

Reserve Capacity Mechanism Working Group (RCMWG)

Agenda

Meeting No.	10
Location:	IMO Boardroom, Level 17, Governor Stirling Tower, 197 St. Georges Tce, Perth
Date:	Thursday 28 February 2013
Time:	2:00 pm to 5:00 pm

Item	Subject	Responsible	Time
1.	WELCOME	Chair	2 min
2.	APOLOGIES / ATTENDANCE	IMO	2 min
3.	MINUTES FROM MEETING 9	IMO	10 min
4.	ACTIONS & DECISIONS REGISTER	IMO	10 min
5.	RESERVE CAPACITY PRICE AND DYNAMIC REFUND MECHANISM <i>Presentation by Mr Mike Thomas</i>	The Lantau Group	90 min
6.	GENERAL BUSINESS	IMO	5 min

Reserve Capacity Mechanism Working Group

Minutes

Meeting No.	9
Location:	IMO Boardroom Level 17, 197 St Georges Terrace, Perth
Date:	Thursday 22 November 2012
Time:	Commencing at 12.30pm – 5.45pm

Attendees	Class	Comment
Allan Dawson	Chair	
Suzanne Frame	IMO	
Brad Huppatz	Market Generator (Verve Energy)	
Ben Tan	Market Generator	
Andrew Sutherland	Market Generator	
Shane Cremin	Market Generator	
Wendy Ng	Market Customer	
Steve Gould	Market Customer	
Stephen MacLean	Market Customer (Synergy)	
Andrew Stevens	Market Customer/Generator	
Geoff Gaston	Market Customer	Proxy
Jeff Renaud	Demand Side Management	
Geoff Down	Contestable Customer	
Brendan Clarke	System Management	
Wana Yang	Observer (Economic Regulation Authority)	
Lisa Taylor	Observer (Public Utilities Office)	
Apologies	Class	Comment
Patrick Peake	Market Customer	
Justin Payne	Contestable Customer	
Paul Hynch	Observer (Public Utilities Office)	
Also in attendance	From	Comment
Wayne Trumble	Observer (Griffin Energy)	
John Rhodes	Observer (Synergy)	
Fiona Edmonds	Observer (Alinta)	
Mike Thomas	Presenter (The Lantau Group)	
Dr Richard Tooth	Presenter (Sapere Research Group)	
Aditi Varma	Minutes	

Greg Ruthven	Observer (IMO)	
Natasha Cunningham	Observer (IMO)	

Item	Subject	Action
1.	<p>WELCOME AND APOLOGIES / ATTENDANCE</p> <p>The Chair opened the ninth and final meeting of the Reserve Capacity Mechanism (RCM) Working Group (RCMWG) at 12:30pm.</p> <p>The Chair welcomed the members in attendance and noted apologies from Mr Patrick Peake, Mr Justin Payne and Mr Paul Hynch. He acknowledged observers present from Griffin Energy, Synergy and Alinta.</p>	
2.	<p>MINUTES ARISING FROM MEETING 8</p> <p>The following amendments were noted:</p> <p>On page 6, Ms Wana Yang requested the following change:</p> <ul style="list-style-type: none"> <i>Ms Yang mentioned that it was not the quantity of excess capacity that was a concern. The concern stemmed more from an economic efficiency perspective because excess capacity indicated inefficient over-investment. She also noted that the Shared Capacity Cost was always borne by the Market Customers, irrespective of whether there was excess capacity or a shortfall.</i> <p>On page 7, Mr Brendan Clarke requested that the minutes reflect that no agreement was reached among working group members on the Reserve Capacity Price proposal. The Chair noted that such a change was not required as the minutes appropriately reflected that members had discussed the proposal. The minutes were silent on whether any agreement was reached. Mr Clarke then requested that his support for Option 3a be minuted.</p> <p><i>Action Point: The IMO to publish amended minutes of RCMWG meeting no.8 on the Market Web Site.</i></p>	IMO
3.	<p>ACTIONS ARISING</p> <p>Ms Suzanne Frame noted that Action Item 2 (The IMO to include information on the cost effectiveness of proposed solutions or harmonisation) remained a work in progress until a full suite of recommendations had been proposed.</p> <p>Ms Frame added that Action Items 3, 4 and 5 were completed subsequent to the last meeting.</p> <p>Ms Frame advised that Action Item 6, 7 and 8 would be addressed over the course of the meeting.</p> <p>Mr Greg Ruthven noted that further information on Action Item 4 – (Relevant Demand (RD) and scaled Individual Reserve Capacity Requirements (IRCR)) had been provided as part of the meeting papers. Mr Ben Tan questioned whether this action item would be discussed any further. Mr Tan noted that he was aware that further work had been undertaken to assess the extent of the issue, which would help working group members in deciding if this issue required</p>	

	<p>further attention. Mr Andrew Stevens noted that the numbers had changed since the last meeting. Mr Geoff Gaston observed that it was incorrect to compare Relevant Demand with scaled IRCR instead of unscaled IRCR, because Demand Side Programmes (DSPs) did not have control over the scale; instead they had control over the actual MegaWatt demand.</p> <p>Mr Tan queried if the main point of the discussion was the philosophy behind it; that a Load should not be able to sell more than it had bought. Mr Jeff Renaud noted that a similar philosophy had been applied in the PJM Capacity Market. He added that in his view the comparison should be made with the scaled IRCR as that was what the market paid for. Mr MacLean also supported the philosophy of not being able to sell more than you had bought. The Chair considered that this philosophy seemed fundamental to the discussion. Dr Steve Gould observed that the principal issue was whether, given that a DSM contributor is able to manage its Load, that a Market Customer could actually manage its IRCR by design, for example, by deliberately curtailing load so as to minimise the IRCR, whilst simultaneously maintaining high Relevant Demand. Mr Renaud responded that he was not aware of the extent to which this happened, but noted that it was a concern that could be addressed by capping RD at IRCR, and added that in his view, capping at the scaled IRCR would resolve the issue. He also observed that DSPs that had several Associated Loads did not have individual RD's for each load, so it was not possible to tease out the attributable value.</p> <p>The Chair asked if members would agree to adopt the principle that 'what was not bought could not be sold'. Members agreed to proceed as suggested.</p> <p><i>Action Item: The IMO to develop a Pre Rule Change Proposal to implement the principle: what was not bought cannot be sold, in the context of Relevant Demand and IRCR.</i></p>	IMO
4.	<p>AGENDA ITEM 5: Conditions for Demand Side Programme Dispatch</p> <p>The Chair invited Dr Richard Tooth to make his presentation. The following discussion points were noted:</p> <ul style="list-style-type: none"> • Mr Gaston noted that harmonisation of dispatch could not be interpreted in the true sense of the word because DSP dispatch conditions were proposed to be different from generators. He argued that a notice period of two hours for DSPs makes it easier for them to perform, whereas obligations were much more stringent on generators because they get dispatched even within their two hour gate closure. Mr Renaud noted that the obligation on System Management to give notice did not negate the requirement for DSPs to perform and that it was in System Management's interest to provide notice to DSPs to be prepared. • Mr Andrew Sutherland queried if Capacity Cost Refunds for non-performance by DSPs would still be much higher than those for generators. Mr MacLean answered that the 'understanding he received from the last meeting was that DSPs would fall in the same refund category as generators because now they would be subjected to unlimited hours of availability. Mr Renaud noted that DSPs would always be subject to a higher denominator for refunds. Discussion ensued on the capability of DSPs to respond 	

within minutes. In response to a query from Mr Tan, Mr Renaud noted that the capability of DSPs to respond within minutes varies across Loads, and reducing the two hour notice of dispatch would create a significant impact. Mr Gaston questioned why if it was indeed possible for DSPs to respond within minutes, they received the two hour notice of dispatch period from System Management rather than receiving a Dispatch Instruction, akin to what generators receive. He further added that managing the dispatch of different DSPs by giving them adequate notice should be the decision of the business owner, and considered that this should occur in the Balancing Merit Order. Mr Renaud argued that managing the dispatch of different DSPs in the current market would be practically impossible because currently all DSPs bid in at the same price and a random number generator is used for dispatch. Ms Frame noted that during Market Rules Evolution Plan meetings, votes were canvassed on the proposal for including DSPs in the Balancing Market; however there was no desire to progress that proposal at that time. Ms Frame queried members whether the priority of the proposal for DSM to participate in the Balancing Market had now changed. Mr Gaston considered that the question was whether DSM was being harmonised to perform like a generator in terms of dispatch. Ms Frame noted that the philosophical discussion around what was intended by “harmonisation” of demand and supply side sources of capacity occurred early in the working group meetings, and explained that the intent was not to make them identical, rather to more closely align their performance requirements to level the playing field.

- During discussion on Proposal 1¹; Mr Stevens noted that the decision for using any amount of DSM should be solely System Management’s responsibility and that it should be able to justify that decision accordingly. Mr Shane Cremin and Mr Brad Huppertz also agreed with this point. Mr MacLean observed that System Management might not be comfortable with making a decision which can be open to criticism. Dr Gould observed that the Power System Operation Procedure (PSOP) on Dispatch already included powers for System Management to issue Dispatch Advisories when it considered that the Operating State had changed from Normal to High-Risk. Having issued that Dispatch Advisory, System Management had unrestricted powers to use whatever it considered suitable. He further added that it seemed that the proposal would make an incremental adjustment on protections which already existed. Dr Tooth mentioned that this recommendation was not expected to change current behaviour.
- On Proposal 2²; members sought some clarification on whether DSPs could be dispatched as a priority by using the consumption decrease price. Mr Gaston noted that the proposal seemed to add another layer of complexity when in fact tie-breaking rules already existed. The Chair clarified that this was beyond the Balancing Merit Order and that a random number generator could

¹ Proposal 1: A rule is established to ensure that the DSM quantity dispatched is not more than can be reasonably justified to manage the uncertainty of the short-term requirements consistent with the Dispatch Criteria

² Proposal 2: the rank-based-on load size rule in the Non-Balancing Dispatch Merit Order be removed and replaced with a ranking based on time since last dispatch

	<p>not be integrated into this part of the system. Mr Tan queried if self-dispatches by DSPs could be considered when counting the most recent dispatch. In response to this query, Dr Tooth clarified that only dispatches conducted by System Management would be counted. Mr Renaud and Mr Clarke discussed whether System Management could conduct partial dispatches of DSPs for example, System Management only dispatching a DSP for a fraction of the total amount it had initially bid in. The Chair noted that clarity on this action item would be sought by the IMO.</p> <ul style="list-style-type: none"> • Dr Tooth noted that the discussion indicated that members agreed that rank based on load size needed to be removed and the point of contention was whether dispatch should instead be conducted on rank-based-on-time. Ms Wana Yang queried whether this logic should also exist for generators to facilitate consistency. In response, the Chair and other members noted that this would not be possible because generators are allowed to bid in different offer tranches at different values. • Discussion ensued on the possible scenarios in which DSPs would likely be dispatched. Dr Tooth noted that there would need to be an unlikely disaster scenario for all of the DSPs to simultaneously get dispatched. Mr John Rhodes argued that the proposal placed an unlimited liability on Market Customers who are contracting for an unknown level of risk. He queried as to why the burden of a disaster scenario, which is the principle behind the design of the Reserve Capacity Mechanism, should be placed on DSPs. Discussion ensued on the risk of unlimited dispatch for DSPs. Mr Cremin observed that the risk profile for DSPs was similar to that for generators. If generators went on outage for prolonged periods of time then they would be liable for refunds. Similarly, for DSPs the risk that they would be dispatched existed and must be built into their business risk plans. Members agreed that the market should not underwrite this risk for DSPs. Mr MacLean argued that unlimited hours of availability for DSPs constituted discrimination because by definition this technology could not be available for an unlimited time period. Mr Geoff Down noted that the risk depends on whether the DSP is a portfolio of programmes or a single large programme. He added that the market might lose some of the DSPs because of this unlimited availability criterion, as programmes will have to assess how much they have available to curtail. Discussion continued on what risk management techniques might be applied by DSPs as the new rule comes into play. • The Chair summarised the discussion and questioned members for their consent to move forward with the recommended proposals. He acknowledged that more work needed to be done on rule development and implementation. Members agreed to move forward as proposed. Mr MacLean did not agree with the proposal of unlimited hours of availability for DSPs. <p><i>Action Points:</i></p> <ul style="list-style-type: none"> • <i>On Proposal 2, the IMO to check whether System Management can dispatch DSM for a part of its full quantity.</i> • <i>The IMO to work through rule change development process on the recommended proposals.</i> 	<p>IMO</p> <p>IMO</p>
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5. AGENDA ITEM 6: Dynamic Refunds Mechanism

The Chair invited Mr Mike Thomas to make his presentation. The following discussion points were noted:

- On the topic of recycling, Mr MacLean opined that the benefit being accorded to better performing resources had not been quantified and thus it was difficult to ascertain how the recommendations would improve the current situation.
- On the topic of recycling refunds by either availability versus dispatch, Mr Cremin disagreed with Mr Thomas that rebates should be based on availability. He noted that in this market Capacity Credits are paid three years in advance for capacity to be available even though it may never get used. He observed that Mr Thomas's proposed recycling approach attached more value to capacity which is available but rarely gets dispatched such as peaking units and DSPs. He added that such an approach should be balanced by a reduction in the compensation they get for Capacity Credits.
- Mr MacLean observed that the proposal did not present enough incentive for improvement. He added that if this change was implemented, it would imply that bilateral contracts might need to be rewritten as generators would now be able to recoup some of their costs through the recycling mechanism. Mr Stevens argued that this might be the case for only a few contracts, but most other contracts would not be affected.
- Discussion ensued on the topic of refund factors. Mr Sutherland noted that the principle behind Mr Thomas's refund factor proposal was that the value of capacity would be higher as the system reserve margin went lower. He added that payments on the revenue side, however, did not respond the same way i.e., higher payments for capacity as the system reserve margin went lower
- Discussion ensued on how Planned and Forced Outages would get treated under the dynamic refunds regime. While evaluating various options, Mr Gaston observed that a refund factor of 18 would translate into very high financing risks and that this was compounded by the fact that the Maximum Reserve Capacity Price was not a forecast-able figure. Mr Tan agreed with this observation. Mr Sutherland noted that as the refund factor gets high, generators would start building the risk margin into the energy price. Mr Gaston agreed that a high refund factor would price capacity out of the energy market.
- Mr Gaston noted that the underlying behaviour that the dynamic refunds regime was striving to correct was generators not coming back online from an outage as soon as possible. He observed that for peaking plants, even a refund factor of one was stringent enough to make them undertake repairs as soon as possible. He noted that baseload generators would be hit even harder when on outage as they would have to cover their energy prices by having to buy at high prices in the Balancing Market. He further added that the proposal did not seem to be having an effect on the incentives for generators to come back online from an outage. The Chair noted that the proposal was not trying to change current incentives; instead it was making the refunds regime more

	<p>reflective of system conditions. He added that it also had the extra benefit of incentivising better performing generation assets.</p> <ul style="list-style-type: none"> • Mr MacLean observed that the question for generators to consider was that if the recycling of refunds was implemented, how the generators would share the money between them. • The Chair asked members if the proposal should be progressed. Mr MacLean noted his objection to the proposal on the grounds that some bilateral contracts that were already in place would need to be re-written. Mr Gaston noted his support for Option C³ as long as the maximum refund factor remained at 6 and did not increase any further. However, he did not agree with the recycling mechanism as he was not convinced as to how this would translate into reduced cost for retailers. Mr Clarke noted his support for the recycling mechanism but added that the sharing of the pool of money between generators and retailers needed to be further clarified. He also noted his support for the option of recycling refunds to generators based on dispatch rather than availability because for System Management, a generator that may be able to start within minutes would be preferable to the one which may take hours. The Chair noted that the recommendations will be put forward to the IMO Board with an acknowledgement of the objections raised by some MAC members. He also added that the recommendations would be developed into rule changes and the rule change process would also offer members time to register their objections. <p><i>Action Item: The IMO to make recommendations to the IMO Board on the dynamic refunds regime whilst acknowledging the objections raised by some MAC members.</i></p>	IMO
6.	<p>AGENDA ITEM 7: Reserve Capacity Price</p> <p>The Chair invited Mr Mike Thomas to make his presentation on the Reserve Capacity Price. The following discussion points were noted:</p> <ul style="list-style-type: none"> • The Chair observed there were a number of factors contributing to excess reserve capacity. The current process was to move incrementally in the direction of incentivising the right outcome in the Reserve Capacity Mechanism. This did not necessarily mean that the excess capacity problem would get fixed or that the Reserve Capacity Mechanism would be shielded from the detrimental effects of other external factors such as commercial and government policy decisions. • Mr Clarke agreed that there was an excess capacity problem and added that the cost-benefit analysis conducted on the Planning Criterion suggesting that the reserve margin could be reduced to 7.6%, further reiterated this problem. Mr Clarke added that the Rule Change Proposal recently submitted to implement the 7.6% reserve margin (RC_2012_21) was a step in the right direction. • Ms Yang noted that the Market Rules allowed for the IMO to hold an auction if the Reserve Capacity Requirement was not met. 	

³ The following options were presented in Mr Thomas's presentation: Option A- IMO's proposal as presented in RDIWG meeting no.11; Option B- IMO's proposal with a minimum refund factor level; Option C- IMO's proposal linked to the Reserve Capacity Price.

The Chair observed that the auction had never taken place since market start. Mr Thomas noted that even if the auction had to happen, the market would have to go through several learning processes to adjust to the mechanism. Ms Yang also queried which one of the three capacity markets (PJM, NYISO and New England) had the most economically efficient auction. Mr Thomas observed that in any auction process, an administrative demand curve had to be instituted to avoid the high volatility in price.

- Mr MacLean opined that the contextual discussion was too little too late. He added that members had missed the opportunity of thinking through the context of the problem and could only just react to the proposals on the table. However, Mr Renaud argued that members had discussed the problem and the proposed solution many times over the past few months.
- Mr Tan noted that the underlying assumption was that generators which were already embedded in the market would hurt themselves and other generators by bringing in new capacity, but new Participants who have had no exposure to the market would not care as to what the price per Capacity Credit was, because they would get that anyway. Mr Cremin counter-argued that the new participant would only enter the market if it was profitable to do so. If the MRCP was also adjusted then the market would not remain that profitable anymore.
- Mr MacLean questioned whether the effect would be exactly the same if instead of the price curve starting at 110% of the MRCP and 97% of the Reserve Capacity Requirement (RCR), it was to simply commence at the intersection of the MRCP and the RCR. Mr Thomas replied that the result would not be the same because 110% was a higher number over the MRCP and strengthened the incentive for retailers to contract for new capacity as supply and demand approached balance. Discussion ensued over how reserve capacity is paid for when there is a shortfall in the market. Ms Yang confirmed that currently there is no price limit on Supplementary Reserve Capacity under the Market Rules.
- Mr Clarke argued that it was not clear why a generator would want to offer a contract to a retailer in the current situation. Mr Renaud suggested that a greater concern for the market should be the cost of excess capacity rather than the quantity. Mr Clarke observed that the cost benefit analysis recently conducted on the Planning Criterion recommending that the reserve margin should be reduced to 7.6% suggested that excess capacity should be zero. Mr Ruthven clarified that the reserve margin was to be used in determining the RCR, whereas the current discussion was considering the price outcomes when the quantity of capacity in the market exceeded the RCR. Mr Stevens added that it was important to note that from a retailer's perspective, the lowest cost for energy was the most beneficial outcome, but from a market's perspective, the matter at hand was how to shape the market so that excess capacity did not cost more. Mr Cremin echoed that point of view and added that the two numbers that were used to shape the capacity mechanism- the RCR and the MRCP were both prone to errors and Mr Thomas's proposal was just one way of sending the market a signal when to bring in or not bring in additional capacity. The Chair added that the market

should not bear the cost of that additional capacity.

- Mr Gaston observed that the Reserve Capacity Mechanism was a prescribed process and was never intended to provide a market based outcome. He added that the MRCP was known two years in advance and that acted as a signal for the market to bring in additional capacity. Discussion ensued among members on what had incentivised excess capacity to enter the market. Mr Cremin was of the view that so much excess would not exist in the current market if the MRCP had not been so volatile. The Chair disagreed with this point of view and observed that decisions around bringing in new capacity were not based on price alone. He added that the market must also be able to guard against a situation of shortfall.
- Mr MacLean observed that the price would be predictable if the IMO was able to reduce volatility in the MRCP and the entry of capacity would become regulated. Further, if the price signal was unable to bring in sufficient capacity, then the Market Rules allowed for an auction process to be carried out. He added that the auction process would be able to bring in excess capacity because it allowed the price to rise up to the MRCP. However, Mr Tan argued that an auction would be unlikely to bring in excess capacity because of the long lead time for a project to be built and ready.
- Discussion ensued on a retailer's desire to contract for capacity under the current mechanism. Mr Thomas argued that under the current mechanism there was very little incentive for a retailer to contract bilaterally for capacity. Mr MacLean observed that contracts were based on the future expectation of price and were forged for many years. As a result, what happened in the short-term would not be a big concern to the retailer. He stressed that the higher price reduction as suggested in Mr Thomas's proposal made the situation uncertain and difficult to contract in. Mr Down observed that the customers who had entered into contracts expecting a fixed price on energy would also be affected by any changes on the price. The Chair observed that parameters such as devaluation of the Australian dollar and the Weighted Average Cost of Capital which are not controllable by the IMO affect the MRCP.
- Mr Tan asked for some clarification on the numbers proposed in Mr Thomas's proposal. He noted his support for the structure and the theories that went behind it, but he was not convinced that the proposed numbers were correct. The Chair observed that if a change in slope were to be considered, it would need to be transitioned through using the IMO's transitional arrangements guidelines.
- The Chair canvassed members' opinions on proceeding further with the recommendations. Mr MacLean noted any change at present time would be too early because the effect of the changes in MRCP and load forecasting capacity still needed to play out. Mr Clarke noted that a case for change sooner rather than later existed because of the presence of excess capacity in the market. Mr Renaud noted that he was generally supportive of the changes as it seemed to be balanced around a reasonable pivot point of 7% excess capacity in the market. Mr Cremin noted

	<p>his view that the MRCP and the sliding scale should be delinked from each other. He supported the idea of implementing the change because it was a suitable way forward without completely changing the market. Ms Lisa Taylor asked if more analysis could be made available before this was progressed to the rule development stage. Mr Gaston did not support the proposal. Dr Gould observed that under the proposed mechanism, prices would rise sending a strong signal to retailers to contract bilaterally.</p> <ul style="list-style-type: none"> • The Chair offered that the IMO would conduct more analysis, including a proposed transition path, and send it via email to gauge MAC members' support. <p><i>Action Item:</i></p> <p><i>The IMO to conduct more analysis on Reserve Capacity Price, including a proposed transition path and send it via email to canvas MAC members' support.</i></p>	IMO
	<p>CLOSED</p> <p>The Chair thanked the members and declared the meeting closed at 5.45 pm.</p>	

Agenda item 4: RCMWG Actions and Decisions Register

Legend:

Shaded	Shaded action points are actions that have been completed since the last RCMWG meeting.
Unshaded	Unshaded action points are still being progressed.

#	Action	Responsibility	Meeting arising	Status/Action
2	The IMO to include information on the cost effectiveness of proposed solutions on harmonisation	IMO	April	This action item will be addressed at the stage of Pre Rule Change Proposal development.
6	The Lantau Group to address the following specific concerns raised by members on the proposed refunds mechanism: The need to renegotiate bilateral contracts The reallocation of money from Market Customers to Market Generators The continued application of costs of Supplementary Reserve Capacity to Market Customers	The Lantau Group	October	Completed. Presented at November meeting
7	The Lantau Group to conduct further analysis on the impacts of the proposed refunds regime on individual Facilities.	The Lantau Group	October	Completed. Presented at November meeting
8	The Lantau Group to examine the effects of the Reserve Capacity Price proposal with the help of some worked examples.	The Lantau Group	October	Completed. Presented at November meeting

#	Action	Responsibility	Meeting arising	Status/Action
9	The IMO to develop a Pre Rule Change Proposal to implement the principle: what was not bought cannot be sold, in the context of linking Relevant Demand and IRCR	IMO	November	This action item will be addressed at the time of developing Pre Rule Change Proposals
10	The IMO to check whether System Management can dispatch DSM for a part of its full quantity	IMO	November	Completed. Clause 7.7.3 specifies that a Dispatch Instruction needs to contain the required level of consumption, placing no restriction on the quantity to be dispatched. The PSOP: Dispatch does not expand on this.
11	The IMO to make recommendations to the IMO Board on the dynamic refunds regime whilst acknowledging the objections raised by some MAC members	IMO	November	Completed. Presented to IMO Board in December 2012
12	The IMO to conduct more analysis on Reserve Capacity price, including a proposed transition path and send it via email to canvass MAC members' support	IMO	November	Completed. Distributed to RCMWG members on 7 December 2012

KEY PROPOSALS THAT WILL PROCEED TO RULE CHANGE PROCESS

A] RESERVE CAPACITY PRICE (WORK STREAM 1)

- Slope of Reserve Capacity Price (RCP) formula to be increased so as to reduce the RCP at a faster rate as excess capacity increases.
- RCP to be allowed to move up to, or above, the MRCP as capacity supply and demand approach balance.
- Maximum Reserve Capacity Price to be renamed an expected or a benchmark Reserve Capacity Price.
- The IMO to recommend to the IMO Board that a set of transitional arrangements be adopted.

B] HARMONISATION OF DEMAND SIDE & SUPPLY SIDE RESOURCES (WORK STREAM 2)

- The IMO to relax its requirement for Facilities to have firm fuel supply contracts in place if the capacity refund mechanism is assessed to provide sufficient commercial incentives for Facilities to be available when required.
- The revised DSM availability requirements for the 2014¹ Reserve Capacity Cycle will be as follows:

Days of Availability	All Business Days
Dispatch events per year	Unlimited
Hours per day	6 hours
Total hours available	Unlimited
Earliest Start	10:00 AM
Latest Finish	8:00 PM
Minimum notice period of dispatch	2 hours + day before notice (best endeavours) of probable dispatch

- All DSPs to provide a telemetry service that enables real time information on availability and performance to be recorded for the 2014² Reserve Capacity Cycle onwards (noting a period of transition to apply for existing DSPs, up to mid-2015)
- Remove the 'third-day rule' from the 2014³ Reserve Capacity Cycle onwards — whereby a DSP dispatched for a third continuous day is not subject to capacity refunds.

¹ The Key Decisions Register in the meeting papers for Meeting 7 of the RCMWG had indicated that these amendments would commence for the 2013 Reserve Capacity Cycle. Amending rules could not be implemented in time for the 2013 Reserve Capacity Cycle but can apply for the following year.

² As above.

³ As above.

- Incorporate into the Market Rules ability for DSP's to be dispatched outside of nominated availability limitations on a best efforts basis (i.e. with no implications for capacity refunds for non-performance).
- The rank-based-on load size rule in the Non-Balancing Dispatch Merit Order be removed and replaced with a ranking based on time since last dispatch.

C] RESERVE CAPACITY REFUNDS (WORK STREAM 3)

- A dynamic Reserve Capacity refund regime be implemented, where the refund factor is determined from the capacity margin available in each Trading Interval.
- Refund factor to be capped at 6, as per current arrangements.
- The IMO to recommend to the IMO Board that a set of transitional arrangements be adopted.

D] INDIVIDUAL RESERVE CAPACITY REQUIREMENT (WORK STREAM 4)

- The selection of IRCR Trading Intervals be modified to select the 4 days of highest peak demand, not highest daily demand.
- The IMO to develop a Rule Change Proposal to implement the principle that a Load may not sell more capacity (through DSM) that it buys (through IRCR).

Agenda Item 5: Reserve Capacity Price

Following discussion on the Reserve Capacity Price (RCP) at Meeting No. 9 held on 22 November 2012, the IMO developed a model comparing the current Reserve Capacity Price (RCP) formula with that recommended by Mr Mike Thomas of The Lantau Group. The model was developed independently of previously developed models, but used the proposed RCP formula developed by The Lantau Group.

The model also included future supply and demand scenarios using updated Maximum Reserve Capacity Price (MRCP) values reflecting the ones used in the MRCP report that was published in January 2013.

The IMO also proposed a three-year transitional arrangement.

The IMO circulated this model via email on 7 December 2012 and canvassed support from RCMWG members. Responses were received from six members.

The following is a summary of responses:

- Dr Steve Gould supported the proposal.
- Mr Jeff Renaud supported the proposal.
- Mr Andrew Stevens specifically supported the proposed slope of -3.75 and uplift in the MRCP at 110%. He also supported the transition arrangements and suggested that he may support a more aggressive implementation schedule if proposed.
- Mr Geoff Gaston did not support the proposal. He proposed that the MRCP uplift should be 120%, slope at -3.25 and a floor on the MRCP at 70%.
- Mr Ben Tan supported the proposal in its structure but noted that the numbers needed more work.
- Mr Brendan Clarke did not support the proposal on the grounds that it did not provide a cost benefit analysis.
- Ms Wendy Ng requested that the timeframe for consultation be extended till the end of January. No further communication was received.

No responses were received from the following members:

- Mr Brad Huppatz
- Mr Andrew Sutherland
- Mr Shane Cremin
- Mr Stephen MacLean
- Mr Geoff Down
- Ms Wana Yang
- Mr Paul Hynch

Subsequently, proposals were presented to the IMO Board in December 2012. The IMO Board has requested the RCMWG members to frame a more specific set of recommendations.

The following paper has been developed by Mr Thomas in response to the Board's request to address any outstanding issues. The IMO's model is included after Mr Thomas' paper.

Memo

To: RCM Working Group

From: Mike Thomas

Date: 22 February 2013

Subject: RCM and Refunds Package

1. OVERVIEW

At the RCM WG meeting in November 2012, we set out our recommended changes to the RCM and the associated Refunds Regime, as discussed and evolved over the course of WG meetings that commenced in February 2012.¹ These changes reflect a number of findings and observations, repeated below in high-level, summary form:

- The RCM has flaws;
 - Does not reflect market conditions;
 - Distorts incentives to invest and contract;
 - Therefore reduces efficiency;

¹ The IMO had completed analysis of a dynamic refund regime proposal in 2011, just ahead of commencing an analysis of the RCM regime. The RCM regime review recommended deferring consideration of the refund regime proposal until it could be harmonised with recommendations related to the RCM regime. As identified at the time, the potential changes to the refund regime would have reduced refund exposure, which would have *increased* the value expected to be recovered by an investor in reserve capacity – the very opposite of what was determined to be the appropriate economic signal at that time. Consequently, the IMO's refund regime recommendations were held in abeyance so as to be considered jointly with recommendations arising from the RCM review.

- The refunds regime also has flaws:
 - Does not reflect market conditions;
 - Is not integrated consistently with the RCM;
 - Therefore reduces efficiency;
- And, finally, that the RCM and refund regime should be viewed as a coherent package.

The RCM regime clearly impacts the value of refund exposure, and vice versa. In particular, new investment will only be economic if the combination of energy revenues plus capacity credit revenues *less* any lost revenue from the refund regime is at least equal to the long-run marginal cost of new capacity.

2. FORMING A COHERENT PACKAGE

The RCM and Refunds Regime establish crucial parameters and mechanisms that, depending on how well they work, can either enhance or impair the competitive processes and pressures of the WEM. The components of a coherent package, covering both the RCM and the associated Refunds Regime, are summarised below:

- Enhanced linkage between the RCP and market conditions;
 - In the form of a more sensitive linkage between changes in the amount of excess reserve capacity and changes in the level of the RCP;
 - This is mainly achieved through the setting of the slope parameter;
- Enhanced linkage between refund exposure and market conditions;
 - In the form of refunds that vary depending on the amount of available reserve capacity;
 - This is mainly achieved through setting of the dynamic refund factors that are based on actual market outcomes;
- Consistent and robust incentives for desirable outcomes;
 - In the form of a more robust and logical nexus between the RCP formulation and the MRCP concept and definition²; and

² This was substantially achieved through the MRCP review that was undertaken and that has occurred separately and independently of this consultation on the RCM itself.

- Align investment incentives with desired capacity resource performance characteristics;
 - This is achieved through the introduction of refund revenue recycling across reserve capacity resource providers, which rewards better performing resources, treats average resources in an average way, and penalises, relatively speaking, less available resources.
 - In addition, recycling prevents value spill over (leakage) arising when refunds are paid to retailers and, thus must, be “offset” by other revenue sources when new capacity resources are required.

Making changes to the Refunds Regime without considering the potential impact on the RCM itself has the potential to be little more than a transfer of value, which, once achieved, locks in positions that must then be reconsidered when evaluating changes to the RCM. Reviewing the RCM and refunds regime as a package avoids this problem.

3. THE ADJUSTMENTS TO THE RCM

Competitive market forces, backstopped by the RCM, ultimately determine the reserve capacity quantity in the WEM. The RCP is determined by an adjustment formula linked, on the one hand, to a robust estimate of the cost of new capacity via the MRCP and, on the other hand, to the level of excess reserve capacity. The MRCP revisions reduced future MRCP values materially relative to those determined for the 2012/13 and 2013/14 capacity years.

The adjustment formula used in the WEM incorporates a slope function, which has been recommended to be changed to “-3.75”, a value significantly steeper than the “-1” value embedded in the current formulation. The recommended “-3.75” value evolved from the previously recommended slope value of “-3.25”, which had been developed to yield a point of equivalence at a given level of excess reserve capacity between the current RCM formula and the modified RCM formula – a value selected to minimise the need for a transition given the already material changes implemented with respect to the MRCP methodology.³ The increase in proposed slope to -3.75 from -3.25 also was advised in the context of introducing recycling within the refunds regime.

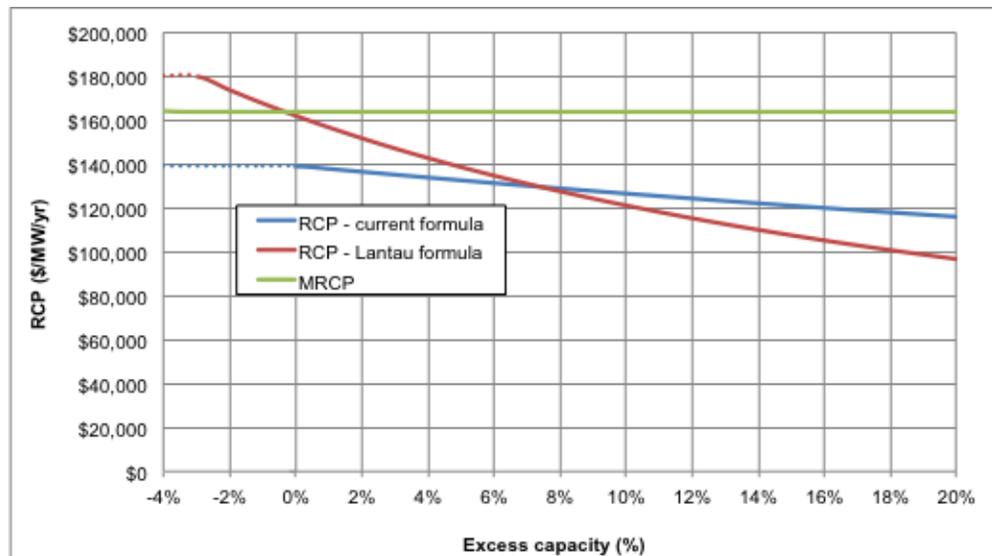
³ It was also noted that given the existence of significant excess reserve capacity the *economic* value of *incremental* reserve capacity can be virtually zero (based on the impact on the LOLP) – a fact that could, in theory, support a far steeper slope function linked to the LOLP. Such extreme steepness, however, would introduce significant and disruptive risk into the WEM, which is already a small market exposed to disruptions caused by lumpy investment and volatile demand growth. It is observed that those capacity markets in other countries that rely more directly on auctions to discover clearing prices have struggled with the “zero/infinity” challenge. In general, these markets have had to resort to various complex and evolving mechanisms to modulate this extreme sensitivity, analogous to the role the slope function plays in the RCM.

4. OTHER ASPECTS OF THE RCP FORMULA

Two other aspects of the RCP formula should be noted. The proposed changes include a provision to allow the RCP to reach a level that is 10 percent *above* than the Benchmark RCP should reserve capacity be only 97 percent or less of the RCR. The selection of 97 percent is reflective of the observation that there exists an approximately three percent forecast error band with respect to demand forecasts made two years forward.

Combining this 97 percent factor, the proposed slope of -3.75 and a maximum RCP of 110% of the BRCP, the RCP would be just below the BRCP at the point of zero excess reserve capacity, as shown in Figure 1.

Figure 1: Proposed Pricing Regime



Source: IMO calculations as distributed to the RCM WG in December 2012

In the event that the amount of excess reserve capacity falls below the RCR, a supplemental auction would be called. Under such situation, any uncontracted capacity credits procured through the IMO would be sold at up to 110% of the RCP, per the formula. By allowing the RCP to increase above the BRCP, it is more certain that capacity resources can be economically developed should such a shortage situation arise. These modifications to the RCM are intended to enhance the RCM as a backstop and as a mechanism capable of reinforcing rather than undermining natural incentives for retailers and capacity resource providers to hedge price-related risks through commercial contracts.

5. WHY RECYCLE REFUNDS TO CAPACITY PROVIDERS?

The payment of refunds to retailers is a feature of the existing refunds regime. While on one hand it might be argued that retailers who pay for capacity credits ought to get their money back if capacity does not perform, this misses the crucial point that it is the overall RCM and not individual reserve capacity resources that is responsible for ensuring adequate capacity. And, to the extent that incentives for availability can be enhanced further, retailers would benefit through the practical existence of a more robust offer curve – a positive force for enhanced competition and market efficiency.

The refunds payable to retailers, however seemingly valuable in the short-term, are of little benefit to retailers in the longer term, as this value leakage must ultimately be offset by either higher energy costs or higher capacity credit values. The commercial rationale to structure the refunds regime as a compensation mechanism for retailers diminishes rapidly once new capacity resources are required.

We therefore advise that the payment of refunds to retailers constitutes a complication and potential distortion to the RCM by virtue of the fact that it results in uncertain revenue “leakage” which detracts from efficient investment signals and represents a highly uncertain revenue stream to retailers with no long-term benefits as a quid pro quo. Instead, we recommend recycling refund revenues within the realm of capacity resource providers so as to sharpen all the relevant incentives associated with maximising the value of existing capacity resources as well as properly incentivising the addition of more available capacity resources to displace less available ones, all in line with the Market Objectives.

With recycling, the value of the RCM is determined clearly and solely by supply and demand conditions each year and by the setting of the MRCP. There is neither value leakage through the refund regime, nor any potentially perverse incentives whereby retailers derive benefit from outcomes that are disadvantageous to the market overall.

An example of a potentially perverse outcome is that of the WA Biomass facility (40MW), which was issued capacity credits, which it ultimately refunded due to being delayed. The impact on retailers was two-fold:

- The additional credits contributed to excess reserve capacity, lowering the RCP at the expense of other capacity resource providers; and
- The refunds that resulted when the facility was delayed then flowed to retailers.

In effect, retailers perversely received a dual benefit from a facility that did not yet operate. Under the recycling-based regime, the initial issuance of capacity credits would have had a similar impact on the RCP, but the deferral of the facility and subsequent refund recycling would have been at least of directionally appropriate recompense to capacity resource providers. While the refunds associated with capacity credits for a 40 MW facility would not have been enough to offset the reduction in the RCP (which would have impacted *all* uncontracted capacity credits), the principle of recycling is inherently more equitable as well as providing a directionally appropriate set of incentives.

With recycling in place, gencos and retailers are free to protect themselves against other commercial risks, such as unexpected non-performance through their commercial contracting and other risk management activities.

6. DYNAMIC REFUND FACTORS

The dynamic refund factor proposal clearly aligns refunds with market conditions much more effectively than do the current fixed, clock-based factors. In the dynamic refund regime presented and discussed at the November 2012 WG meeting, we proposed a maximum refund factor of 6 and a minimum refund factor of 1.

Higher values were discussed but rejected following strenuous stakeholder concerns regarding the impact on financing associated with greatly enhanced refund-related risks. With a maximum refund factor of 6 the economic value of refund exposure is much less than the potential economic detriment associated with unavailability, but an exact matching is not needed to secure a sharper incentive to improve availability during crucial trading intervals.

Over the last three Capacity Years, total refund value has ranged from about 9 to 16 million dollars. These estimates were derived from data provided by the IMO and have considered only refunds related to Forced Outages. As shown in Table 1, the proposed refund regime with dynamic refund factors and a minimum refund factor exposure yields refund exposure similar in magnitude (8 to 18 million) to the current regime, at least over the years shown.

Table 1: Refund Regime Exposure (excluding WA Biomass⁴)

Capacity Year	2009/10	2010/11	2011/12
Capacity Credit (MW) **	5079	5223	5442
MRCP (AUD/MW)	142,200	173,400	164,100
Current Regime			
RCP	108,459	144,235	131,805
Refund (AUD)	9 million	16 million	16 million
Refund as % of total Capacity Credit at RCP	1.70%	2.09%	2.28%
Option B Dynamic Refund Regime (with max refund factor 6 and floor 1)			
RCP	101,464	159,678	135,618
Refund (AUD)	8 million	18 million	12 million
Refund as % of total Capacity Credit at RCP	1.59%	2.22%	1.61%

7. IMPACTS OF THE OVERALL PACKAGE

The changes to the RCM settings produce a benefit to retailers in the near term due to the reduction in the RCP. We estimate an overall reduction in cost to retailers of between 10.4 and 40.5 million depending on whether the amount of excess reserve capacity falls between 9 percent and 15 percent. These values assume a level of 50% bilateral contracting on the basis that additional excess reserve capacity reduces the incentive for retailers to contract with reserve capacity resources directly. At lower levels of bilateral contracting, given such a material amount of excess reserve capacity, the potential savings could be significantly greater.⁵

⁴ While WA Biomass had Forced Outages logged against it even though it was never built, the same was not done for KWINANA_GT2 and KWINANA_GT3 when each was delayed in commissioning at the start of the 2011/12 Capacity Year. For consistency of treatment, WA Biomass has been excluded from the above table.

⁵ We assume bilateral contracts are struck at a price that is equal to 90 percent of the MRCP. We note that under the existing RCM settings there is limited incentive for a retailer to enter into a bilateral contract unless the price offered were somewhat below 85 percent of the MRCP. The values shown, therefore, are potentially conservative.

Table 2: Estimated RCM Value Impact

Capacity (MW)	6000	
MRCP (\$/CC)	163,900	CY2014/15
% Bilaterally contracted	50%	
Bilateral contracts priced at	90%	of MRCP

Excess Capacity	9.00%	12.00%	15.00%
RCP – current (\$/CC)	127,812	124,388	121,143
RCP – proposed (\$/CC)	124,338	115,386	107,636
Costs to Retailers - current (\$)	825,965,780	815,695,179	805,960,435
Costs to Retailers - proposed (\$)	815,543,793	788,686,800	765,437,463
Reduction Value (\$) : (current less proposed)	10,421,987	27,008,379	40,522,972

At lower levels of excess reserve capacity, the incentive to manage risk exposure through bilateral contracting increases. It therefore ceases to make sense to compare scenarios holding the level of bilateral contracting constant. Furthermore, as the amount of reserve capacity reduces below about six percent, the more relevant concerns begin to touch on the question of whether the RCM will properly incentivize new capacity in a timely fashion (given the volatile demand growth that WA is capable of). We would therefore suggest that a focus on refund disposition becomes increasingly irrelevant as the amount of excess reserve capacity reduces.

For example, once new investment is required, retailers no longer gain or lose a net benefit associated with receiving refund revenue. Any increase in refund revenue is potentially at the expense of investment incentives and may be offset by higher energy costs or (in the extreme) reduced reliability. Recycling avoids this problem by ensuring that less reliable capacity pays refunds that ultimately assist the investment case (even if only modestly) of new capacity capable of performing more robustly.

8. SCOPE FOR A TRANSITIONAL IMPLEMENTATION

The proposed changes are sufficient to warrant consideration of a transition programme, though there is no inherent requirement that a transition programme be adopted. In December, the IMO prepared and circulated an analysis of a three-year transition.⁶

From an economic efficiency perspective, the main economic benefits of the proposed changes will start being realised virtually immediately, regardless of whether a transition arrangement is implemented, as stakeholders incorporate the present value impact of the substantially increased sensitivity of RCP values to market conditions into their planning.

⁶ Email 7 December 2012 from Courtney Roberts to the RCM WG conveying a letter from Suzanne Frame and an attached Microsoft Excel workbook.

Note further, that the coherent package to be evaluated comprises changes to the RCM as well as changes to the Refunds Regime. The application of recycling, as discussed further below, naturally offsets some of the revenue loss to capacity resource providers under the more dynamic RCP pricing formula proposed – just as the changes to the RCP formula naturally offsets the revenue loss to retailers associated with the recycling of refund revenues within capacity resource providers.

9. SUMMARY

The overall package of changes is set out below:

- Incorporate dynamic refund factors together with a minimum refund factor;
- Recycle refund revenue to all eligible available capacity;
- Remove the 85 percent discount factor applied to the MRCP;
- Rename the MRCP to the “Benchmark RCP” or “BRCP”, as this properly reflects how the MRCP is calculated currently based on expected costs for a standard capacity resource;
- Set the MRCP (Maximum BRCP) above the BRCP. We have advised a factor of 110% of the BRCP as representing a sufficient uplift as to allow reasonable expectations of being able to earn the BRCP through a combination of contracts and exposure to the RCP formula (which could be below the BRCP any time there is excess reserve capacity).
- Set the MRCP to apply at a point below the RCR such that at 100% of the RCR the RCP equals the BRCP. This change is required by a logical consideration of what the RCP and BRCP are supposed to represent. The expected RCP cannot equal the BRCP if the RCP is only adjustable downward, below the BRCP due to excess reserve capacity. Allowing the RCP to potentially be higher than the BRCP is consistent with the concept of expected value and is logically consistent with the definition and application of the MRCP. Furthermore, this change assists the working of a reserve capacity auction, should it be required, by providing additional headroom.
- Steepen the “slope” term to -3.75, making the RCP formula more responsive to market supply and demand conditions.

APPENDIX A: RCP PROJECTIONS AND TRANSITIONS

[see excel spread sheet as prepared by the IMO and circulated in December 2012]

Courtney Roberts

From: Courtney Roberts
Sent: Friday, 7 December 2012 7:19 AM
To: Market Admin
Subject: Nov RCMWG Action Item: RCP Projections and Transition
Attachments: RCP_projections_and_transitions.xlsx.xlsx

Dear RCMWG Members,

As promised in the final RCM Working Group (RCMWG) meeting on 22 November, the IMO has developed a spreadsheet-based model that compares the current Reserve Capacity Price (RCP) formula with that recommended by Mike Thomas from The Lantau Group. The attached model has been developed from scratch, independently of any models previously developed, but using the proposed RCP formula developed by Mr Thomas.

The spreadsheet also includes scenarios of future supply and demand as presented in the meeting papers for the final RCMWG meeting. Please note that the MRCP values in these scenarios have been updated from 2015/16 onwards to reflect the Draft MRCP Report that has since been published (the value of \$157,500 has been used based on an updated Gamma of 0.25).

The IMO Management intends to recommend to the IMO Board that a three year transition arrangement would apply to this proposal if adopted. The scenarios reflect the price outcomes that would result from the proposed three-year glide path transition, which is proposed to operate as follows:

- 2013/14 and 2014/15 Capacity Years: RCP has already been determined, no change
- 2015/16: current formula applied on the basis that there would be insufficient time to commence a rule change prior to the next Reserve Capacity Cycle
- 2016/17: RCP calculated as $\frac{1}{3}$ * Lantau formula + $\frac{2}{3}$ * current formula
- 2017/18: RCP calculated as $\frac{2}{3}$ * Lantau formula + $\frac{1}{3}$ * current formula
- 2018/19 onwards: Lantau formula applied

This transition would result in the updated formula not taking full effect for 6 years from now. This transition would provide longer-term certainty for investors and a smooth price path during the intervening period.

Given this price formula, it would be appropriate that the price cap for a Reserve Capacity Auction would be 110% of MRCP (or Benchmark RCP under the proposal).

The IMO is seeking confirmation of whether RCMWG members are willing to support the proposal to amend the RCP formula on the basis of the above transition arrangement.

Regards,
Suzanne

Suzanne Frame

Group Manager, Market Development



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Reserve Capacity Price: projections and potential transitions

Kwinana C retires for 2016/17

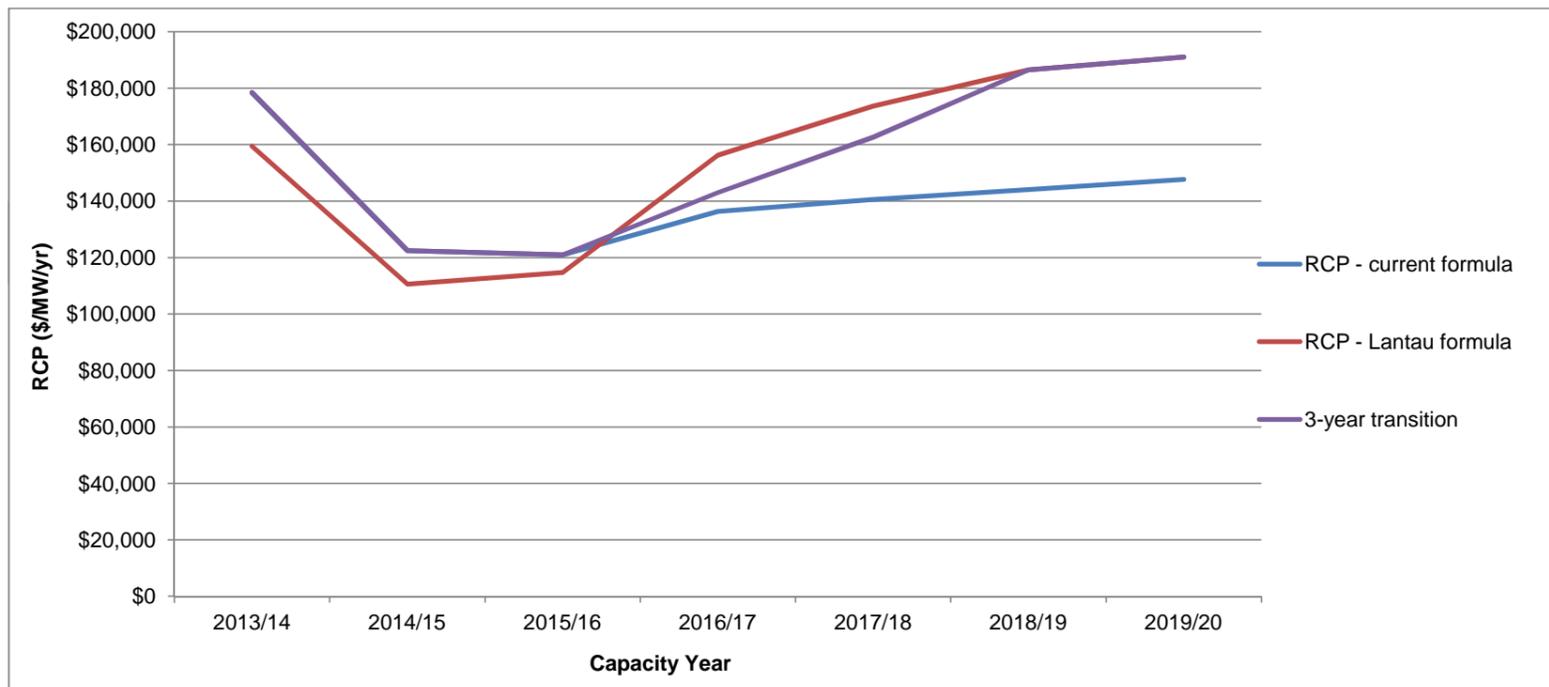
Capacity Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Notes
Actual/projected RCR	5312	5308	5378	5569	5728	5859	6007	From RCMWG papers, Nov 2012, page 95/99
Actual/projected capacity	6086.829	6040.161	5949	5604	5629	5654	5679	From RCMWG papers, Nov 2012, page 95/100
Surplus (MW)	774.829	732.161	571	35	-99	-205	-328	
Surplus (%)	14.6%	13.8%	10.6%	0.6%	-1.7%	-3.5%	-5.5%	
Actual/projected MRCP	\$240,600	\$163,900	\$157,500	\$161,400	\$165,400	\$169,500	\$173,700	Actuals for 13/14 & 14/15; 15/16 from Draft Report with $\gamma=0.25$; indexed at 2.5% thereafter

Note that RCP calculations below assume that administered price applies, even in shortfall

RCP - current formula	\$178,477	\$122,428	\$121,025	\$136,333	\$140,590	\$144,075	\$147,645	RCP (current) = MRCP * 85% * RCR / capacity; capped at 85% of MRCP
RCP - Lantau formula	\$159,483	\$110,624	\$114,686	\$156,276	\$173,659	\$186,450	\$191,070	RCP (Lantau) = MRCP * 110% / (1 - ((Surplus% + (1-97%)) * (-3.75))); capped at 110% of MRCP

Transition path is projected to commence from 2016/17

3-year transition	\$178,477	\$122,428	\$121,025	\$142,981	\$162,636	\$186,450	\$191,070	
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Total capacity costs:

	Percentage bilaterally contracted 70%						
	Bilateral contracts priced at 80% of MRCP						
RCP - current formula	\$1,146,022,128	\$776,235,343	\$740,695,725	\$735,715,269	\$758,794,829	\$781,057,695	\$803,950,475
RCP - Lantau formula	\$1,111,338,299	\$754,845,820	\$729,381,442	\$769,242,914	\$814,638,059	\$852,934,170	\$877,933,647
3-year transition	\$1,146,022,128	\$776,235,343	\$740,695,725	\$746,891,151	\$796,023,649	\$852,934,170	\$877,933,647

Reserve Capacity Price: projections and potential transitions

Kwinana C remains in service

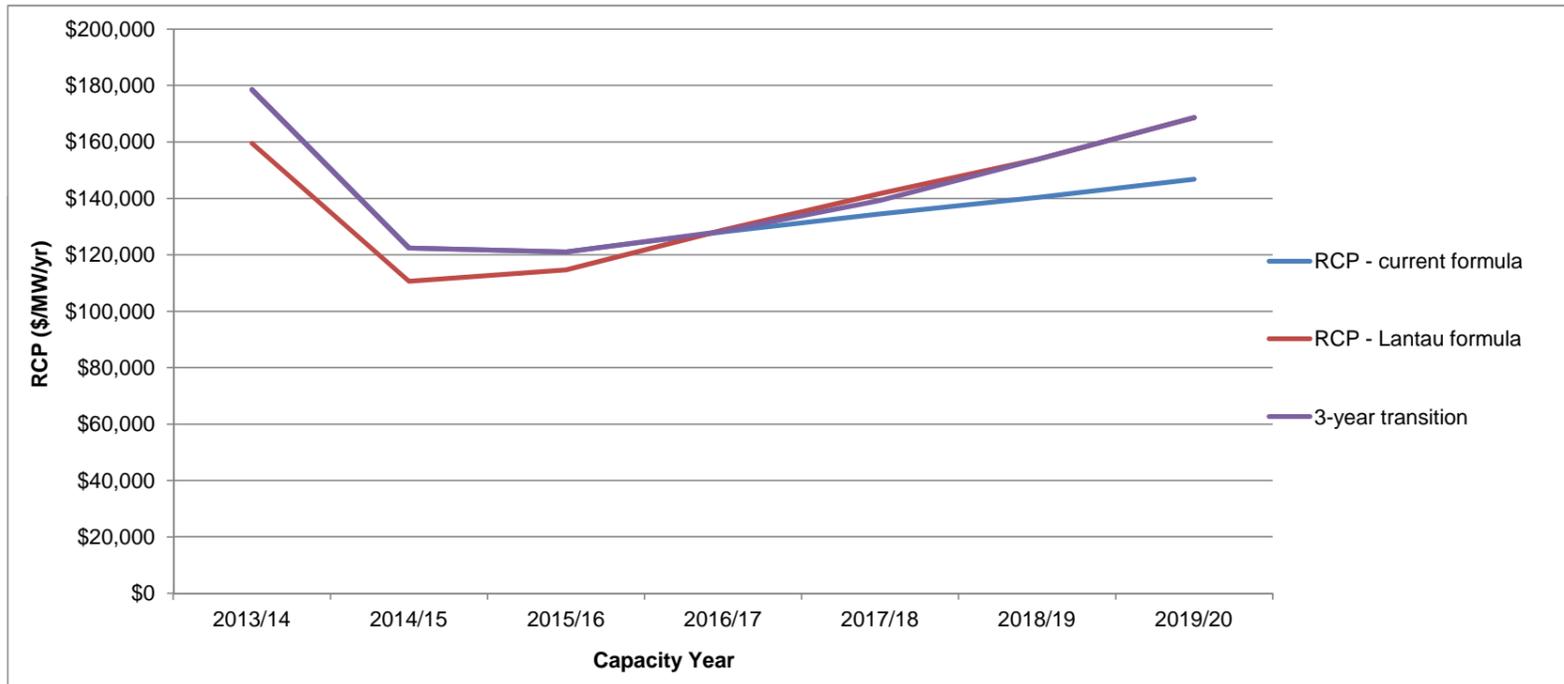
Capacity Year	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	Notes
Actual/projected RCR	5312	5308	5378	5569	5728	5859	6007	From RCMWG papers, Nov 2012, page 95/99
Actual/projected capacity	6086.829	6040.161	5949	5965	5990	6015	6040	From RCMWG papers, Nov 2012, page 95/100
Surplus (MW)	774.829	732.161	571	396	262	156	33	
Surplus (%)	14.6%	13.8%	10.6%	7.1%	4.6%	2.7%	0.5%	
Actual/projected MRCP	\$240,600	\$163,900	\$157,500	\$161,400	\$165,400	\$169,500	\$173,700	Actuals for 13/14 & 14/15; 15/16 from Draft Report with $\gamma=0.25$; indexed at 2.5% thereafter

Note that RCP calculations below assume that administered price applies, even in shortfall

RCP - current formula	\$178,477	\$122,428	\$121,025	\$128,082	\$134,441	\$140,338	\$146,838	RCP (current) = MRCP * 85% * RCR / capacity; capped at 85% of MRCP
RCP - Lantau formula	\$159,483	\$110,624	\$114,686	\$128,731	\$141,695	\$153,793	\$168,626	RCP (Lantau) = MRCP * 110% / (1 - ((Surplus% + (1-97%)) * (-3.75))); capped at 110% of MRCP

Transition path is projected to commence from 2016/17

3-year transition	\$178,477	\$122,428	\$121,025	\$128,299	\$139,277	\$153,793	\$168,626	
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Total capacity costs:

	Percentage bilaterally contracted						
	70%						
	Bilateral contracts priced at		80% of MRCP				
RCP - current formula	\$1,146,022,128	\$776,235,343	\$740,695,725	\$768,343,893	\$796,407,616	\$824,184,428	\$853,593,935
RCP - Lantau formula	\$1,111,338,299	\$754,845,820	\$729,381,442	\$769,504,732	\$809,443,617	\$848,462,690	\$893,072,739
3-year transition	\$1,146,022,128	\$776,235,343	\$740,695,725	\$768,730,839	\$805,098,284	\$848,462,690	\$893,072,739

Reserve Capacity Price: comparison of current and Lantau formulae versus excess capacity

MRCP (\$/MW/yr) \$163,900
 RCR (MW) 5308

RCP (current) = MRCP * 85% * RCR / capacity; capped at 85% of MRCP
 RCP (Lantau) = MRCP * 110% / (1 - ((Surplus% + (1-97%)) * (-3.75))); capped at 110% of MRCP

Percentage excess	MRCP	RCP - current formula	CP - Lantau formula	
-4%	\$163,900	\$139,315	\$180,290	
-3%	\$163,900	\$139,315	\$180,290	
-2%	\$163,900	\$139,315	\$173,773	
-1%	\$163,900	\$139,315	\$167,712	
0%	\$163,900	\$139,315	\$162,058	
1%	\$163,900	\$137,936	\$156,774	
2%	\$163,900	\$136,583	\$151,823	
3%	\$163,900	\$135,257	\$147,176	
4%	\$163,900	\$133,957	\$142,804	
5%	\$163,900	\$132,681	\$138,685	
6%	\$163,900	\$131,429	\$134,796	
7%	\$163,900	\$130,201	\$131,120	
8%	\$163,900	\$128,995	\$127,639	
9%	\$163,900	\$127,812	\$124,338	
10%	\$163,900	\$126,650	\$121,203	
11%	\$163,900	\$125,509	\$118,223	
12%	\$163,900	\$124,388	\$115,386	
13%	\$163,900	\$123,288	\$112,681	
14%	\$163,900	\$122,206	\$110,101	2014/15 EXCESS
15%	\$163,900	\$121,143	\$107,636	
16%	\$163,900	\$120,099	\$105,279	
17%	\$163,900	\$119,073	\$103,023	
18%	\$163,900	\$118,064	\$100,862	
19%	\$163,900	\$117,071	\$98,789	
20%	\$163,900	\$116,096	\$96,800	

