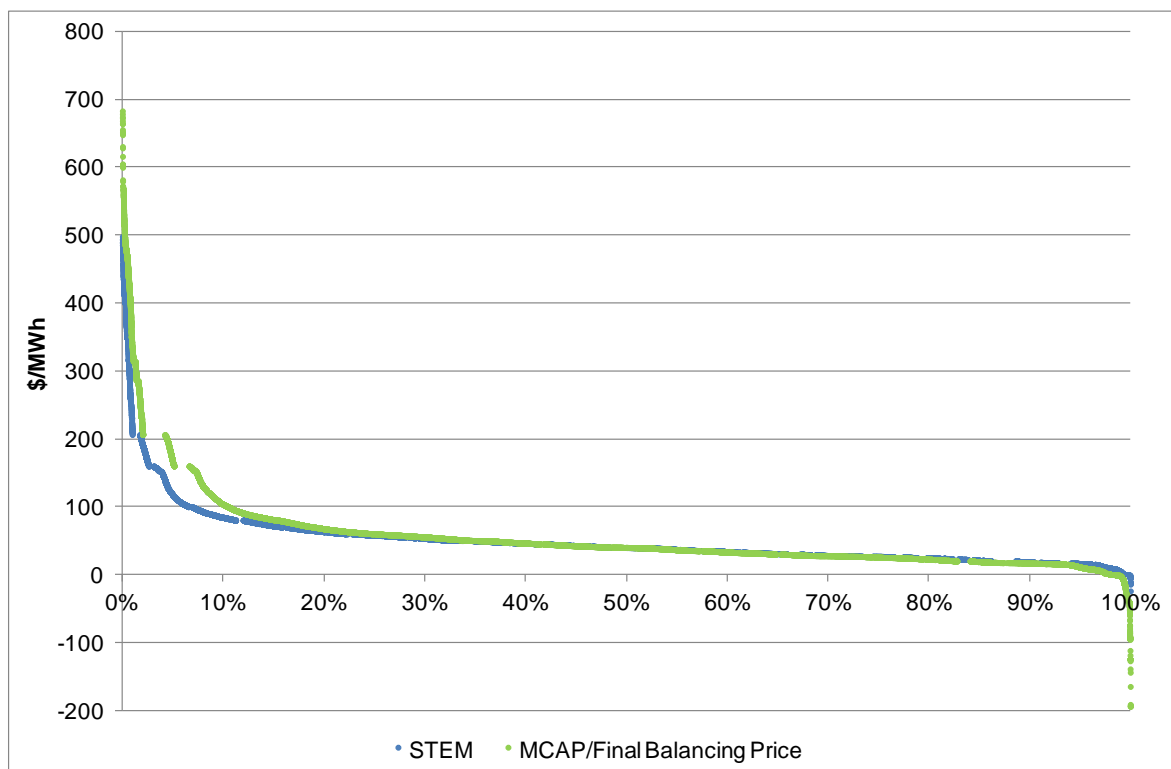


Figure 25 illustrates a comparison of MCAP/ Final Balancing Price duration curves for the periods 21 September 2006 (market commencement) to 30 June 2013, 1 August 2010 to 31 July 2011, 1 August 2011 to 30 June 2012 and 1 July 2012 to 30 June 2013.

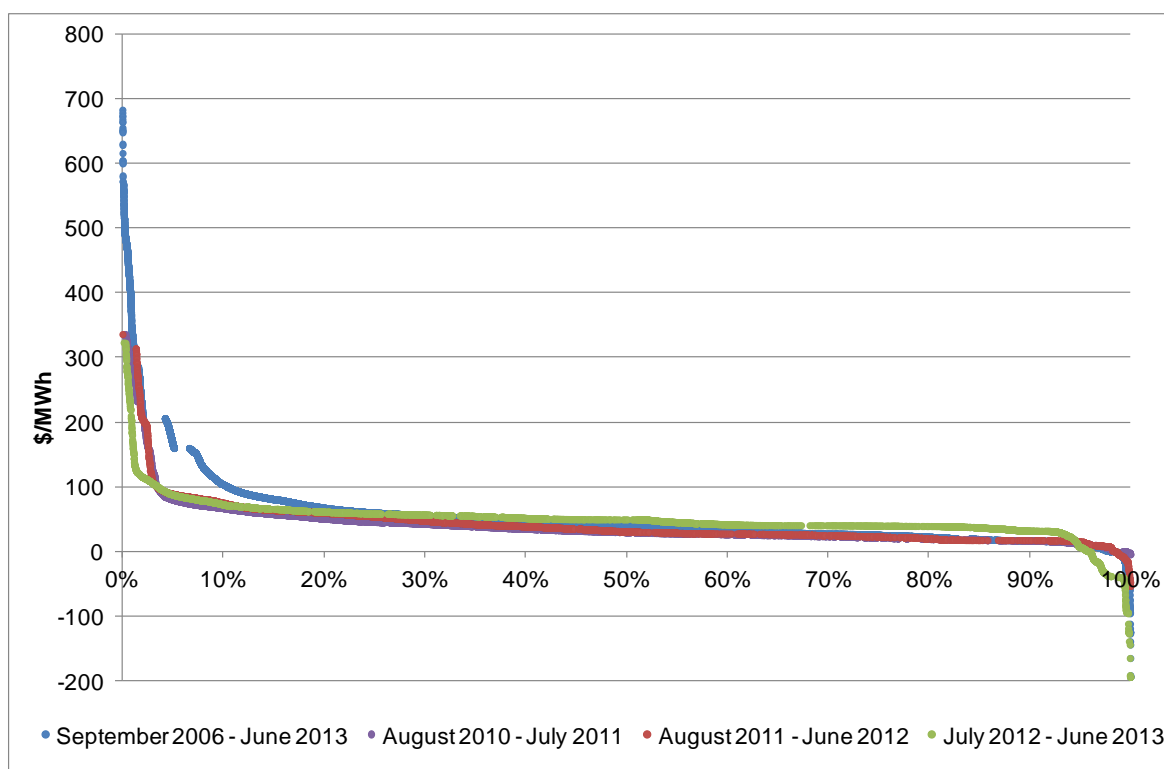
Figure 25 Comparison of price duration curves for MCAPs

Figure 25 shows that of the four periods examined MCAP/ Final Balancing Price were highest during the current Reporting Period (1 July 2012 to 30 June 2013). The green line (MCAP/ Final Balancing Price for the current Reporting Period) indicates that it exceeded the MCAPs for the previous two reporting periods for about 70 per cent of the duration. However, as reported previously prices were highly volatile during Varanus Island incident.

Clause 2.16.4(f) of the Market Rules requires the calculation of the correlation between capacity available in Balancing and the incidence of high prices.

When considering the correlation between STEM Clearing Prices and quantities offered into the STEM, the correlation between capacity available in Balancing and the incidence of high Balancing prices will fail to usefully capture key determinants of Balancing prices. Therefore, correlations are not included in this report. However, the Authority continues to work with the IMO on developing appropriate forms of analysis to explain the incidence of high Balancing prices. Clause 2.16.4(g) of the Market Rules requires the IMO to explore the key determinants for high prices in the STEM and Balancing. The Authority notes the IMO has a process for analysing the key drivers associated with high price incidents observed in Balancing. The results from this analysis are provided to the Authority and discussed at the regular surveillance meeting held between the two organisations. The IMO is currently in the process of formally documenting this process and exploring options for the development of appropriate models for undertaking the analyses required under clause 2.16.4(g) and 2.16.4(f) of the Market Rules.

5.2.2.4 *Capacity available through Balancing (through Dispatch Instructions)*

Clause 2.16.2(i) of the Market Rules requires that the MSDC identify the capacity available through Balancing from Balancing Facilities, Dispatchable Loads and Demand Side Programmes.

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

5.2.2.5 *Number and frequency of Dispatch Instructions*

Clause 2.16.2(j) of the Market Rules (as at 30 June 2012) requires that the MSDC identify the frequency and nature of Dispatch Instructions to Market Participants other than Verve Energy.

Dispatch Instructions are issued by System Management to Market Participants other than Verve Energy, directing the participant to vary the output or consumption of one of its facilities.

Figure 26 shows the total number of increment Dispatch Instructions and decrement Dispatch Instructions issued per Calendar Day⁹⁹, from 21 September 2006 (market commencement) to 30 June 2013.¹⁰⁰

During the current Reporting Period, the maximum numbers of Dispatch Instructions recorded per Day were:

- 113 increment and 102 decrement on 30 May 2013;
- 113 increment on 30 May 2013; and
- 106 decrement on 18 May 2013.

The issuance of the Dispatch Instructions during late February 2011 coincided with the shutdown of gas supply production at Varanus Island due to the effects of Cyclone Carlos. This gas supply disruption affected generation in the SWIS and led to the declaration of a High Risk Operating State from 23 February 2011 until 1 March 2011. In order to manage the High Risk Operating State during this period, System Management issued the (above listed) increment instructions to Scheduled Generators to increase production over their Resource Plans, and the decrement instructions to Demand Side Management (**DSM**) providers to dispatch Curtailable Load. From that event until 11 November 2012, the total number of Dispatch Instructions issued daily remained under 100. As a result of the commencement of the new Balancing Market, the number of Dispatch Instructions have increased significantly as can be seen from Figure 26. Prior to the introduction of the new Balancing Market, Dispatch Instructions were only issued to IPPs in the instance where Verve Energy was unable to provide facilities to meet Balancing requirements. With the commencement of the new Balancing Market, there is an opening up of the market to IPPs, with the increase in Dispatch Instructions simply a by product of more facilities being actively involved in Balancing, rather than only being involved in circumstances where Verve Energy could not provide the service.

⁹⁹ Due to the data complexity, the daily count of the Dispatch Instructions has been reported as per Calendar Day.

¹⁰⁰ Note that this counts a System Management Dispatch Instruction that spans multiple Trading Intervals as multiple Dispatch Instructions.

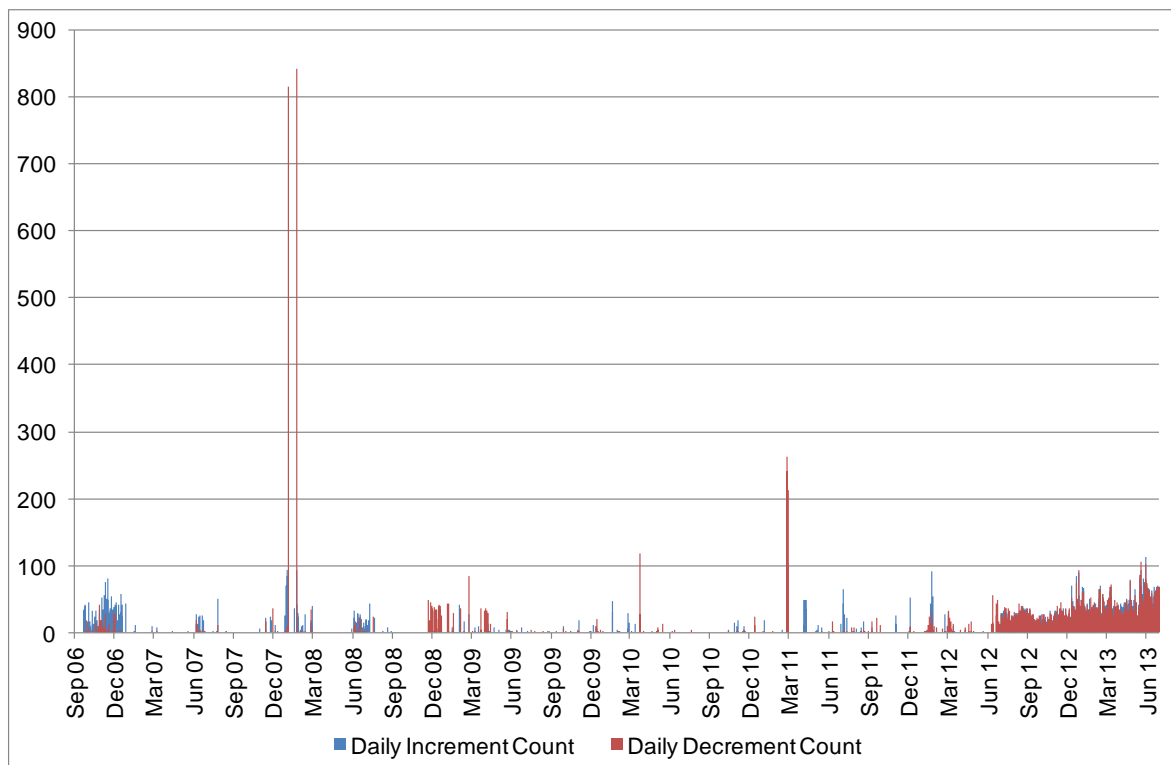
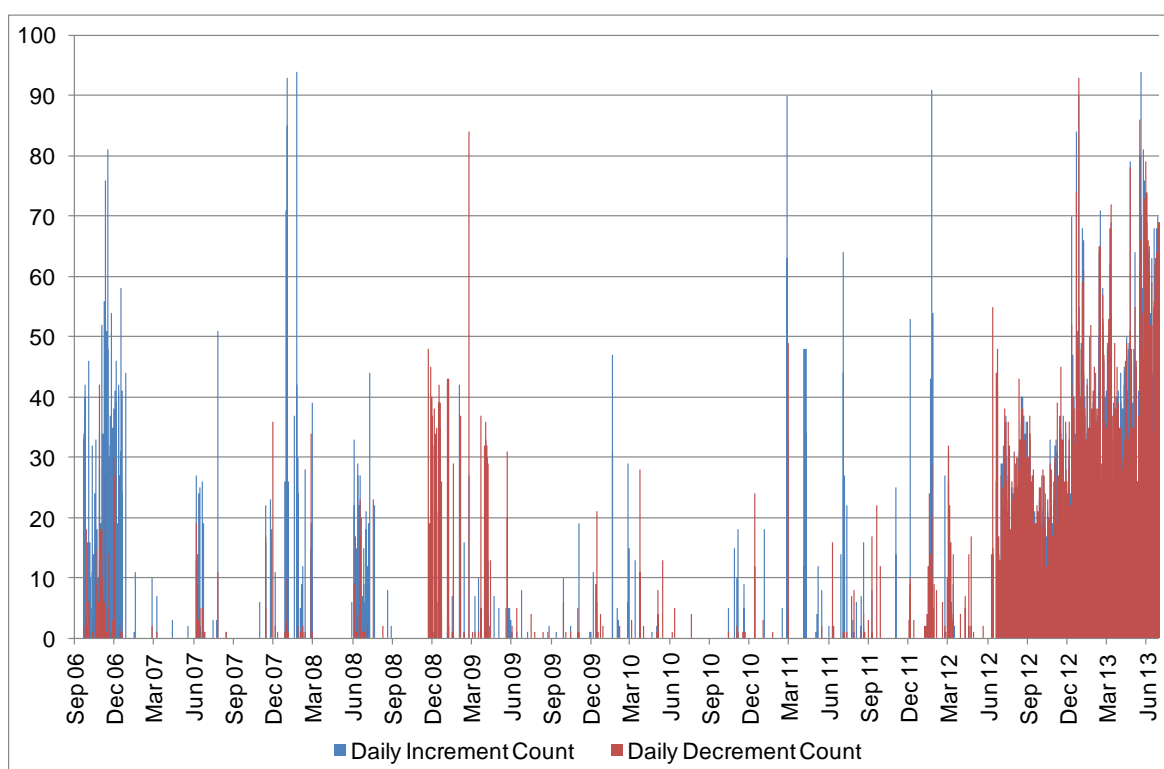
Figure 26 Daily count of Dispatch Instructions (21 September 2006 to 30 June 2013)

Figure 27 shows the total number of increment Dispatch Instructions and decrement Dispatch Instructions issued per Calendar Day, from 21 September 2006 (market commencement) to 30 June 2013, with the outliers removed (i.e., increment or decrement Dispatch Instructions recorded per Day above 100 in total).

Figure 27 Daily count of Dispatch Instructions - outliers removed (21 September 2006 to 30 June 2013)



5.3 Bilateral market

5.3.1 Bilateral quantities

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

Details of Bilateral quantities scheduled with the IMO by individual participants are classified as confidential information. In principle, information on Bilateral quantities could be aggregated and included in this public version of the report. However, a significant proportion 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 the total average Bilateral quantities per Trading Interval scheduled with the IMO in the current Reporting Period increased by approximately 3.30 per cent compared to the previous Reporting Period.

5.4 Retail sector

5.4.1 Number of customers changing retailer

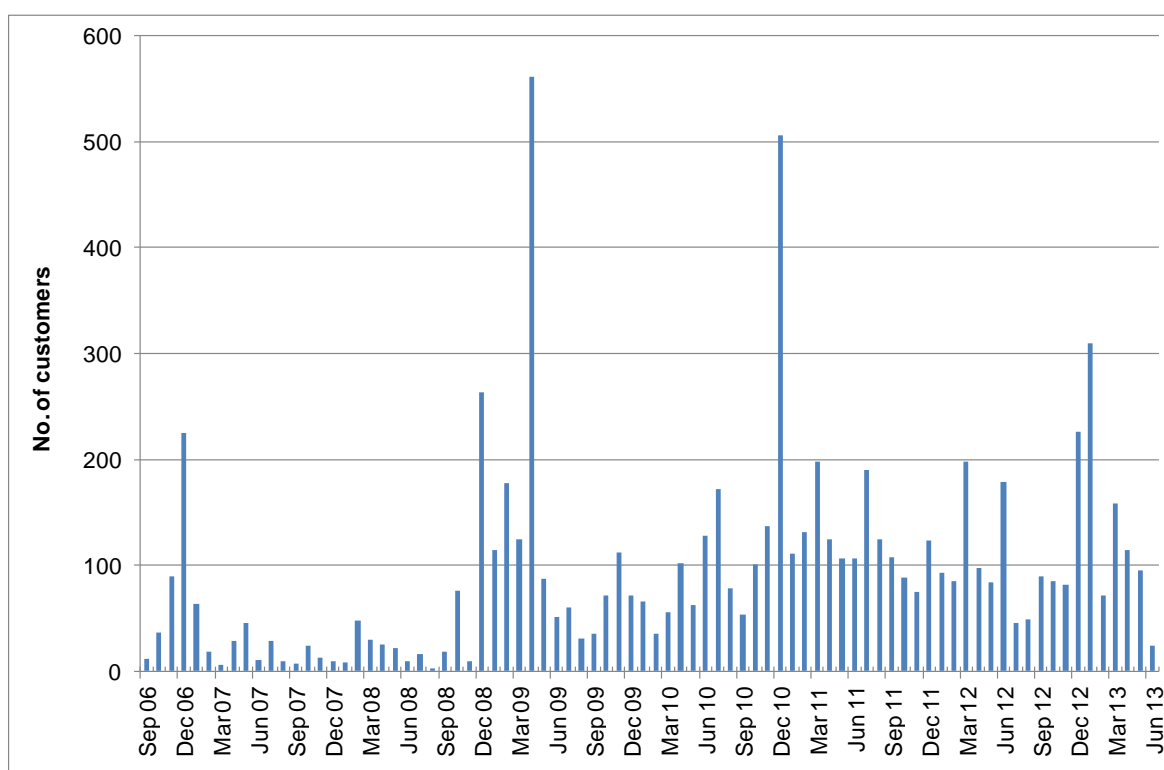
Although not required under the Market Rules, this section provides data on the rate at which customers have switched, or 'churned,' between retailers from 21 September 2006 (market commencement) to 30 June 2012.

Figure 28 illustrates levels of customer transfer¹⁰¹ in the contestable section of the electricity market in the SWIS since market commencement. Levels of customer transfer spiked in the first few months following market commencement, with 225 customers being transferred between retailers in December 2006. Customer transfer numbers then moderated and remained relatively low throughout 2007 and for the majority of 2008.

The general trend has been toward a steady increase in the number of customers changing retailers since December 2008, which likely reflects the Government's decision to increase tariffs in 2009. Notably, customer transfer numbers spiked in April 2009 (561 customers) and again in December 2010 (506 customers).

For the current Reporting Period, the monthly average customer transfer number was 120, compared to a monthly average of 156 in the previous Reporting Period. The maximum number of customer transfers reached 198 in March 2012.

Figure 28 Number of customers changing retailer (customers per month)



¹⁰¹ Customer churn is measured by the number of National Meter Identifiers (NMIs) transferred between retailers.

5.5 Surveillance items

5.5.1 Fuel Declarations

A Market Participant submitting a STEM Submission must include a Fuel Declaration.¹⁰² Clause 2.16.2(gA)i of the Market Rules requires that the MSDC identify all Fuel Declarations. There is also a requirement under Clause 2.16.4(cA) of the Market Rules to calculate any consistent or significant variations between Fuel Declarations and the actual real-time operation of a Market Participant.

Table 6 summarises the Fuel Declarations for each dual fuel Facility, showing the percentage of all Trading Intervals for which each dual fuel Facility was assumed to be operating on Non-Liquid and Liquid Fuels, for the 2008/09 through 2012/13 Reserve Capacity Years. Dual fuel facilities tend to declare either liquid or non-liquid for the majority of the Trading Intervals for which they make a declaration, suggesting that dual fuel facilities have a primary fuel supply, with occasional use of a secondary fuel supply.¹⁰³

In the 2012/13 Reserve Capacity Year, the Fuel Declarations for Alinta's Wagerup facilities to be run on Liquid Fuel decreased to approximately 13 per cent, compared to approximately 20 per cent during the previous capacity year. Verve Energy's Kwinana_GT1 and GT2 facilities declared to run on Non-Liquid Fuel for 100 per cent of the total time during the 2012/13 Reserve Capacity Year, as compared to 30 and 39 per cent respectively of the time during the previous Reserve Capacity Year, which was the first time these facilities made Non-Liquid Fuel Declarations. Similarly NewGen Neerabup made its first Non-Liquid Fuel Declaration for the first time during the 2011/12 Reserve Capacity Year (30 per cent), which increased to 100 per cent for the 2012/13 Reserve Capacity Year.

¹⁰² See clause 6.6.1 of the Market Rules.

¹⁰³ Fuel Declarations for these facilities are influenced by the expected availability of gas, although Market Participants are not always aware of gas supply constraints 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 monitors variations between Fuel Declarations and actual operation.

Table 6 Fuel Declarations (last three Capacity Years)

Participant	Resource Name	Liquid declaration	Non-liquid declaration	Liquid declaration	Non-liquid declaration	Liquid declaration	Non-liquid declaration	Liquid declaration	Non-liquid declaration
		2009/10 Cap Year	2009/10 Cap Year	2010/11 Cap Year	2010/11 Cap Year	2011/12 Cap Year	2011/12 Cap Year	2012/13 Cap Year	2012/13 Cap Year
Alcoa	ALCOA_KWI								
Alcoa	ALCOA_PNJ								
Alcoa	ALCOA_WGP	100.0%		36.7%					
Alinta	ALINTA_WGP_AGG			1.6%	20.8%				
Alinta	ALINTA_WGP_GT	62.7%	37.3%	8.3%	69.0%	20.3%	79.7%		100.0%
Alinta	ALINTA_WGP_U2	62.6%	37.4%	6.9%	70.3%	20.0%	80.0%		100.0%
Goldfields Power	PRK_AG	100.0%		97.9%	1.8%	100.0%		98.3%	1.7%
NewGen Neerabup	NEWGEN_NEERABUP_GT1						30.9%		100.0%
Perth Energy	PERTHENERGY_KWINANA_GT1	6.3%		99.7%		100.0%		100.0%	
Southern Cross	STHRNCRS_EG								
Verve Energy	KEMERTON_GT11	0.3%	99.7%	1.1%	98.6%		100.0%		100.0%
Verve Energy	KEMERTON_GT12	0.8%	99.2%	1.1%	98.6%		100.0%		100.0%
Verve Energy	KWINANA_G3								
Verve Energy	KWINANA_G4								
Verve Energy	KWINANA_G5		100.0%	1.1%	98.6%	0.3%	99.7%		94.1%
Verve Energy	KWINANA_G6		100.0%		99.5%		71.2%		75.5%
Verve Energy	KWINANA_GT1	100.0%		99.7%		100.0%		100.0%	
Verve Energy	KWINANA_GT2						30.1%		100.0%
Verve Energy	KWINANA_GT3						38.8%		100.0%
Verve Energy	PINJAR_GT1		100.0%	0.3%	99.5%	0.3%	99.7%		100.0%
Verve Energy	PINJAR_GT2	100.0%		99.2%	0.6%	99.7%	0.3%	100.0%	
Verve Energy	PINJAR_GT3		100.0%	0.6%	99.2%	0.3%	99.7%		100.0%
Verve Energy	PINJAR_GT4	100.0%		99.2%	0.6%	99.5%	0.5%	100.0%	
Verve Energy	PINJAR_GT5		100.0%	0.6%	99.2%	0.3%	99.7%		100.0%
Verve Energy	PINJAR_GT7	100.0%		99.2%	0.6%	99.5%	0.5%	100.0%	

*Blanks in the above table denote no values to be reported in respective category.

5.5.2 Availability Declarations

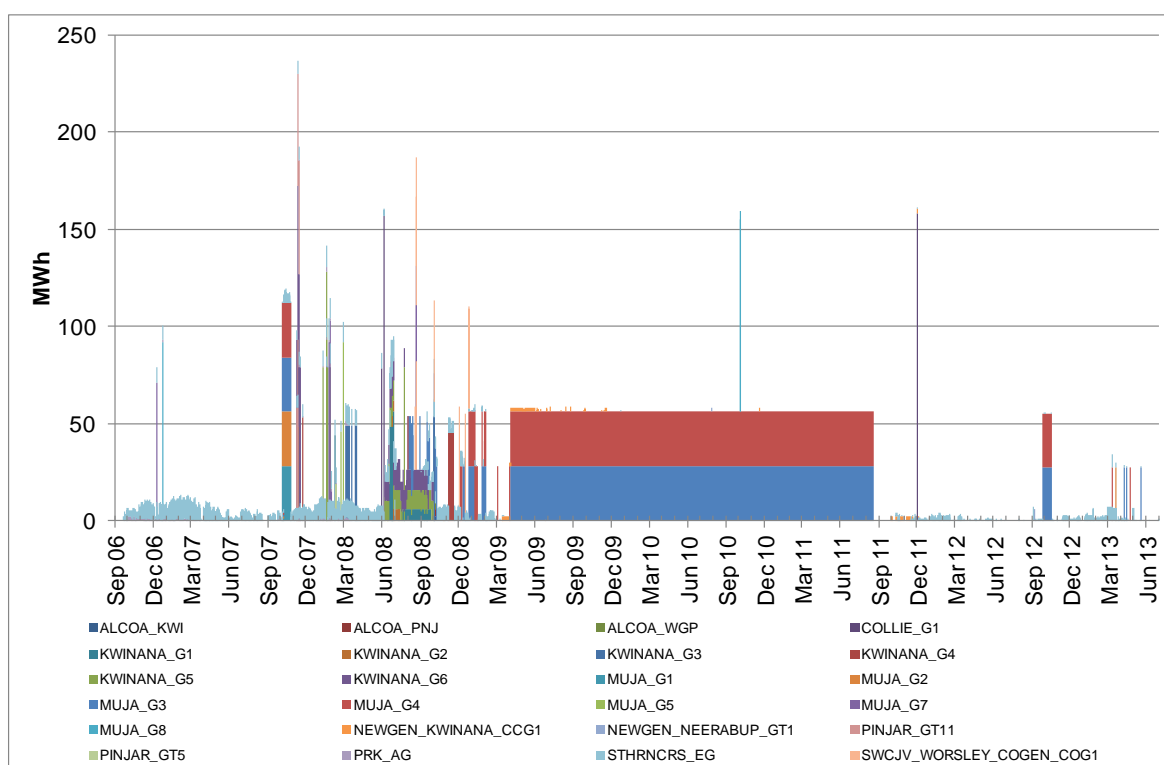
Clause 2.16.2(gB) of the Market Rules requires that the MSDC identify all Availability Declarations. There is also a requirement under clause 2.16.4(cA) to calculate any consistent or significant variations between Availability Declarations and the actual real-time operation of a Market Participant's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

A Market Participant submitting a STEM Submission must include an Availability Declaration on net available energy.¹⁰⁴

Figure 29 illustrates daily average Availability Declarations by Market Participant.

As noted in the previous report to the Minister, the Authority notes unavailability declarations of approximately 56 MWh for the Muja G3 and Muja G4 units continued in the current reporting period. These units were declared unavailable through the STEM Submission's Availability Declarations mechanism to avoid System Management dispatching them as per the Dispatch Merit Order (**DMO**). Verve Energy's Collie G1 units had a large level of unavailability in the first week of October 2012. High levels of unavailability were also experienced by the Muja G5 in April 2013 and Muja G6 plant in February 2013. Alinta Pinjar U1 reported unavailability for several Trading Intervals in July 2012 and September 2012.

Figure 29 Daily average Availability Declarations (MWh unavailable per Trading Interval)



¹⁰⁴ See clause 6.6.1 of the Market Rules. The Availability Declaration is to set out, for each Trading Interval and for each of the Market Participant's facilities, as 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.

Significant variations between Availability Declarations and the actual real-time operation of a Market Participant are assessed by comparing:

- the remaining capacity available after taking into account quantities declared in an Availability Declaration, with
- the total (Loss Factor-adjusted) quantity supplied, as measured by System Management's Supervisory Control and Data Acquisition (**SCADA**) system.

If, on the basis of this comparison, the remaining capacity available is less than the quantity supplied, this indicates that a Facility has been available to supply the market to a greater extent than was indicated in the STEM Submission for that Facility. The purpose of this statistic is to detect whether a Market Participant falsely declares that low cost capacity is unavailable. By leaving out low cost capacity the Market Participant will be able to put in a submission with a higher cost schedule. This could result in a higher STEM Clearing Price. The Market Participant could then generate with the low cost capacity, which is truly available, and make an excessive profit.

Table 7 sets out the proportion of Trading Intervals for which a Facility was actually available to a greater extent than set out in a STEM Submission during the 2009/10 through 2011/12 Capacity Years. Historically, if IPPs did not remain within dispatch tolerances of their planned production, they were subject to UDAP or DDAP penalties. Verve Energy were not subject to these charges, as Verve Energy's facilities were used to balance the system and thus had lower incentive to minimise the difference between the actual output and Availability Declarations.

Under the new competitive Balancing market, The Authority notes the lower discrepancy from the previous Reporting Period for Verve Energy's Cockburn, Muja G5 and Muja G6 facilities.

In the previous report to the Minister, the Authority noted the large extent that Landfill Gas & Power's Tamala Park facility and Collgar's Wind Farm had actual output exceed Availability Declarations during various periods of the Reporting Period. There were no Trading Intervals in the Reporting Period where Landfill Gas & Power's Tamala Park facility had actual output exceeding Availability Declarations. Collgar's Wind Farm's actual output exceed Availability Declarations for less than 0.20 per cent of the time during the Reporting Period.

The Authority notes the improved discrepancy for the October and November months for the NewGen Kwinana facility and Alcoa Wagerup facility compared to the previous Reporting Period. The actual output of Perth Energy's Rockingham facility exceeded its Availability Declaration by 15 per cent during the October and November months of 2012.

Table 7 Proportion of Trading Intervals for which actual output exceeds Availability Declarations (last three Capacity Years)

*Participant	Resource Name	Cold season 2010/11 Cap Year	Hot season 2010/11 Cap Year	Intermediate season 2010/11 Cap Year	Cold season 2011/12 Cap Year	Hot season 2011/12 Cap Year	Intermediate season 2011/12 Cap Year	Cold season 2012/13 Cap Year	Hot season 2012/13 Cap Year	Intermediate season 2012/13 Cap Year
Alcoa	ALCOA_WGP	0.01%	0.02%	0.00%	2.31%		9.29%	5.98%	2.41%	0.33%
Alinta Sales	ALINTA_PNJ_U1				1.50%			0.03%		0.01%
Alinta Sales	ALINTA_PNJ_U2	0.47%	0.00%	0.00%	1.50%					0.90%
Alinta Sales	ALINTA_WGP_U2	0.06%	0.00%	0.00%				0.10%		
Alinta Sales	ALINTA_WWF									
Collgar Wind Farm	INVESTEC_COLLGAR_WF1	7.27%	0.00%	0.00%	0.06%		16.97%	0.20%	0.21%	0.01%
Goldfields Power	PRK_AG	0.05%	0.00%	0.20%	0.02%		0.14%		0.03%	0.02%
Greenough River	GREENOUGH_RIVER_PV1				0.38%					
Griffin Power 2	BW2_BLUEWATERS_G1	0.41%	0.00%	0.14%	1.53%				0.03%	0.02%
Griffin Power	BW1_BLUEWATERS_G2	0.63%	0.50%	0.00%	0.02%	1.50%			0.10%	0.01%
Landfill Gas and Power	KALAMUNDA_SG	0.05%	0.10%	0.00%	0.02%	0.09%		0.07%		
Landfill Gas and Power	TAMALA_PARK				7.99%	32.17%				
Merredin	NAMKKN_MERR_SG1				0.06%				0.03%	0.07%
Mount Barker	SKYFARM_MTBARKER_WF1				0.03%					
NewGen Power Kwinana	NEWGEN_KWINANA_CCG1	0.01%	0.00%	0.00%	0.18%		6.22%			0.11%
NewGen Neerabup	NEWGEN_NEERABUP_GT1	0.14%	0.00%	0.00%		0.31%	0.10%			0.02%
Perth Energy	ATLAS									
Perth Energy	ROCKINGHAM	0.00%	0.00%	19.43%						15.91%
Perth Energy	SOUTH_CARDUP				1.58%		0.34%	0.03%		
Southern Cross Energy	STHRNCRS_EG	0.01%	0.00%	0.00%					0.03%	
Tesla	TESLA_GERALDTON_G1				0.01%			3.24%	2.82%	0.38%
Tesla	TESLA_PICTON_G1				0.01%	0.02%	0.10%			0.01%
Tiwest	TIWEST_COG1	0.27%	0.00%	0.00%	0.03%	0.14%	0.00%	0.03%	0.96%	0.06%
Verve Energy	ALBANY_WF1	1.67%	0.50%	1.13%	0.01%	0.26%				
Verve Energy	COCKBURN_CCG1	15.15%	0.26%	18.58%	10.29%	1.28%	8.23%	2.32%		5.59%
Verve Energy	COLLIE_G1	1.96%	1.93%	6.11%	0.79%	1.83%	0.79%	0.41%	2.98%	0.74%
Verve Energy	GERALDTON_GT1	0.01%	0.03%	0.00%	0.06%		0.24%		0.03%	

*Participant	Resource Name	Cold season 2010/11 Cap Year	Hot season 2010/11 Cap Year	Intermediate season 2010/11 Cap Year	Cold season 2011/12 Cap Year	Hot season 2011/12 Cap Year	Intermediate season 2011/12 Cap Year	Cold season 2012/13 Cap Year	Hot season 2012/13 Cap Year	Intermediate season 2012/13 Cap Year
Verve Energy	KEMERTON_GT11	2.61%	0.65%	1.16%	1.50%	0.72%	0.55%	0.20%	0.55%	0.98%
Verve Energy	KEMERTON_GT12	1.02%	1.65%	2.66%	0.57%	3.31%	0.79%	0.07%	0.33%	0.11%
Verve Energy	KWINANA_G1	1.13%	0.07%	0.72%						
Verve Energy	KWINANA_G2	1.87%	0.31%	4.68%						
Verve Energy	KWINANA_G4									
Verve Energy	KWINANA_G5	1.68%	2.32%	7.27%	1.71%	0.67%	1.02%	0.07%	0.31%	0.73%
Verve Energy	KWINANA_G6	0.00%	0.33%	2.42%	0.55%	0.97%	0.14%	0.07%		0.22%
Verve Energy	KWINANA_GT1	0.02%	0.00%	0.14%		0.05%		0.07%		0.07%
Verve Energy	KWINANA_GT2				1.63%			0.79%	1.12%	0.86%
Verve Energy	KWINANA_GT3				1.98%			0.79%	4.67%	2.54%
Verve Energy	MUJA_G5	8.23%	11.52%	8.44%	13.35%	16.12%	13.59%	4.68%	3.00%	2.34%
Verve Energy	MUJA_G6	4.13%	6.61%	10.79%		3.53%	7.41%	0.03%	12.24%	9.64%
Verve Energy	MUJA_G7	1.76%	4.65%	1.16%	3.01%	3.33%	6.39%	0.14%	0.29%	1.05%
Verve Energy	MUJA_G8	4.06%	3.19%	4.68%	0.68%	3.69%	4.34%	2.05%	0.33%	0.58%
Verve Energy	MUNGARRA_GT1	0.27%	0.00%	1.64%	0.01%			0.61%		0.17%
Verve Energy	MUNGARRA_GT2	0.02%	0.03%	0.00%	0.44%		0.10%	0.44%		0.72%
Verve Energy	MUNGARRA_GT3	0.20%	0.00%	2.94%	0.03%				0.02%	0.09%
Verve Energy	PINJAR_GT1	0.09%	0.00%	0.03%	0.01%					0.22%
Verve Energy	PINJAR_GT10	0.00%	0.02%	0.00%	0.66%	0.24%	0.65%	0.17%	0.12%	0.09%
Verve Energy	PINJAR_GT11	0.00%	1.60%	0.00%	0.58%	1.37%			0.02%	0.02%
Verve Energy	PINJAR_GT2	0.13%	0.00%	0.00%	0.03%					
Verve Energy	PINJAR_GT3	0.05%	0.02%	0.10%	0.03%	0.26%			0.02%	0.01%
Verve Energy	PINJAR_GT4	0.55%	0.00%	0.48%	0.60%	0.03%			0.07%	0.02%
Verve Energy	PINJAR_GT5	0.27%	0.00%	0.07%	0.02%	0.02%			0.19%	0.09%
Verve Energy	PINJAR_GT7	0.05%	0.00%	0.07%	0.01%	0.05%			0.03%	0.01%
Verve Energy	PINJAR_GT9	1.79%	0.17%	0.00%	1.05%	0.22%	0.10%	0.65%		0.18%
Verve Energy	PPP_KCP_EG1	16.13%	4.87%	18.20%	7.22%	6.20%	9.12%	9.97%	0.59%	21.99%
Verve Energy	SWCJV_WORSLEY_COGEN_COG1	45.45%	0.10%	37.67%	91.80%	59.17%	87.19%	88.70%	59.21%	94.57%

*Participant	Resource Name	Cold season 2010/11 Cap Year	Hot season 2010/11 Cap Year	Intermediate season 2010/11 Cap Year	Cold season 2011/12 Cap Year	Hot season 2011/12 Cap Year	Intermediate season 2011/12 Cap Year	Cold season 2012/13 Cap Year	Hot season 2012/13 Cap Year	Intermediate season 2012/13 Cap Year
Verve Energy	TIWEST_COG1				0.03%	0.14%		0.03%	0.96%	0.06%
Verve Energy	WEST_KALGOORLIE_GT2	0.01%	0.00%	0.00%		0.02%			0.03%	0.06%
Verve Energy	WEST_KALGOORLIE_GT3	0.02%	0.00%	0.00%		0.03%		0.24%		
Vinalco	MUJA_G3								7.28%	3.71%
Vinalco	MUJA_G4				0.07%				23.64%	7.18%

*Blanks in the above table denote no values to be reported in respective category.

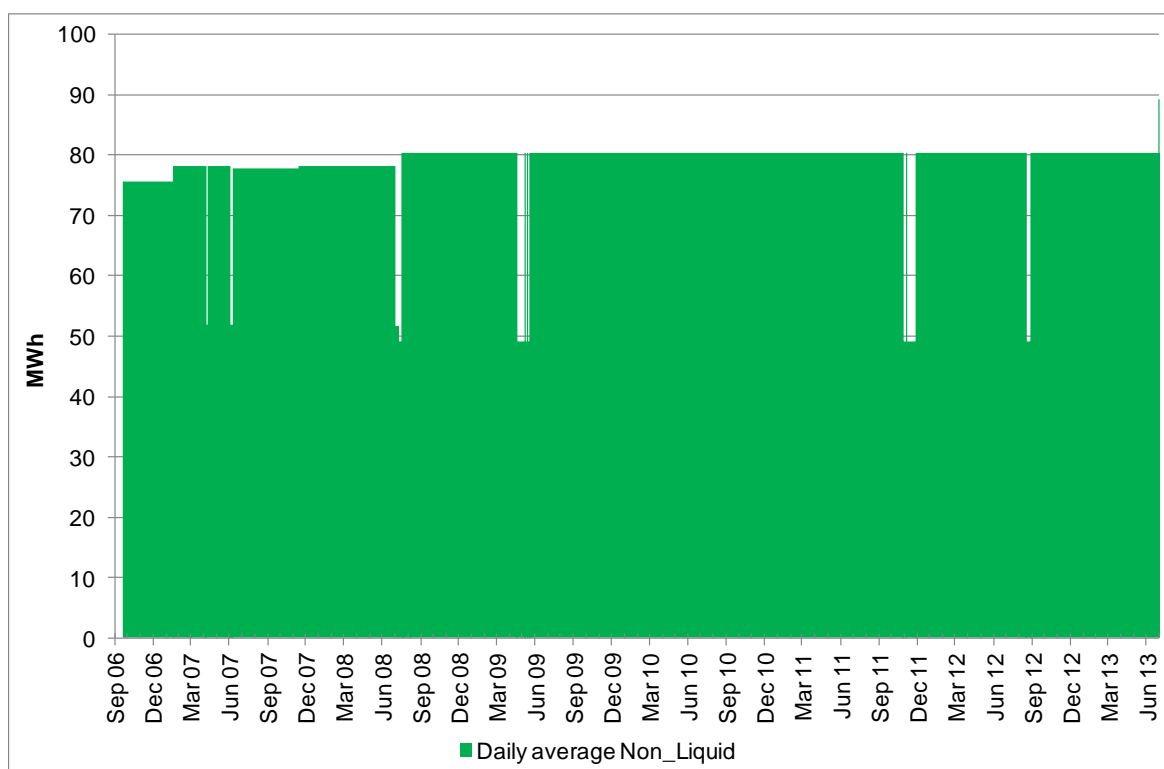
5.5.3 Ancillary Service Declarations

A Market Participant that is a provider of Ancillary Services must include an Ancillary Services Declaration in its STEM Submission.¹⁰⁵ 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) of the Market Rules to calculate any consistent or significant variations between Ancillary Service Declarations and the actual real-time operation of a Market Participant.

Up until March 2013, Verve Energy was the only Market Participant providing Ancillary Services and therefore the only Market Participant required to make an Ancillary Services declaration. Subsequent to the introduction of NewGen into the LFAS market, Rule Change (RC_2013_06) was introduced, relating to the exclusion of LFAS Quantities from Daily Ancillary Service Files. This rule change resulted in a removal of the obligation on System Management to include LFAS in the Ancillary Service estimate each Scheduling Day.

Figure 30 shows that the only Market Participant to submit an Ancillary Service Declaration has been Verve Energy, with the average quantities of Ancillary Services fairly consistent at 80 MWh per Trading Interval for the current Reporting Period.¹⁰⁶

Figure 30 Daily average Ancillary Services declarations (MWh per Trading Interval)



¹⁰⁵ See Clause 6.6.1. The Ancillary Services declaration is to set as 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.

¹⁰⁶ The decreases in Ancillary Service Declarations from May to July 2008, from April to May 2009, and from late October 2011 to late November 2011, were due to Collie Power Station being on outage during those times.

5.5.4 *Variations in Short Term Energy Market Offers and Bids*

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

The prices and quantities of STEM Offers and STEM Bids by each Market Participant are illustrated in Figure 36 through Figure 73 in Appendix 3. As has been observed in previous Reports to the Minister, there are significant variations in the prices and/or quantities of offers and bids of all Market Participants. In many cases, these variations occur both in the short-term (day-to-day) and longer term (since market commencement).

Significant variations in STEM Offers and STEM Bids present difficulties in the development of a robust system for identifying substantial variations relative to recent past behaviour. Development of a robust system requires conceptual issues to be addressed: including what constitutes a 'substantial variation' in prices or quantities and the definition of 'recent past behaviour'. The resolution of these two issues will impact on the variations that are required to be identified by the MSDC.

In attempting to track how a Market Participant's STEM offers and bids change over time, the IMO has defined a variable summarising the participant offers and bids for a Trading Interval into a single number. The Authority has been provided with a record of this variable for each of the Market Participants since market commencement. Given the challenges in the conceptual issues identified, the Authority will continue to examine how this variable could be used, as well as explore other methods of analysis, to satisfy the requirement under clause 2.16.2(h) of the Market Rules.

5.5.5 *Evidence of Market Customers over-stating 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 over-stated its consumption, it is necessary to determine the Market Customer's planned load and actual load in accordance with the following.

- Planned load is determined in a different way for a stand-alone Market Customer and a Market Customer that is also a Market Generator.
- For a stand-alone Market Customer, planned load is measured as its Net Contract Position.
- For a Market Customer that is also a Market Generator, planned load is measured as demand set out in the Bilateral Nominations. The reason that the Net Contract Position does not provide an appropriate measure of planned load for a Market Customer that is also a Market Generator is that the Net Contract Position may also include results from STEM trading.
- 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.

The extent to which a Market Customer over-states its consumption is determined by calculating planned load less actual load. If planned load less actual load is positive, this

indicates that the Market Customer has over-stated its consumption. If planned load less actual load is negative, this indicates that the Market Customer has under-stated its consumption.

Variations between planned load and actual load for individual Market Customers are classified as confidential. Hence, this information is not presented in this public version of the report.

5.5.6 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.

Figure 31 illustrates the daily average number of units subject to Planned Outages per Trading Interval.

Figure 31 Number of Facilities on Planned Outages (cumulative daily average)

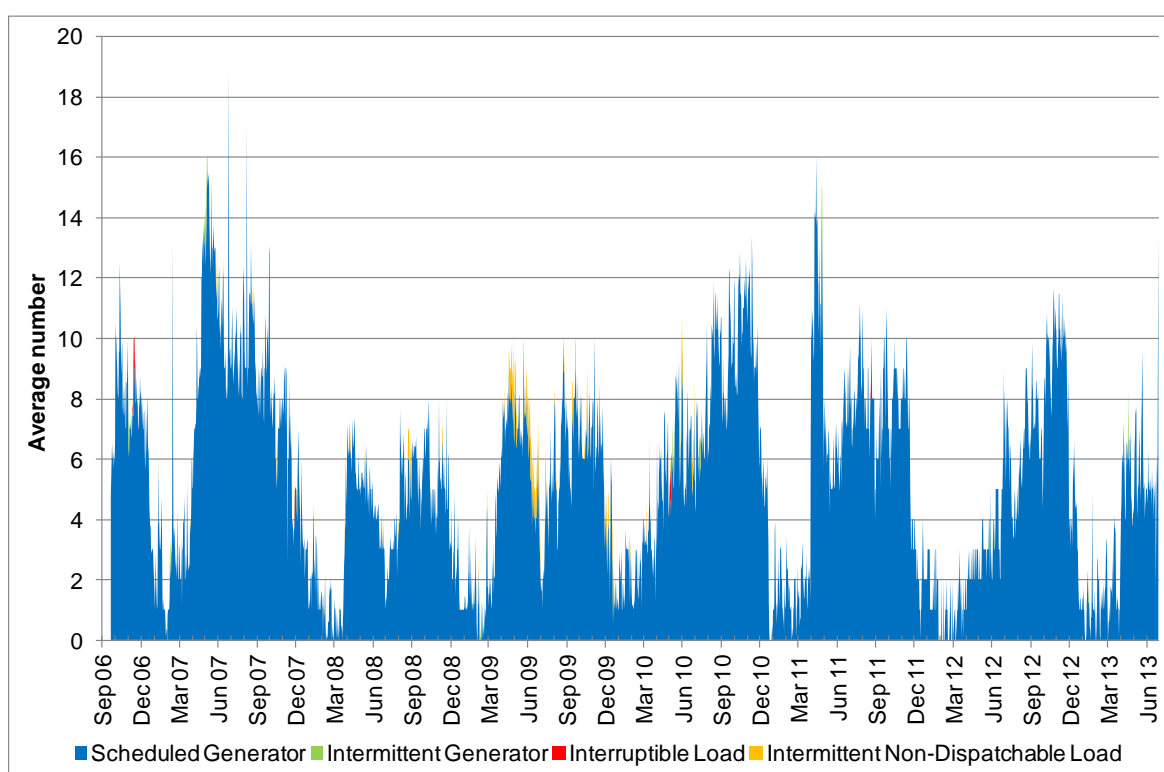
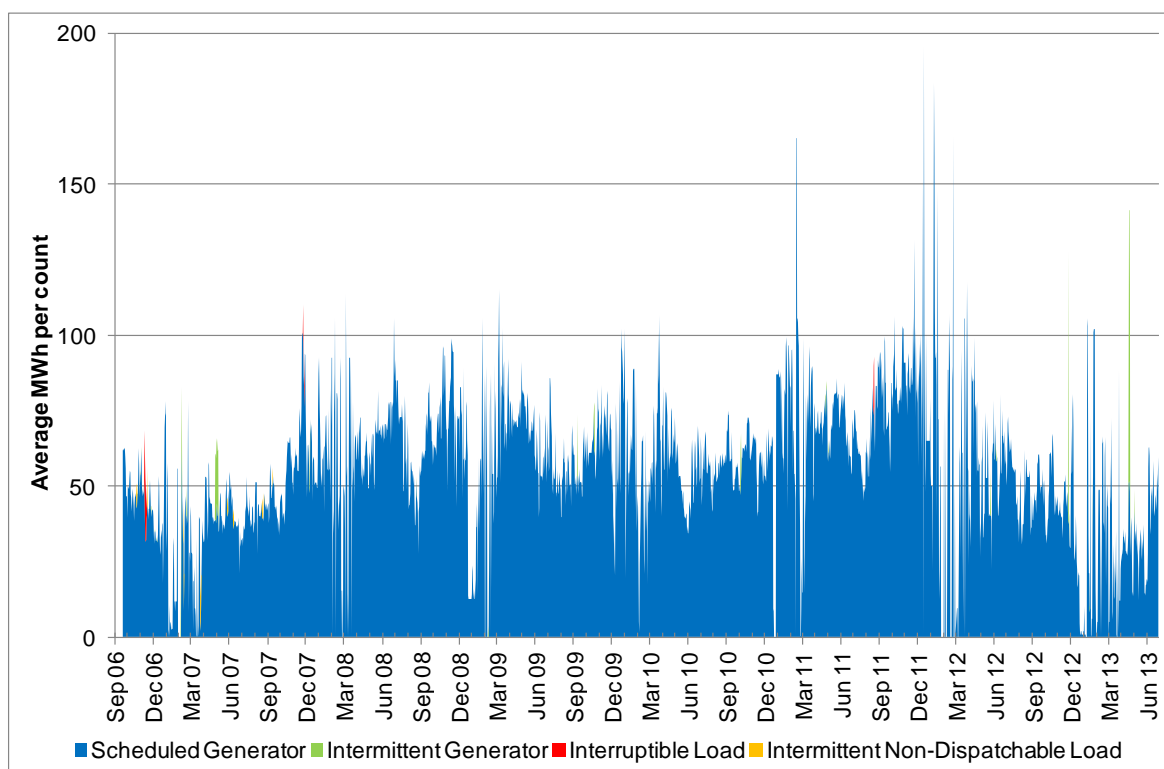


Figure 32 illustrates the accompanying MWh quantity of Planned Outages.

Figure 32 Quantity of energy subject to Planned Outage (cumulative daily average MWh per facility)



Overall, the average number of facilities on Planned Outage for the reporting period was 5, compared with 4.6 for the previous reporting period. As expected, Planned Outages tend not to occur during December, January, February and March, in line with the low level of reserve margins prevailing at these peak summer demand times.

The amount on Planned Outage was much lower in the current Reporting Period compared to the previous period, with a drop in the average from 71 MWh per Trading Interval to 40 MWh per Trading Interval. This improvement was more noticeable during the peak summer demand periods of December to March, with the average Planned Outage per interval dropping from 77 MWh per Trading Interval to 33 MWh per Trading Interval.

The number of Planned Outages was significantly lower during the low demand period August to November compared to the previous Reporting Period, decreasing from an average of 80 MWh to 46 MWh. The decrease in the size of Planned Outages in this period was a result of the improved performance of a number of Verve Energy's facilities. The Authority had raised its concerns in previous reports to the Minister over the impact of Planned Outages on the economic efficiency of the market and welcomes the improvement in this area. Verve Energy's Muja G6 facility had the largest number of Planned Outages during this period, followed by Alcoa's WGP facility.

Table 2 presented in section 5.1.6 above provides the information on each Facility's capacity subject to outages relative to the Facility's maximum generating capacity.

Figure 33 illustrates the daily average number of units subject to Forced Outages per Trading Interval.

Figure 33 Number of Facilities on Forced Outages (cumulative daily average)

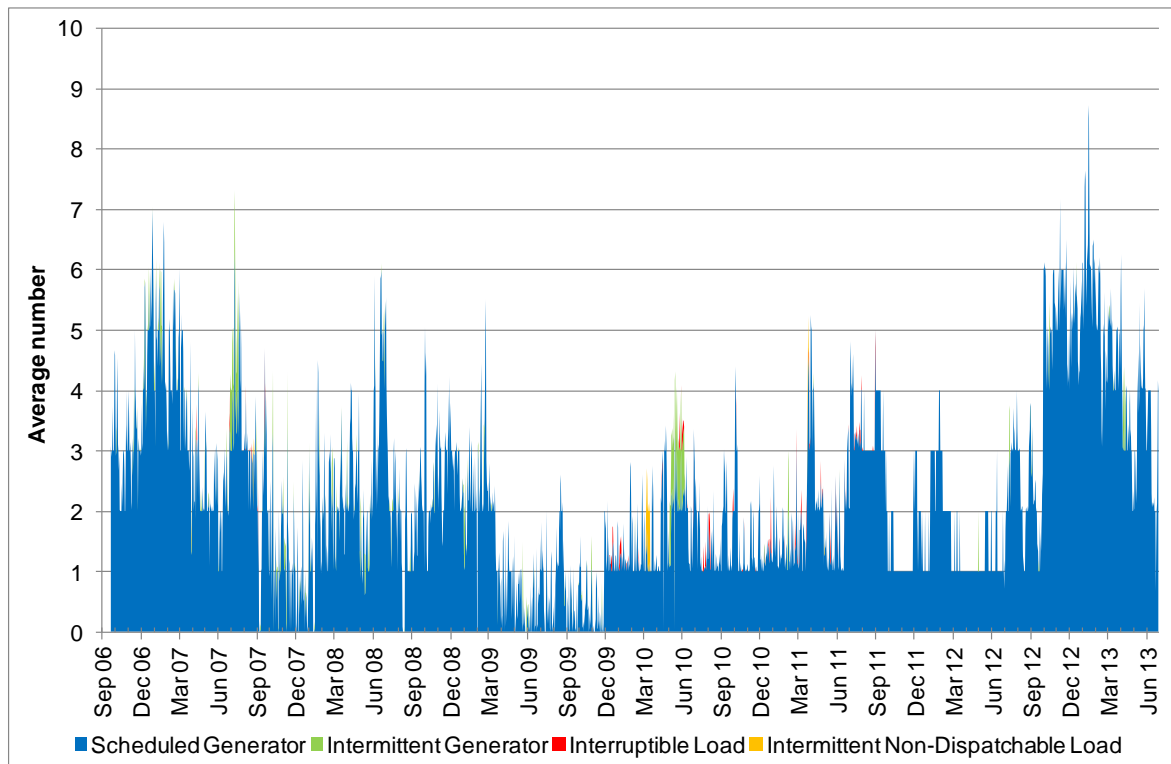
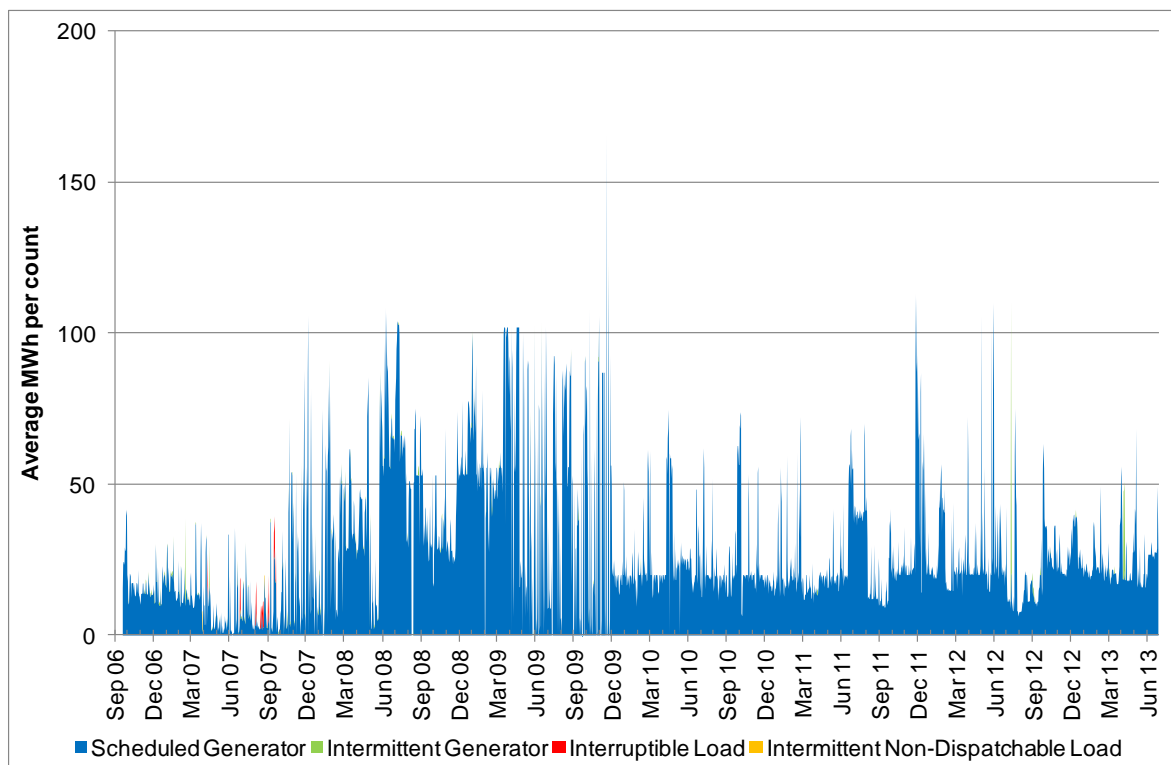


Figure 34 illustrates the accompanying MWh quantity of Forced Outages.

Figure 34 Quantity of energy subject to Forced Outage (cumulative daily average MWh per Trading Interval)



As would be expected, there is no clear seasonal pattern for Forced Outages. The overall number of Forced Outages for the current Reporting Period was noticeably higher than the previous reporting period. For the previous Reporting Period, the average number of Forced Outages was under two per day. This increased to an average of four per day in the current Reporting Period. The increase was a result of the Muja G1, G2, G3 and G4 units being on Forced Outage.

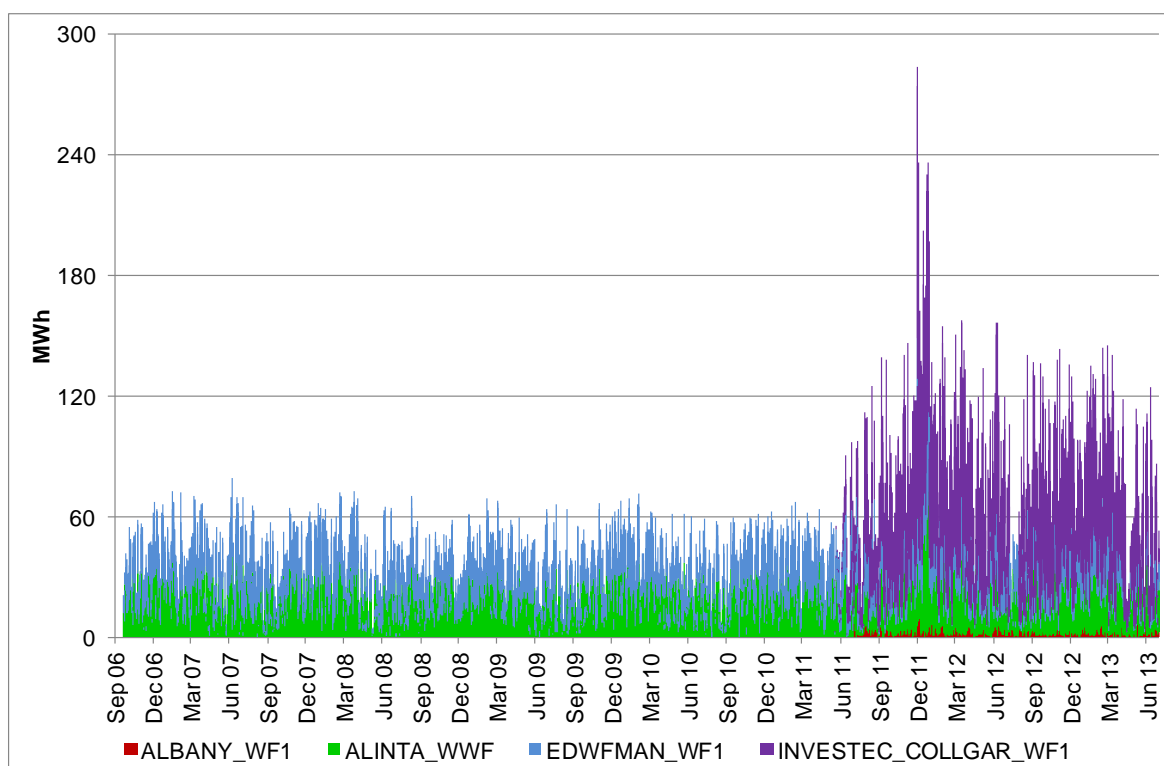
Whilst the average number of facilities on Forced Outage increased during the current reporting Period, the average MWh of Forced Outage declined during the period from an average of 28 MWh per Trading Interval to an average of 24 MWh per Trading Interval.

A large number of Verve Energy facilities had significant improvement in Forced Outage levels for the current Reporting Period compared to the previous Reporting Period. These included Muja G7, Muja G8, Collie and Cockburn facilities.

The number of facilities on Forced Outages averaged four between August 2012 and November 2012, an increase from two in the August 2011 to November 2011 period. There was however a slight decrease in the average size of Forced Outage during this period, from 21.8 MWh to 21.5 MWh. During this period Verve Energy's Muja_G1 (159 MWh) and Muja_G2 (116 MWh) had the largest number of Forced Outages. Verve Energy's Muja_G3 and G4, as well as their Kwinana G5 and G6 facilities, also had a high number of Forced Outages during this period. This offset the improvement seen in the Muja G7, Muja G8, Collie and Cockburn units as mentioned earlier. Griffin Power's Bluewaters facilities also incurred a large number of Forced Outages during this period. No major Forced Outages were observed during the current Reporting Period for Intermittent Generators, Interruptible Loads and Intermittent Non-Dispatchable Loads.

As per the previous Reporting Period, the average Forced Outage quantities remained under 50 MWh for the majority of the period.

Figure 35 below shows the cumulative daily average MWh quantities generated by major Wind Farms since market commencement, in September 2006. The cumulative daily average remained around 60 MWh between September 2006 and June 2011, with Alinta's Walkaway Wind Farm and Emu Downs Wind Farm being the dominant Intermittent Generators. Since early June 2011 the cumulative daily average nearly doubled with the Collgar Wind Farm becoming operational. During the current Reporting Period the cumulative daily average Intermittent Generation was significantly lower during July 2012 as Collgar Wind Farm was observed on a Forced Outage for majority of the month.

Figure 35 WindFarm Generation (cumulative daily average MWh per Trading Interval)

5.5.7 Key determinants of high prices in the Short Term Energy Market and Balancing

Clause 2.16.4(g) requires the IMO to explore the key determinants of high prices in the STEM and Balancing market. The Authority notes that the IMO has established a process for analysing the key drivers associated with the high price incidents observed in the STEM and Balancing market. The results from this analysis are provided to the Authority and discussed at the regular surveillance meeting held between the two organisations. The IMO is currently in the process of formally documenting this process and exploring options for the development of appropriate models for undertaking the analysis required under and clause 2.16.4 (g) of the Market Rules.

5.6 Other information

5.6.1 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 30 September 2013 the following participants were registered with the IMO:

- 37 entities registered as Market Generators only. There are 3 new participants in this category compared to when last reported on 19 April 2013. These new participants are Biogas Pty Ltd and Phoenix Energy;
- 16 entities registered as Market Customers only. There are two new participants in this category compared to when reported on 19 April 2013, which is AER Retail Pty Ltd and Cockburn Cement Ltd. Clear Energy Pty Ltd has changed from being a Market Customer only to be both a Market Generator and Market Customer; and

- 12 entities registered as both Market Generators and Market Customers (Clear Energy Pty Ltd is the only new registered participant in this category compared to when last reported on 19 April 2013).

This is a total of 65 registered entities. Table 11 in Appendix 3 provides a list of these participants at 2 September 2008, 6 October 2009, 14 October 2010, 3 October 2011, 10 December 2012 and 30 September 2013.

In addition to these Market Generators and Market Customers, there are other classes of Market Participants. As at 30 September 2013, there were two entities registered as Network Operators: Western Power and Alinta Sales Pty Ltd.

5.6.2 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 (**BSCs**) that System Management enters into.

The Authority's analysis is set out in section 3.1.1 above.

5.6.3 Rule Change Proposals

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

The formal Rule Change process under the Market Rules commenced on 15 December 2006. Prior to this, the former Office of Energy (now the PUO) 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.¹⁰⁷

Information on Market Rule changes that have commenced, been rejected or are under development is available on the IMO's website. Table 8 provides a summary of the IMO's progression of Rule Change Proposals, since the commencement of the formal Rule Change process in December 2006 to June 2013.

Table 8 Progression of Rule Change Proposal since market commencement

Date range	Received	Commenced	Not progressed	Rejected	Under development
15 December 2006 and 31 July 2007	9	9 ¹⁰⁸	-	-	-
1 August 2007 and 31 July 2008	36	36 ¹⁰⁹	-	-	-
1 August 2008 and 31 July 2009	37	24 ¹¹⁰	-	3	10

¹⁰⁷ 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.

¹⁰⁸ As at the end of the 2007 calendar year.

¹⁰⁹ All of which have commenced.

¹¹⁰ As at the time the 2009 Report to the Minister was released.

Date range	Received	Commenced	Not progressed	Rejected	Under development
1 August 2009 and 31 July 2010	19	15 ¹¹¹	2	1	1
1 August 2010 and 31 July 2011	29	25 ¹¹²	2	-	2
1 August 2011 and 30 June 2012	13	10 ¹¹³	-	1	2
1 July 2012 and 30 June 2013	23	19 ¹¹⁴	-	2	2

¹¹¹ As at the time the 2010 Report to the Minister was released.

¹¹² As at the time the 2011 Report to the Minister was released.

¹¹³ As at the time the 2012 Report to the Minister was released.

¹¹⁴ As at the time the 2013 Report to the Minister was released.

Appendices

Appendix 1 The Authority's reporting requirements under the Market Rules and the related sections in this report

Reporting Requirements under the Market Rules

The Market Rules require the Authority to provide to the Minister for Energy a report on the effectiveness of the market in meeting the Wholesale Market Objectives, and set out specific reporting requirements for the Authority.

Clause 2.16.11 of the Market Rules sets out a requirement for the Report to the Minister to report on the effectiveness of the market in dealing with the matters identified in clauses 2.16.9 and 2.16.10 of the Market Rules.¹¹⁵

Clause 2.16.9 of the Market Rules specifies that the Authority is responsible for monitoring the effectiveness of the market in meeting the Wholesale Market Objectives, and that the Authority must investigate any market behaviour that has resulted in the market not functioning effectively. The Authority, with the assistance of the IMO, must monitor:

- Ancillary Services Contracts and Balancing Support Contracts;
- instances of inappropriate and anomalous market behaviour (in relation to bidding in the STEM and Balancing, as well as in the making of Availability Declarations, Ancillary Services Declarations and Fuel Declarations);
- market design problems or inefficiencies; and
- problems with the structure of the market.

Clause 2.16.10 of the Market Rules requires that the Authority must review the effectiveness of:

- the Market Rule change process and Procedure change process;
- the compliance monitoring and enforcement measures in the Market Rules and Regulations;
- the IMO in carrying out its functions under the Regulations, the Market Rules and Market Procedures; and
- System Management in carrying out its functions under the Regulations, the Market Rules and Market Procedures.

Clause 2.16.12 of the Market Rules sets out further requirements for the Report to the Minister, as follows:

- a summary of the information and data compiled by the IMO and the Economic Regulation Authority under clause 2.16.1;
- the 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:
 - the Reserve Capacity market;
 - the market for Bilateral Contracts for capacity and energy;
 - the Short Term Energy Market;
 - Balancing;

¹¹⁵ Pursuant to clause 2.16.11 of the Market Rules, the report must be produced at least annually, or more frequently where the Authority considers that the WEM is not effectively meeting the Wholesale Market Objectives.

- the dispatch process;
- planning processes; and
- the administration of the market, including the Market Rule change process;
- an assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market; and
- any recommended measures to increase the effectiveness of the market in meeting the Wholesale Market Objectives to be considered by the Minister.

Clause 2.16.5 of the Market Rules states that the IMO must, on request from the Economic Regulation Authority, and in any event at least once each month, provide the Economic Regulation Authority with the data identified in the Market Surveillance Data Catalogue (as set out in clause 2.16.2) and the results of the analysis on that data (as set out in clause 2.16.4.)

Reporting requirements mapped to the sections of this report

Table 9 Mapping of the reporting requirements under the Market Rules (as of 30 June 2013) to report sections

Market Rule clause	Market Rule reporting requirement	See report section
2.16.9 (a)	Monitoring of Ancillary Services Contracts and Balancing Support Contracts	3.1
2.16.9 (b)	Monitoring of inappropriate and anomalous market behaviour	3.2
2.16.9 (c)	Monitoring of market design problems or inefficiencies	3.3
2.16.9 (d)	Monitoring of problems with the structure of the market	3.4
2.16.10 (a)	Effectiveness of the Market Rule change process and Procedure change process	4.1.1
2.16.10 (b)	Effectiveness of the compliance monitoring and enforcement measures in the Market Rules and Regulations	4.1.2
2.16.10 (c)	Effectiveness of the IMO in carrying out its functions under the Regulations, the Market Rules and Market Procedures	4.1.3.1
2.16.10 (d)	Effectiveness of System Management in carrying out its functions under the Regulations, the Market Rules and Market Procedures	4.1.3.2
2.16.12 (a)	Summary and analysis of the Market Surveillance Data Catalogue	5
2.16.12 (b)	Effectiveness of the market	3
2.16.12 (b) i.	Effectiveness of the Reserve Capacity market	4.2
2.16.12 (b) ii.	Effectiveness of the market for Bilateral Contracts for capacity and energy	4.3
2.16.12 (b) iii.	Effectiveness of the Short Term Energy Market	4.4
2.16.12 (b) iv.	Effectiveness of Balancing	4.5
2.16.12 (b) v.	Effectiveness of the dispatch process	4.6
2.16.12 (b) vi.	Effectiveness of planning processes	4.7
2.16.12 (b) vii.	Effectiveness of the administration of the market, including the Market Rule change process	4.1 and 4.1.1

Market Rule clause	Market Rule reporting requirement	See report section
2.16.12 (c)	Assessment of any specific events, behaviour or matters that impacted on the effectiveness of the market	2 and the Executive Summary
2.16.12 (d)	Any recommended measures to increase the effectiveness of the market in meeting the Wholesale Market Objectives to be considered by the Minister	2 and the Executive Summary

Table 10 Mapping of the MSDC data and analysis requirements under the Market Rules (as of 30 June 2013) to report sections

Market Rule clause	Market Rule reporting requirement	See report section
2.16.2(a)	The number of Market Generators and Market Customers in the market	5.6.1
2.16.2(b)	The number of participants in each Reserve Capacity Auction	5.1.1
2.16.2(c)	Clearing prices in each Reserve Capacity Auction and STEM Auctions	5.1.3
2.16.2(d)	LFAS Submissions	Appendix 3
2.16.2(dA)	All Reserve Capacity Auction offers	5.1.2
2.16.2(e)	All bilateral quantities scheduled with the IMO	5.3.1
2.16.2(f)	All STEM Offers and STEM Bids, including both quantity and price terms	5.2.1.4
2.16.2(g)	Balancing Submissions, including associated Balancing Price-Quantity Pairs and Ramp Rate Limits	5.2.2
2.16.2(gA)	All Fuel Declarations	5.5.1
2.16.2(gB)	All Availability Declarations	5.5.2
2.16.2(gC)	All Ancillary Service Declarations	5.5.3
2.16.2(h)	Any substantial variations in STEM Offer and STEM Bid prices or quantities relative to recent past behaviour	5.5.4
2.16.2(hA)	Any evidence that a Market Customer has significantly overstated 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	5.5.5
2.16.2(hB)	The information in clause 7A.2.18(c) (i.e. any information as to whether a Facility was not able to comply with a Dispatch Instruction from System Management and the reasons for that non-compliance)	5.2.2
2.16.2(hC)	Any substantial variations in Balancing Prices, Non-Balancing Facility Dispatch Instruction Payments or Balancing Quantities relative to recent past behaviour	5.2.2
2.16.2(i)	The capacity available through Balancing from Balancing Facilities, Dispatchable Loads and Demand Side Programmes	5.2.2.4
2.16.2(j)	The frequency and nature of Dispatch Instructions and Operating Instructions to Market Participants	5.2.2.5
2.16.2(k)	The number and frequency of outages of Scheduled Generators and Non-Scheduled Generators, and Market Participants' compliance with the outage scheduling process	5.5.6
2.16.2(l)	The performance of Market Participants with Reserve Capacity Obligations in meeting their obligations	5.1.6
2.16.2(m)	Details of Ancillary Service Contracts that System Management enters into	5.6.2
2.16.2(n)	All LFAS Prices	Appendix 3
2.16.2(o)	The number of Rule Change Proposals received, and details	5.6.3

Market Rule clause	Market Rule reporting requirement	See report section
	of Rule Change Proposals that the IMO has decided not to progress under clause 2.5.6	
2.16.2(p)	Such other items of information as the IMO considers relevant to the functions of the IMO and the Economic Regulation Authority under this clause 2.16.	-
2.16.4(a)	Where applicable, calculation of the means and standard deviations of values in the Market Surveillance Data Catalogue	5.2.1 and 5.2.2
2.16.4(b)	Monthly, quarterly and annual moving averages of prices for the STEM Auctions, the Balancing Market and the LFAS Market	5.2.1, 5.2.2 and 2.2
2.16.4(c)	Statistical analysis of the volatility of prices in the STEM Auctions, the Balancing Market and the LFAS Market	5.2.1, 5.2.2 and Appendix 3
2.16.4(cA)	Any consistent or significant variations between the Fuel Declarations, Availability Declarations, and Ancillary Service Declarations for, and the actual operation of, a Market Participant facility in real-time	5.5.1
2.16.4(d)	The proportion of time the prices in the STEM Auctions and through Balancing are at each Energy Price Limit	5.2.1 and 5.2.2
2.16.4(e)	Correlation between capacity offered into the STEM Auctions and the incidence of high prices	5.2.1
2.16.4(f)	Correlation between capacity offered into and made available in the Balancing Market and the incidence of high prices	5.2.2
2.16.4(fA)	Correlation between capacity offered into and made available in the LFAS Market and the incidence of high prices	2.2
2.16.4(g)	Exploration of the key determinants for high prices in the STEM in Balancing, in the Balancing Market and in the LFAS Market, including determining correlations or other statistical analysis between explanatory factors that the IMO considers relevant and price movements	5.2.1.3
2.16.4(h)	Such other analysis as the IMO considers appropriate or is requested of the IMO by the Economic Regulation Authority	-

Appendix 2 Submissions received

To assist the Authority's preparation of the 2013 Report to the Minister, the Authority published a Discussion Paper on 2 September 2013, inviting interested parties to make submissions on issues impacting the effectiveness of the WEM. The submission period closed on 14 October 2013.

The Authority received 5 submissions in response to the Discussion Paper:

- Alinta Energy
- Bluewaters Power
- Community Electricity
- System Management
- Western Power

Permissions for publication were received for all submissions and they are available on the Authority's [website](#).

The Authority wishes to acknowledge the time and effort that goes into the preparation of these submissions. The Authority continues to value stakeholder feedback on issues impacting on the effectiveness of the WEM. Whilst the Authority has taken into the feedback received from stakeholders in the preparation of this report, the Authority notes some issues raised by stakeholders are considered to be out of scope for this report and will be addressed at a later stage where appropriate.

Appendix 3 Market Surveillance Data Catalogue – additional information

Short Term Energy Market Offers and Bids

Short Term Energy Market Offers

Figure 36 to Figure 56 show STEM Offers for each Market Participant from market commencement to 30 June 2013. In the current Reporting Period, five Market Participants have commenced making offers in the STEM, namely Tesla Geraldton, Tesla Kemerton, Tesla Northam, Merredin Energy and Vinalco.

Figure 36 shows Alcoa's offers were exclusively priced at the Maximum STEM Price or at Alternative Maximum STEM Price historically. A notable change in pricing behaviour is observed from December 2012 onwards where Alcoa offered cheap STEM quantities in the price range of \$0/MWh to \$50/MWh.

Figure 36 Alcoa's daily average STEM Offers (cumulative MWh per Trading Interval)

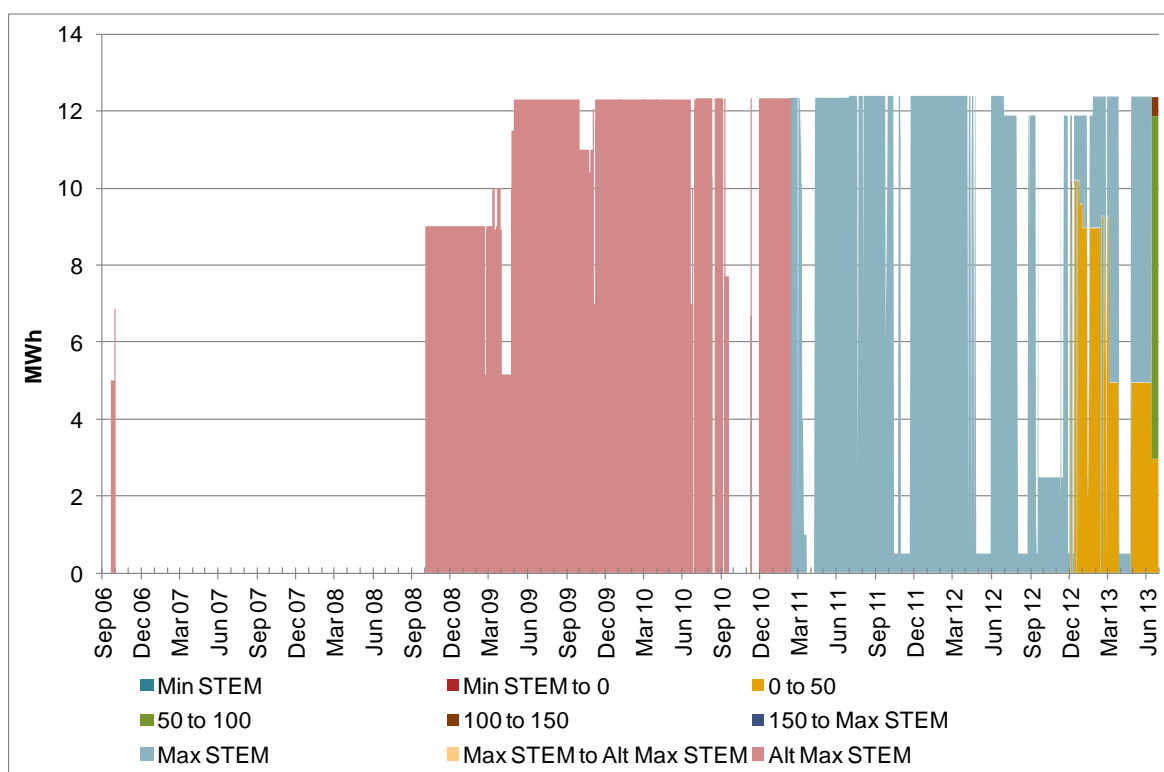


Figure 37 shows that Alinta continued to offer large volumes into the STEM, priced at the Alternative Maximum STEM Price, and also offered large volumes priced at the Maximum STEM Price. It is noted that volumes were offered in price range of \$50/MWh to \$100/MWh, compared to the previous reporting period when the volumes were offered in price range of \$0/MWh to \$50/MWh.

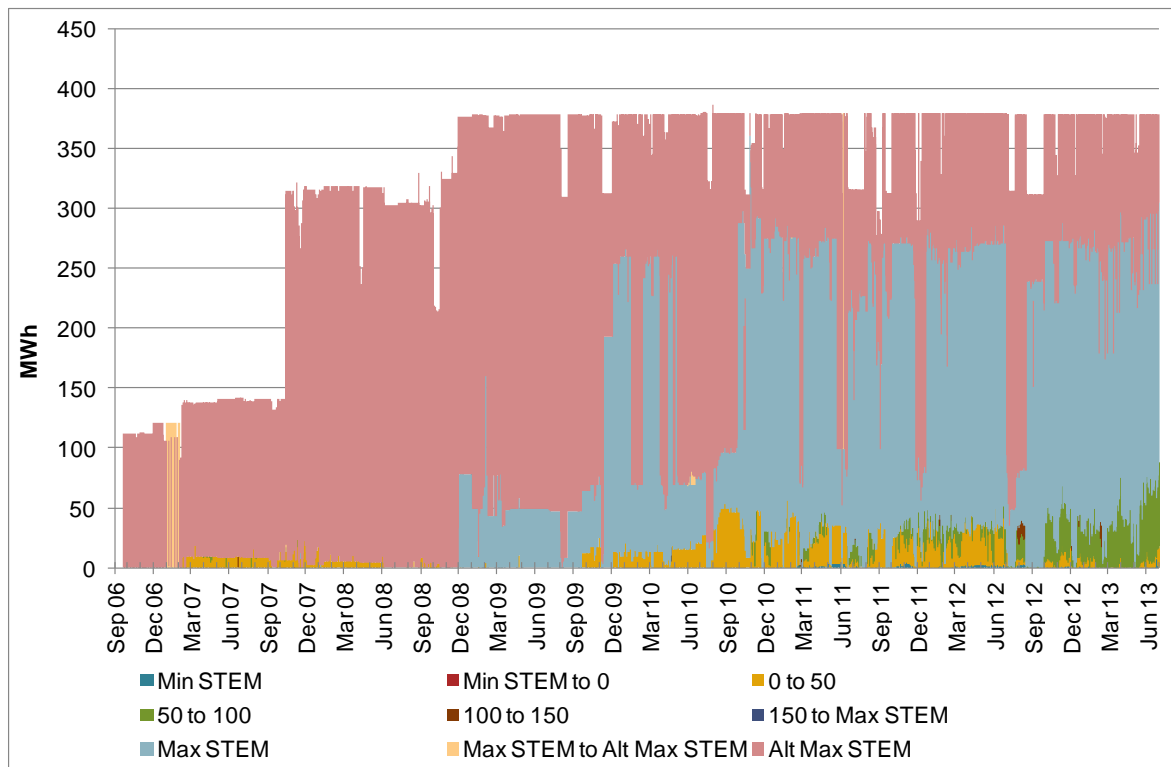
Figure 37 Alinta's daily average STEM Offers (cumulative MWh per Trading Interval)

Figure 38 shows ERM Power offered very small volumes at Alternative Maximum STEM Price during July 2012, November 2012 and December 2012.

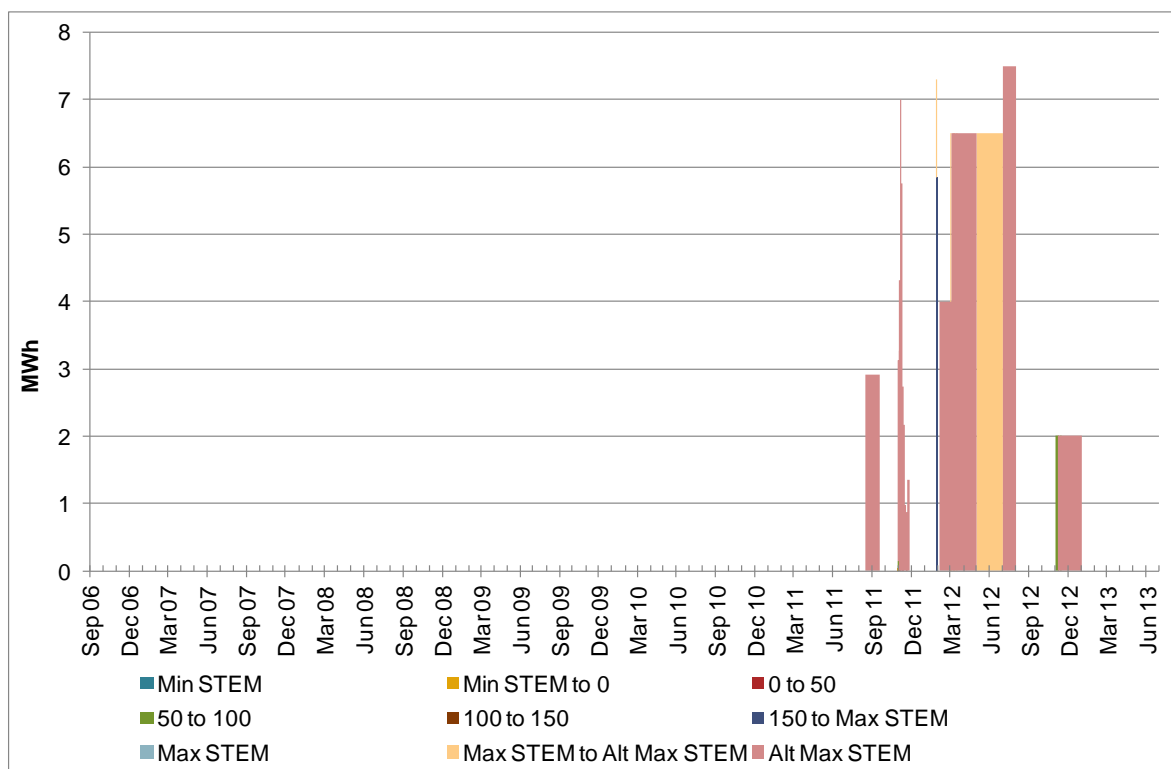
Figure 38 ERM Power's daily average STEM Offers (cumulative MWh per Trading Interval)

Figure 39 shows Goldfields Power continued to offer volumes priced almost exclusively at the Alternative Maximum STEM Price during the current Reporting Period.

Figure 39 Goldfields Power's daily average STEM Offers (cumulative MWh per Trading Interval)

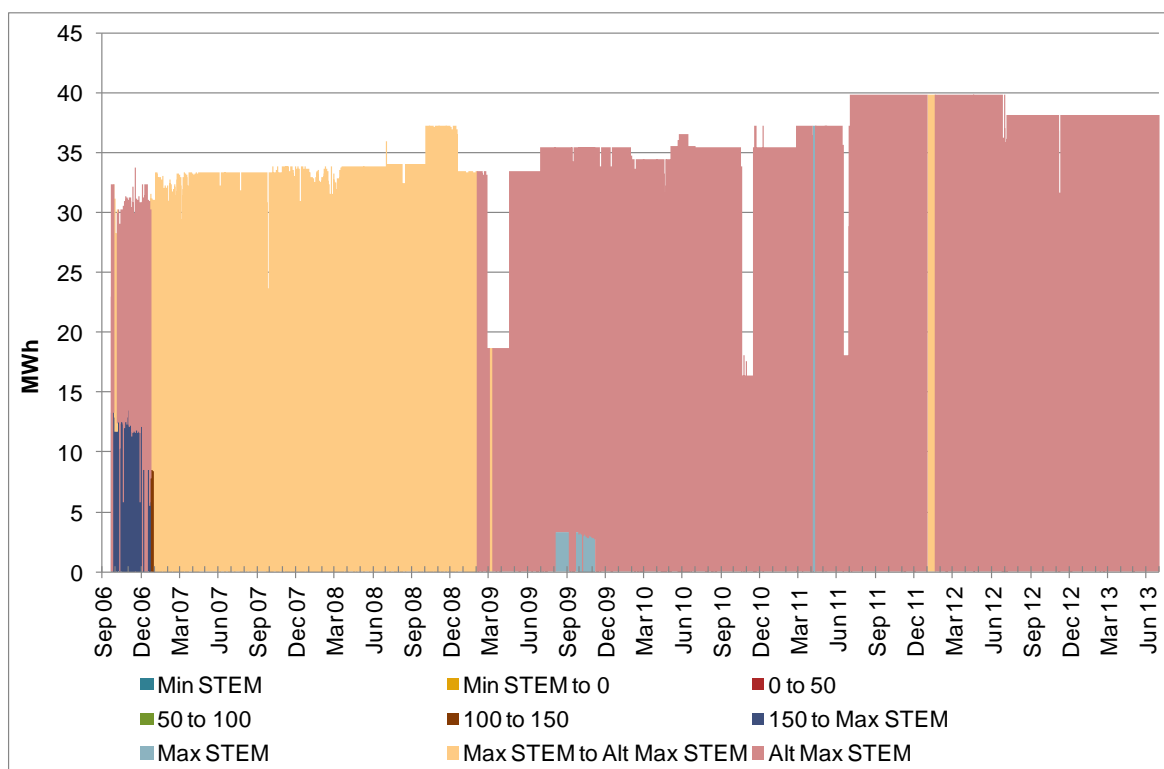


Figure 40 shows that during the current Reporting Period, Griffin Power offered the majority of its volumes in the STEM at Alternative Maximum STEM Price, whilst Figure 41 shows that Griffin Power 2 offered STEM volumes in a range of prices. It is also noted that Griffin Power 2 offered STEM volumes in the price range of Minimum STEM Price to \$0/MWh in periods of low demand i.e. during August 2012, September 2012, May 2013 and June 2013 (denoted by yellow in Figure 41).

Figure 40 Griffin Power's daily average STEM Offers (cumulative MWh per Trading Interval)

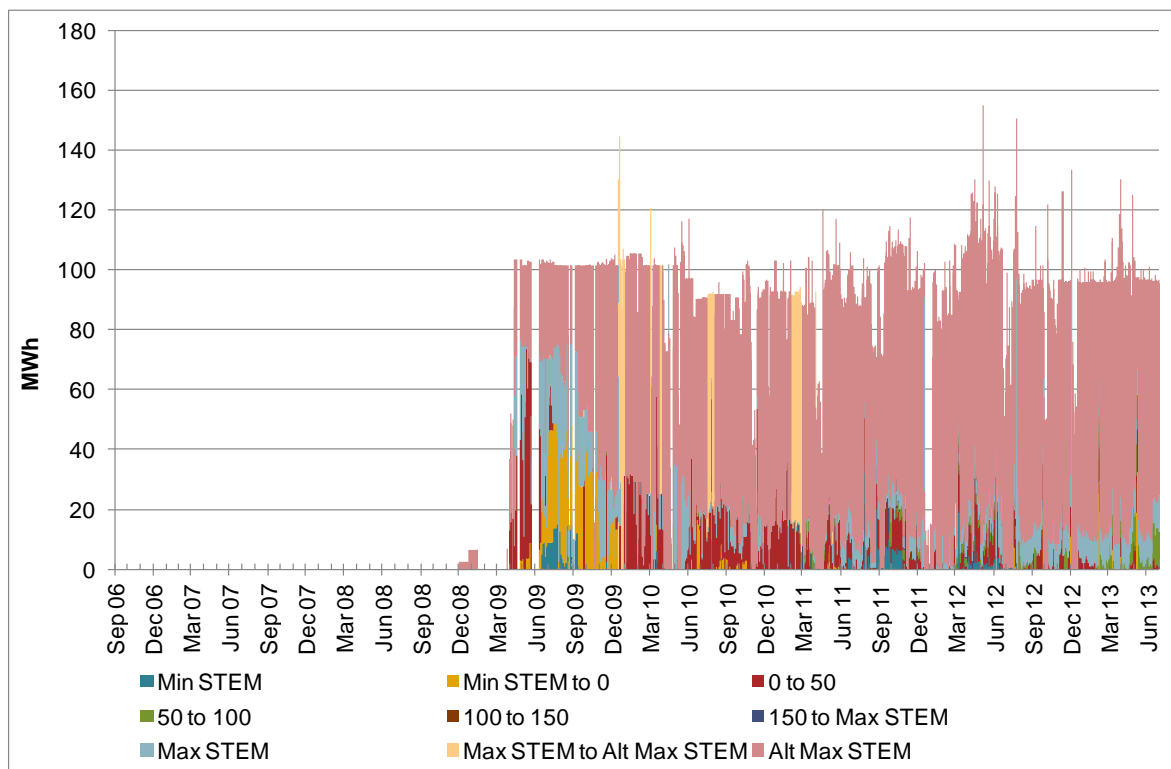


Figure 41 Griffin Power 2's daily average STEM Offers (cumulative MWh per Trading Interval)

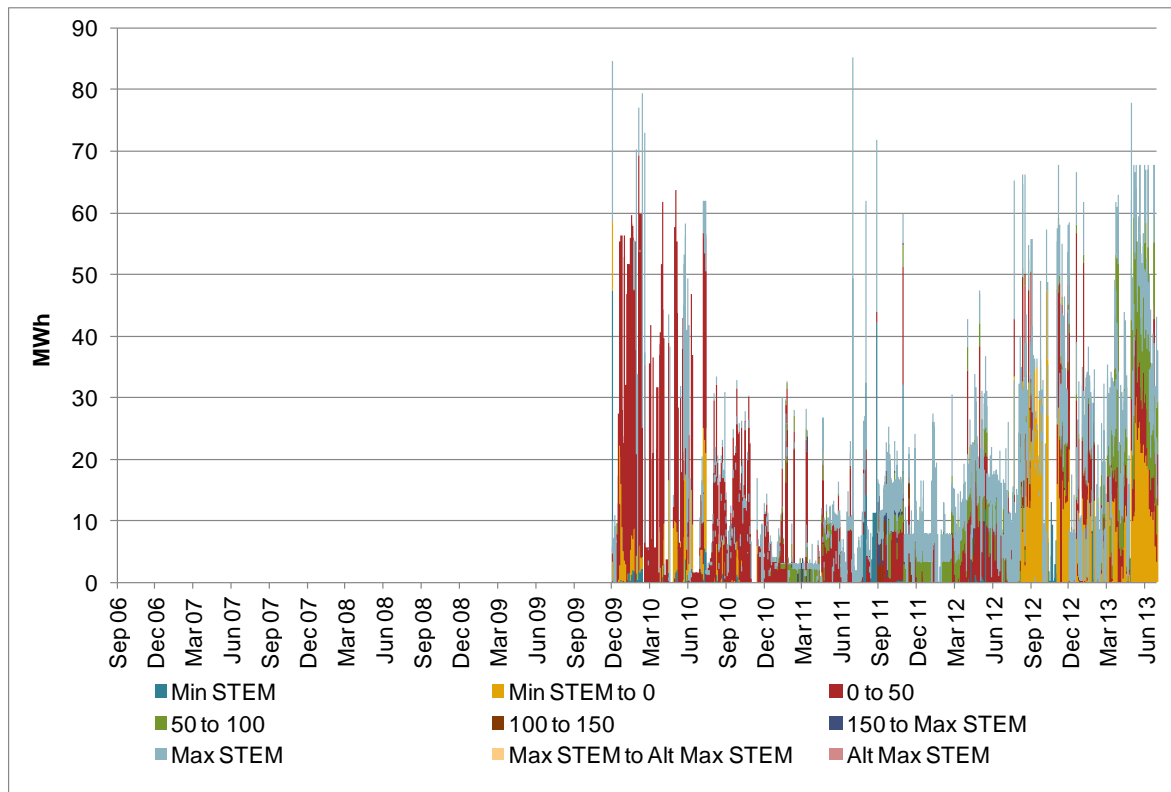


Figure 42 shows Karara Energy (registered as a Market Customer since 2007) offered into the STEM for the first time a daily average of 30 MWh at the Alternative Maximum STEM Price for majority of the current Reporting Period.

Figure 42 Karara's daily average STEM Offers (cumulative MWh per Trading Interval)

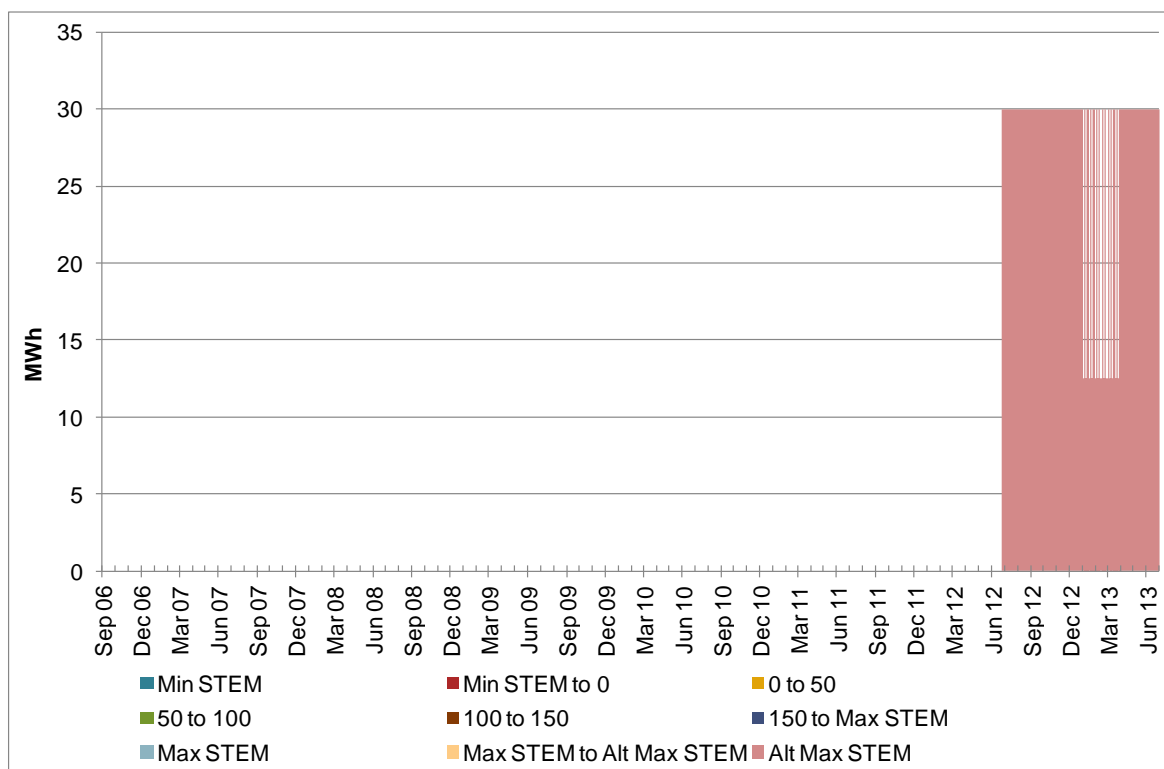


Figure 43 shows Landfill Gas and Power has offered volumes consistently at prices between the Maximum STEM Price and Alternative Maximum STEM Price throughout the current Reporting Period.

Figure 43 Landfill Gas and Power's daily average STEM Offers (cumulative MWh per Trading Interval)

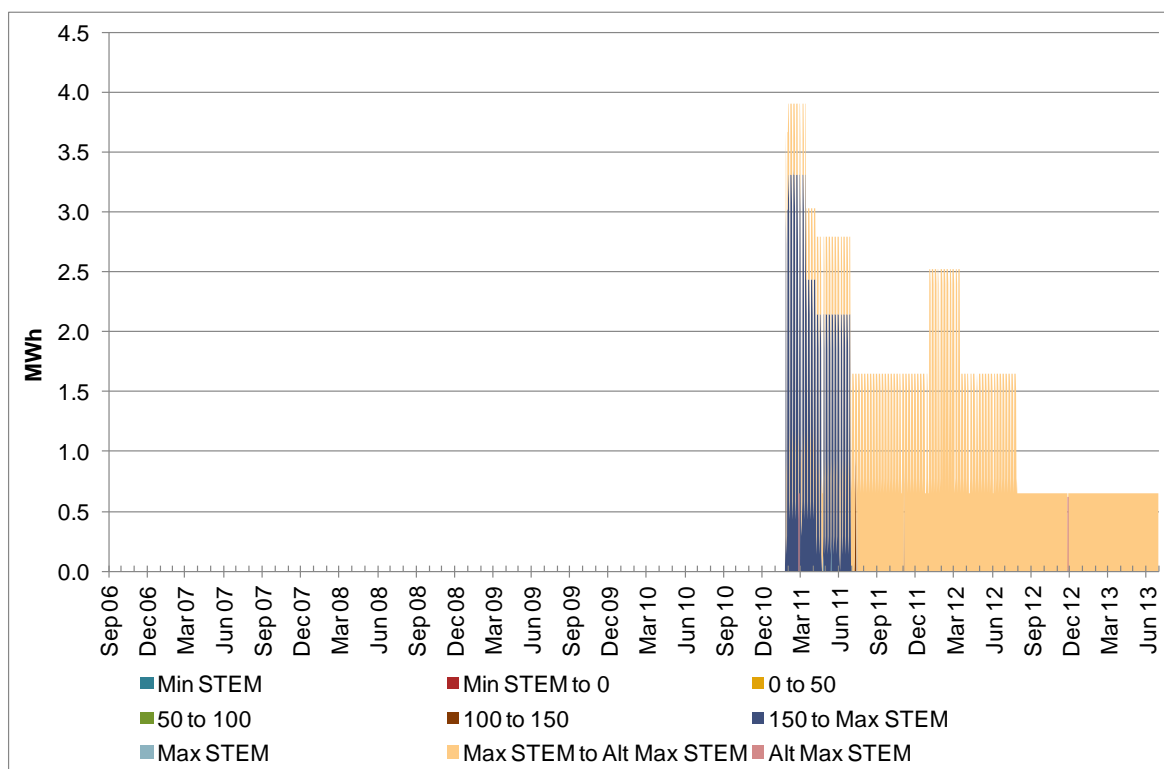


Figure 45 shows that NewGen Kwinana offered the majority of its STEM volumes at the Maximum STEM Price, notable volumes can also be seen in the \$50/MWh to \$100/MWh. The period of no STEM Offers during October 2011 and November 2011, October 2012 and April 2013 was a result of the facility being on Planned Outages.

Figure 44 Merredin daily average STEM Offers (cumulative MWh per Trading Interval)

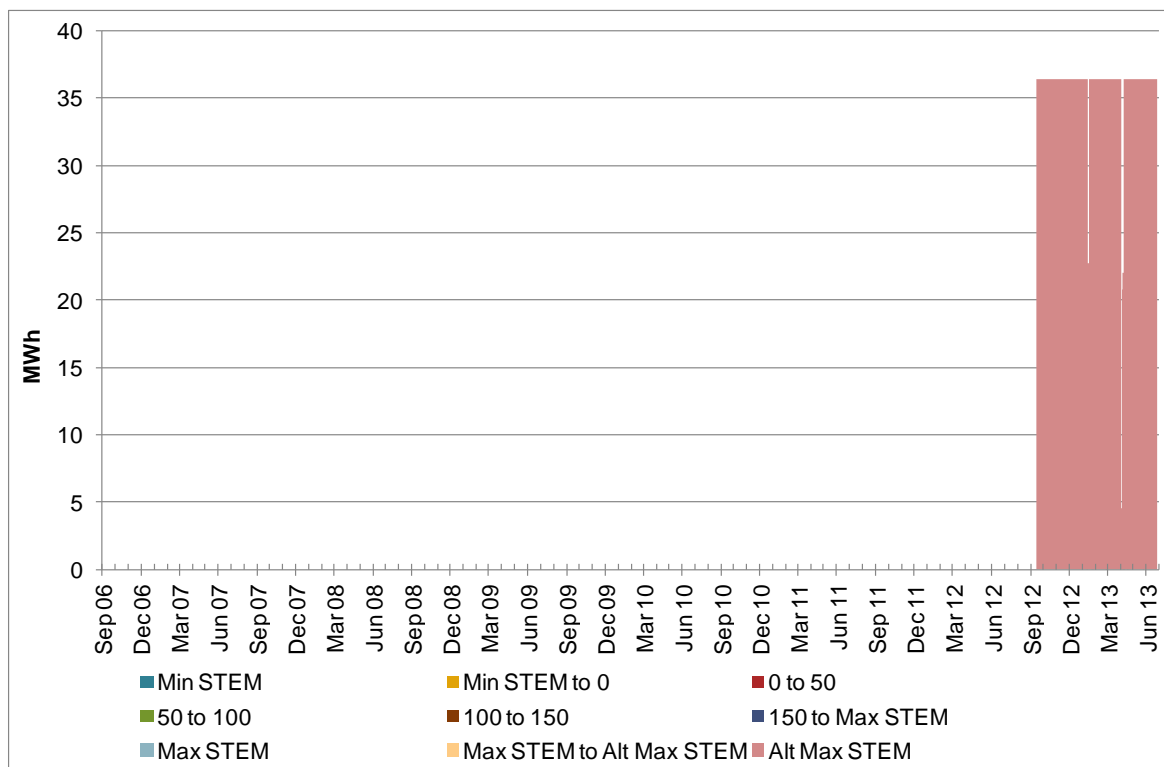


Figure 45 NewGen Power Kwinana's daily average STEM Offers (cumulative MWh per Trading Interval)

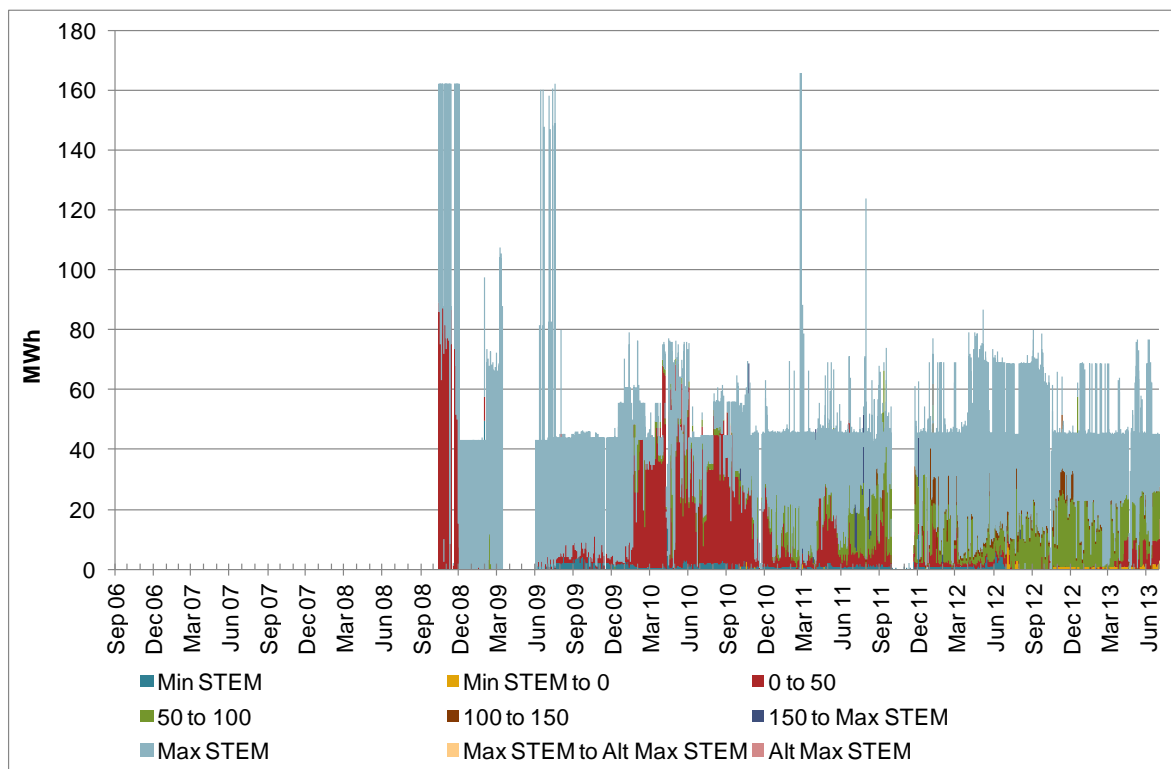


Figure 46 shows that NewGen Neerabup's STEM Offers continue to be almost exclusively priced at the Maximum STEM Price during the current Reporting Period.

Figure 46 NewGen Neerabup's daily average STEM Offers (cumulative MWh per Trading Interval)

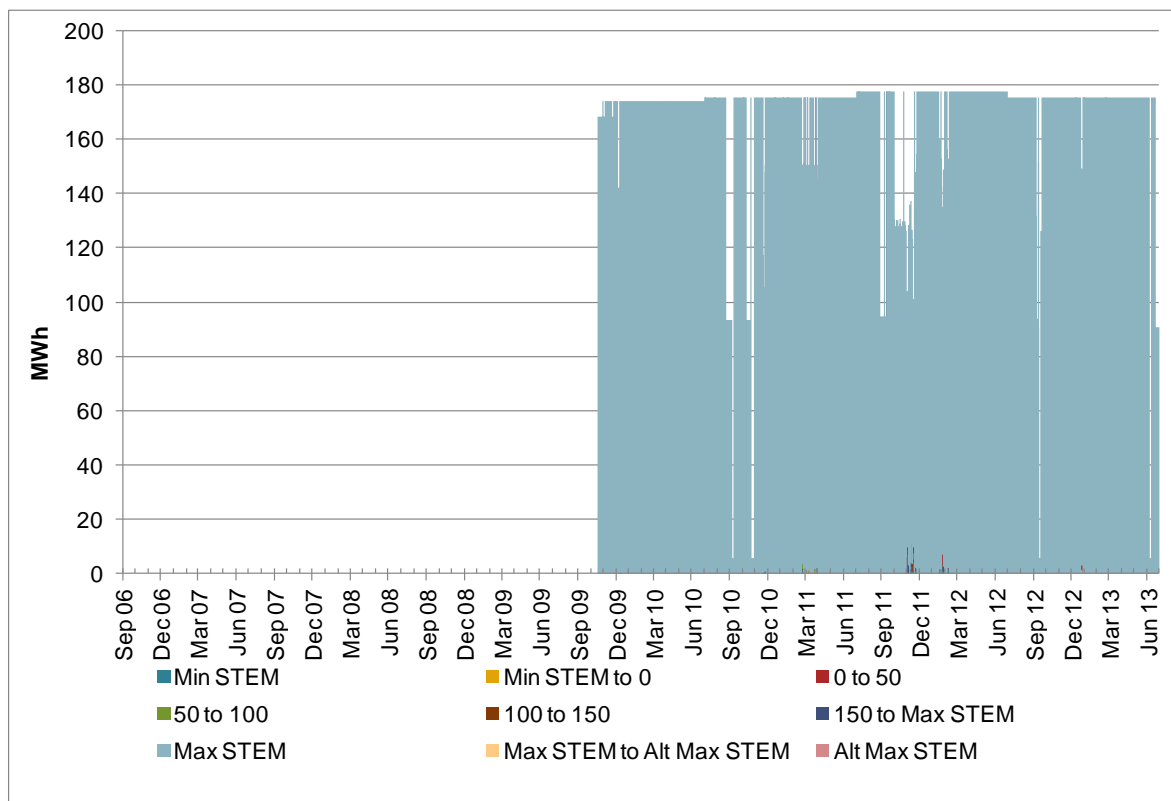


Figure 47 and Figure 48, respectively, shows that Perth Energy and Southern Cross Energy have priced most of their STEM Offers at the Alternative Maximum STEM Price during the current Reporting Period.

Figure 47 Perth Energy's daily average STEM Offers (cumulative MWh per Trading Interval)

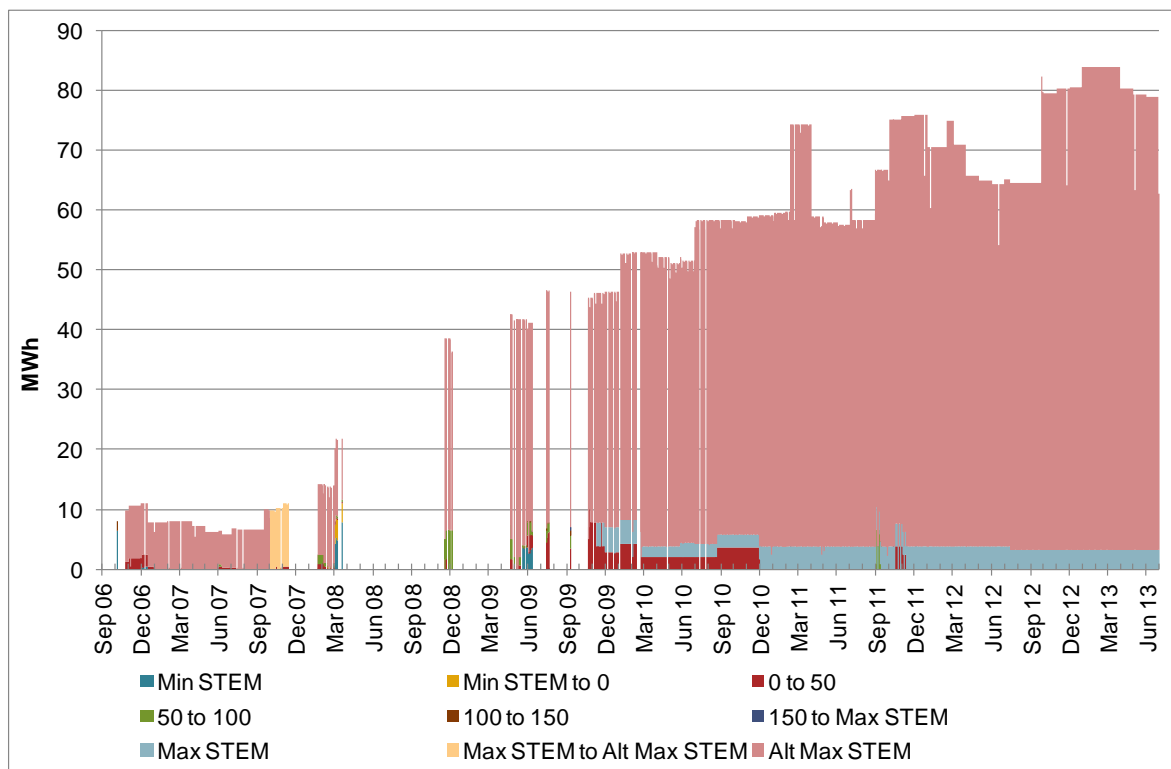


Figure 48 Southern Cross Energy's daily average STEM Offers (cumulative MWh per Trading Interval)

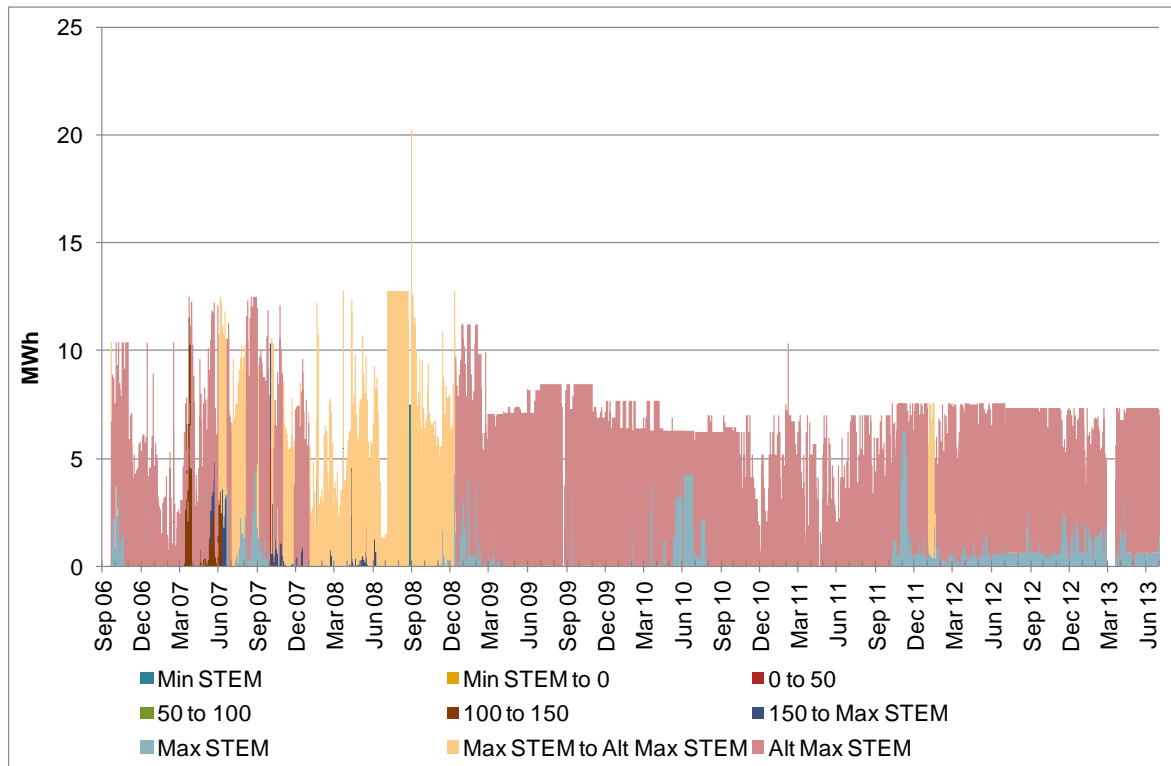


Figure 49 shows that Tiwest continues to offer energy at the Alternative Maximum STEM Price majority of the current Reporting Period, except for the period March 2012 to June 2013 where it offered energy at Maximum STEM Price.

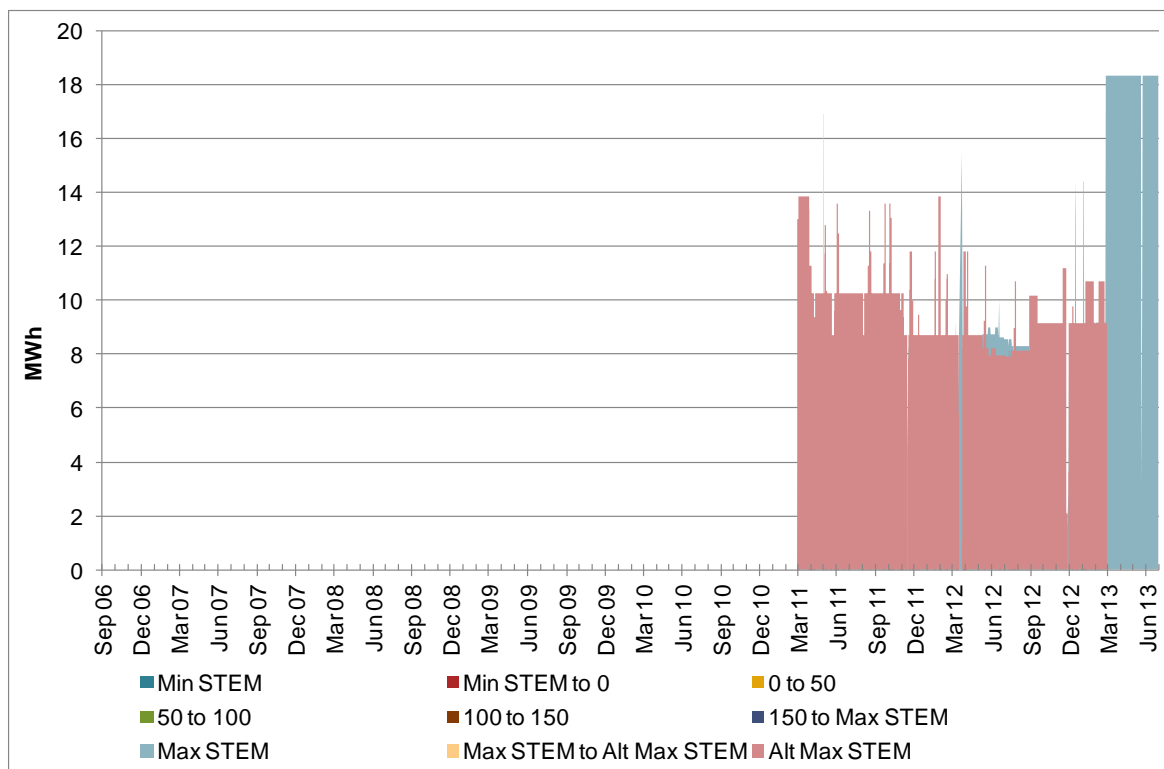
Figure 49 Tiwest's daily average STEM Offers (cumulative MWh per Trading Interval)

Figure 50 shows Tesla Management offered smaller volumes in the STEM notably at the Alternative Maximum STEM Price, and at prices between the Maximum STEM Price to the Alternative Maximum STEM Price.

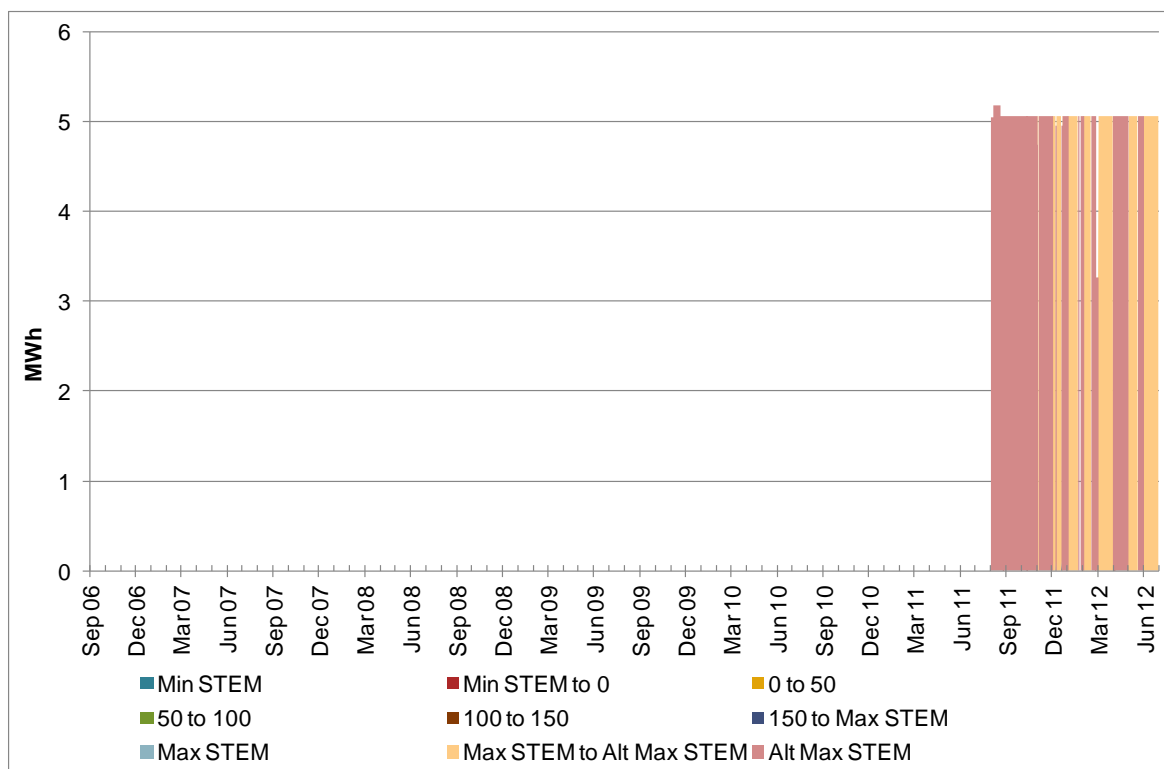
Figure 50 Tesla Management's daily average STEM Offers (cumulative MWh per Trading Interval)

Figure 51 Tesla Geraldton's daily average STEM Offers (cumulative MWh per Trading Interval)

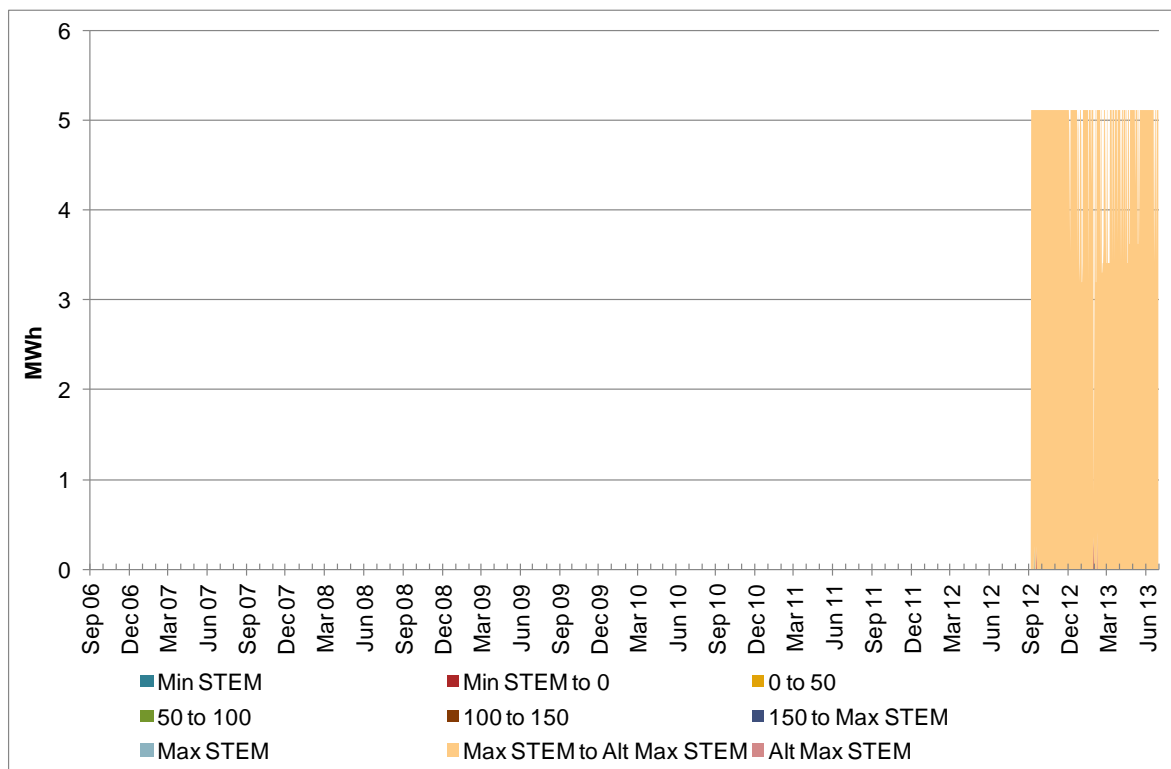


Figure 52 Tesla Kemerton's daily average STEM Offers (cumulative MWh per Trading Interval)

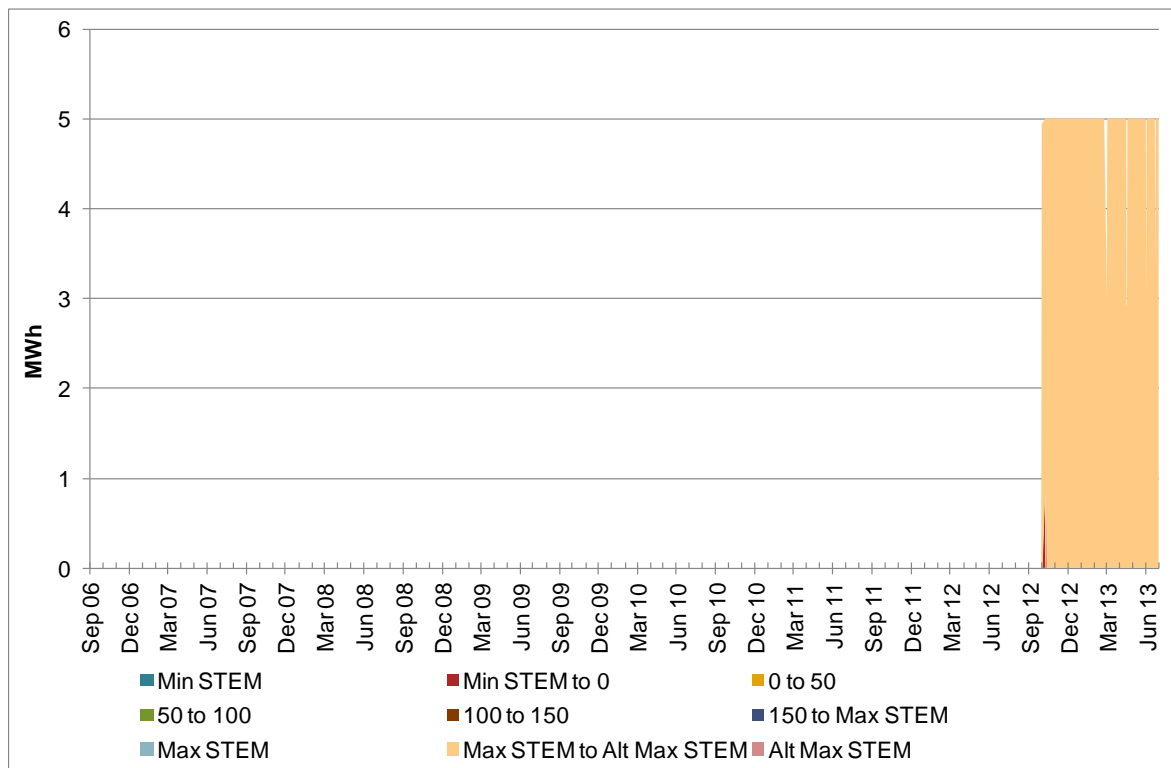


Figure 53 Tesla Northam's daily average STEM Offers (cumulative MWh per Trading Interval)

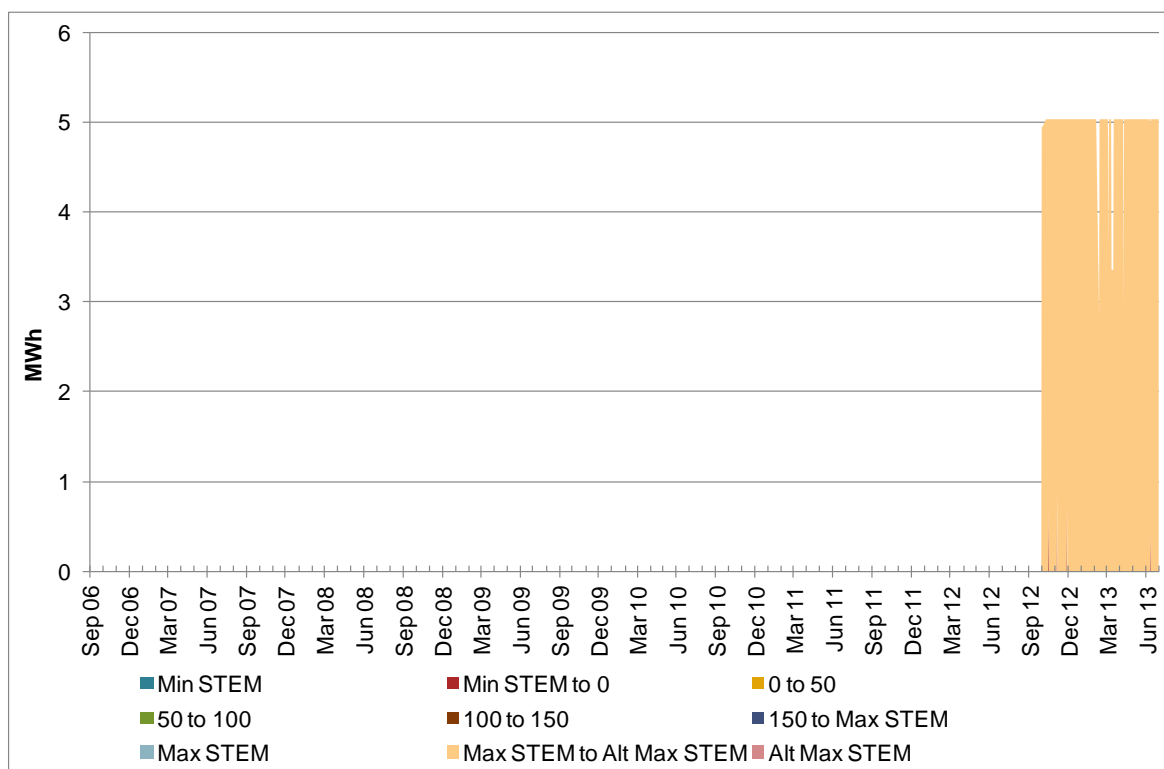


Figure 51, Figure 52 and Figure 53 show that Tesla Geraldton, Tesla Kemerton and Tesla Northam, distillate fuel generators, were the new entrants for 2012/13 Capacity Year. All three generators have offered volumes in the STEM at prices between the Maximum STEM Price to the Alternative Maximum STEM Price.

Figure 54 shows that Western Energy offered majority of its total quantities at prices between Maximum STEM Price and the Alternative Maximum STEM Price, with fewer quantities at Alternative Maximum STEM Price for the current Reporting Period.

Figure 54 Western Energy's daily average STEM Offers (cumulative MWh per Trading Interval)

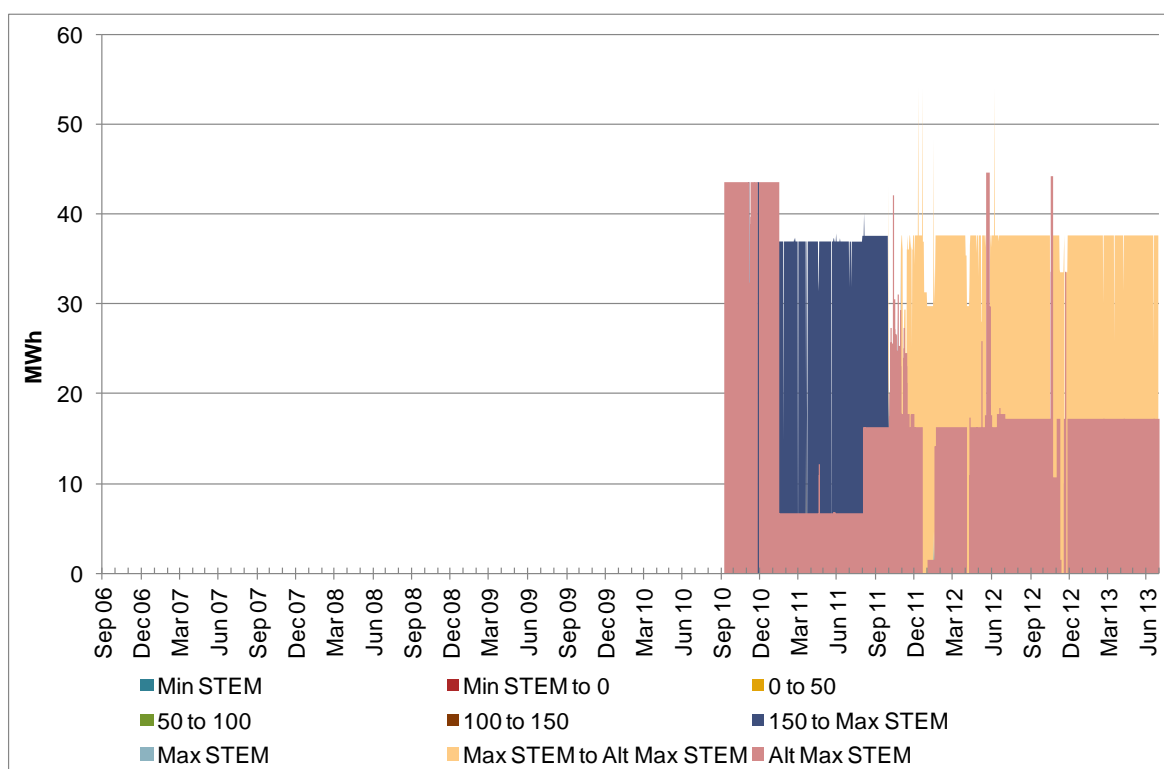


Figure 55 shows that Synergy has continued to offer significant volumes into the STEM in the current Reporting Period, primarily priced at the Alternative Maximum STEM Price to cover its demand positions. Synergy offered notable STEM volumes in the price range 0/MWh to 50/MWh, during the July 2011 to October 2011 period (denoted by red in Figure 55) in the previous Reporting Year. It can be seen that STEM volumes in the price range 0/MWh to 50/MWh increased and were available for majority for the current Reporting Period as compared with the previous Reporting Year. These Synergy's STEM quantities were also present during Off-Peak periods. The Authority considers that this could be the result of Synergy off-loading over nominated quantities back in STEM from its Vesting Contract with Verve Energy.

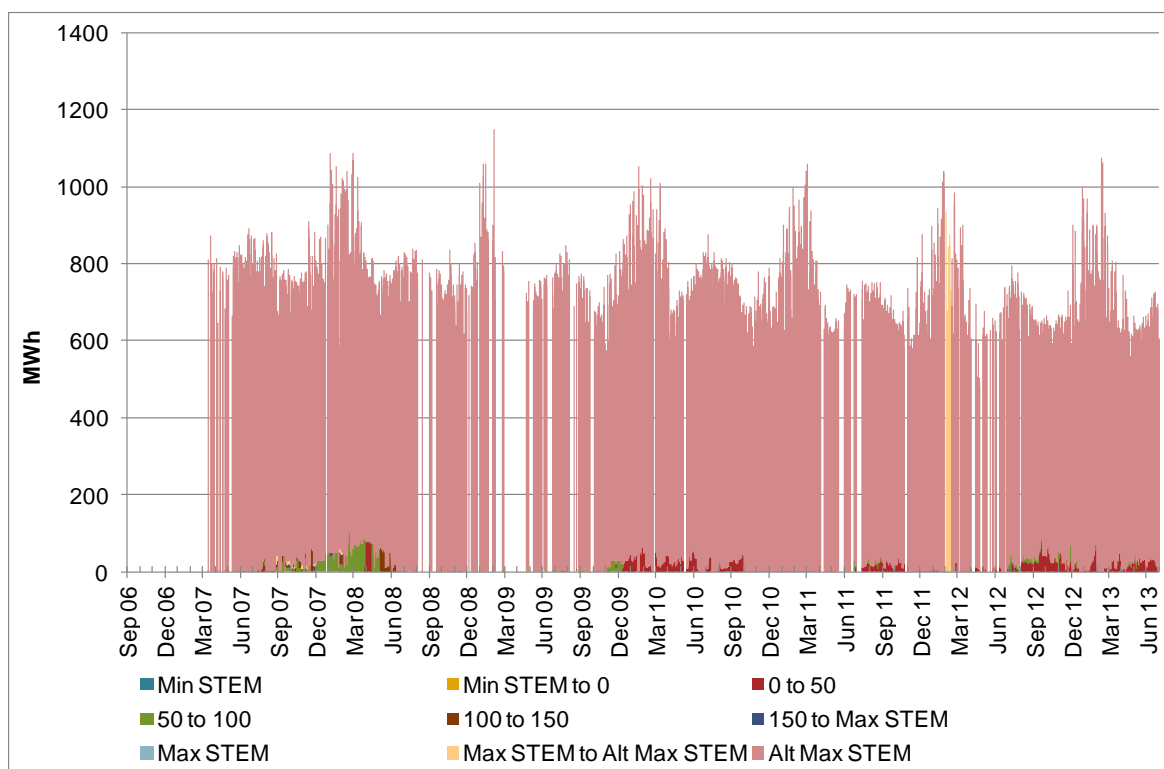
Figure 55 Synergy's daily average STEM Offers (cumulative MWh per Trading Interval)

Figure 56 shows that Verve Energy has consistently offered significant volumes into the STEM since market commencement, with the majority of Verve Energy's offers priced at the Maximum STEM Price. STEM Offer quantities from Verve Energy remained at low levels during July 2012 to November 2012, as this period coincided with a very high level of Planned Outages. A number of Verve Energy's coal and gas facilities were on extended Planned Outages periodically, which resulted in the minimal quantities offered in price range of \$0/MWh and \$50/MWh and availability of fewer quantities offered in the price range of \$50/MWh to \$100/MWh. Each year a drop in total STEM quantities offered by Verve Energy can be observed at the end of the peak summer period (end of March), as a number of facilities undertake planned maintenance after meeting high summer demand. However, the Offer quantities in the price range of \$50/MWh to \$100/MWh remained at a fairly high level between April 2013 and May 2013 in the current Reporting Period. The Authority also notes a slight improvement in the overall availability of facilities in Verve Energy's Portfolio compared to the previous Reporting Year.

Figure 56 Verve Energy's daily average STEM Offers (cumulative MWh per Trading Interval)

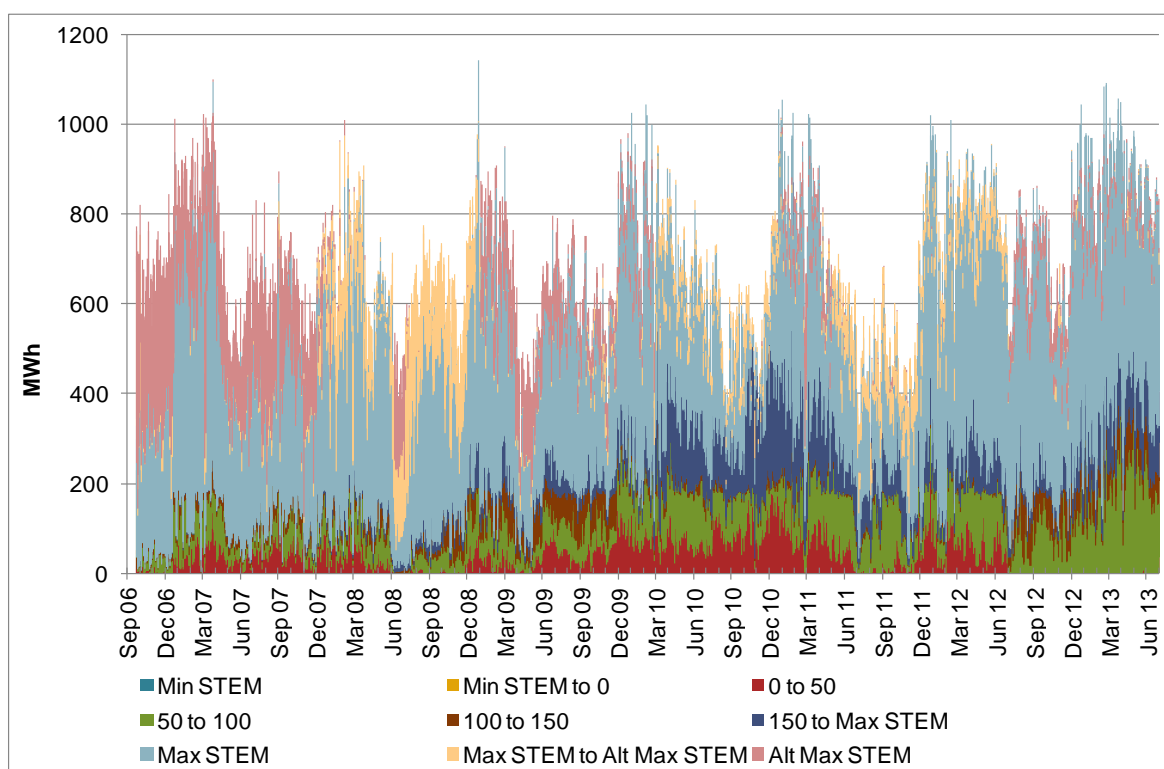


Figure 57 Vinalco's daily average STEM Offers (cumulative MWh per Trading Interval)

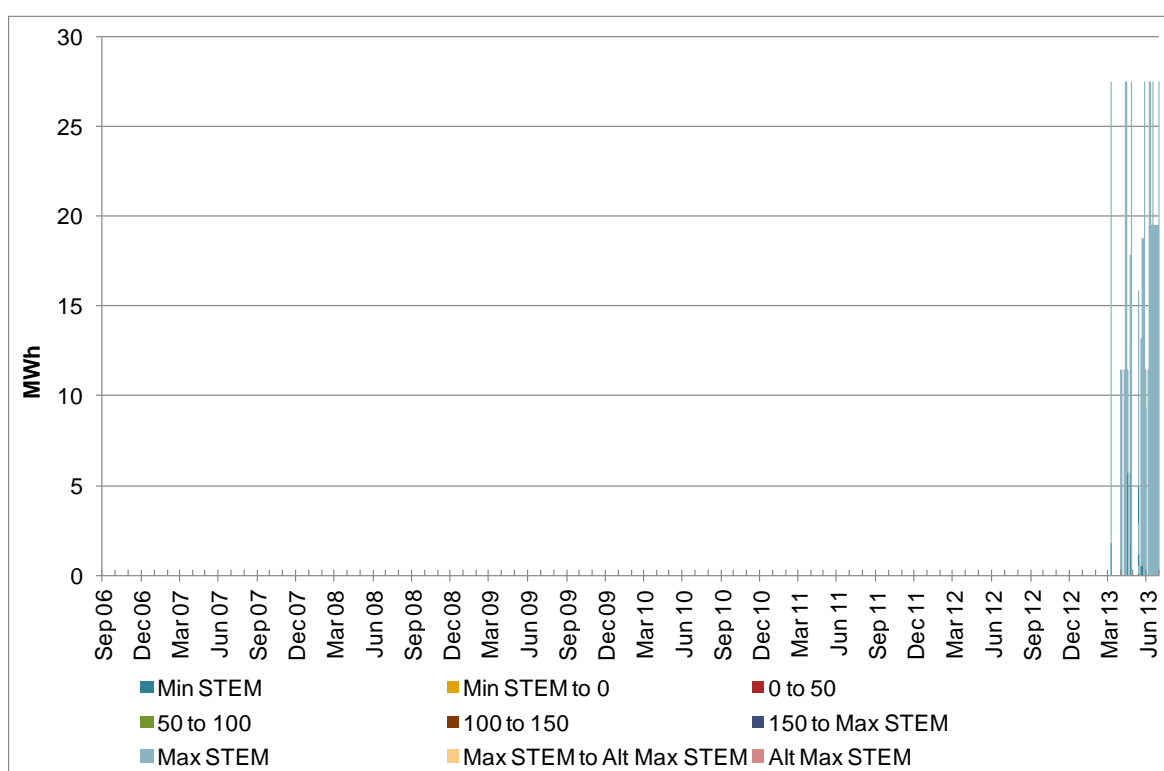


Figure A2 shows that Vinalco was the new entrant for 2012/13 Capacity Year. Vinalco's, a joint venture between Verve Energy and Inalco, four facilities Muja_G1 to Muja_G4 were closed in April 2007 to be refurbished and recommissioned by late 2012. The four Muja facilities had been initially planned to be made available in October 2012 as each unit is

allocated 55 MW Capacity Credits for 2012/13 Capacity Year. The four units received a combined Capacity Credits of 220 MW, but had been on Forced Outage since 17 October 2012. It was noted that Vinalco's Muja_G4 undertook commissioning in February 2013, whilst Muja_G3 came online in mid-March 2013. It can be seen from Figure 57 that Vinalco did not make STEM Offers until March 2013. Muja_G1 and Muja_G2 have not been operational in the current Reporting Period as the Authority noted a media article dated 25 June 2013 in which Government announced that it would mothball Muja_G1 and Muja_G2¹¹⁶. However, an article in September 2013 indicated that Government would push ahead with the refurbishment of Muja_G1 and Muja_G2¹¹⁷.

Short Term Energy Market Bids

Alcoa has not presented any STEM Bids since mid December 2006.

Figure 58 to Figure 73 show the STEM Bids for each Market Participant from market commencement to 30 June 2012.

Figure 58 shows that Alcoa has not presented any STEM Bids since mid December 2006.

Figure 58 Alcoa's daily average STEM Bids (cumulative MWh per Trading Interval)

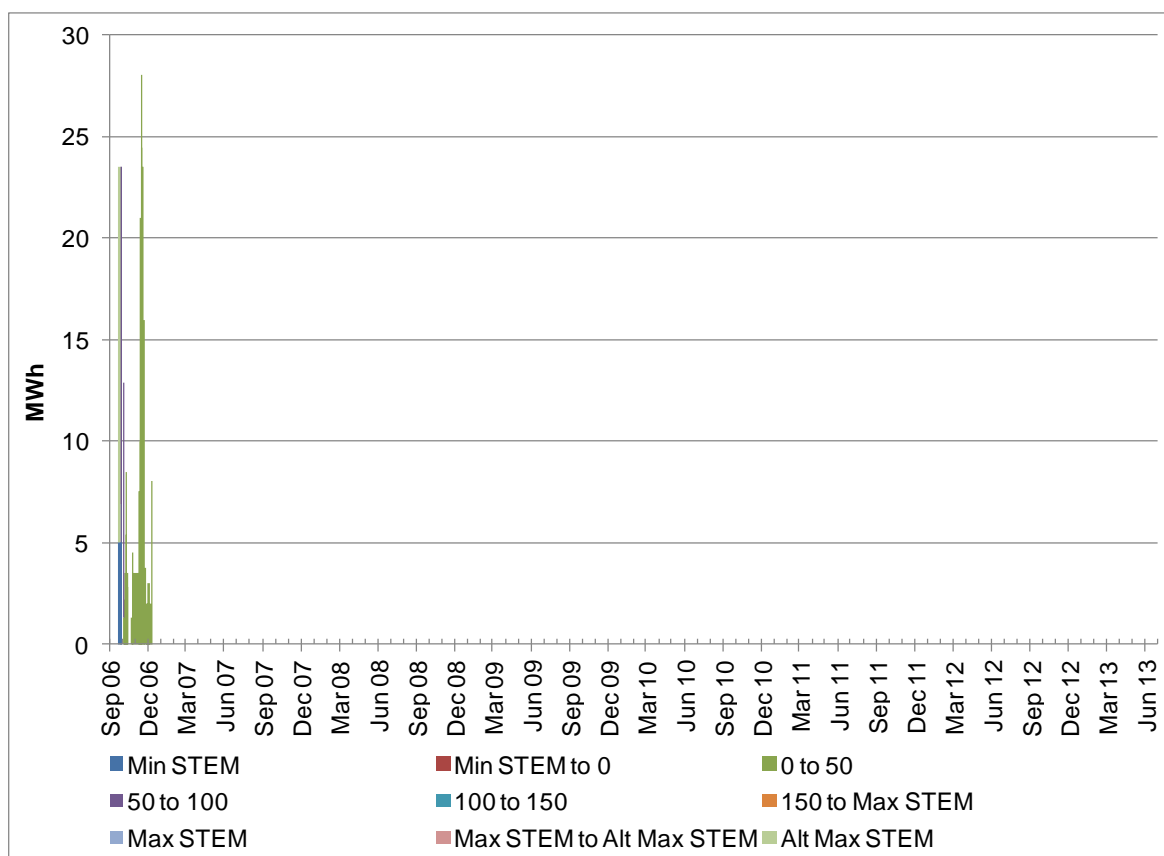


Figure 59 shows that Alinta consistently bid large volumes into the STEM, at the Minimum STEM Price between market commencement and July 2010. Alinta bid in the price range \$0/MWh to \$50/MWh, and also in the price range \$50/MWh to \$100/MWh in the current

¹¹⁶ <http://www.abc.net.au/news/2013-06-25/work-on-muja-power-station-suspended/4779722?section=wa>

¹¹⁷ <http://www.abc.net.au/news/2013-09-12/government-pushes-on-with-muja/4953646?section=wa>

Reporting Period. The quantities bid in the price range \$0/MWh to \$50/MWh were notable from late February 2013 onwards to the end of the Reporting Period.

Figure 60 shows that ERM Power bid for volumes in the price ranges of \$0/MWh to \$50/MWh, \$50/MWh to \$100/MWh and \$100/MWh to \$150/MWh. As a retailer, ERM Power could be seen bidding for notable quantities in the price range \$100/MWh to \$150/MWh during peak winter and peak summer period in the current Reporting Period.

Figure 59 Alinta's daily average STEM Bids (cumulative MWh per Trading Interval)

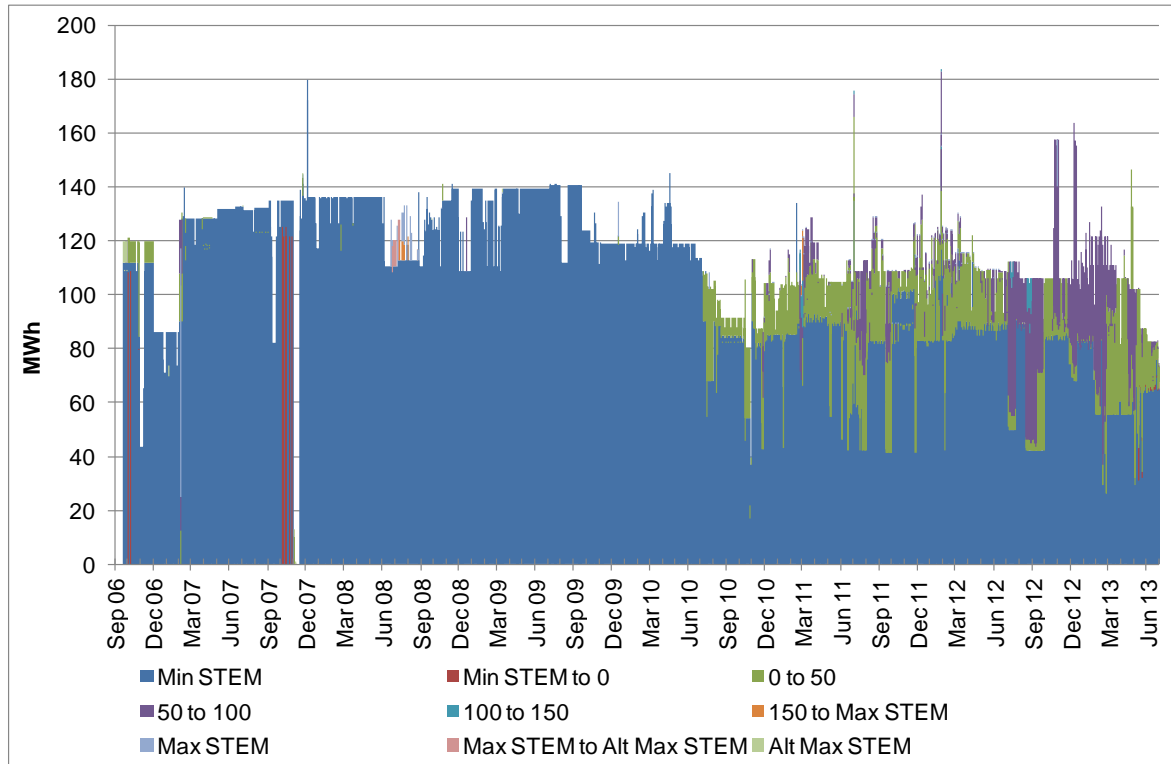


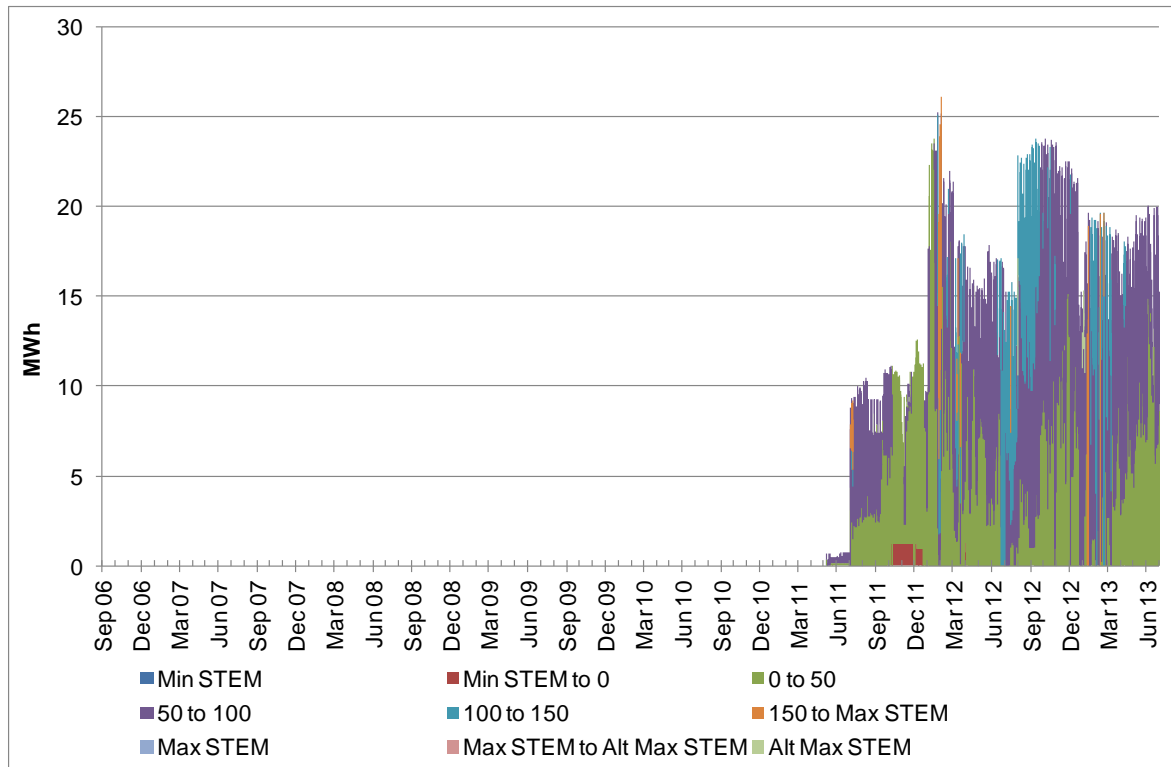
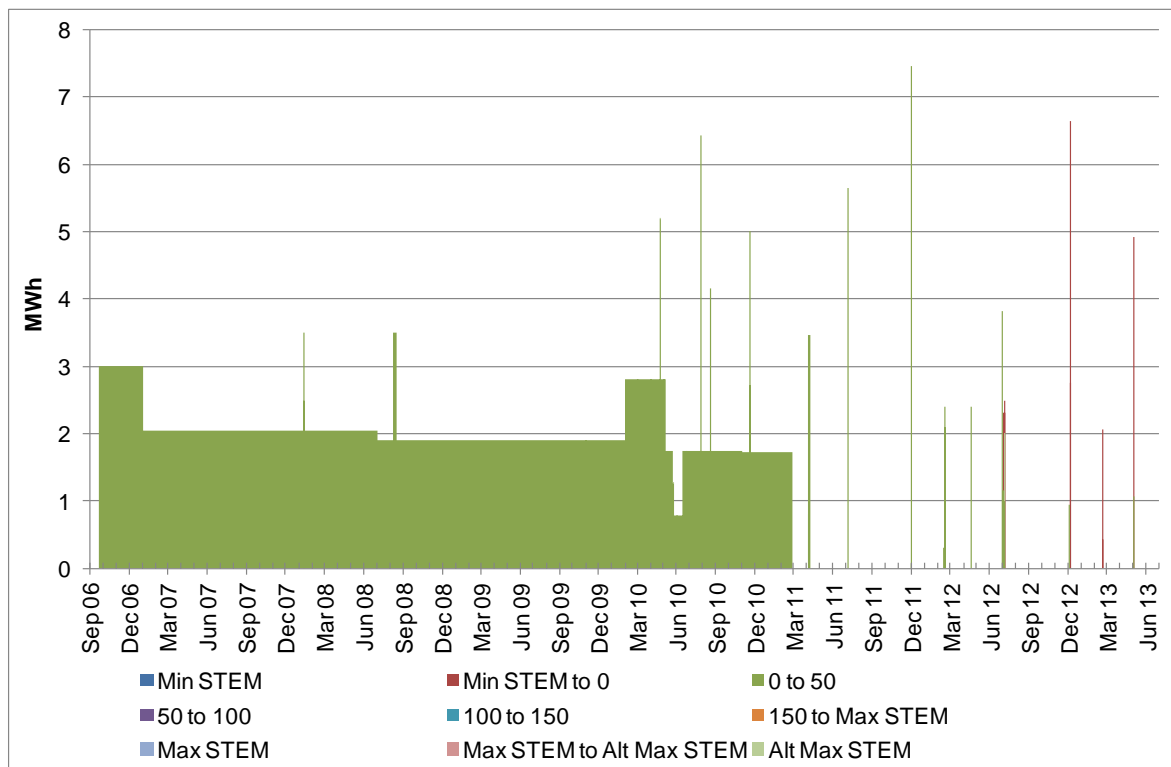
Figure 60 ERM Power's daily average STEM Bids (cumulative MWh per Trading Interval)**Figure 61 Goldfields Power's daily average STEM Bids (cumulative MWh per Trading Interval)**

Figure 62 Griffin Power's daily average STEM Bids (cumulative MWh per Trading Interval)

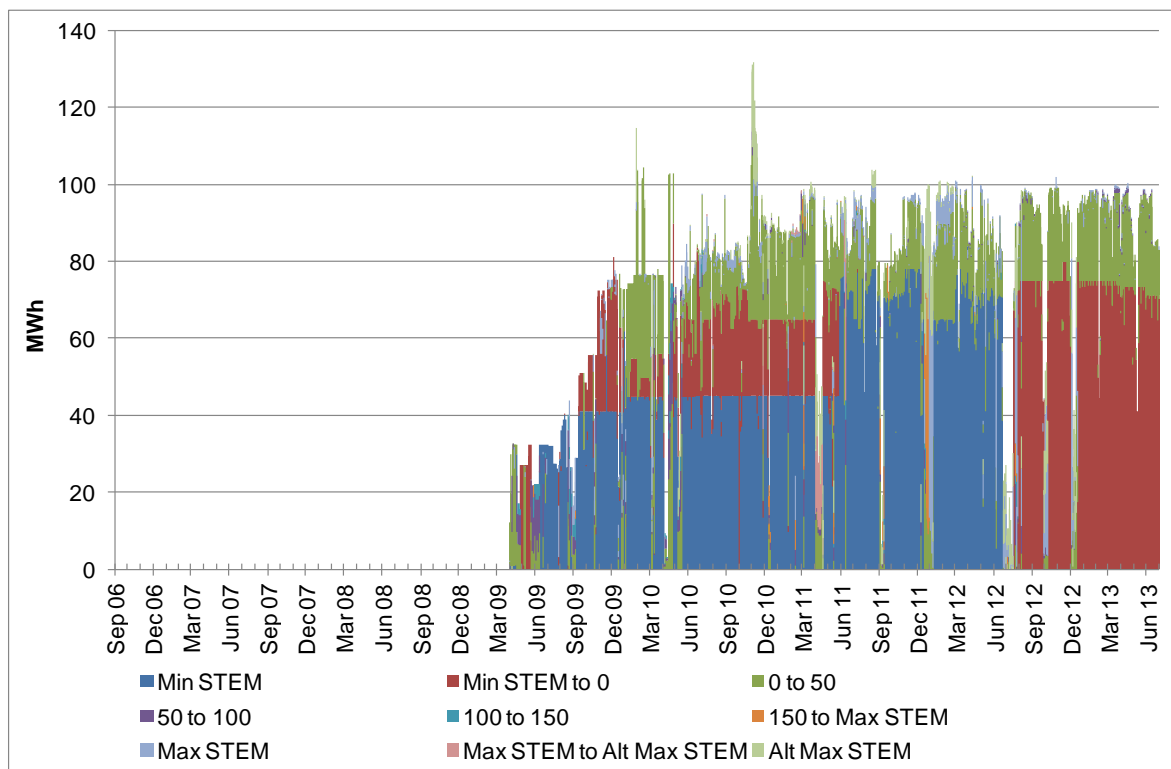


Figure 63 Griffin Power 2's daily average STEM Bids (cumulative MWh per Trading Interval)

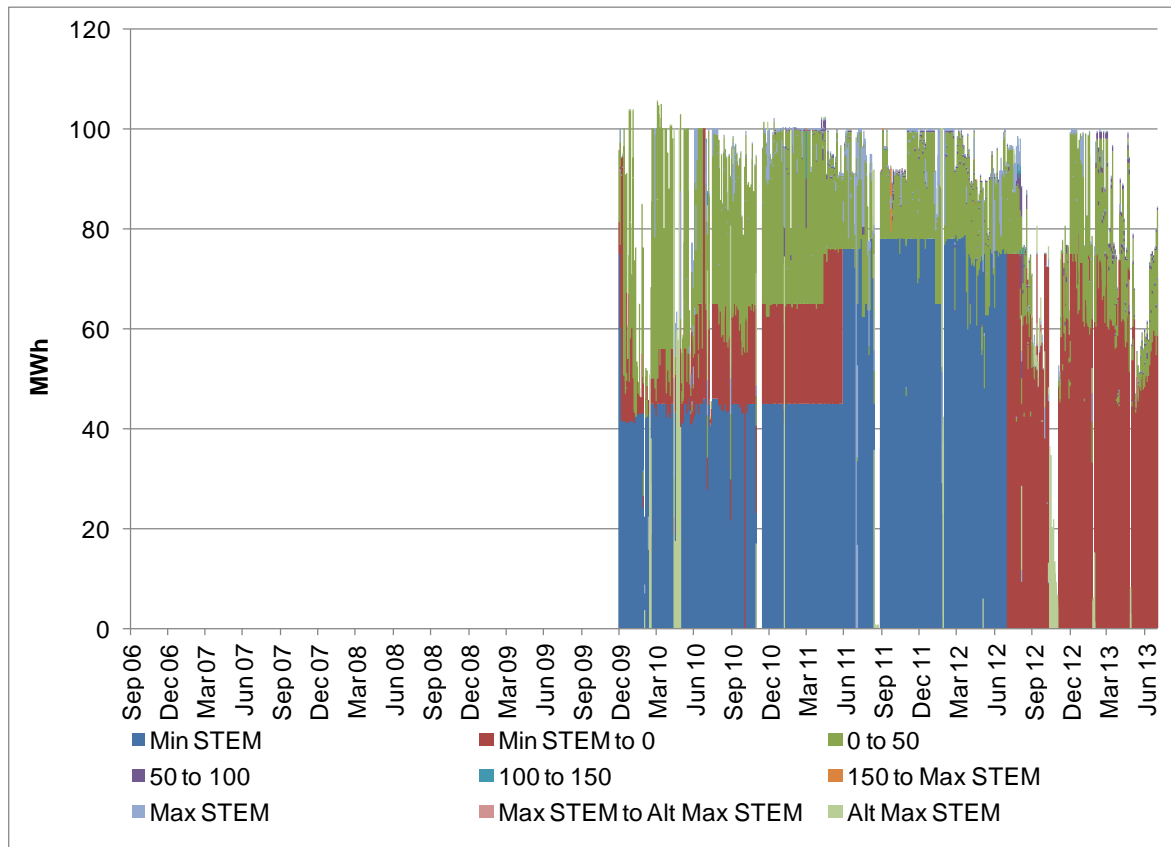


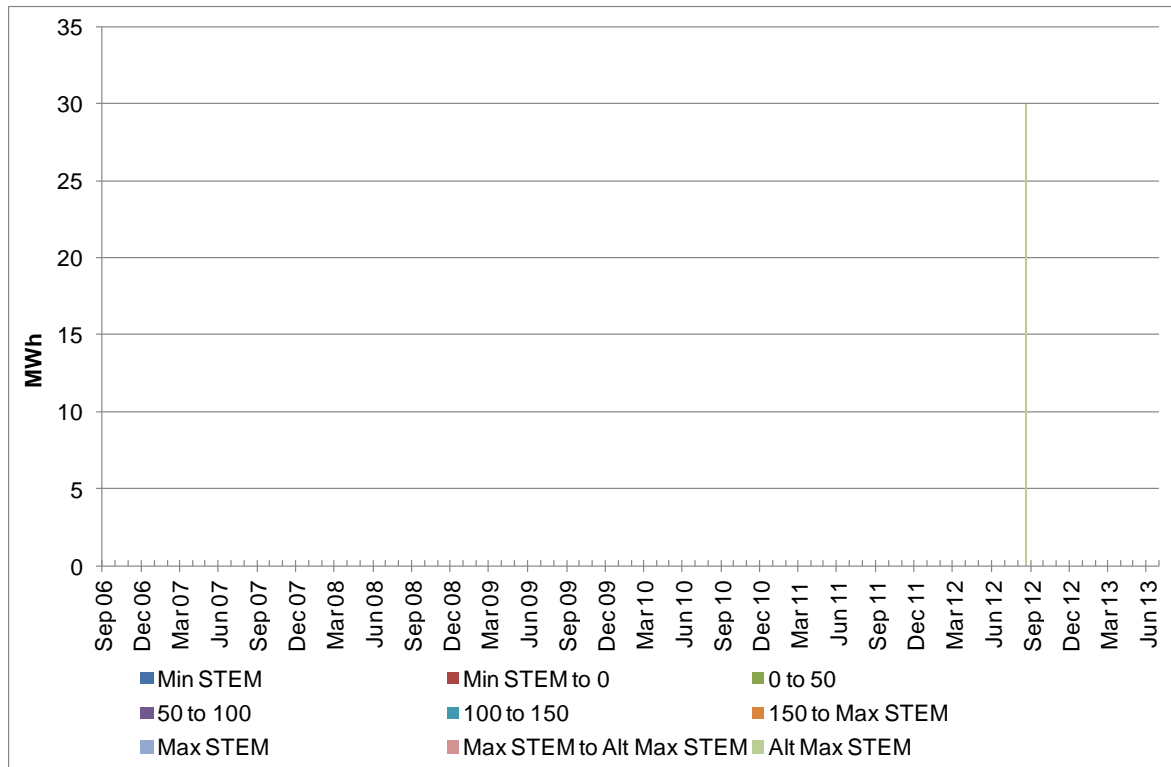
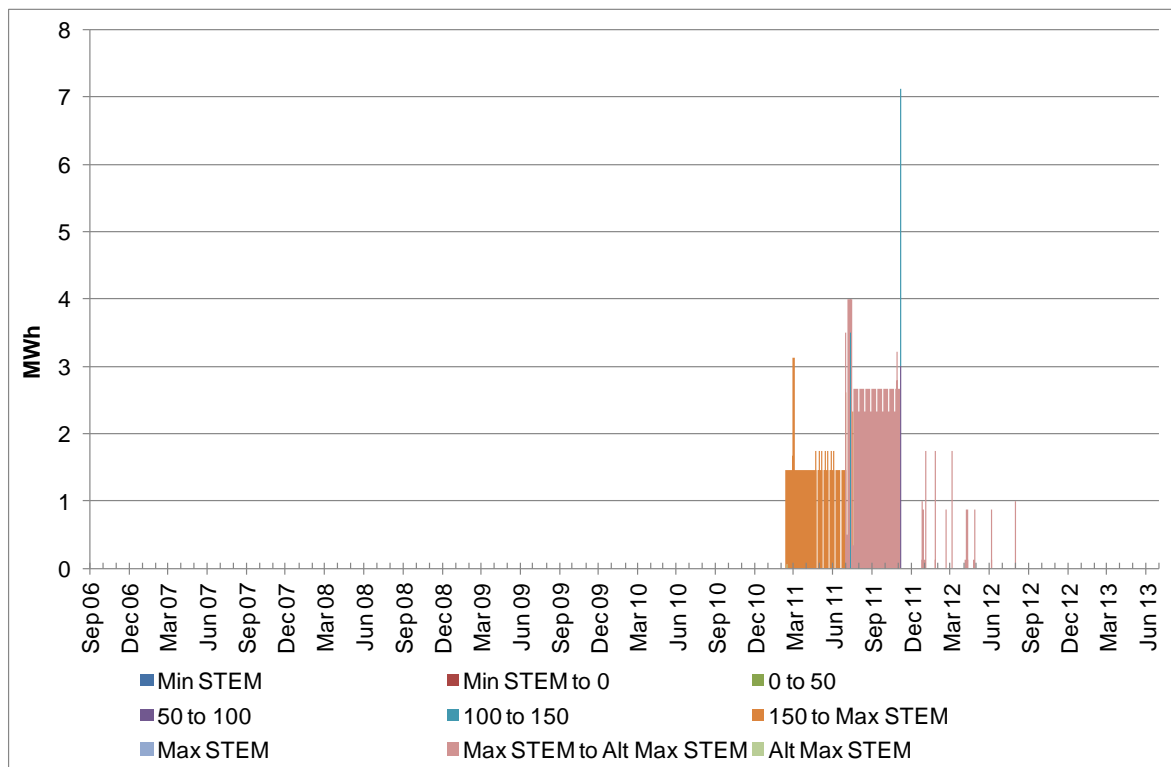
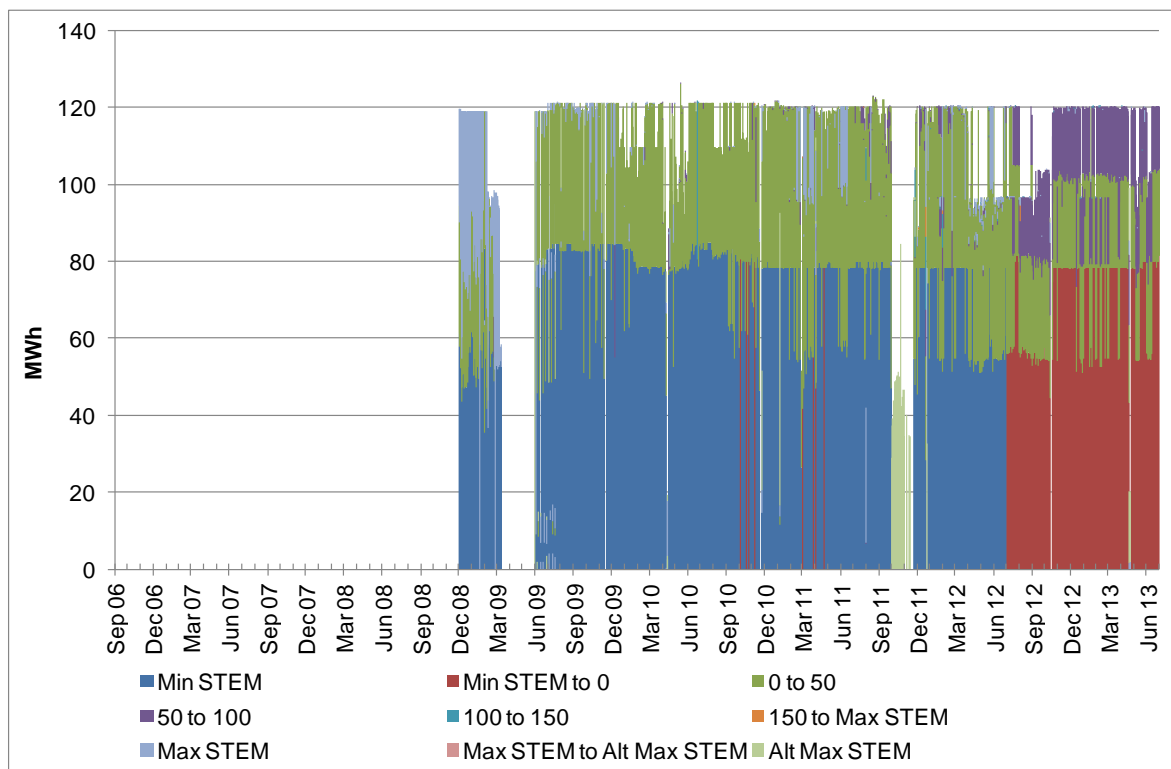
Figure 64 Karara's daily average STEM Bids (cumulative MWh per Trading Interval)**Figure 65 Landfill Gas and Power's daily average STEM Bids (cumulative MWh per Trading Interval)**

Figure 66 NewGen Power Kwinana's daily average STEM Bids (cumulative MWh per Trading Interval)



As can be seen from Figure 62, Figure 63 and Figure 66 Griffin Power, Griffin Power 2 and NewGen Kwinana bid majority of their respective STEM quantities between Minimum STEM Price to \$0/MWh, or in the range of \$0/MWh to \$50/MWh throughout the current Reporting Period.

Figure 67 NewGen Neerabup's daily average STEM Bids (cumulative MWh per Trading Interval)

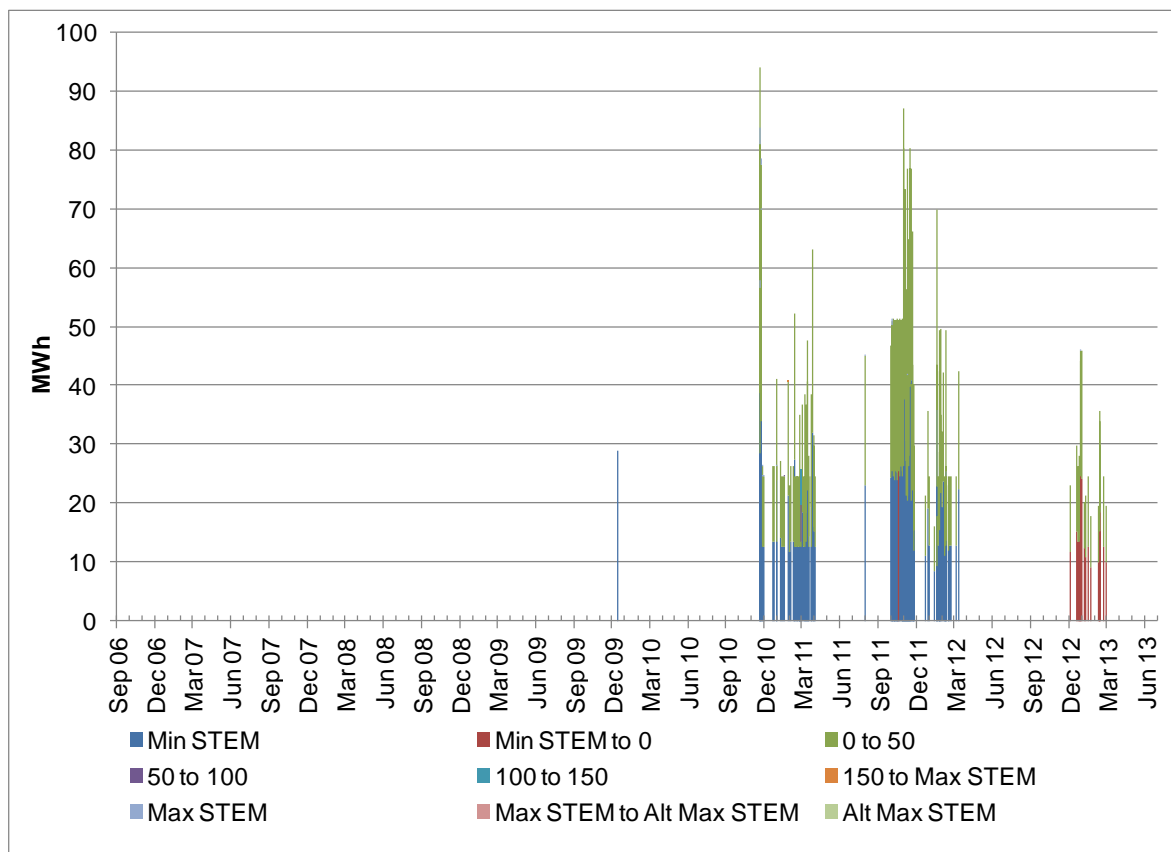


Figure 68 Perth Energy's daily average STEM Bids (cumulative MWh per Trading Interval)

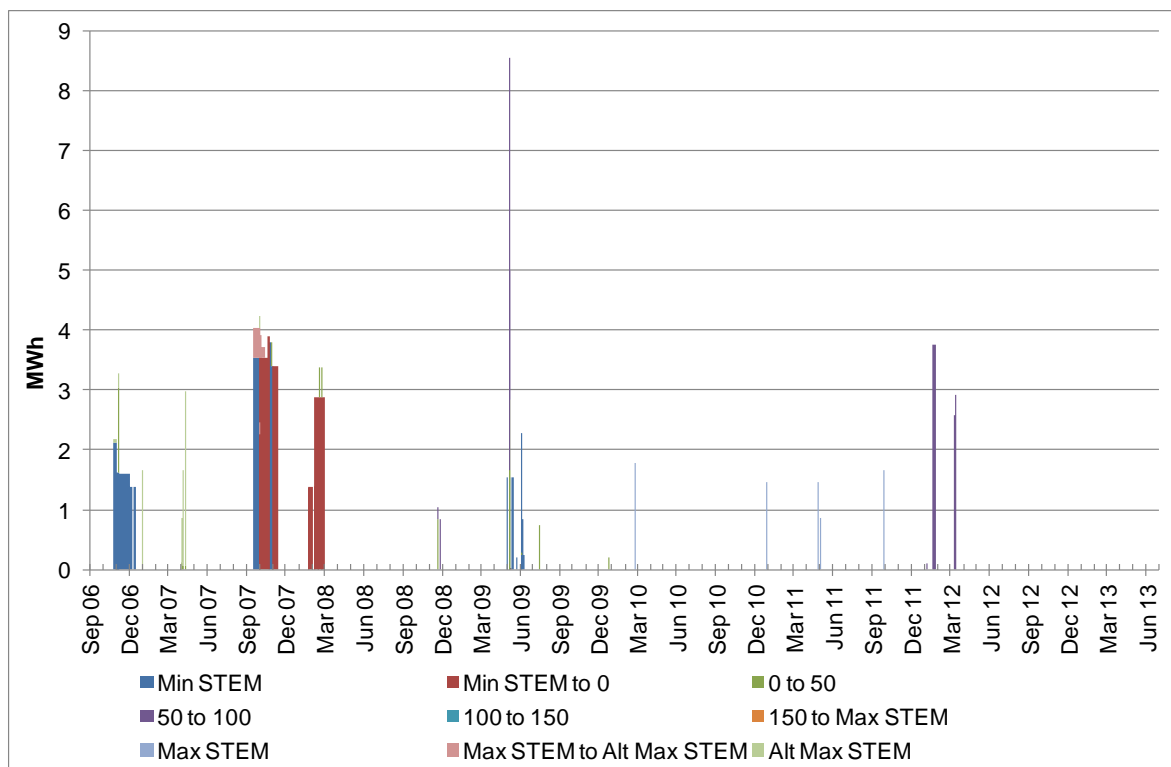


Figure 69 Southern Cross Energy's daily average STEM Bids (cumulative MWh per Trading Interval)

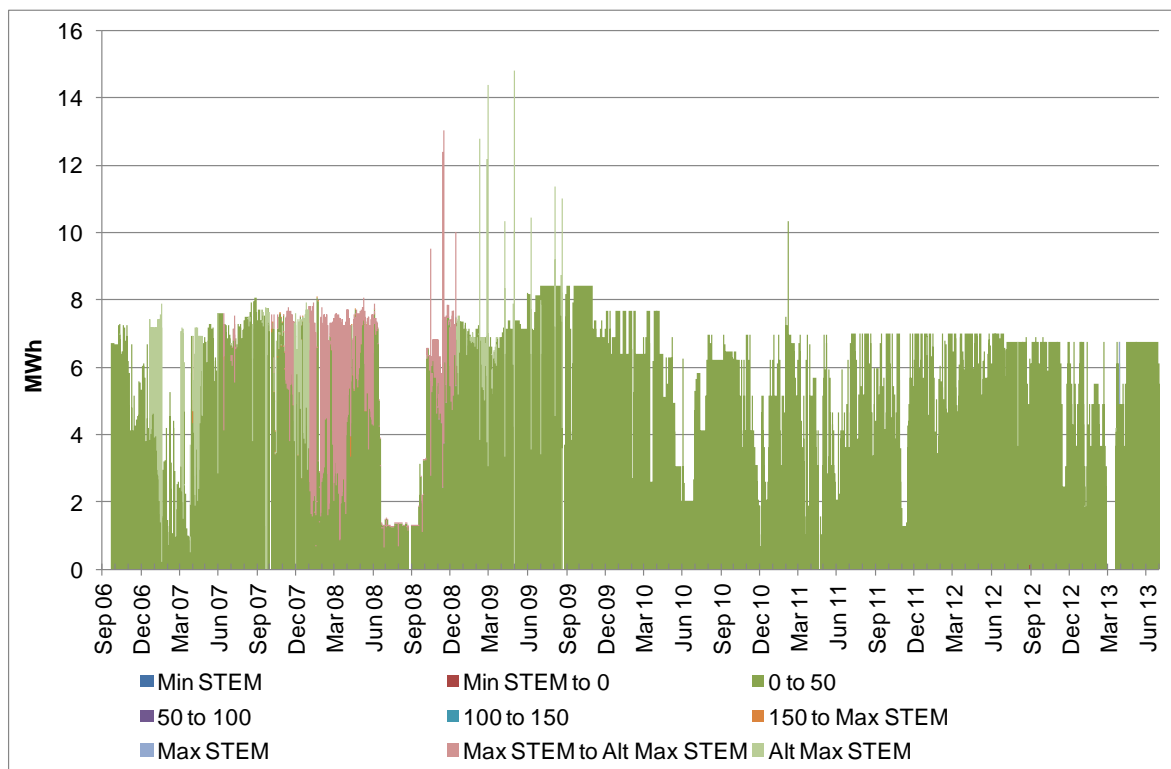


Figure 70 Tiwest's daily average STEM Bids (cumulative MWh per Trading Interval)

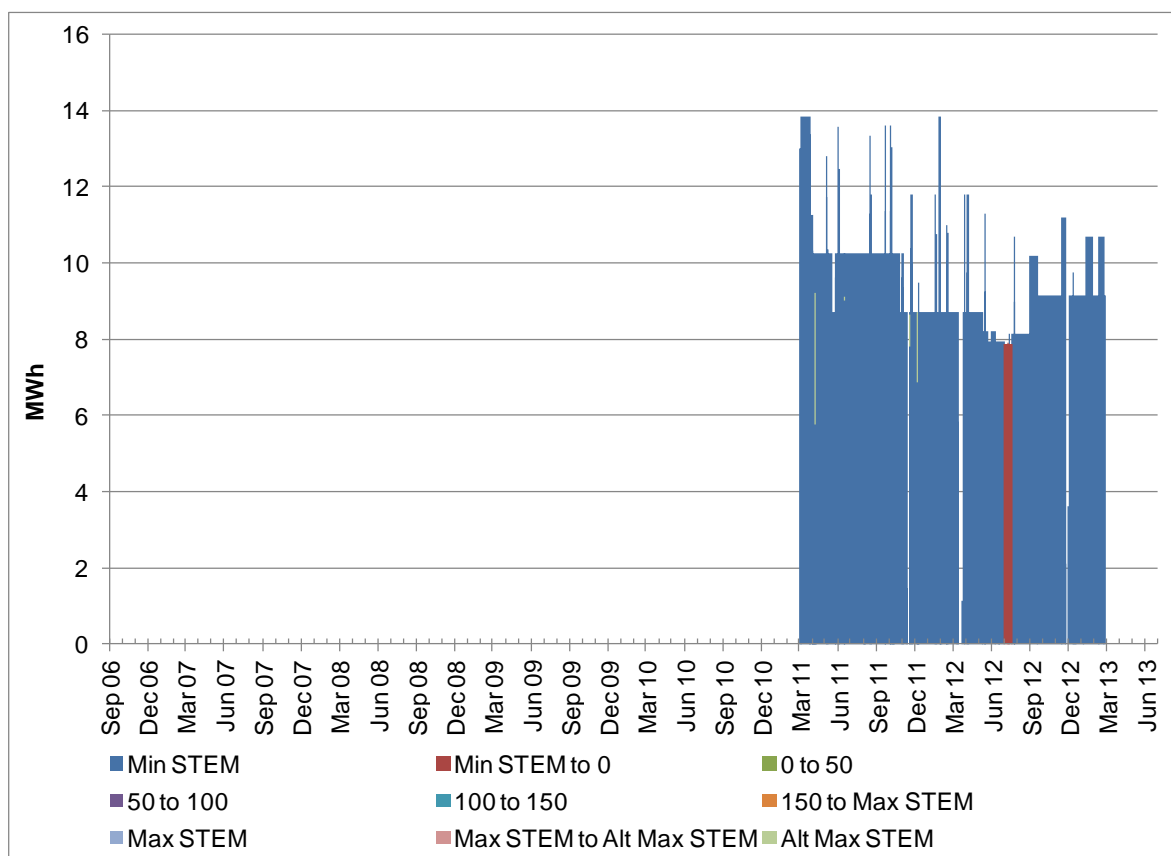


Figure 71 Western Energy's daily average STEM Bids (cumulative MWh per Trading Interval)

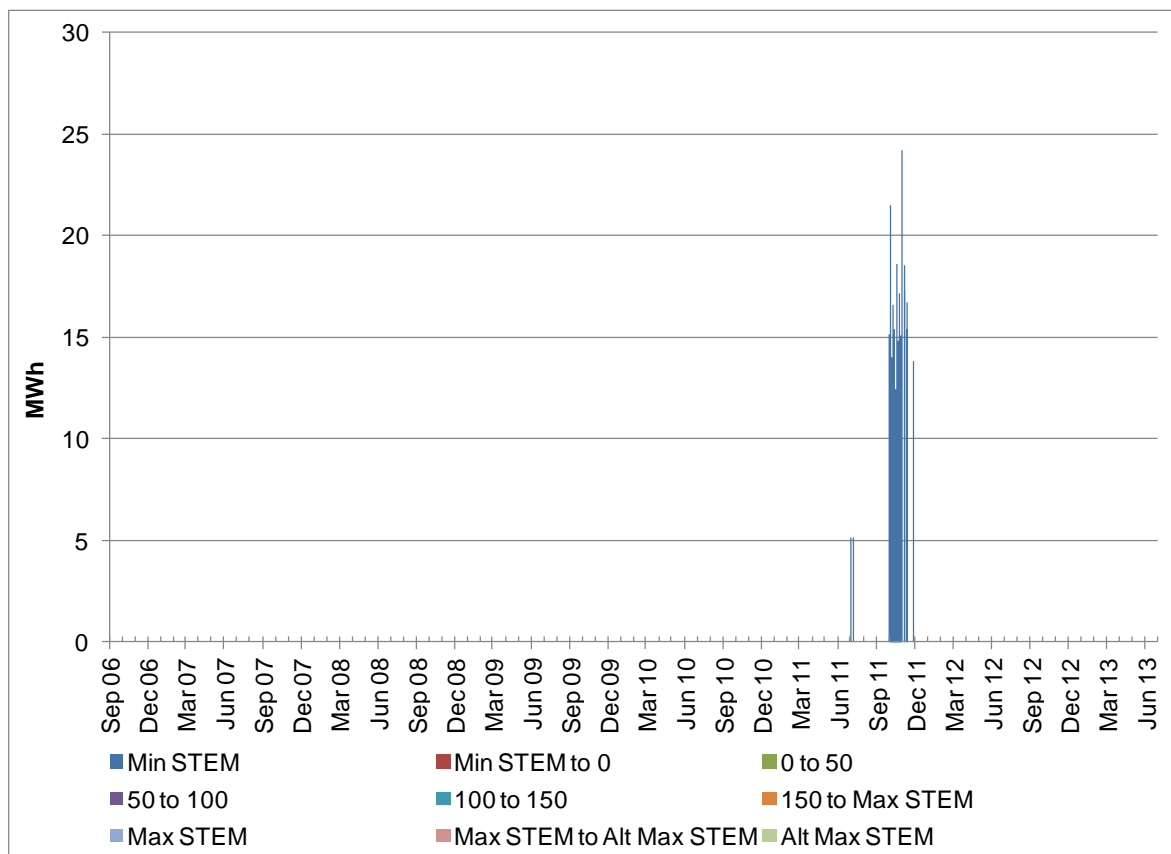


Figure 72 Synergy's daily average STEM Bids (cumulative MWh per Trading Interval)

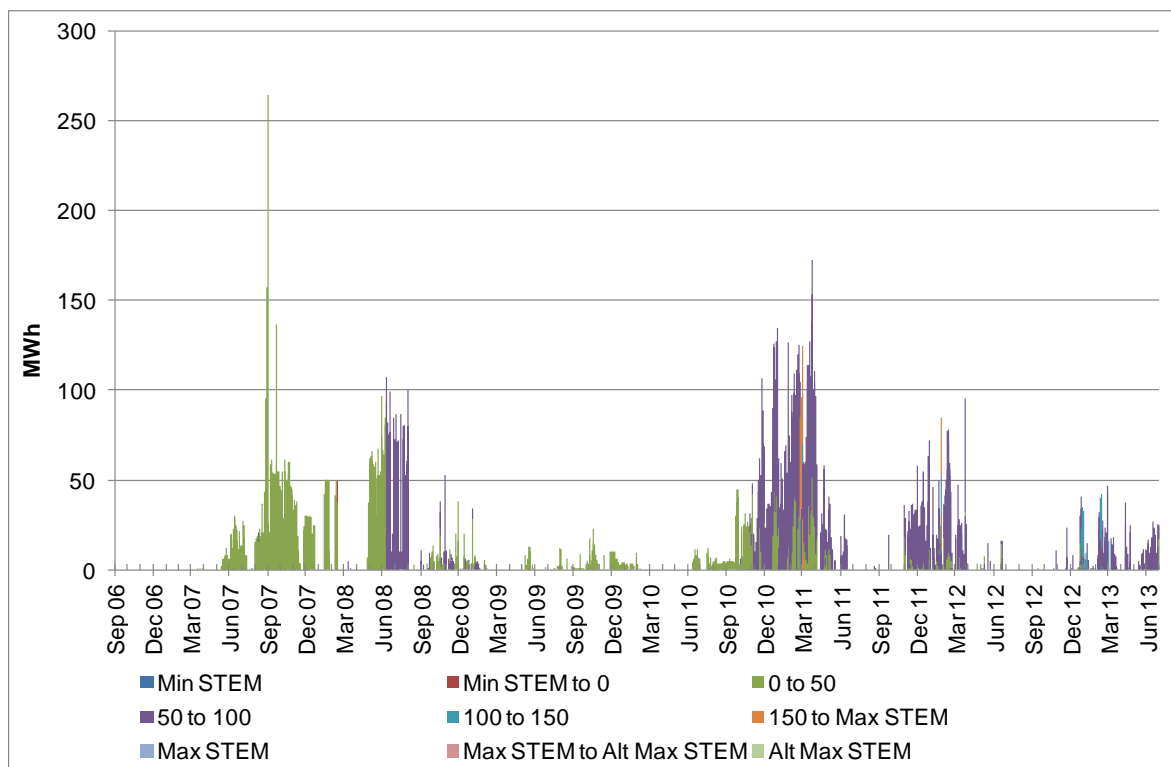


Figure 72 shows that Synergy bid fewer STEM volumes during December 2012 to March 2013 (warmer months) at price range between \$50/MWh and \$100/MWh compared

to the same period last year. It is possible that Synergy, as a retailer, over nominated its demand quantities under the Vesting Contract for the summer period in the current Reporting Year. As a result, it was observed that Synergy sold notable volumes in STEM instead of purchasing volumes from STEM during peak summer period.

Figure 73 shows Verve Energy's volumes of Bids have been reasonably consistent since market commencement. These Bids were priced primarily at relatively low price (in the \$0/MWh to \$50/MWh range shown in green) or at negative prices (i.e. at the Minimum STEM price shown in blue and between Minimum STEM range to \$0/MWh shown in red).

Figure 73 Verve Energy's daily average STEM Bids (cumulative MWh per Trading Interval)

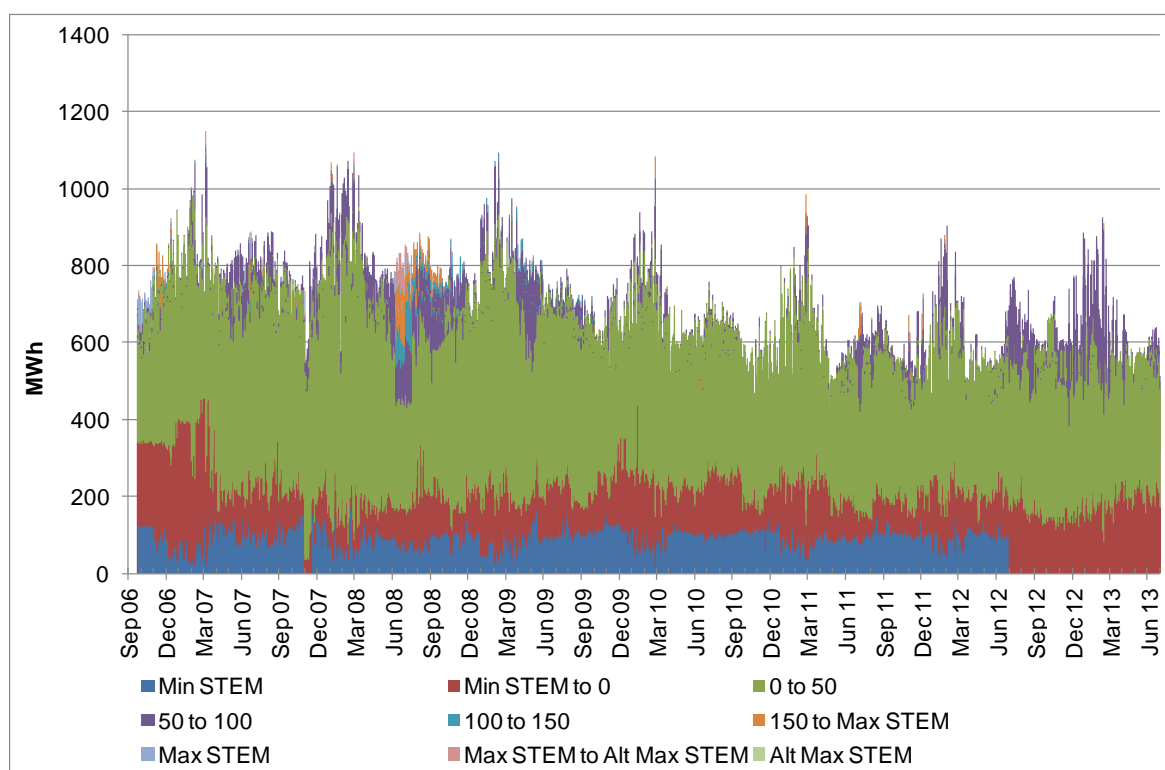
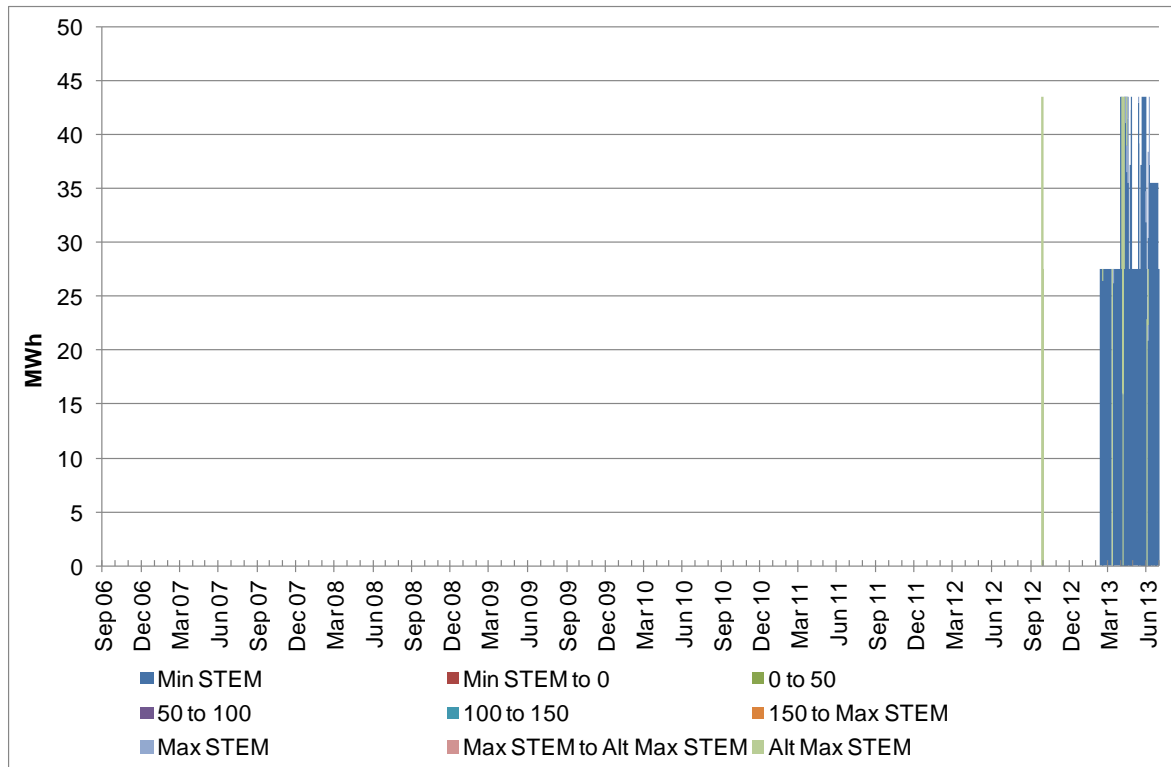
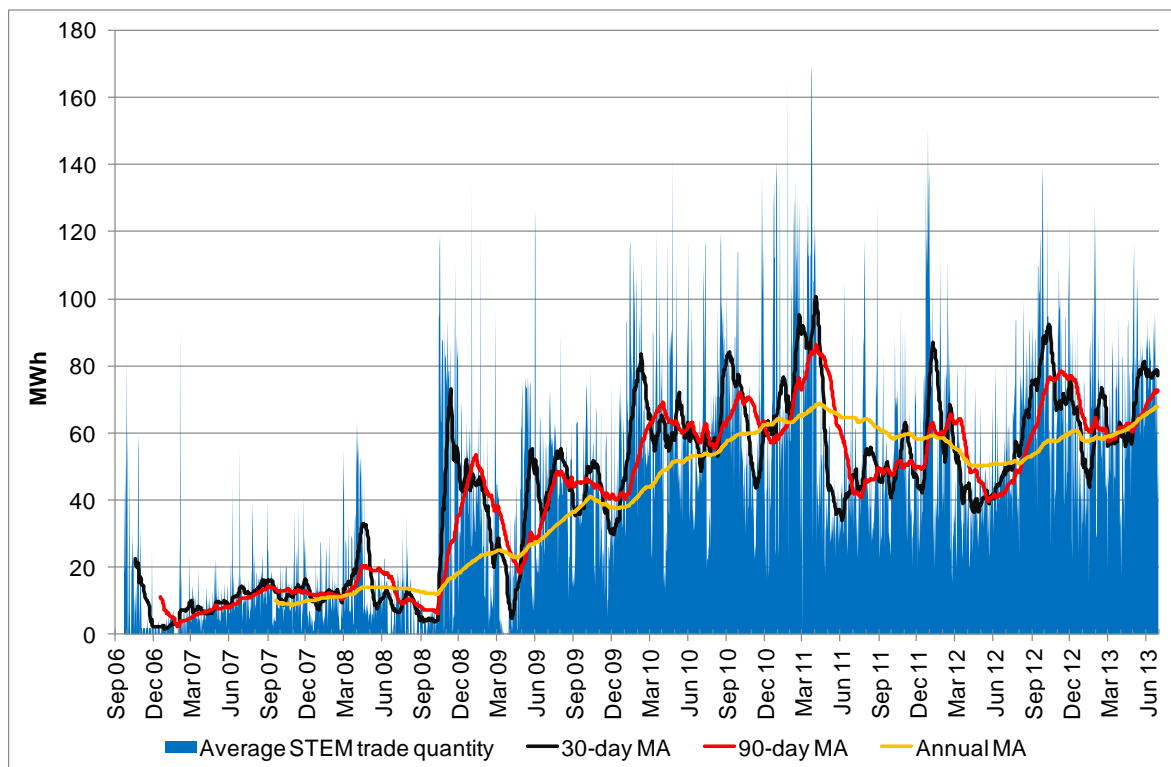


Figure 74 Vinalco's daily average STEM Bids (cumulative MWh per Trading Interval)

Short Term Energy Market traded volumes

Figure 75 Average STEM Clearing Quantities (per Trading Day)

Balancing prices

MCAP and Balancing Prices

Figure 76 and Figure 77 compare 30-day and 90-day moving averages of peak STEM and Balancing prices, respectively.

Figure 76 30-day moving average Peak STEM and Balancing prices

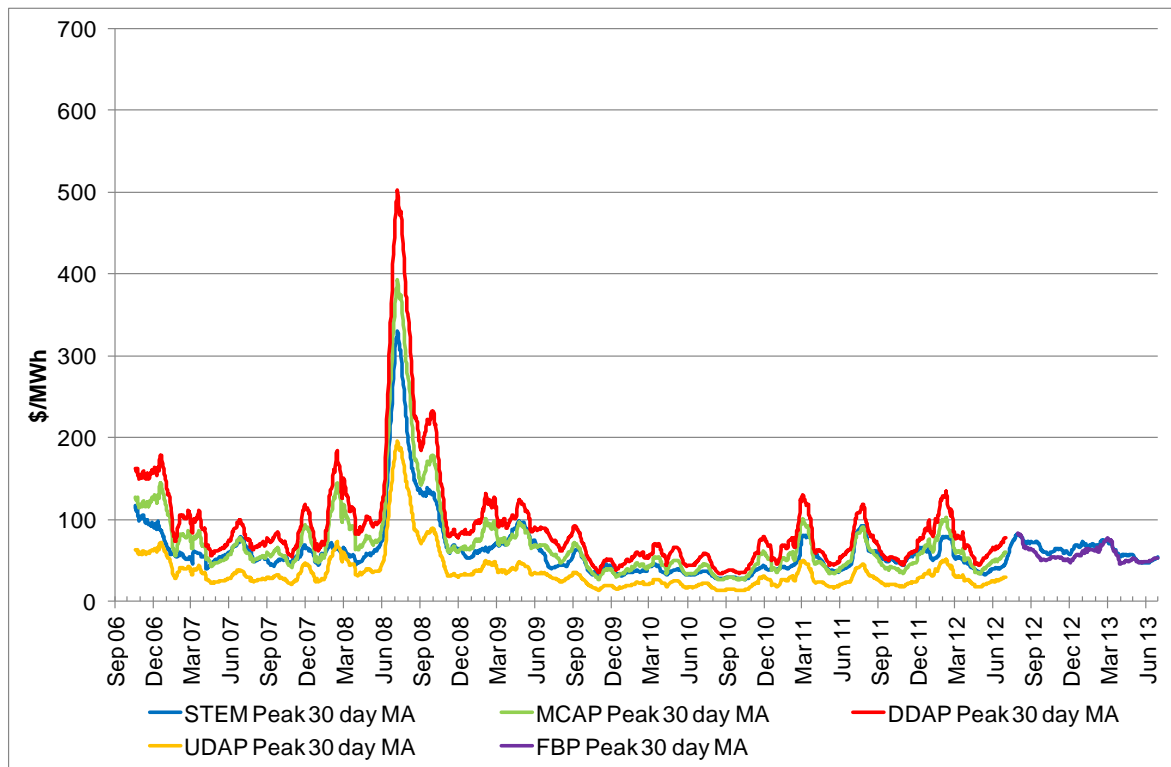


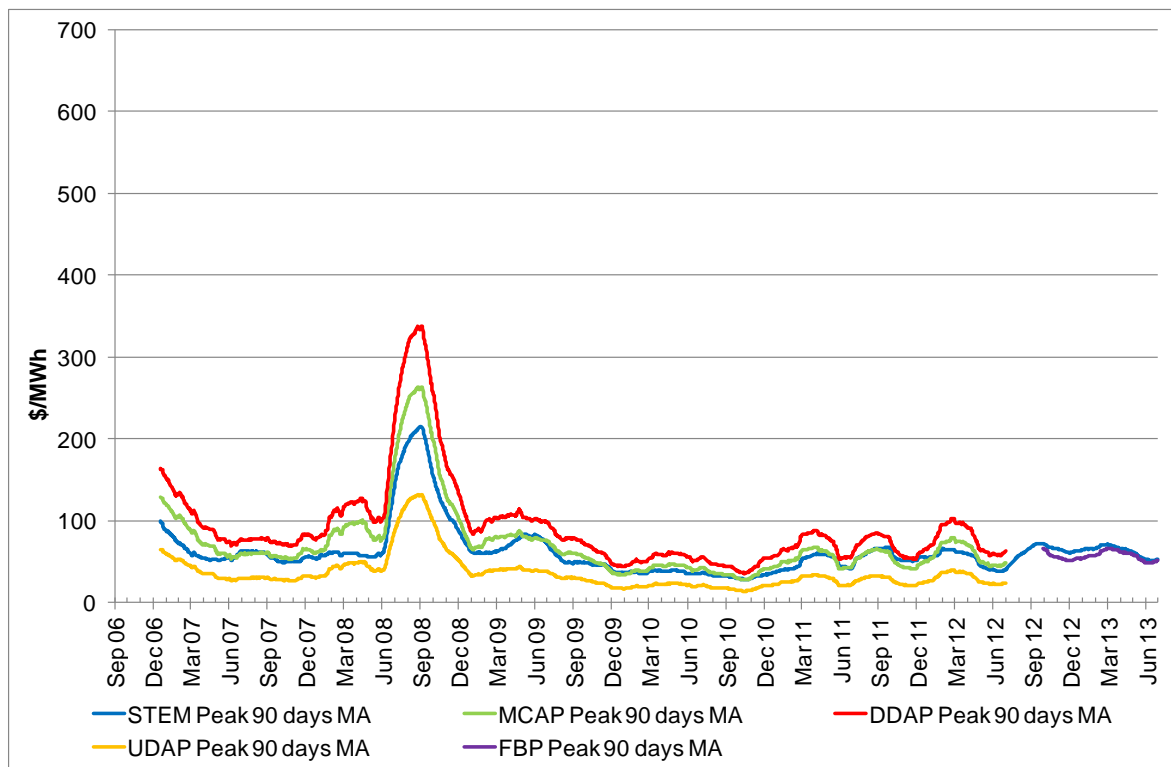
Figure 77 90-day moving average Peak STEM and Balancing prices

Figure 78 and Figure 79 compare 30-day and 90-day moving averages of off-peak STEM and Balancing prices, respectively.

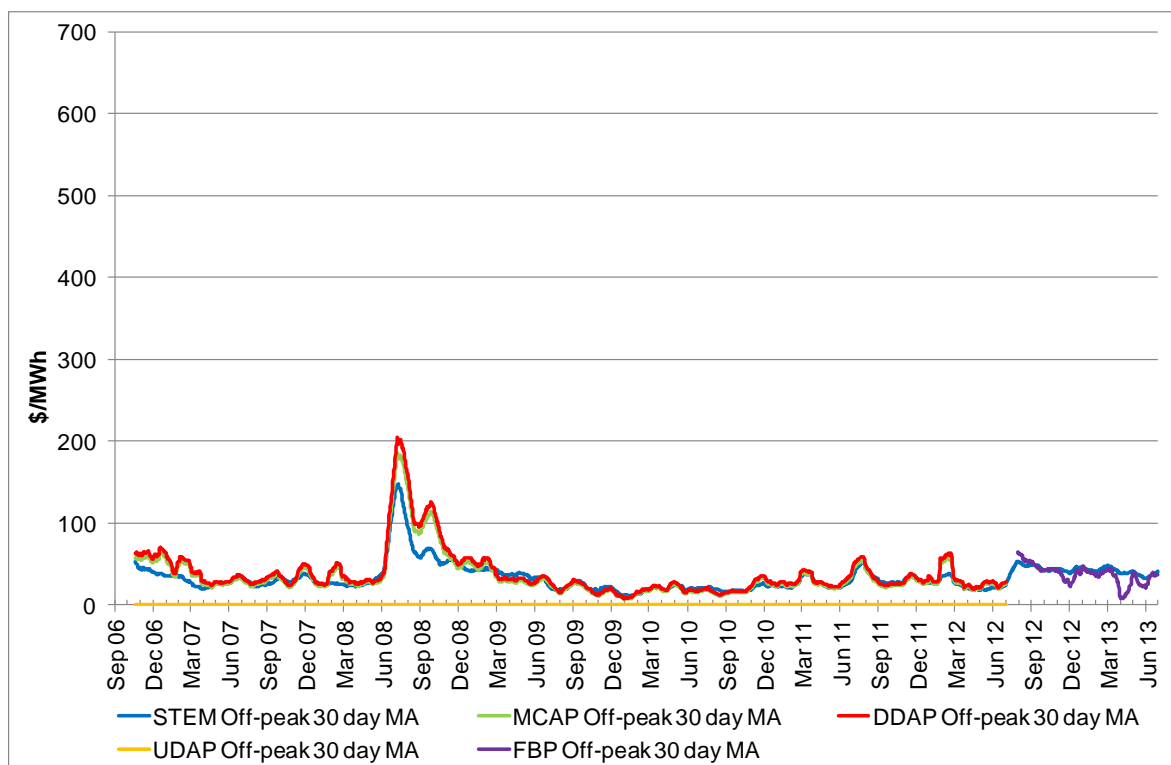
Figure 78 30-day moving average Off-Peak STEM and Balancing prices

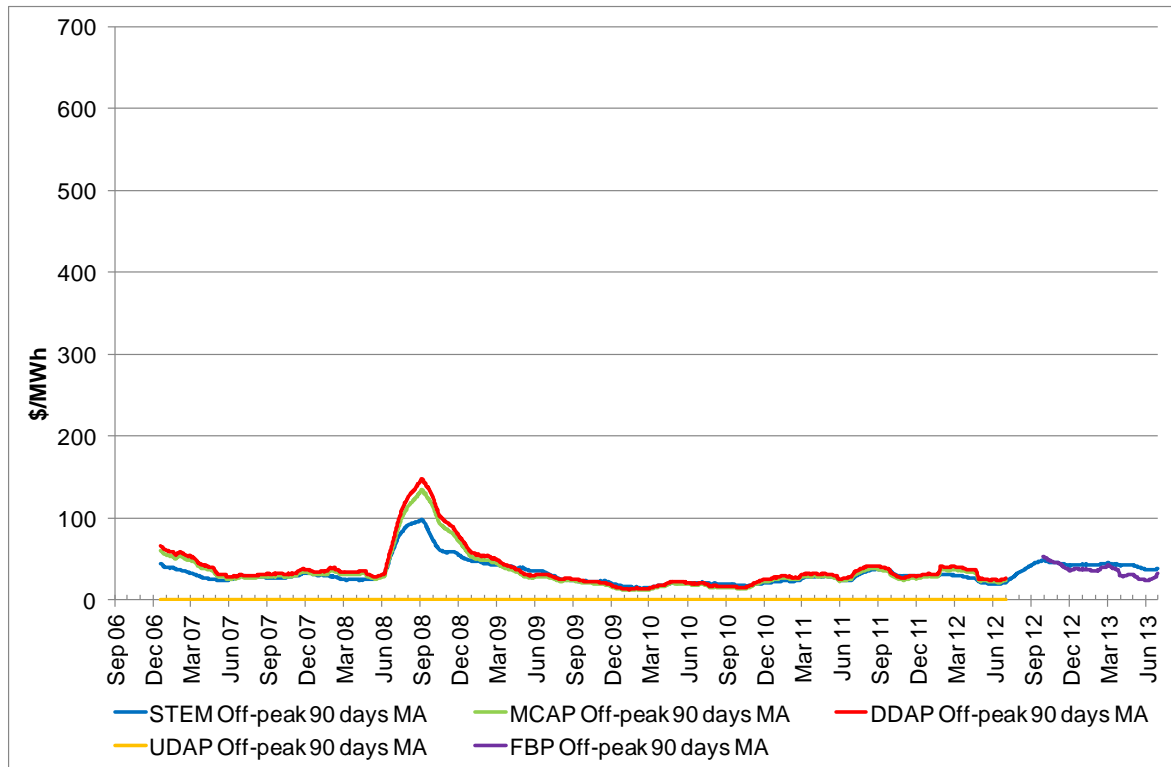
Figure 79 90-day moving average Off-Peak STEM and Balancing prices

Figure 80 and Figure 81 show annual moving average STEM and Balancing prices for peak and off-peak periods, respectively.

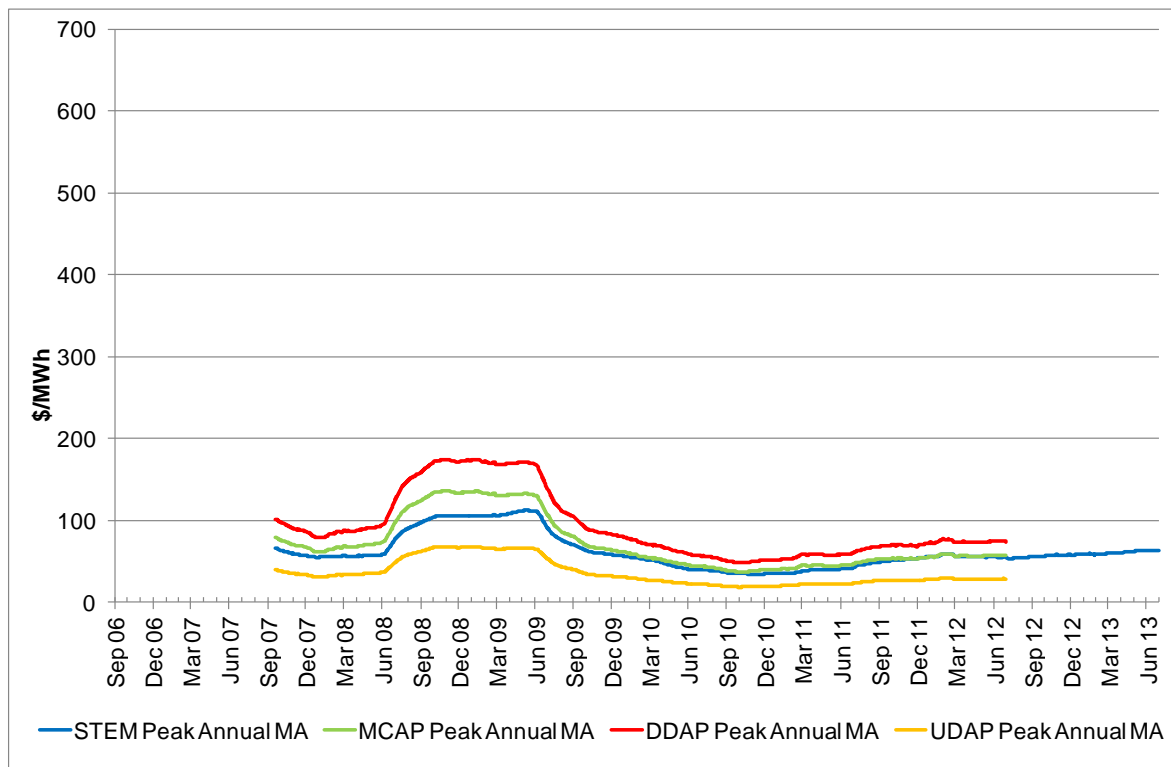
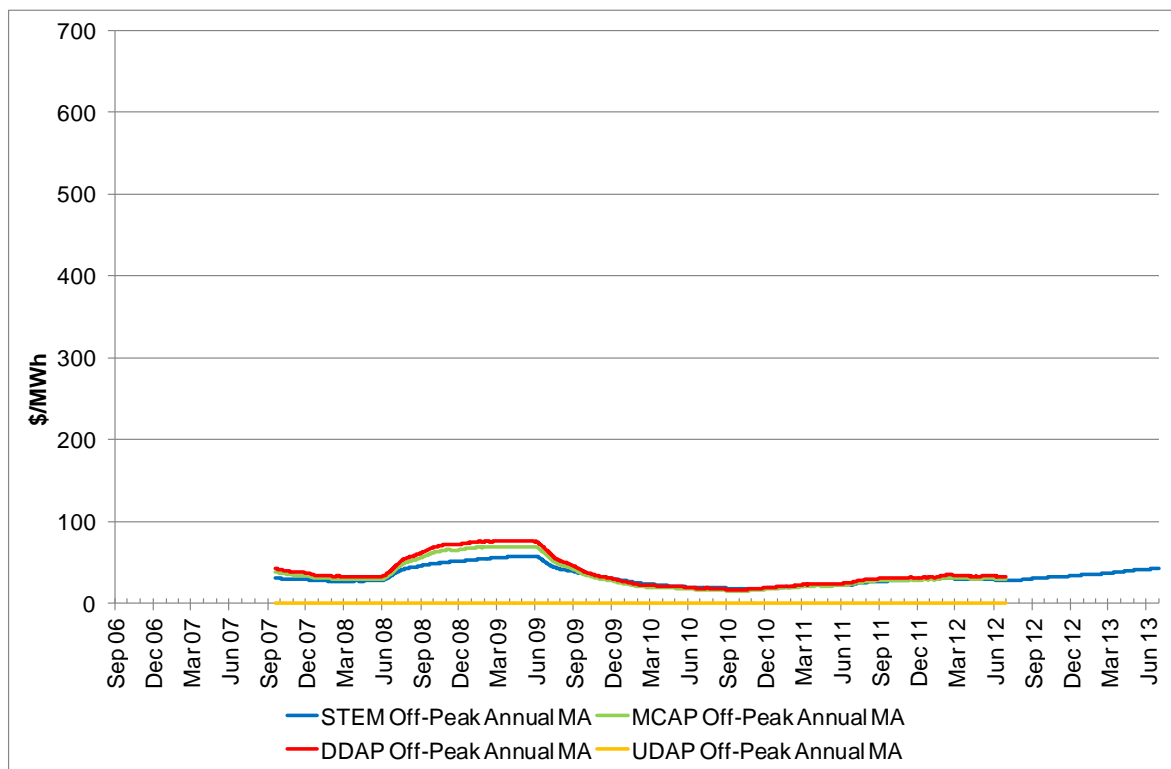
Figure 80 Annual moving average Peak STEM and Balancing prices

Figure 81 Annual moving average Off-Peak STEM and Balancing prices

Volatility of Balancing prices

Figure 82 and Figure 83 illustrate the means and standard deviations (as well as the maxima and minima) of Balancing prices. Since October 2010, there has been a widening of the difference between minimum and maximum prices. Maximum prices have tended to be realised at relatively higher levels since October 2010 when compared to the period following the Varanus Island incident in June 2008. Minimum prices have been fairly similar across these periods.

Figure 82 Summary statistics for MCAP/ Final Balancing Price during Peak Trading Intervals (per calendar month)

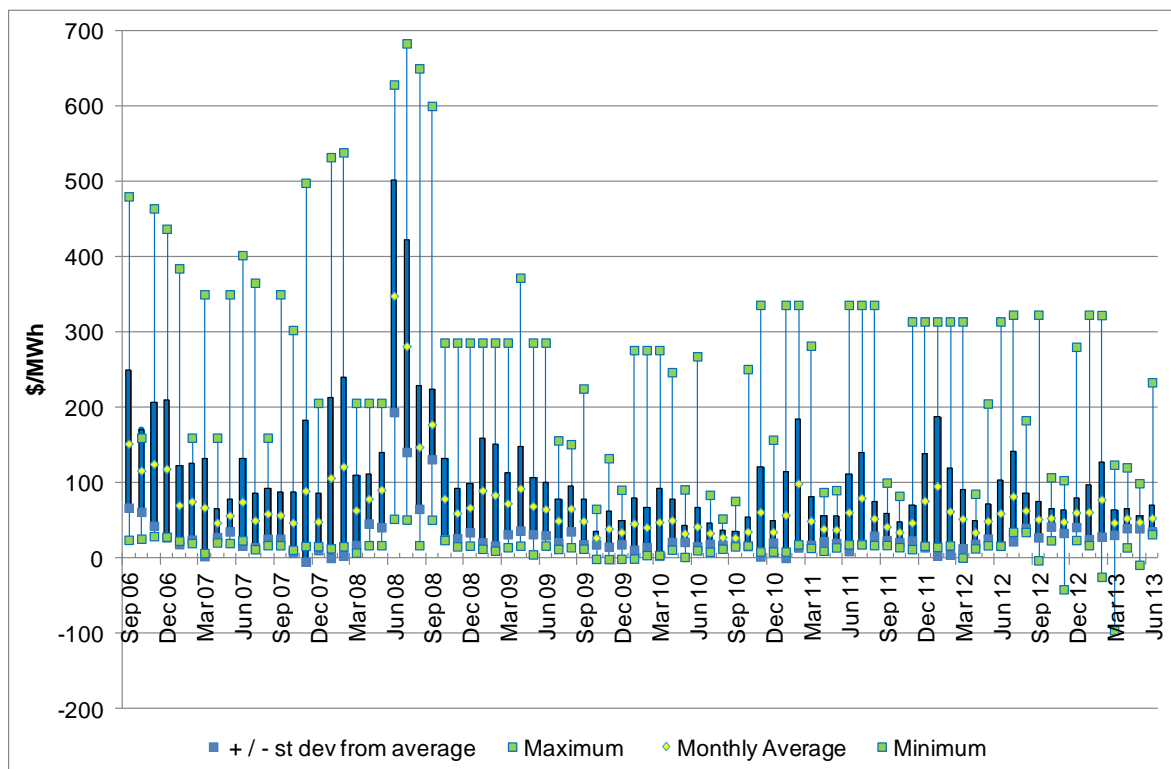
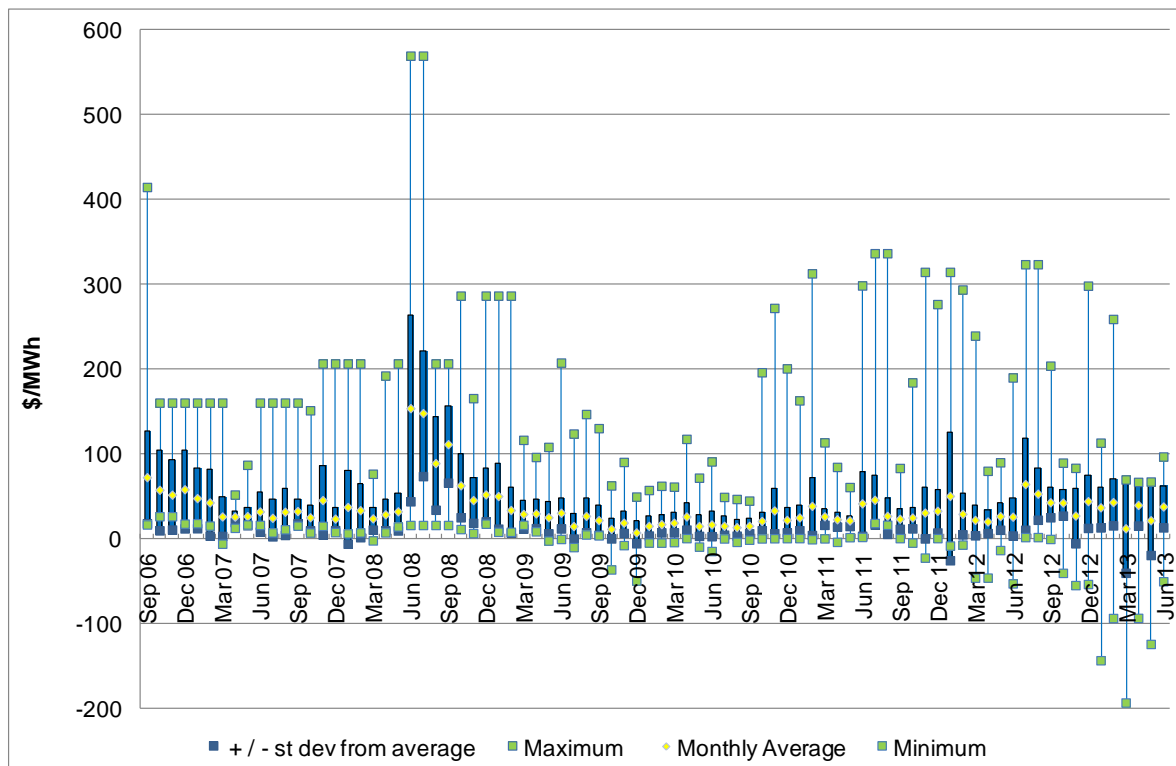


Figure 83 Summary statistics for MCAP/ Final Balancing Price during Off-Peak Trading Intervals (per calendar month)



High Balancing prices

Figure 84 and Figure 85 illustrate the price duration curves for MCAPs during peak and off-peak periods for 21 September 2006 to 30 June 2012.

Figure 84 shows that DDAPs were notably higher than the STEM prices in peak periods across all the Trading Intervals from market commencement. DDAP and UDAP price duration curves can be seen in a related shape to the MCAP price duration curve, as DDAP is derived from the MCAP.

Figure 84 Price duration curves for STEM Clearing Prices, MCAPs, UDAPs and DDAPs during Peak periods (21 September 2006 to 30 June 2012)

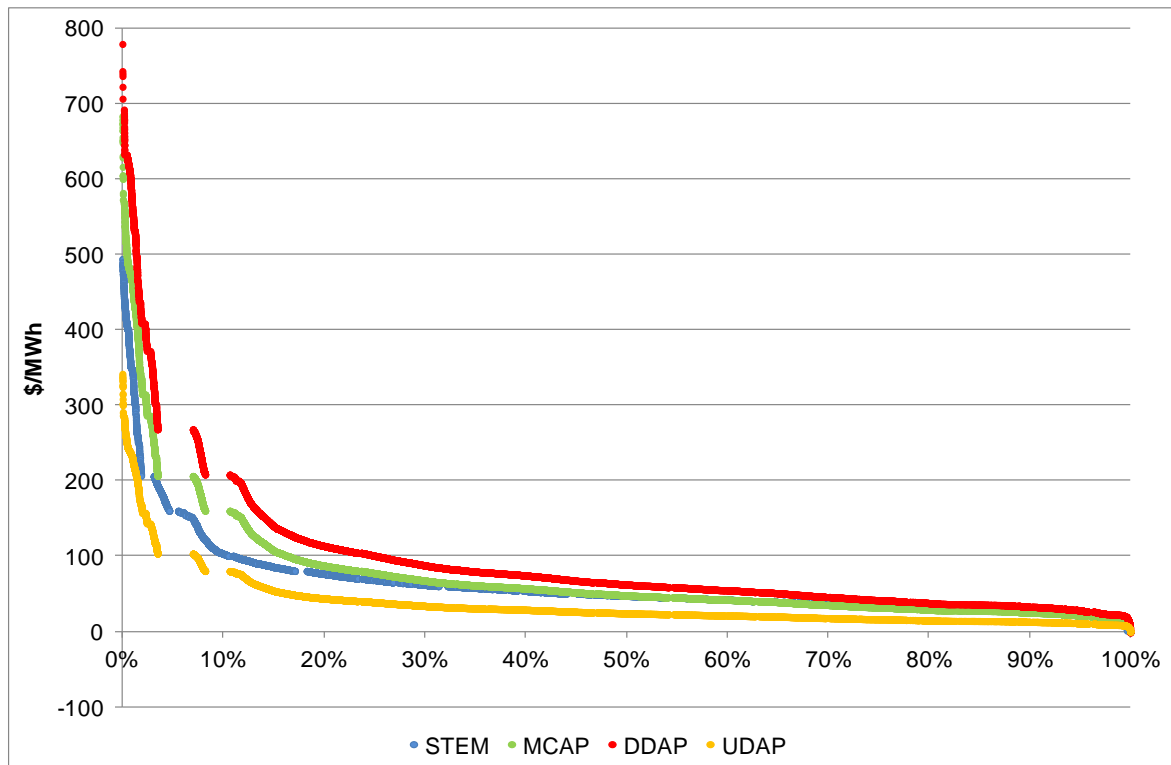


Figure 85 shows that during off-peak periods, the majority of DDAPs occur in a broad range below \$100/MWh (between negative \$55/MWh and \$100/MWh) for approximately 94.30 per cent of the total Off-peak Trading Intervals, with a fairly even distribution of prices within this range (no notable change from previous Reporting Period's price duration curve). It can also be seen that STEM prices have comparatively remained under \$100/MWh for longer durations (about 98 per cent) during off-peak periods than the peak periods (about 89 per cent).

Figure 85 Price duration curves for STEM Clearing Prices, MCAPs, UDAPs and DDAPs during Off-Peak periods (21 September 2006 to 30 June 2012)

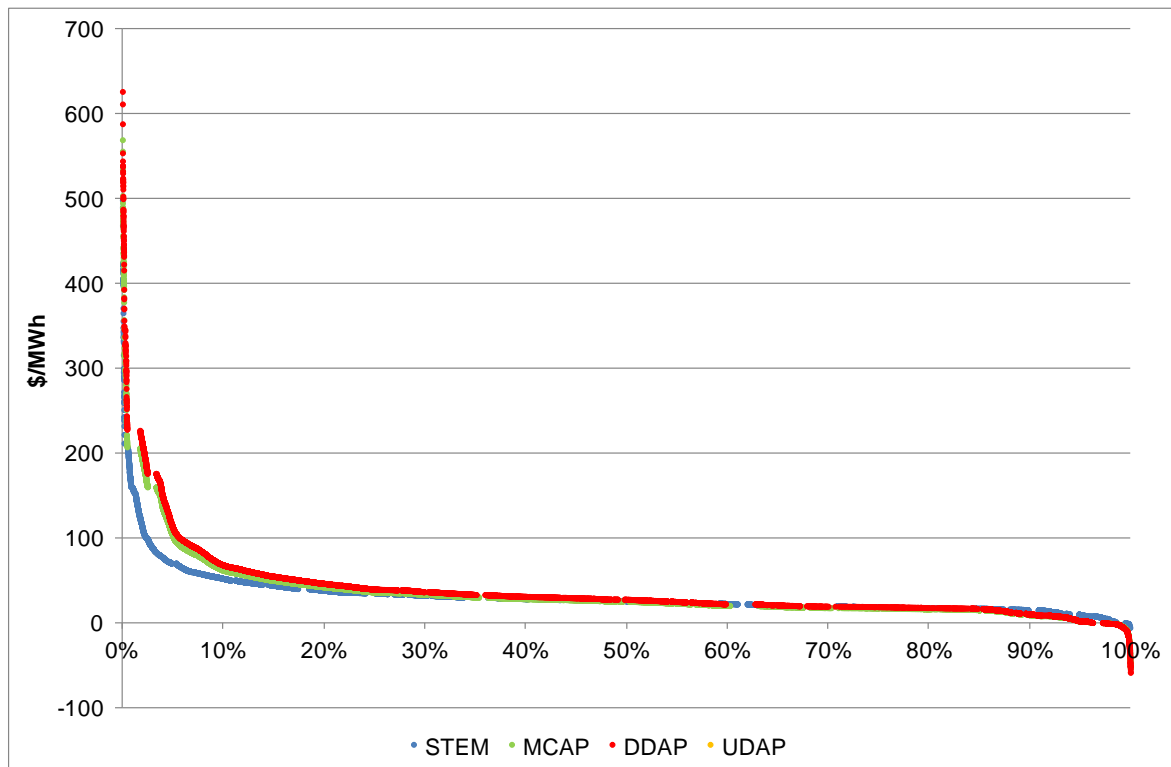


Figure 86, Figure 87 and Figure 88 illustrate price duration curves for STEM prices and MCAPs during Peak periods, for the periods 1 August 2009 to 31 July 2010, 1 August 2010 to 31 July 2011, and 1 August 2011 to 30 June 2012 respectively. STEM and MCAP price duration curves for the 2009/10 Reporting Period were comparatively smoother than the respective prices duration curves for the 2010/11 Reporting Period and the 2011/12 Reporting Period.

Figure 86 Price duration curves for STEM Clearing Prices and MCAPs during Peak periods (01 August 2009 to 31 July 2010)

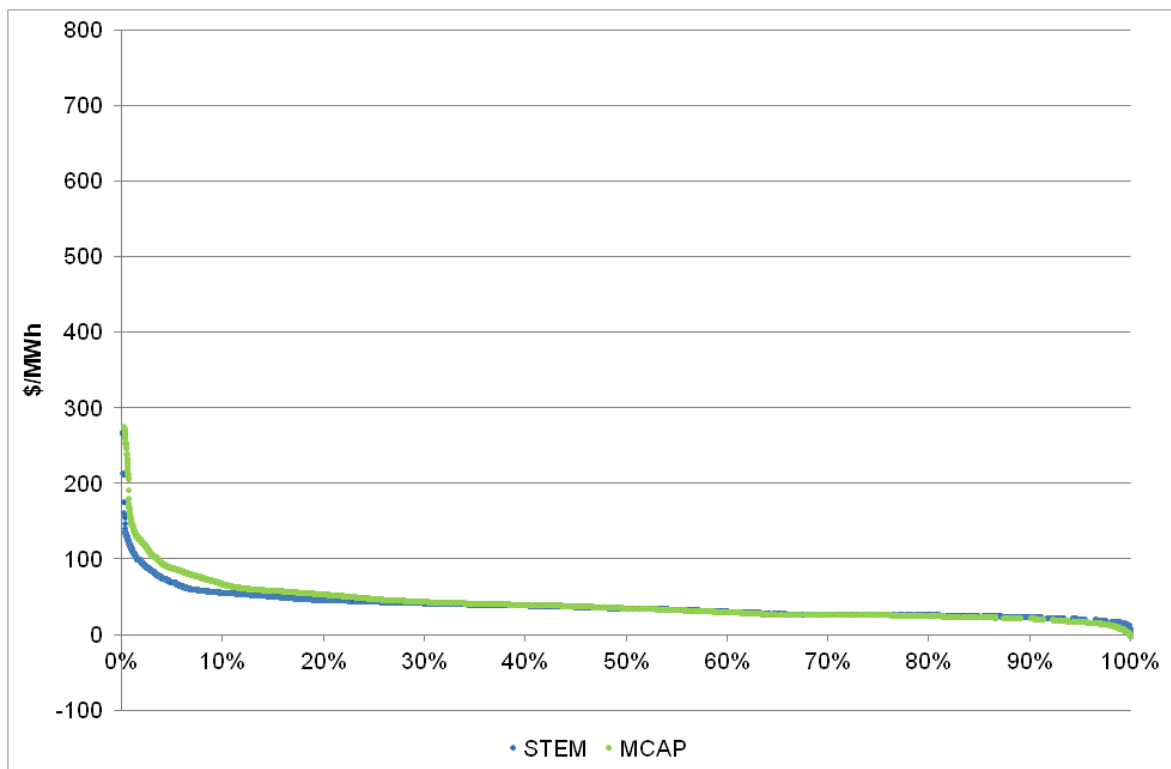


Figure 87 Price duration curves for STEM Clearing Prices and MCAPs during Peak periods (01 August 2010 to 31 July 2011)

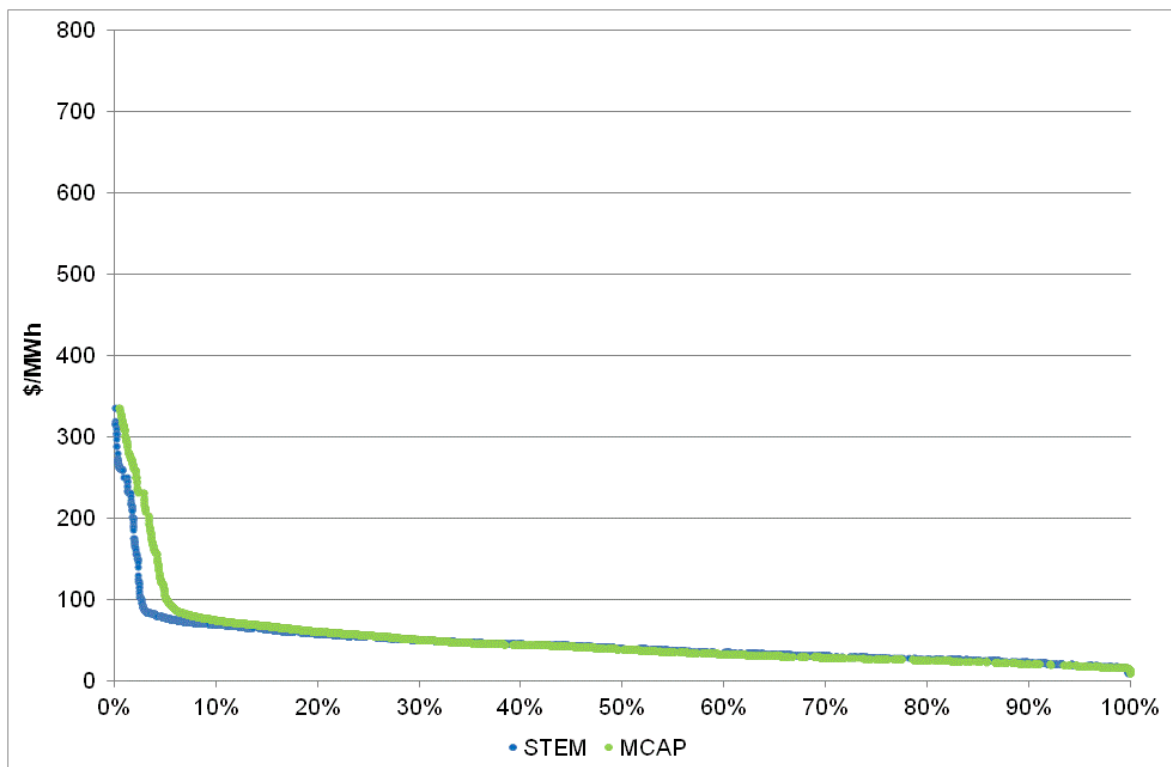


Figure 88 Price duration curves for STEM Clearing Prices and MCAPs during Peak periods (01 August 2011 to 30 June 2012)

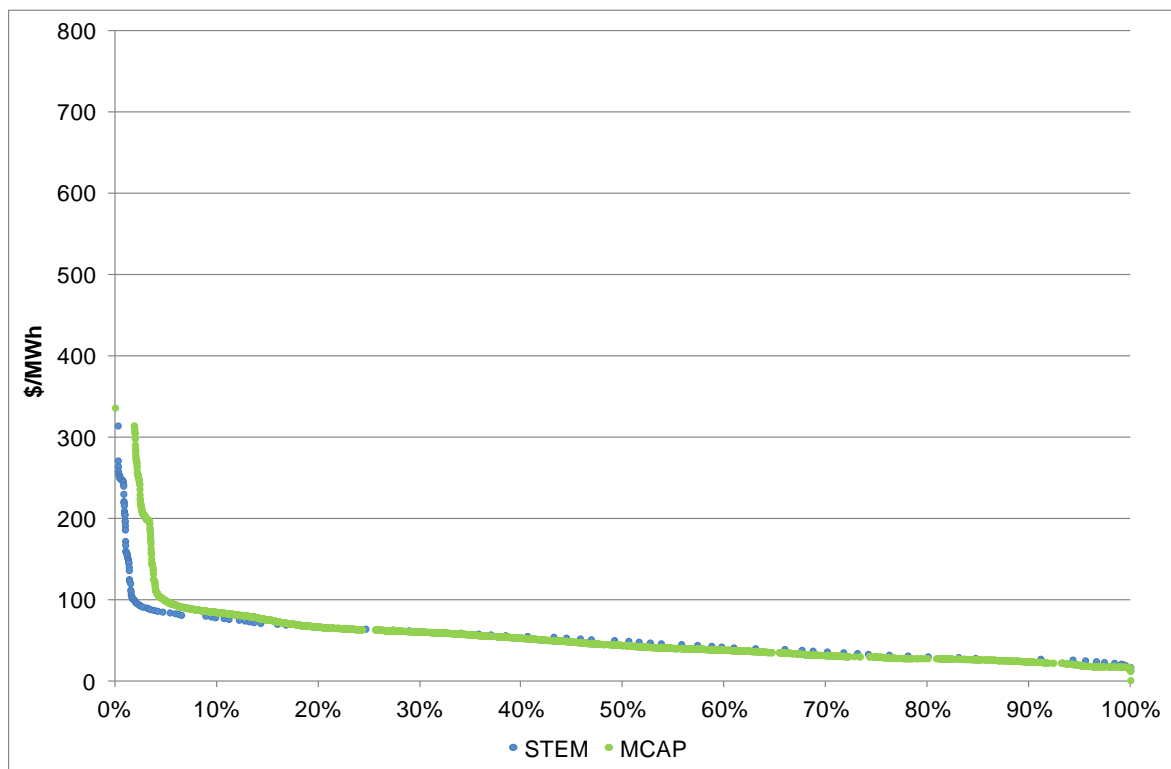
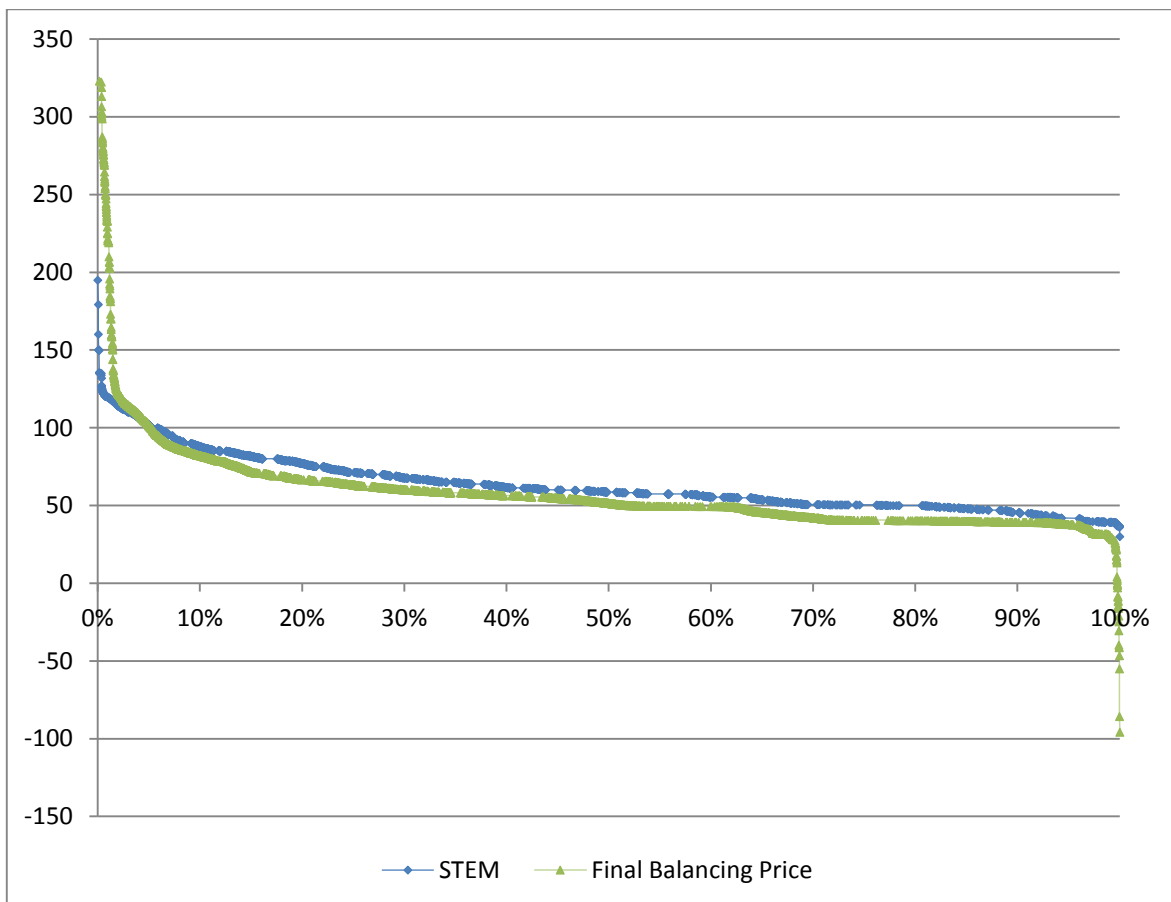


Figure 89 Price duration curves for STEM and Final balancing Price during Peak periods (01 July 2012 to 30 June 2013)

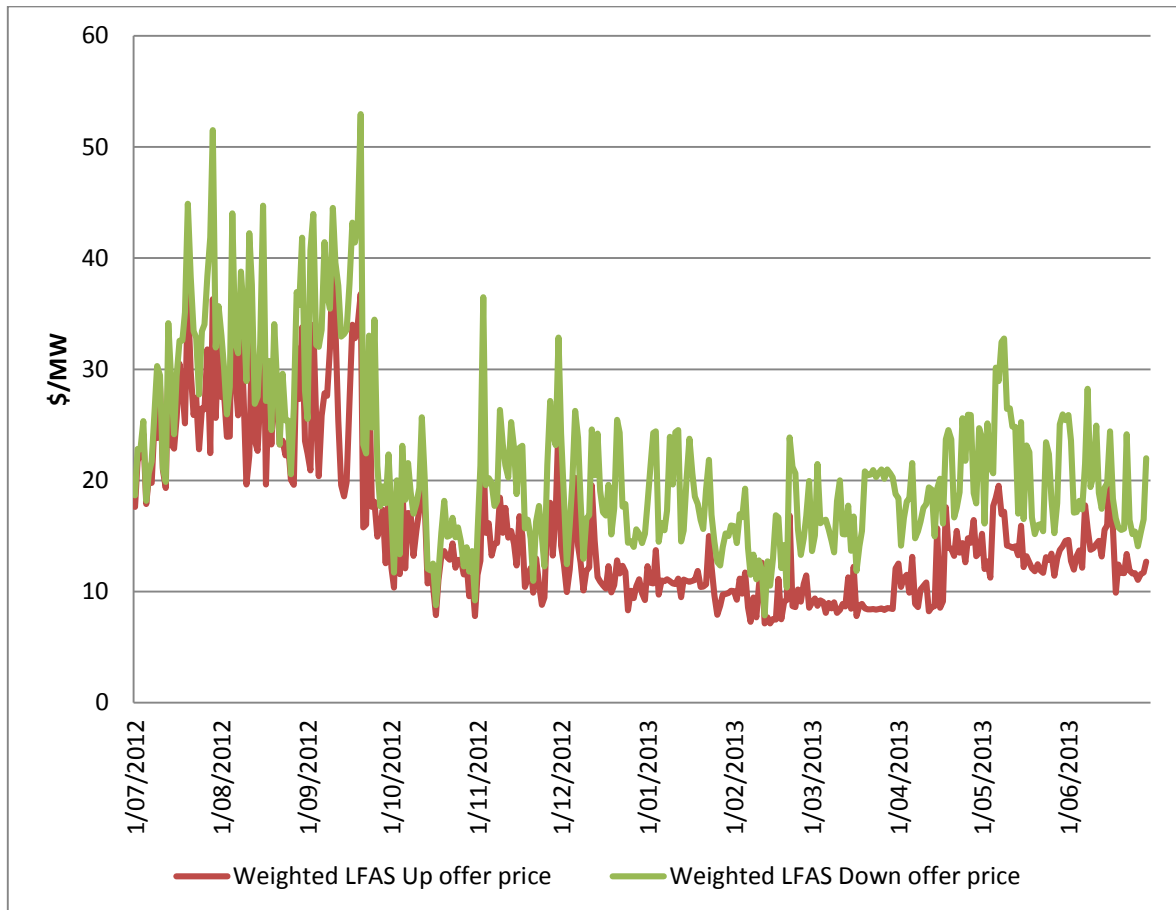


Evidence of Market Customers over-stating consumption

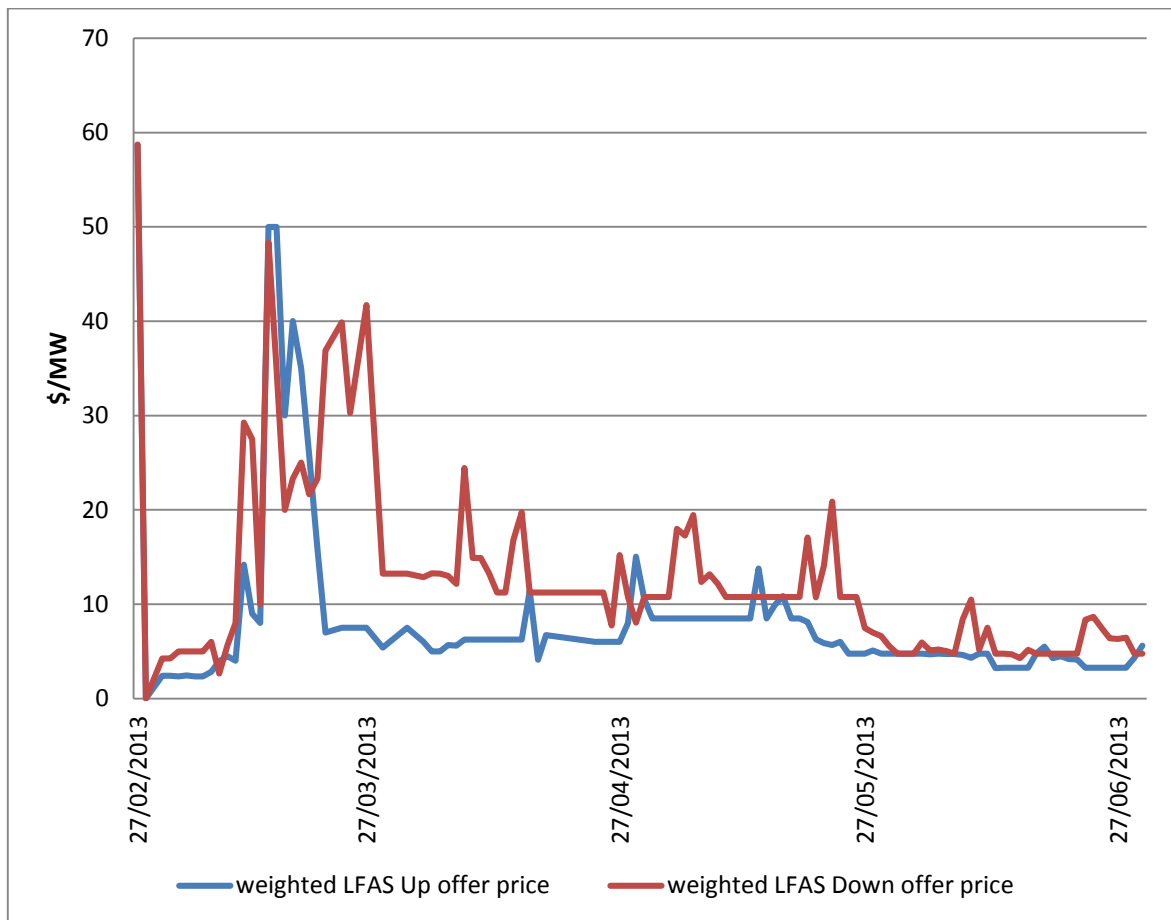
Positive 'planned load less actual load' values denote an over-statement of consumption, whereas negative values denote an under-statement of consumption. The variations between planned load and actual load by individual Market Customers have been examined by the Authority. As this information is classified as confidential, it is not presented in this public version.

Load Following Ancillary Services prices

Figure 90 Verve Energy daily average LFAS Up offer price and LFAS Down offer price



Verve Energy is required under the Market Rules (Market Rule 7B.2.5) to provide offers for at least the amount of LFAS required by the market. In other words, based on the current requirement of 72 MW, Verve Energy is required to offer at least 72 MW into the LFAS market. Total Trading Interval quantities offered for both LFAS Up and LFAS Down was 126 MW from 1 July to 3 July 2012, 112 MW from 4 July to 6 February 2013 and 100.8 MW from 7 February 2013 to the end of the Reporting Period.

Figure 91 NewGen daily average LFAS Up offer price and LFAS Down offer price

NewGen made its first offer into the LFAS market on 27 February 2013. Unlike Verve Energy, NewGen are not providing offers in every Trading Interval and do not offer in the full amount of LFAS required by the market. From market entry until the start of April, NewGen would offer on average 20 MW per Trading Interval for LFAS Up and 20 MW for LFAS Down. From April until the end of the reporting period, average offers for the Trading Intervals that it participated in was 30 MW. As per the chart, the average prices that have been offered by NewGen for both LFAS Up and LFAS Down have tended to decline over time.

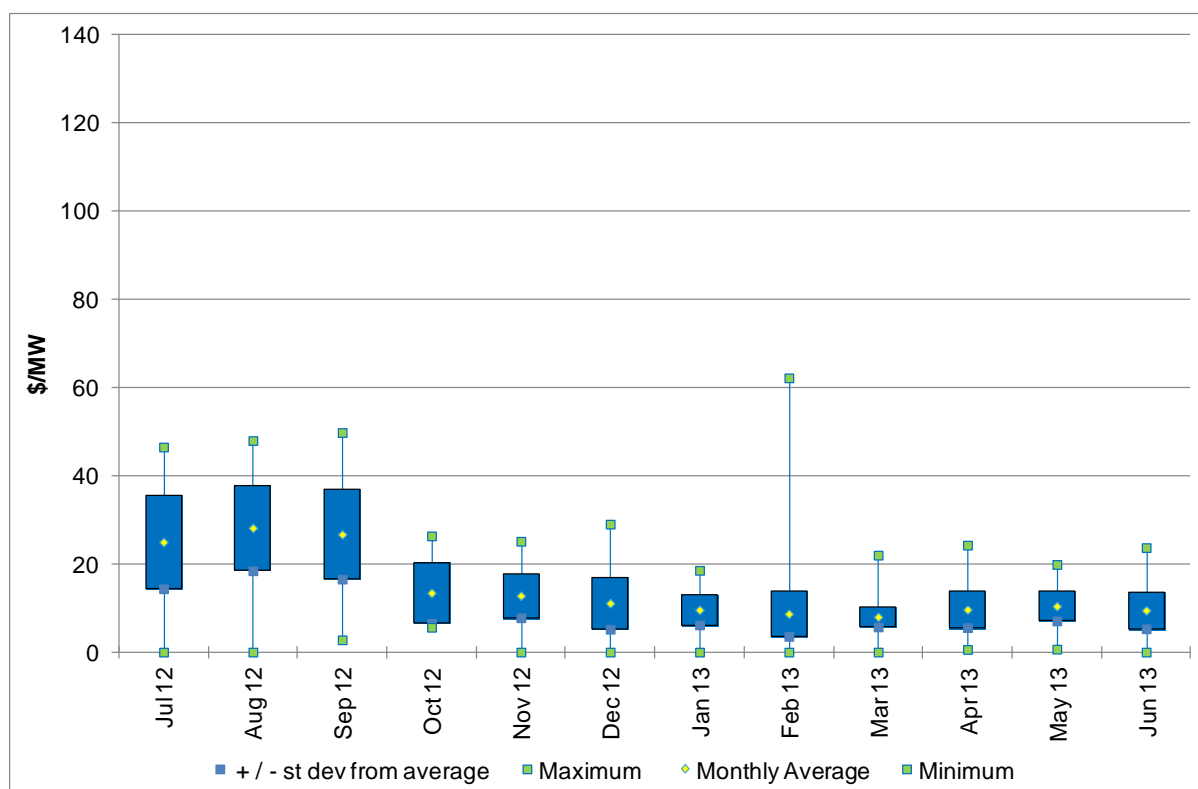
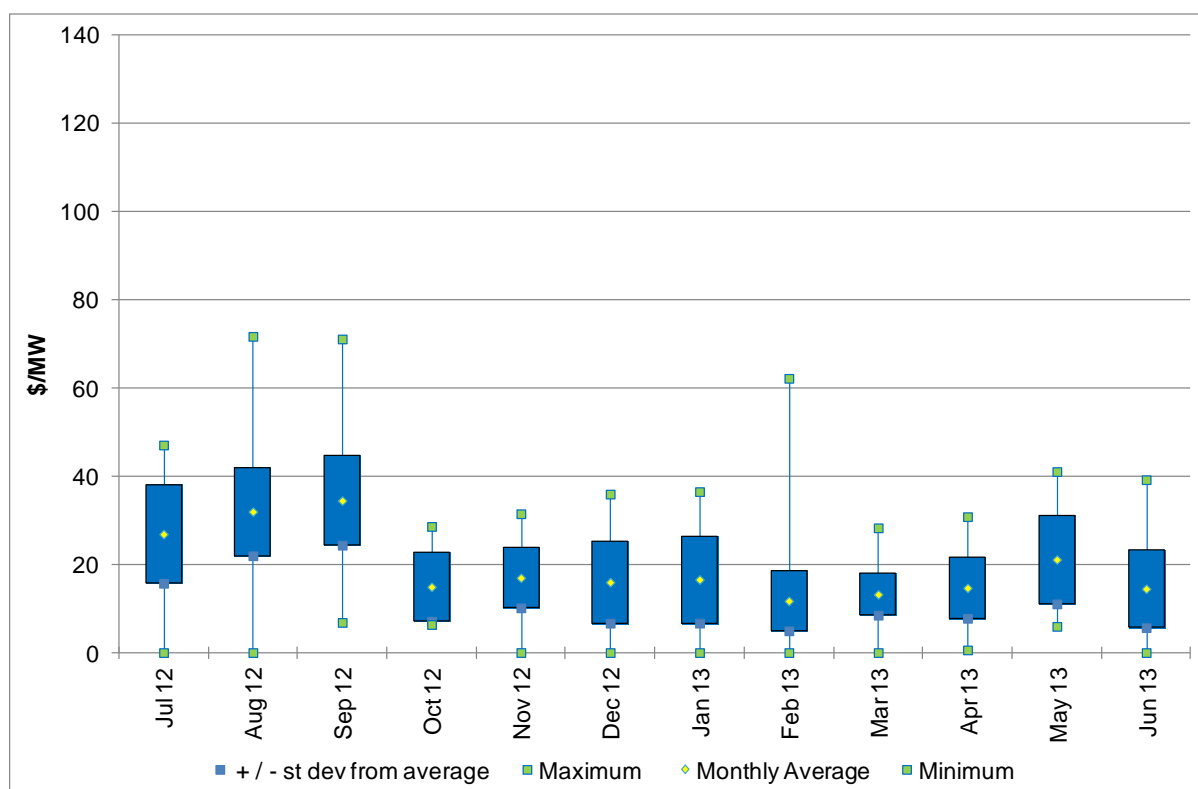
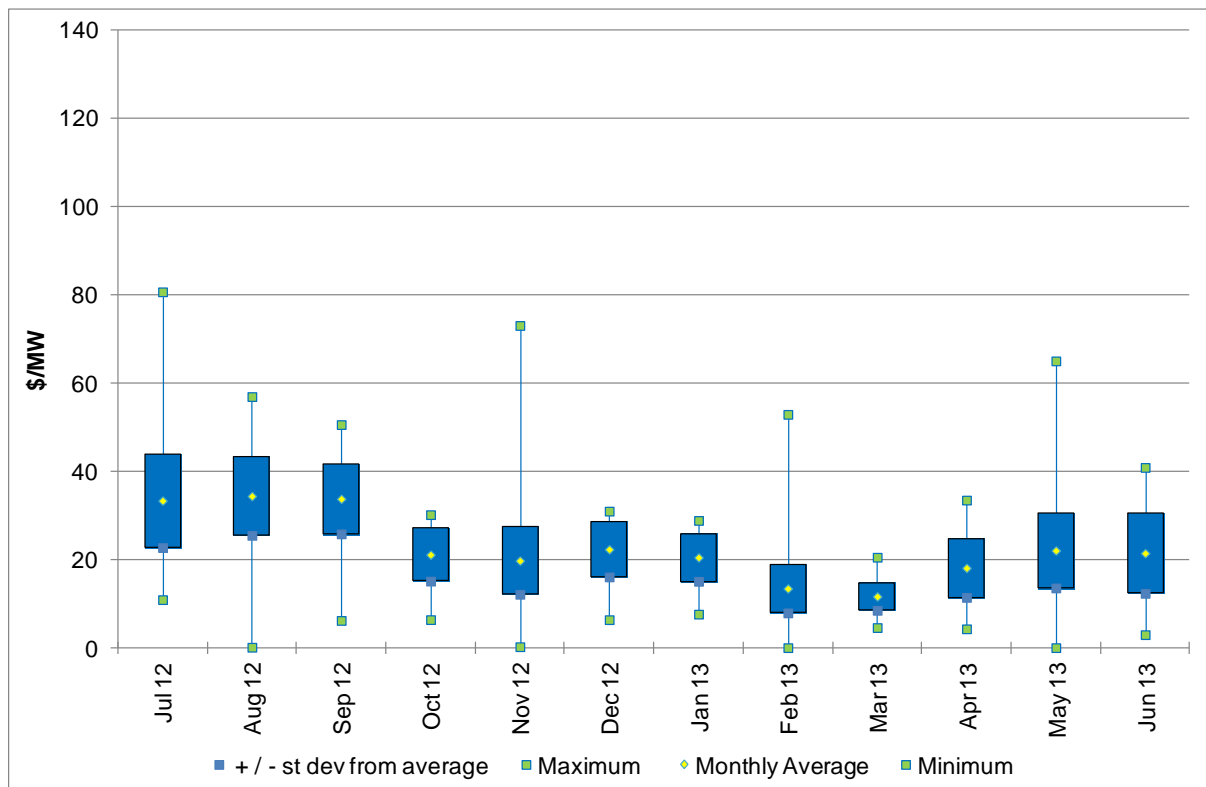
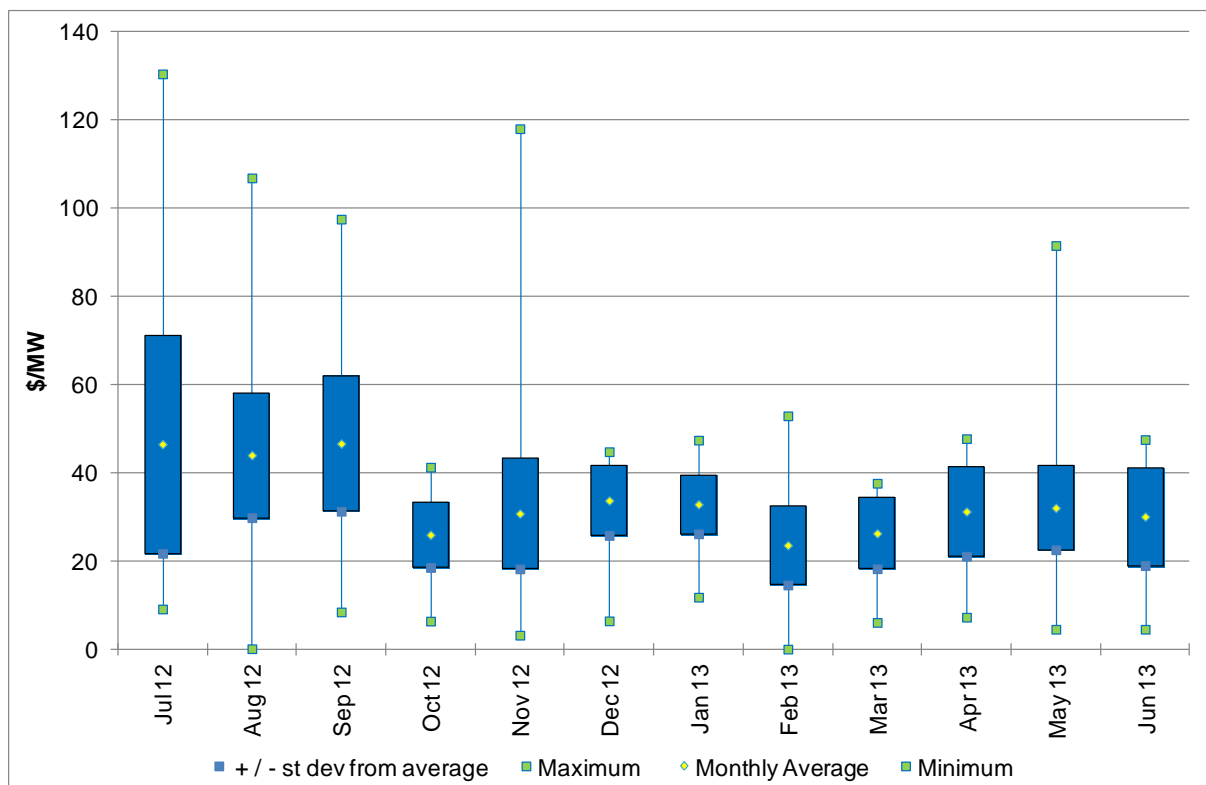
Figure 92 LFAS Up Peak Summary Statistics**Figure 93 LFAS Down Peak Summary Statistics**

Figure 94 LFAS Up Off Peak Summary Statistics**Figure 95 LFAS Down Off Peak Summary Statistics**

Registered Market Generators and Market Customers

Table 11 Registered Market Generators and Market Customers

	6 October 2009	14 October 2010	3 October 2011	10 December 2012	30 September 2013
Market Generators and Market Customers	Alcoa of Australia Limited	Alcoa of Australia Limited	Alcoa of Australia Limited	Alcoa of Australia Limited	Alcoa of Australia Limited
	Alinta Sales Pty Ltd	Alinta Sales Pty Ltd	Alinta Sales Pty Ltd	Alinta Sales Pty Ltd	Alinta Sales Pty Ltd
	Griffin Power Pty Ltd	Griffin Power Pty Ltd	Griffin Power 2 Pty Ltd	Blair Fox Pty Ltd	Blair Fox Pty Ltd
	Griffin Power 2 Pty Ltd	Griffin Power 2 Pty Ltd	Griffin Power Pty Ltd	Griffin Power 2 Pty Ltd	Clear Energy Pty Ltd
	Landfill Gas and Power Pty Ltd	Landfill Gas and Power Pty Ltd	Landfill Gas and Power Pty Ltd	Griffin Power Pty Ltd	Griffin Power 2 Pty Ltd
	Perth Energy Pty Ltd	Metro Power Company Pty Ltd	Metro Power Company Pty Ltd	Landfill Gas and Power Pty Ltd	Griffin Power Pty Ltd
	Southern Cross Energy	Perth Energy Pty Ltd	Perth Energy Pty Ltd	Metro Power Company Pty Ltd	Landfill Gas and Power Pty Ltd
	Verve Energy	Southern Cross Energy	Southern Cross Energy	Perth Energy Pty Ltd	Metro Power Company Pty Ltd
Market Generators (only)		Verve Energy	Tiwest	Southern Cross Energy	Perth Energy Pty Ltd
			Verve Energy	Tiwest	Southern Cross Energy
				Verve Energy	Tiwest
					Verve Energy
	Biogen	Advanced Energy Resources	Advanced Energy Resources	Advanced Energy Resources	Advanced Energy Resources
	Collgar Wind Farm	Biogen	Biogen	Biogen	Biogass Pty Ltd
	Coolimba Power Pty Ltd	Collgar Wind Farm	Blair Fox Pty Ltd	Collgar Wind Farm	Biogen
	EDWF Manager Pty Ltd	Coolimba Power Pty Ltd	Collgar Wind Farm	Coolimba Power Pty Ltd	Collgar Wind Farm
	Eneabba Gas Limited	EDWF Manager Pty Ltd	Coolimba Power Pty Ltd	Denmark Community Windfarm Ltd	Coolimba Power Pty Ltd
	Eneabba Energy Pty Ltd	Eneabba Gas Limited	EDWF Manager Pty Ltd	EDWF Manager Pty Ltd	Denmark Community Windfarm Ltd
	Goldfields Power Pty Ltd	Eneabba Energy Pty Ltd	Eneabba Energy Pty Ltd	Eneabba Gas Limited	EDWF Manager Pty Ltd
	Mount Herron Engineering Pty Ltd	Goldfields Power Pty Ltd	Eneabba Gas Limited	Eneabba Energy Pty Ltd	EMRC
	Namarkkon Pty Ltd	McNabb Plantation Alliance Pty Ltd	Goldfields Power Pty Ltd	Genthurst Pty Ltd	Eneabba Gas Limited
	NewGen Power Kwinana Pty Ltd	Mount Herron Engineering Pty Ltd	McNabb Plantation Alliance Pty Ltd	Goldfields Power Pty Ltd	Eneabba Energy Pty Ltd

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NewGen Neerabup Pty Ltd	Namarkkon Pty Ltd	Merredin Energy	Greenough River	Genthrust Pty Ltd
NewGen Neerabup Partnership	NewGen Power Kwinana Pty Ltd	Mount Herron Engineering Pty Ltd	Merredin Energy	Goldfields Power Pty Ltd
SkyFarming Pty Ltd	NewGen Neerabup Pty Ltd	Mt.Barker Power Company Pty Ltd	Moonies Hill Energy	Greenough River
Tesla Corporation Pty Ltd	NewGen Neerabup Partnership	Mumbida Wind Farm Pty Ltd	Mount Herron Engineering Pty Ltd	Merredin Energy
Vinalco Energy Pty Ltd	SkyFarming Pty Ltd	Namarkkon Pty Ltd	Mt.Barker Power Company Pty Ltd	Moonies Hill Energy
Wambo Power Ventures Pty Ltd	Tesla Corporation Pty Ltd	NewGen Neerabup Partnership	McNabb Plantation Alliance Pty Ltd	Mount Herron Engineering Pty Ltd
Waste Gas Resources Pty Ltd	Vinalco Energy Pty Ltd	NewGen Neerabup Pty Ltd	Mumbida Wind Farm Pty Ltd	Mt.Barker Power Company Pty Ltd
Western Australia Biomass Pty Ltd	Wambo Power Ventures Pty Ltd	NewGen Power Kwinana Pty Ltd	NewGen Power Kwinana Pty Ltd	McNabb Plantation Alliance Pty Ltd
Western Energy Pty Ltd	Waste Gas Resources Pty Ltd	SkyFarming Pty Ltd	NewGen Neerabup Partnership	Mumbida Wind Farm Pty Ltd
	Western Australia Biomass Pty Ltd	Tesla Corporation Management Pty Ltd	NewGen Neerabup Pty Ltd	NewGen Power Kwinana Pty Ltd
	Western Energy Pty Ltd	Tesla Corporation Pty Ltd	SkyFarming Pty Ltd	NewGen Neerabup Partnership
		Tesla Geraldton Pty Ltd	Tesla Corporation Pty Ltd	NewGen Neerabup Pty Ltd
		Tesla Holdings	Tesla Geraldton Pty Ltd	Phoenix Energy
		Tesla Kemerton Pty Ltd	Tesla Holdings	SkyFarming Pty Ltd
		Tesla Northam Pty Ltd	Tesla Kemerton Pty Ltd	Tesla Corporation Pty Ltd
		Vinalco Energy Pty Ltd	Tesla Corporation Management Pty Ltd	Tesla Geraldton Pty Ltd
		Walkaway Wind Power Pty Ltd	Tesla Northam Pty Ltd	Tesla Holdings
		Wambo Power Ventures Pty Ltd	UON Pty Ltd	Tesla Kemerton Pty Ltd
		Waste Gas Resources Pty Ltd	Vinalco Energy Pty Ltd	Tesla Corporation Management Pty Ltd
		Western Australia Biomass Pty Ltd	Western Australia Biomass Pty Ltd	Tesla Northam Pty Ltd
		Western Energy Pty Ltd	Walkaway Wind Power Pty Ltd	UON Pty Ltd
			Wambo Power Ventures Pty Ltd	Vinalco Energy Pty Ltd
			Western Energy Pty Ltd	Wambo Power Western Australia Biomass Pty Ltd

	6 October 2009	14 October 2010	3 October 2011	10 December 2012	30 September 2013
				Waste Gas Resources Pty Ltd	Walkaway Wind Power Pty Ltd Western Energy Pty Ltd Waste Gas Resources Pty Ltd
Market Customers (only)	Barrick (Kanowna) Limited Clear Energy Pty Ltd DMT Energy Energy Response Pty Ltd Karara Energy Pty Ltd Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation	Amanda Australia Pty Ltd Barrick (Kanowna) Limited Clear Energy Pty Ltd DMT Energy Energy Response Pty Ltd EnerNOC Australia Pty Ltd ERM Power Retail Pty Ltd Karara Energy Pty Ltd Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation	Amanda Australia Pty Ltd Barrick (Kanowna) Limited Clear Energy Pty Ltd DMT Energy Energy Response Pty Ltd EnerNOC Australia Pty Ltd ERM Power Retail Pty Ltd Karara Energy Pty Ltd Newmont Power Pty Ltd Premier Power Sales Pty Ltd Synergy Water Corporation	Amanda Australia Pty Ltd Clear Energy Pty Ltd DMT energy EnerNOC Australia Pty Ltd Energy Response Pty Ltd ERM Power Retail Pty Ltd Focus Operations HBJ Minerals Pty Ltd Barrick (Kanowna) Limited Karara Energy Pty Ltd La Mancha Resources Newmont Power Pty Ltd Premier Power Sales Pty Ltd Water Corporation Synergy	AER Retail Pty Ltd Amanda Australia Pty Ltd Cockburn Cement Ltd DMT energy EnerNOC Australia Pty Ltd Energy Response Pty Ltd ERM Power Retail Pty Ltd Focus Operations HBJ Minerals Pty Ltd Barrick (Kanowna) Limited Karara Energy Pty Ltd La Mancha Resources Newmont Power Pty Ltd Premier Power Sales Pty Ltd Water Corporation Synergy

Appendix 4 Glossary of acronyms

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
ANAO	Australian National Audit Office
BSC	Balancing Support Contract
CCGT	Combined cycle gas turbine
CPRS	Carbon Pollution Reduction Scheme
CSO	Community Service Obligation
DDAP	Downward Deviation Administered Price
DMO	Dispatch Merit Order
DSM	Demand Side Management
EPL	Energy Price Limits
ERB	Electricity Review Board
FRC	Full retail contestability
IMO	Independent Market Operator
IPP	Independent Power Producer
LFAS	Load Following Ancillary Service
LGP	Landfill Gas and Power
LRET	Large-scale Renewable Energy Target
MAC	Market Advisory Committee
MCAP	Marginal Cost Administered Price
MEP	Market Evolution Program
MPI	Market participant interface
MRCP	Maximum Reserve Capacity Price
MSDC	Market Surveillance Data Catalogue
MW	Megawatt
MWh	Megawatt hour
NEM	National Energy Market
OCGT	Open cycle gas turbine
PASA	Projected Assessment of System Adequacy
RCM	Reserve Capacity Mechanism
RCMWG	Reserve Capacity Mechanism Working Group
RCP	Reserve Capacity Price
RCR	Reserve Capacity Requirement
RDIWG	Rules Development Implementation Working Group
RDQ	Relevant Demand Quantity
RET	Renewable Energy Target

RVC	Replacement Vesting Contract
SCADA	Supervisory control and data acquisition
SEA	Sustainable Energy Association
SRAS	Spinning Reserve Ancillary Service
SRES	Small-scale Renewable Energy Scheme
SRMC	Short run marginal cost
STEM	Short Term Energy Market
SWIS	South West interconnected system
TEC	Tariff equalisation contribution
UDAP	Upward Deviation Administered Price
VC	Vesting Contract
WEM	Wholesale Electricity Market