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## Rules Development Implementation Working Group (RDIWG)

### Meeting No. 8: Agenda

**Location:** Level 3, Governor Stirling Tower, 197 St Georges Terrace, Perth

**Date:** Tuesday, 1 February 2011

**Time:** 9.30am – 2.00pm

1. Previous meeting's minutes
2. Balancing Market Proposal:
  - a. Design details;
  - b. High level business requirements;
  - c. System impacts; and
  - d. Initial rule change impacts (for information only).
3. Update on Reserve Capacity Refunds (verbal update only)
4. General Business
5. Outstanding Action items
6. Proposed additional meeting dates
7. Next meeting date and time: Tuesday, 22 February 2011 (9.30am – 2.00pm)

Independent Market Operator

Rules Development Implementation Working Group

**Minutes**

<b>Meeting No.</b>	7
<b>Location:</b>	IMO Board Room Level 3, Governor Stirling Building, 197 St Georges Terrace, Perth
<b>Date:</b>	Tuesday 14 December 2010
<b>Time:</b>	Commencing at 9.33am to 12.36pm

<b>Attendees</b>	
Allan Dawson	IMO (Chair)
John Rhodes	Market Customer
Corey Dykstra	Market Customer
Steve Gould	Market Customer
Patrick Peake	Market Customer
Andrew Everett	Market Generator
Shane Cremin	Market Generator
Andrew Sutherland	Market Generator
Phil Kelloway	System Management
Paul Hynch	Office of Energy
Chris Brown	ERA
Jacinda Papps	Minutes
Jim Truesdale	Presenter
Greg Thorpe	Presenter
Ben Williams	Presenter
Troy Forward	Observer
Douglas Birnie	Observer
Adam Lourey	Observer

<b>Item</b>	<b>Subject</b>	<b>Action</b>
1.	<b>WELCOME AND APOLOGIES / ATTENDANCE</b> The Chair opened the 7th meeting of the Rules Development Implementation Working Group (RDIWG) at 9.33am.  The Chair welcomed Mr Adam Lourey as an observer to the meeting.	
2.	<b>PREVIOUS MEETING'S MINUTES</b> The minutes of RDIWG Meeting No. 6, held on 23 November 2010, were circulated prior to the meeting.	

Item	Subject	Action
	<p>The first bullet point on page 4, section 3 was discussed, with two members raising concerns. It was agreed that the IMO would consider the comments and revert with revisions. The following amendments are suggested:</p> <p><u>Page 4: Section 3: Balancing Provision Options</u></p> <ul style="list-style-type: none"> <li>• The following points were discussed. <ul style="list-style-type: none"> <li>○ Some RDIWG members noted that the approach had limitations and would not deliver equal treatment of Verve Energy and Independent Power Producers (IPPs) with regard to balancing arrangements. However, members <u>also</u> acknowledged the <del>recommendation</del> <u>direction</u> of the Market Advisory Committee (MAC) that initial development work <u>for the Market Evolution Program, including options to increase participation in the provision of balancing services</u>, should assume the retention of the current hybrid market design (with retention of the relationship between System Management and Verve Energy), <del>evolving this design as far as practicable, prior to considering exploration of further market design options.</del></li> </ul> </li> </ul> <p>In addition to this, the following amendments were agreed during the meeting:</p> <p><u>Page 6: Section 4: Ancillary Services Procurement</u></p> <ul style="list-style-type: none"> <li>• It was agreed that the proposals for competitive Balancing and LFAS provision <del>should be developed together as a package</del> <u>should not be developed in isolation</u>, given their interdependencies and the potential IT cost implications.</li> </ul> <p><u>Page 7: Section 6: STEM timing and related issues</u></p> <ul style="list-style-type: none"> <li>• RDIWG members agreed that, <u>based on the information available to them</u>, there would appear to be insufficient benefits <u>compared with costs</u> to warrant a move in the Scheduling Day timeline...</li> </ul> <p><i>Action Point: The IMO to amend the minutes of Meeting No. 6 to reflect the points raised by the RDIWG and publish on the website as final.</i></p>	<p style="text-align: center;"><b>IMO</b></p>
<p style="text-align: center;"><b>3</b></p>	<p><b>RESERVE CAPACITY REFUNDS</b></p> <p>Mr Ben Williams gave a presentation highlighting key aspects of the “Review of Capacity Cost Refunds” paper distributed to RDIWG members in the papers for this meeting. The presentation is attached as Appendix 1.</p> <ul style="list-style-type: none"> <li>• There was general discussion on whether capacity refunds drive maintenance behaviour, with divergent opinions from members. These opinions ranged from refunds not influencing O&amp;M schedules for some participants to refunds, and having to report Forced Outages to member’s Boards, providing strong incentives.</li> <li>• The Chair noted that there has been recent evidence from one market participant where long term maintenance programmes have not been upheld, and that the participant concerned cited</li> </ul>	

Item	Subject	Action
	<p>that refunds drove its rectification programme.</p> <ul style="list-style-type: none"> <li>• There was discussion on the current static determination of risk, i.e. risk is higher in the Hot Season and lower in the Cold Season and overnight. It was noted that actual risk is dependent on not just the seasonal and peak/off-peak factors, but also everything else that is happening on the system at the same time. It was noted that the shoulder periods (or when the factor of 4 is applied) seem to be the periods of greater risk, as reserve is tighter during these times.</li> <li>• The RDIWG discussed what the current maximum factor should be. Opinions on this varied also. Some members considered that the current factor of 6 should be retained (as any increase from this would significantly affect economic profiles of some plants) while other members considered that the maximum factor should increase.</li> <li>• One member noted a concern that the paper did not consider that the factor of 6 is multiplied by the Maximum Reserve Capacity Price (MRCP), a figure that has increased substantially over the past few years. The Chair noted that a paper on the review of the RCM was on the agenda for the December MAC meeting.</li> <li>• The RDIWG discussed whether the paper covered all the issues and noted that: <ul style="list-style-type: none"> <li>○ The delivery risk of new plant is a separate issue and should not be included in the paper; and</li> <li>○ The paper would be expanded to cover the use of a consolidated fund for refunds for the purposes of Supplementary Reserve Capacity.</li> </ul> </li> </ul> <p><i>Action Point: The IMO to expand the Reserve Capacity refunds paper to cover the use of a consolidated fund for refunds for the purposes of Supplementary Reserve Capacity.</i></p> <ul style="list-style-type: none"> <li>• Some members noted that if aging facilities experience increasing Planned Outages, then these facilities should be penalised. The IMO noted that it takes into account Planned Outage rates when determining the amount of certified Reserve Capacity each year, additionally, if fleet performance is low, the IMO can direct a participant to log Forced Outages instead of Planned Outages.</li> <li>• It was noted that currently a facility can be cleared in STEM at below its level of minimum generation, and suggested that, until this issue is resolved, refunds be removed for these instances.</li> <li>• The RDIWG discussed whether there would be any potential for gaming with regard to relaxing the automatic refund regime for minor variations away from resource plans. It was noted that the compliance and monitoring regime will be increased. It was noted that the increased compliance/monitoring regime would amount to an additional 1 – 2 analysts at the IMO.</li> </ul> <p>The RDIWG:</p>	

Item	Subject	Action
	<ul style="list-style-type: none"> <li>• Endorsed, in principle, the amendment of the capacity refund regime to a dynamically calculated refund factor based on actual reserve and a series of breakpoints;</li> <li>• Noted that further work on the maximum refund factor is required, including analysis of refunds versus Forced Outage rates versus deviations;</li> <li>• Endorsed the concept regarding participant's exposure to refunds of moving away from the automatic refunds exposure regime in the market (whereby only material (as opposed to minor) variations away from resource plans would trigger a refund obligation - with the threshold still to be determined). When developing the solution the IMO to give consideration to the issues raised in the meeting, including the: <ul style="list-style-type: none"> <li>○ Operational testing regime and its costs;</li> <li>○ Application of commissioning;</li> <li>○ Application of tolerances; and</li> <li>○ Exposure to declared Forced Outages;</li> </ul> </li> <li>• Noted that further work on the detail of the threshold for calling an operational test and interactions with emerging changes to Balancing and Ancillary Services will be required.</li> </ul>	
4	<p><b>UPDATE ON BALANCING PROPOSAL</b></p> <p>Mr Jim Truesdale outlined that the purpose of the Balancing proposal workshop, to be held after the RDIWG meeting, was to outline the concept in greater detail to participant's operational staff.</p> <p>The following points were discussed/noted:</p> <ul style="list-style-type: none"> <li>• It was questioned why Verve Energy couldn't submit revised portfolio supply curves prior to gate closure. Mr Truesdale noted that Verve Energy gets the benefit of portfolio based bidding, and also noted the information that was presented at the previous RDIWG meeting regarding simple and complex offers. It was agreed that, in principle, Verve Energy could re-submit a portfolio supply curve for a bona fide physical/material event. It was noted that the circumstances in which Verve could resubmit would need to be fleshed out in greater detail, although it would be difficult to quantify a set of circumstances.</li> <li>• It was noted that there are currently two main reasons that the proposal is not recommending full facility based bidding for Verve Energy at present, these being the substantial system and resource changes which would be required to facilitate this.</li> <li>• It was noted that, although no firm decisions had been made, gate closure should be as late as possible to minimise the risk of events happening which may change the balancing outcomes. It was suggested that this gate closure could be a 2 – 3 hours ahead rolling gate closure, given that System Management has some flexibility with Verve Energy plant.</li> </ul>	

Item	Subject	Action
5	<p><b>GENERAL BUSINESS</b></p> <p>There was no general business discussed.</p>	
6	<p><b>OUTSTANDING ACTION POINTS</b></p> <p>The RDIWG discussed the following action points:</p> <ul style="list-style-type: none"> <li>• <b>Item 11:</b> The IMO is currently awaiting information from System Management.</li> <li>• <b>Item 13:</b> The IMO to remove this from the action point list as forecasts will be assessed as part of the Balancing work stream.</li> <li>• <b>Item 19:</b> IMO and System Management to discuss.</li> <li>• <b>Item 24:</b> The IMO to remove this from the action point list.</li> <li>• <b>Item 30:</b> Mr Thorpe and Mr Truesdale have discussed with Verve Energy, the results were reported back as part of the Balancing paper presented at meeting no. 6. Action point complete.</li> <li>• <b>Item 32:</b> Mr Peake outlined the original rationale behind the current weightings used for Capacity Cost Refunds. Action point complete.</li> <li>• <b>Item 37:</b> The IMO to remove this from the action point list.</li> <li>• <b>Item 42:</b> The IMO site visits are underway.</li> <li>• <b>Item 43:</b> The IMO is awaiting its formal accounting advice.</li> <li>• <b>Item 46:</b> The IMO has initiated its work on the high level cost benefit analysis for the proposed Balancing provision solution.</li> <li>• <b>Item 47:</b> It was noted that there will be no Power System Security issues with Verve Energy supplying up to 100MW of Load Following Service after its HEGTs are commissioned. However, there may be an issue if Collgar were to complete its commissioning in the near future. It was noted that Collgar has indicated, on its website, that commissioning will be completed in April 2012.</li> <li>• <b>Item 48:</b> Underway.</li> <li>• <b>Items 51/52:</b> Outstanding.</li> </ul>	
7	<p><b>NEXT MEETING</b></p> <p>It was agreed that the 18 January 2011 meeting be cancelled.</p> <p>Meeting No. 7 will be held on Tuesday 1 February 2011 (9.30am-2.00pm).</p>	
10	<p><b>CLOSED:</b> The Chair declared the meeting closed at 12.36pm.</p>	

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## Agenda Item 2a: Cover Paper Balancing Design Details

### 1. BACKGROUND

The Rules Development Implementation Working Group (RDIWG) Terms of Reference (ToR) define the scope of works of the RDIWG to:

“[include] consideration, assessment, development and post-implementation evaluation of changes to the Market Rules associated with the issues list agreed by the MAC at its 11 August 2010 meeting<sup>1</sup>.”

These issues were grouped into the following areas:

- Balancing mechanism;
- Reserve Capacity Refunds;
- STEM Operation;
- Alignment of Gas and Electricity;
- Other issues relevant to Balancing; and
- Ancillary Services.

At the 23 November and 14 December 2010 RDIWG meetings (meetings 6 and 7 respectively) the IMO presented a high level balancing design proposal which aimed to address some of the key issues identified. The RDIWG agreed the design had merit and should be developed further for RDIWG consideration.

### 2. OVERVIEW

The attached paper, presents a the IMOs further work on a design for a competitive balancing market which addresses the following issues identified in the ToR:

- There is very limited opportunity for participants other than Verve to participate in providing balancing services and this inevitably means the cost of balancing is higher than it needs to be.
- Provisions for Balancing Support Contracts have not been effective to date.
- The calculation of MCAP and the role of UDAP and DDAP mean that balancing prices are not cost reflective and this leads to inefficient incentives for decisions about prices and participation and inequitable financial transfers between participants that compromise the integrity of the WEM.
- Lack of transparency inhibits the ability of Market Participants to optimise interaction in the daily energy market.

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<sup>1</sup> This issues list, grouped in terms of the prioritisation given by the MAC, is attached as appendix 1 to this document.

- The requirement for resource plans to match STEM outcomes may be limiting participation in STEM and/or forcing inefficient dispatch of IPPs and Verve (as balancer) as IPPs attempt to comply with the resultant resource plans.
- Pay as bid pricing for dispatch of IPP plant for balancing (outside a balancing support contract) is incompatible with efficient wider participation in balancing and potentially over compensates IPPs which bid at price caps due to uncertainty of dispatch outcomes.
- There is very limited opportunity for participants other than Verve to participate in providing Ancillary Services. This is due to the lack of certainty surrounding the pricing mechanism and the requirement to provide the service at a discount to Verve. System Management will look to develop a day-ahead procurement mechanism (as agreed at the 16 June 2010 MAC meeting) and present the outcomes of its analysis at the RDIWG.

Specifically, the paper presents a proposal for a balancing market which will increase competition in Balancing and result in a more transparent flow of information. The design details presented will also enable a “clean” balancing price to be calculated and ensure that participants who require balancing energy are exposed to the balancing price of the marginal generator. The design paper also notes expected interactions between the Balancing Market and Load Following Ancillary services market to the extent needed to ensure compatibility. Detailed design of the Load Following Ancillary Services within the framework described will follow.

The paper provides additional detail of the design that was presented to the RDIWG on 14 December 2010 as the basis for discussion by the RDIWG on 1 February. A further document discussing the rationale for the design (incorporating any amendments agreed with the RDIWG) will be presented to the 22 February 2011 RDIWG meeting for endorsement to be sent to the Market Advisory Committee (MAC) as a final concept paper. A formal Rule Change Proposal will then be prepared.

The IMO notes that System Management has not had sufficient time to fully consider the design details paper prior to its release to the RDIWG. Discussions are and will be ongoing with System Management.

### 3. RECOMMENDATIONS

The IMO recommends that the RDIWG:

- **Discuss** the design details presented in the attached paper; and
- **Agree** to provide the IMO/MEP team with comments on the design before February 10 2011 on the attached design details paper;
- **Note** that the IMO will develop a detailed rationale document detailing the design choices and rationale, incorporating RDIWG comments at the 22 February meeting. This document will be used as the basis for the Rule Change proposal which will be presented to the MAC;
- **Note** that further comment will be provided by System Management as appropriate;
- **Endorse** the high level design for the incorporation of a competitive LFAS market; and
- **Note** the IMO will present further LFAS design details as the design evolves.



## APPENDIX 1: SUMMARY OF DESIGN ISSUES/PROBLEMS

### Group 1: Balancing Mechanism

1. There is very limited opportunity for participants other than Verve to participate in providing balancing services and this inevitably means the cost of balancing is higher than it needs to be.
2. Provisions for Balancing Support Contracts have not been effective to date.
3. The calculation of MCAP and the role of UDAP and DDAP mean that balancing prices are not cost reflective and this leads to inefficient incentives for decisions about prices and participation and inequitable financial transfers between participants that compromise the integrity of the WEM.
8. Lack of transparency inhibits the ability of Market Participants to optimise interaction in the daily energy market.

### Group 2: Reserve Capacity Refunds

4. At different times the capacity refund arrangements under and over price the value of capacity leading inefficient decisions by participants about the timing of maintenance and presentation of capacity.

### Group 3: STEM Operation

5. The timing of operation and single pass design of STEM may be limiting the ability of the market to achieve efficient operation and cost reflective prices and accordingly creates a barrier for participation by all parties.
6. The requirement for resource plans to match STEM outcomes may be limiting participation in STEM and/or forcing inefficient dispatch of IPPs and Verve (as balancer) as IPPs attempt to comply with the resultant resource plans.
8. Lack of transparency inhibits the ability of Market Participants to optimise interaction in the daily energy market.

### Group 4: Alignment of Gas and Electricity

7. Poorly aligned gas and electricity mechanisms inhibits flexibility to respond to changing circumstances and produces suboptimal outcomes in the WEM.
8. Lack of transparency inhibits the ability of Market Participants to optimise interaction in the daily energy market.

### Group 5: Other Issues relevant to balancing

Please note: these issues may be addressed in some of the other proposed groups.

9. Provision for net bilateral submissions compromises transparency and the accuracy of future price forecasts and may therefore lead to sub optimal decisions about participation by other Market Participants.
10. Pay as bid pricing for dispatch of IPP plant for balancing (outside a balancing support contract) is incompatible with efficient wider participation in balancing and potentially over compensates IPPs which bid at price caps due to uncertainty of dispatch outcomes.

*An additional design issues/problem for noting (i.e. not part of the initial work of the RDIWG) is:*

There is very limited opportunity for participants other than Verve to participate in providing Ancillary Services. This is due to the lack of certainty surrounding the pricing mechanism and the requirement to provide the service at a discount to Verve. System Management will look to develop a day-ahead procurement mechanism (as agreed at the 16 June 2010 MAC meeting) and present the outcomes of its analysis at the RDIWG.

# New Balancing Market proposal – design details

## 1. INTRODUCTION

This document describes the key design features proposed for revised arrangements for short term operation of the Wholesale Electricity Market (WEM) in a manner that retains the core hybrid framework of the current design. This is where IPPs develop Resource Plans for their own facilities and System Management develops dispatch plans for the Verve Energy (Verve) portfolio. The design expands on the high level concept previously presented to the RDIWG at its 14 December 2010 meeting.

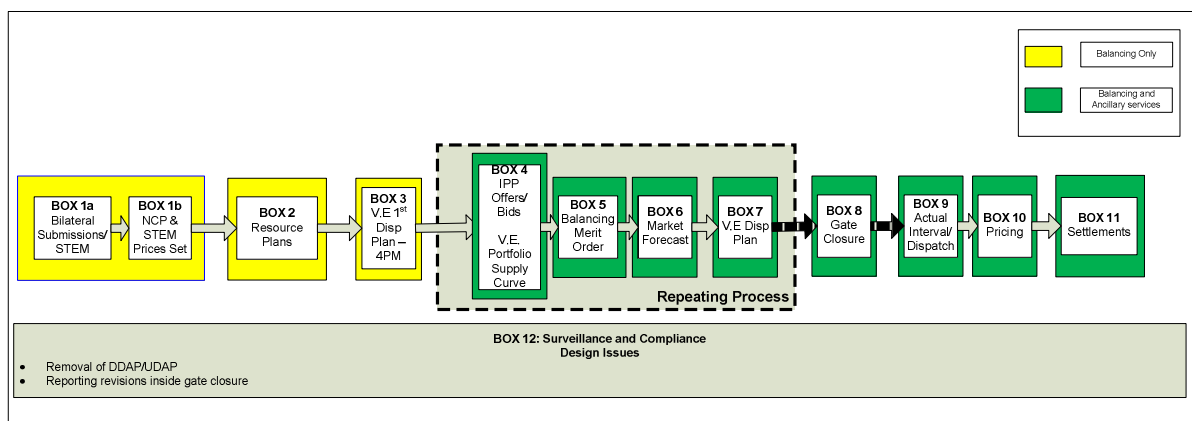
Sections 1 and 2 provide a high level overview (see figure 1). Section 3 provides additional detail of the proposed design in 12 stages.

Appendices A and B provide:

- A more detailed overview showing the roles and responsibilities for each process; and
- an example of the ability of the Balancing design to enable an IPP to de-commit a Facility if appropriate pricing conditions occur.

Finally, appendix C presents a glossary, which outlines the new defined terms that are being proposed in this design paper.

Figure 1: 12 stages of WEM operation



## 2. DESIGN SUMMARY

- The proposal is designed as an enhancement of the current hybrid design where IPPs are dispatched on the basis of Resource Plans and Balancing submissions (offers up/ bids down) around that level and Verve’s portfolio dispatched by System Management on the basis of gross supply offers. The design also allows Verve to submit offers/bids for selected facilities.



- The design will allow for IPPs to participate in Balancing and provide for competitive provision of Ancillary Services.
- Verve will remain the default balancer and default Ancillary Service provider. System Management will continue to provide a dispatch coordination service to Verve and determine the dispatch of Verve's facilities on a portfolio basis in accordance with dispatch guidelines. As system and market conditions change (for example with weather, availability of fuel, capability of unscheduled wind generation) System Management will amend the Verve portfolio dispatch plan (as it does now), including commitment of units to optimise use of those resources whereas IPPs will renominate Balancing bids and offers. Verve will be able to restate its portfolio supply curve following major changes.
- The initial stages of operation of the market are little changed from the status quo (see the sections on bilateral and STEM submissions and operation of STEM – box 1a and 1b from Figure 1).
- Resource plans will be submitted by IPPs (and for any facilities Verve chooses to manage on a Facility basis). Resource plans will be broadly required to match Net Contract Position (NCP) and self-supplied Load (as now) except when the amount of energy (MWh) required by the NCP changes from one interval to the next. In these cases Market Participants will be entitled to elect to include Balancing energy on a planned basis around their Facility MW ramping rates.
- The first significant change to the design will be the introduction of submission of bids/offers for Balancing and Ancillary Service from IPPs and Verve. These submissions will follow the submission of Resource Plans and calculation of the first dispatch plan for Verve plant. IPPs will make these submissions on a Facility basis and Verve on a portfolio basis. The submissions will be for the full or gross potential Balancing range being offered and Ancillary Service capability and note where these might be mutually exclusive (or conditional) (see box 4).
- The market rules will describe the principles for deciding which Balancing offers/ bids and Ancillary Service offers will be selected for service from the conditional gross capabilities submitted (see box 5).
- The Balancing Merit Order (BMO) will be determined from the Balancing submissions taking account of accepted Ancillary Service offers (see box 5).
- IPPs and Verve will have specified rights to update Balancing and Ancillary Services submissions within nominated gate closure times (see box 8).
- System Management will continue to determine the timing of commitment and decommitment of Verve plant (other than facilities Verve has elected to manage outside its portfolio). In the first instance IPPs will manage commitment and decommitment of their facilities, as currently occurs (as expressed in Facility Resource Plans). However the design of the rules around resubmissions and gate closure will facilitate IPP participation in Balancing including decommitment when appropriate (see box 7).



- Non scheduled resources (e.g. wind) may submit an offloading price and will be incorporated in the Balancing Merit Order used by System Management at the time of dispatch.
- System Management will dispatch all plant to meet demand and ensure secure operating conditions are maintained in accordance with the final merit order. The Real Time Balancing Merit Order (RTBMO) is developed by updating the BMO and accounting for operational limitations advised to System Management (see box 9).
- The Balancing price will be determined ex post from the total generation requirements used and the RTBMO used for dispatch – no Upward Deviation Administrative Price (UDAP) or Downward Deviation Administrative Price (DDAP) factors will apply. Constrained on/off payments will be made for Facility offers/bids dispatched at prices inconsistent with their submissions (see box 10).
- System Management will retain wide authority to manage security of operation (see box 9).

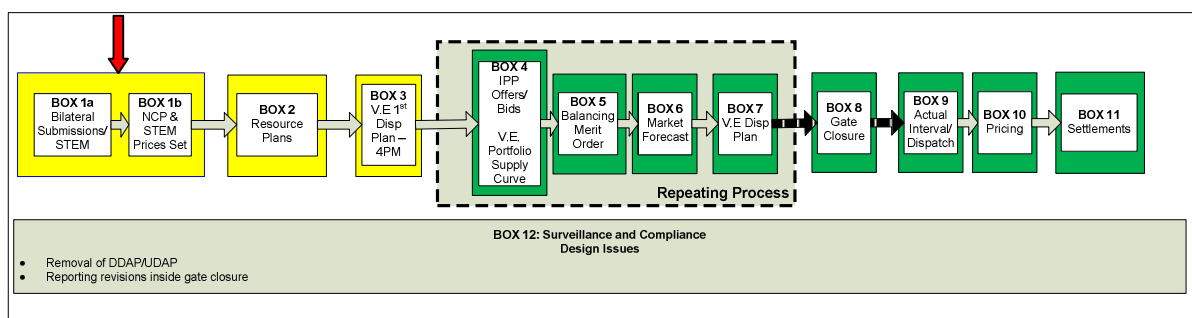
### 3. DETAILED DESIGN

The following pages describe each of the 12 stages in more detail. This current version of the paper provides only dot point summary of design details and later versions will be expanded with greater detail including rationale for design decisions.

#### 3.1 BILATERAL SUBMISSIONS/STEM AND NCP AND STEM PRICES (Box 1)

##### 3.1.1 Purpose:

This section describes the potential impacts on the current STEM process of implementing the new competitive Balancing market.



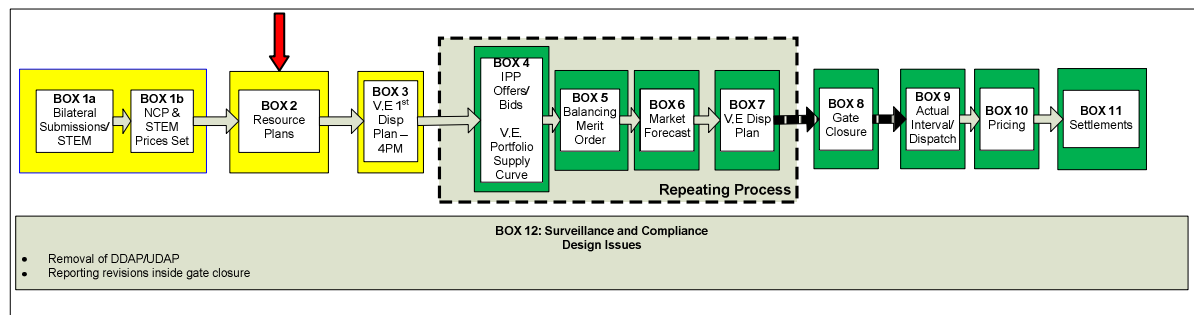
##### 3.1.2 Proposal:

- No Changes to Current STEM process and setting of NCP.

## 3.2 RESOURCE PLANS (Box 2)

### 3.2.1 Purpose:

This section explains the role of Resource Plans (RPs).



### 3.2.2 Background:

Once accepted RPs can be seen as self issued Dispatch Instructions (DIs) that self scheduled facilities need to comply with in order to meet their NCPs and any self supplied load. Proposed RPs must be reviewed and accepted as technically viable by System Management from a system security perspective.

Currently, RPs state the energy (MWh) proposed to be generated in a Facility in each interval and this energy must match the total NCP and self supplied load of the relevant Market Participant.

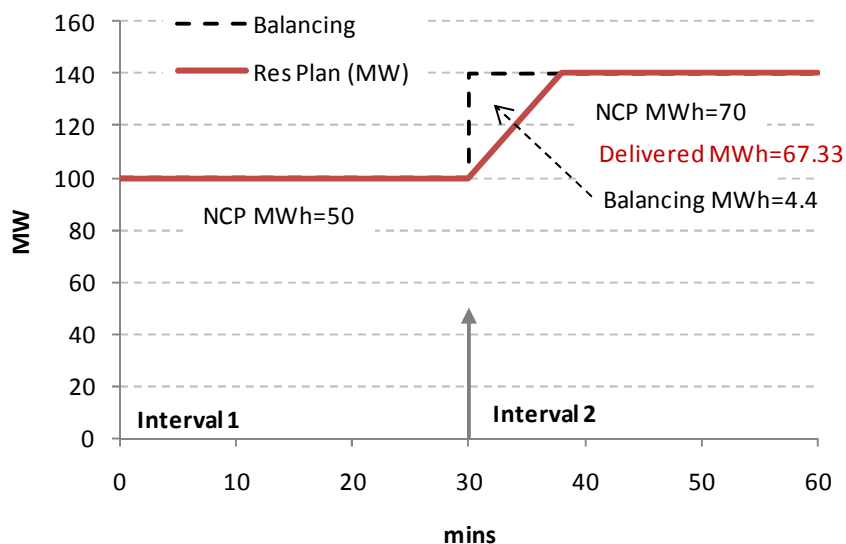
No change to this general principle is proposed, however, the format of the submissions and the stringent requirement for energy within Resource Plans to match NCP when NCP changes, is to be amended.

### 3.2.3 Proposal:

- Resource plans will be required for all IPP scheduled facilities (no change) and any facilities Verve elects to operate on a Facility basis. The sum of Resource Plans submitted by a participant must match the participant's NCP plus self-supplied load except where this quantity is changing from one interval to the next:
- For each dispatch interval, RPs are to specify a MW target (sent out) with a specified ramp rate from a specified time:
  - This will make the format of the implied self dispatch instructions through RPs consistent with the form of System Management dispatch instructions for Balancing in any interval (subject to development of necessary dispatch support tools).
  - Facilities operating to a RP will thus ramp up or down linearly in an interval and will be operating at a nominated level by the end of the interval.



- The RP will form the reference level for Balancing offers/bids.
- System Management will accept/reject RPs in response to inappropriate ramp rates at inappropriate times.
- RPs in each interval from each Market Participant must match the energy (MWh) in the corresponding NCP except when the NCP changes from one interval to the next.
  - When NCP changes from one interval to the next a RP may indicate more or less energy than the relevant NCP providing that the MW dispatch level by the end of the interval aligns with the MW level that would have been required to match the NCP for that interval. This is illustrated in the following example.
  - The RP indicates ramping at 5 MW per minute at the start of interval 2 to a target of 140 MW, equivalent to the MW level implied by the 70 MWh NCP.



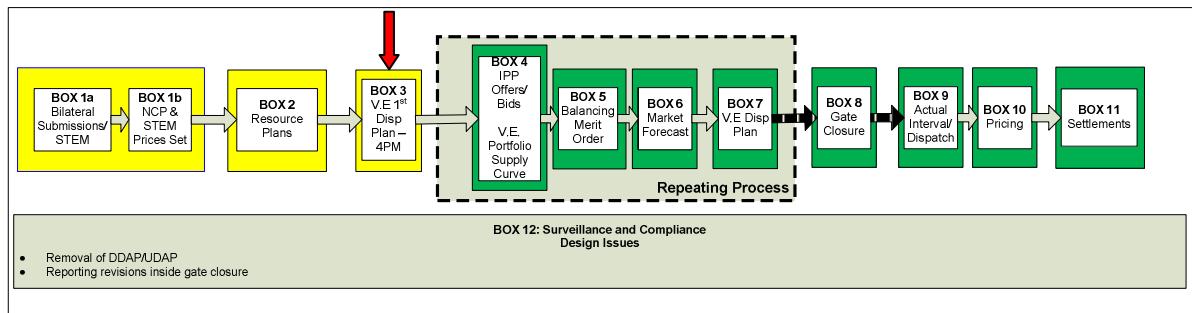
- The above provision is intended to remove the implied need for instantaneous change in dispatch when NCP changes that is required under the status quo. An alternative approach whereby output could rise higher than 70MW and then be reduced for the start of the following interval was considered but is not proposed as it:
  - Unnecessarily complicates the point of reference for System Management to use the Facility to provide Balancing within the interval; and
  - Requires multiple adjustments to operating levels and Balancing on other facilities for no other reason than the account for the half hour settlement of the market.

Note: RPs will contain sufficient information for half hour market processes and will not need to account for the level of Balancing or Ancillary Services that may be accepted by System Management. Bids and offers for Balancing and Ancillary Services will be submitted relative to the RPs. Renominations and operational protocols will provide for System Management to receive all information needed for secure operation of the power system through the Real Time Balancing Merit Order (RTBMO) and within half hour operational details e.g. short term interactions between Resource Plan ramping and Balancing capability (for additional information see Box 9).

### 3.3 VERVE ENERGY 1<sup>ST</sup> DISPATCH PLAN (Box 3)

#### 3.3.1 Purpose:

This section explains the role of the first System Management created Verve Energy Dispatch Plan in the context of the implementation of the competitive Balancing market.



The Verve Energy Dispatch Plan is a service provided for Verve by System Management under the hybrid market design. System Management reviews and updates the dispatch plan as and when circumstances require.

#### 3.3.2 Proposal:

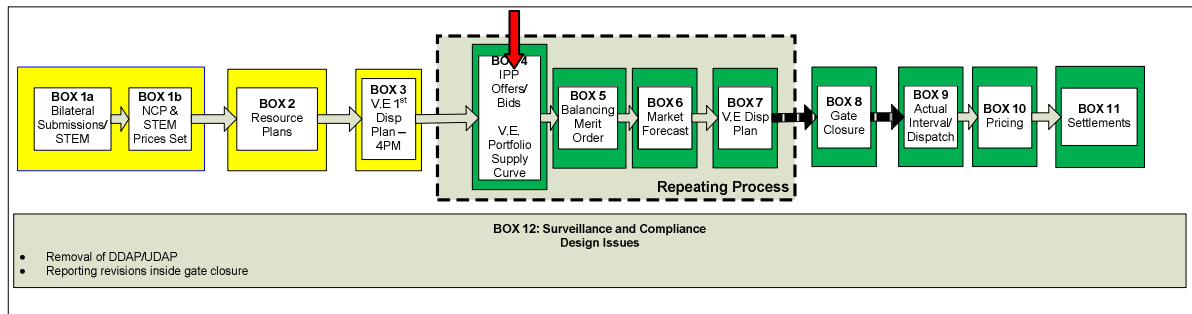
- The Market Rules will require System Management to provide dispatch plans in accordance with the Verve Dispatch Guidelines. As a minimum System Management must provide Verve an initial dispatch plan before Verve is required to submit Balancing offers/bids.
- The Rules will also need to ensure that System Management has the necessary information to account for expected IPP/Verve standalone Facility generation in preparing the Verve dispatch plan (e.g. refer forecasting box 6).

### 3.4 BALANCING OFFERS/BIDS AND VERVE ENERGY PORTFOLIO SUPPLY CURVE AND LOAD FOLLOWING ANCILLARY SERVICE OFFERS (Box 4)

#### 3.4.1 Purpose:

This section explains how bids and offers will be formulated for Balancing and Load Following Ancillary Services (LFAS) from both IPPs and Verve Energy in the context of the implementation of the competitive Balancing market. Given that VE will remain the default balancer.





### 3.4.2 Proposal:

#### Form of bids and offers

- Initial bids/offers for Balancing and Ancillary Services to be submitted by Verve and IPPs at (say 4pm to 5pm).
- As a minimum, Verve will be required to submit a portfolio supply curve for each trading interval comprising multiple pairs of sent out MW and price per MWh for its available capacity.
- Verve will be able to submit bids/offers the same as IPP facilities if Verve chooses to separate out a Facility (or facilities) from its portfolio (and reduce capacity offered in its portfolio accordingly). IPP (and Verve stand alone facilities) bids/offers on a Facility basis stating MW range, price:
  - IPPs *must* submit a price for dispatch above Resource Plan up to the full capacity of each Facility (no change from current).
  - IPPs *may* divide the capacity between Resource Plan and full capacity into up to [5] bands – these will form the basis for upward Balancing tranches in the Balancing merit order.
  - IPPs must submit a price for dispatch below Resource Plan including for decommitment (no change from current arrangement for a price within standing data for emergency de-commitment).
  - IPPs *may* divide the capacity below Resource Plan into up to [5] bands. These will form the basis for downward Balancing tranches in the merit order. Strongly negative prices would be expected below minimum load of generators seeking to avoid decommitment.

All capacity expected to be available from a Facility must be included in bids/offers

- Intermittent and non scheduled resources that can only control reduction in output will be able to provide a price for Balancing down. – System Management will dispatch these resources down to the extent of prevailing output at the submitted price (e.g. wind facilities might submit a bid (unspecified quantity) at –ve \$40 and System Management



will dispatch the prevailing output down if the price would otherwise fall below -ve \$40. Also see boxes 5, 6 and 9).

### **Ancillary Service offers:**

Registered (technically pre qualified) LFAS providers may submit:

- an enablement price (\$/MW),
- upward capability (MW),
- downward capability (MW); and
- Steady State Ancillary Service Base point (SSASB) a pre loading quiescent operating level (MW). The SSASB will reflect the any pre loading required when no Ancillary Service is being called on (e.g. system frequency at 50Hz) but is needed in order for the relevant Facility to be capable of providing the service such as part loading of gas turbines.

### **Joint Balancing and Ancillary Service Conditions:**

Offers to provide Balancing and Ancillary Services will be presumed to be mutually exclusive and that Market Participants will be indifferent about which (if either) service is accepted based on the prices submitted. This will mean that a Balancing offer for +/- 30MW and LFAS offer of +/- 20MW can be made for a Facility with a capacity of 200MW providing the Resource Plan is for no more than 170MW. Market systems will determine which combination of Balancing and LFAS it is appropriate to accept at the time of dispatch e.g. 30MW Balancing with 0MW LFAS or 10MW Balancing and 20MW upward LFAS. Final selection will be made by System Management on the basis of data available just prior to time of dispatch.

### **Resubmissions:**

In order to ensure System Management is presented with accurate information about the quantity available from each Facility and to ensure the prices for dispatch of Verve and IPP resources reflect changes in costs across each day:

- Verve will be eligible to re-submit its Portfolio Supply Curve at yet to be defined set gate closure times and/or when material/ demonstrable changes to the assumptions underpinning the Portfolio Supply Curve that effect the tranches submitted (further work required to define conditions and compliance implications).
- IPPs and Verve (in respect of resources it elects to submit on a Facility basis) may re-submit up to specified rolling gate closure times (see box 8).

### **Assessment of conditional Balancing and Ancillary Service offers:**

The objective of the assessment is to determine as close to optimum mix of Balancing and Ancillary Service providers at any given time.



In principle the selection process should account for enablement costs, any SSASB and the resultant Balancing costs and may for example see more expensive Ancillary Services selected to allow cheaper Balancing at an overall lower cost than selecting Ancillary Service only on the enablement cost for Ancillary Service.

Ideally, selections would be based on a full co-optimisation analysis of Balancing and Ancillary Services. A move to full co-optimisation would be a complexity not warranted at such an early stage of an Ancillary Service market. As such approximate or rules based approaches will be needed (Note: the design allows for future development of a more complex selection criteria if needed).

Subject to further refinement before operation under new rules commences, the initial selection procedure will involve:

- A LFAS merit order established by System Management [4] times per day and as appropriate at the discretion of System Management following material changes in operating conditions; and
- The LFAS merit order to be based on minimising the cost of LFAS enablement payment and estimates of the average constrained on/off payments for any SSASB for the relevant period the merit order applies for (e.g. 6 hours). Enablement payments will be specified in Market Participants submissions and constrained on/off payments will be the difference between the market Balancing price and the price for Balancing submitted by the Market Participant. Initially the LFAS merit order will not normally be reviewed in the event of Balancing resubmissions other than at the [4] specified review times.

The procedure recognises that if all Resource Plans and demand forecasts are accurate and system frequency is steady at 50Hz then no Balancing and no LFAS will be dispatched. In this circumstance if no pre loading is required Balancing costs will be zero and unaffected by enablement of facilities to provide LFAS. The only cost relevant to selecting which Facility to provide LFAS will be the LFAS enablement charge.

In the case where a Facility can only provide LFAS if it is pre loaded to a SSASB, the BMO will be adjusted (see Box 5). The LFAS provider will then be entitled to receive a constrained on/off payment and different sources of Balancing will be required. The procedure requires an estimate of the average constrained on/off payment which will be based on the forecast average Balancing price (from the amended BMO). The use of average prices over a number of hours, the normal fluctuations in demand and intermittent generation as well as changes to Balancing submissions will mean that the Balancing price in this calculation will often differ from the final price meaning that there is a risk that when assessed after-the-fact the order in which LFAS was called will be inefficient. Monitoring of the market should include an assessment of the level of inefficiency as one factor in considering the benefit of refinement of the procedure.

Additionally there will be a mechanism within the Market Rules that will require selection to be on the most efficient basis that is practicable in accordance with available decision support tools and a procedure to be developed by the IMO. The selection methodology can be reviewed periodically (potentially each 6 months in consultation with Market Participants). This approach will establish the principle in the Market Rules but allow progressive improvement on a procedural basis

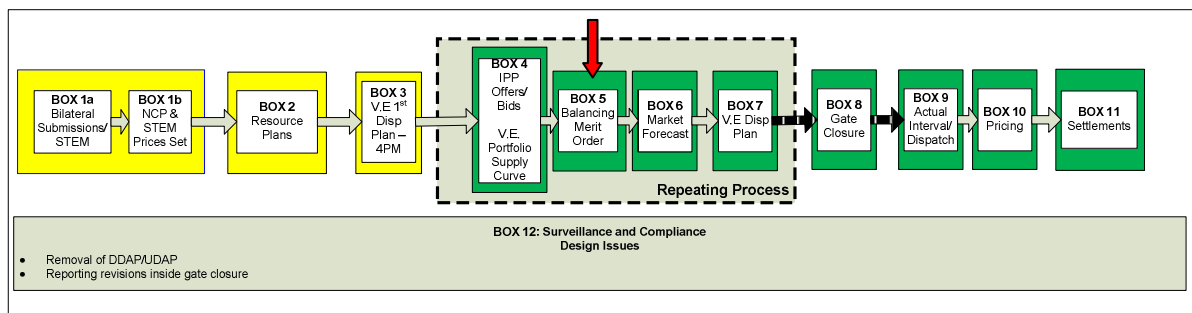
### 3.4.3 Further work:

- Conditions such as the notice period and any opportunity Verve should have to take a Facility back into its portfolio require further work (lack of flexibility may be a barrier to transfer and too much flexibility will add to the operation burden of System Management and IMO software);
- What conditions should Verve be eligible to renominate it's Portfolio Supply Curve; and
- To ensure that the most competitive outcomes are achieved, define a pathway for Verve to participate in the Balancing market on a Facility only basis.

## 3.5 BALANCING MERIT ORDER (Box 5)

### 3.5.1 Purpose:

This section explains how the Balancing Merit Order described above will be constructed.



### 3.5.2 Proposal:

- A Market BMO and a Real Time BMO (RTBMO) will be developed. The Market BMO will be based on submissions made prior to a defined period before trading the relevant interval (e.g. Facility gate closure). At that time, the Market BMO will become the RTBMO. The RTBMO will continue to be updated as circumstances change and submissions need to be updated (for example, due to a Facility failure) and will be used by System Management for dispatch. Pricing will be based on the final Real Time BMO for each trading interval.
- The BMO for each trading interval will be created by inserting Facility Balancing submission quantities (IPP or standalone Verve facilities) into the Verve Portfolio Supply Curve (Portfolio Supply Curve) in price order. For Facility offers/ bids, maximum Facility ramp up and down rates will also be identified in the BMO.
- Unscheduled / intermittent generation will be included in the BMO based on respective Balancing price submissions and forecast Facility quantities. Inclusion in the RTBMO will be based on their Balancing price submissions and the prevailing capability, which will be available for dispatch by System Management.



- The BMO/RTBMO may also incorporate curtailable, dispatchable and interruptible load so that they can be dispatched downwards in accordance with Balancing price submissions.
- Offers or bids with identical prices will be identified/linked in the BMO/ RTBMO. Their treatment in forecasting and dispatch is discussed later.
- Note that it will not be practical to identify Verve liquids facilities specifically within the BMO/RTBMO unless Verve submits them for Balancing on a Facility basis. i.e. quantity/price pairs within Verve's Portfolio Supply Curve are not linked to individual facilities. Discussed further in relation to dispatch.

### **3.5.3 Further work:**

- Review impact on mechanics of Intermittent Loads in the BMO.
- Incorporating curtailable, dispatchable and interruptible load into the BMO.

### **3.5.4 Example:**

Consider the following (stylised) scenario with Verve and 2 IPP facilities. For now it is assumed that Verve submits a Portfolio Supply Curve for its entire portfolio (i.e. Verve does not present any standalone Facility based submissions). It is also assumed that there is no curtailable load or unscheduled/ intermittent generation.



Verve Submission		
Tranche	MW	\$/MWh
14	50	\$420
13	400	\$276
12	200	\$60
11	80	\$40
10	300	\$35
9	60	\$30
8	20	\$25
7	20	\$5
6	100	\$0
5	40	-\$3
4	80	-\$5
3	150	-\$30
2	200	-\$50
1	360	-\$275

Tot Capacity 2,060

IPP1 Facility Submission (Resource Plan = 50 MW <sup>1</sup> )		
Parameter	MW	\$/MWh
Up 1	10	\$50
Down 1	15	\$10
Down 2	25	-\$275

Total Capacity 50

	MW/min up	MW/min down
Max Facility ramp rate	2	2

IPP1 submitted a Balancing bid for some of the capacity below its Resource Plan at a very low price. That capacity would not be dispatched down and/or off unless System Management has no other options available within the RTBMO for normal Balancing purposes, creating an overall security of supply situation, or has to dispatch the Facility down for a localised security of supply situation.

<sup>1</sup> Resource plans will be in the form of ramp rate and MW target as discussed earlier (Box 2). This is ignored here for simplicity but will need to be taken into account in forming dispatch instructions (Box 9). For example, if a Balancing offer is to be dispatched and the Facility will already be ramping in accordance with its Resource Plan.



IPP2 Facility Submission (Resource Plan = 100 MW <sup>2</sup> )		
Parameter	MW	\$/MWh
Up 1	50	\$70
Down 1	50	\$30
Down 2	50	-\$275
Total Capacity		150
	MW/min up	MW/min down
Max Facility ramp rate	3	3

Also assume that a wind farm has bid in to be dispatched down for negative \$40 per MW and the participant has forecast that the Facility will be operating at 50 MW for the duration of the interval.

Submissions would be aggregated into a market BMO for System Management purposes along the following lines. (In practice, the BMO would also identify any identically priced offers and for Facility submissions maximum ramp up and down rates).

ID	MW Range	
	From	To
VE PSC	1,610	2,060
IPP2	100	150
VE PSC	1,410	1,610
IPP1	40	50
VE PSC	1,030	1,410
IPP2	50	100
VE PSC	950	1,030
IPP1	25	40
VE PSC	560	950
<b>Wind1 Down</b>	50	0
VE PSC	360	560
VE PSC	0	360
IPP2	0	50
IPP1	0	25

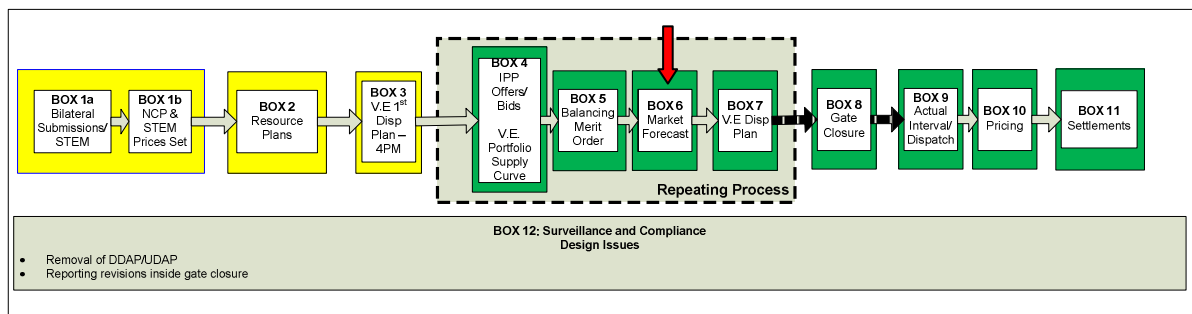
<sup>2</sup> Resource plans will be in the form of ramp rate and MW target as discussed earlier. This is ignored here for simplicity but will need to be accounted for in formulating dispatch instructions.

Information in resubmissions would be used to update the BMO and the RTBMO. Accepted Ancillary Service offers that require pre loading away from Resource Plan in the case of IPPs or Verve where a defined MW quantity is required will be reflected in the BMO as appropriate – for example where partial loading is required on a Facility that would not otherwise be operating would be seen as an increase in the capacity at the bottom of the BMO/RTBMO. Similarly if acceptance of an Ancillary Service offer that was conditionally linked to Balancing and will reduce the amount available for Balancing then the capacity at the bottom of the BMO/RTBMO will increase and the relevant Balancing tranche decrease.

### 3.6 MARKET FORECAST (Box 6)

#### 3.6.1 Purpose:

This section describes the market forecasts that are envisaged.



#### 3.6.2 Proposal:

- Market Participants will be provided with regular (rolling) forecasts of the Balancing price and also their expected Balancing quantity to help them to make informed bids and offers, and prepare for any likely dispatch. Forecasts will extend over the period for which Balancing submissions apply. i.e. forecasts issued today before initial bids and offers for the following trading are due (say prior to 4pm) will cover trading intervals out to 8am tomorrow. Forecasts issued after that time, will cover trading intervals out to 8am the day after.
- The forecasts are especially important in relation to Market Participants decisions about commitment, de-commitment and management of constrained fuel supplies etc and resubmissions to give effect to these decisions.
- It is proposed that the following forecasts will be provided at regular intervals leading into gate closure:
  - Expected system generation requirement (to all Market Participants);
  - Expected overall Balancing quantity (to all Market Participants);
  - Expected overall wind/ non scheduled load and curtailment (to all Market Participants)
  - Expected Balancing price (to all Market Participants); and





- Expected Facility Balancing quantities (to relevant Market Participant only) including identification of any security constrained requirements.
- From the market BMO and forecast total generation requirements, taking account of forecast unscheduled generation, a market forecasting model will determine expected dispatch quantities for facilities (IPP and Verve standalone) and Verve's portfolio and expected Balancing prices.
- The initial forecasts for a trading day will effectively be a system generation schedule covering the rest of the current trading day out to the end of the following trading day. System Management will review this information and advise the IMO of any constraints that need to be applied to generation within the schedule (for example due to a local transmission outage/ constraint). The IMO will incorporate this information into subsequent forecasts.
- System Management will use forecast dispatch quantities for Verve's Portfolio Supply Curve and IPPs (Resource Plans +/- expected dispatch of Balancing offers/ bids) in preparing and updating the Verve dispatch plan.
- The above procedure will continue to be carried out each time a bid/offer is updated by an IPP (or Verve Portfolio Supply Curve updates are allowed) with new forecasts being provided to market at regular intervals. It may also be practical to re-issue forecasts whenever there is a change to input forecasts.
- Forecasts will continue to be provided after gate closure so that IPPs can be prepared for any likely Dispatch Instructions which they might receive.

Appendix A includes an overview of the above processes.

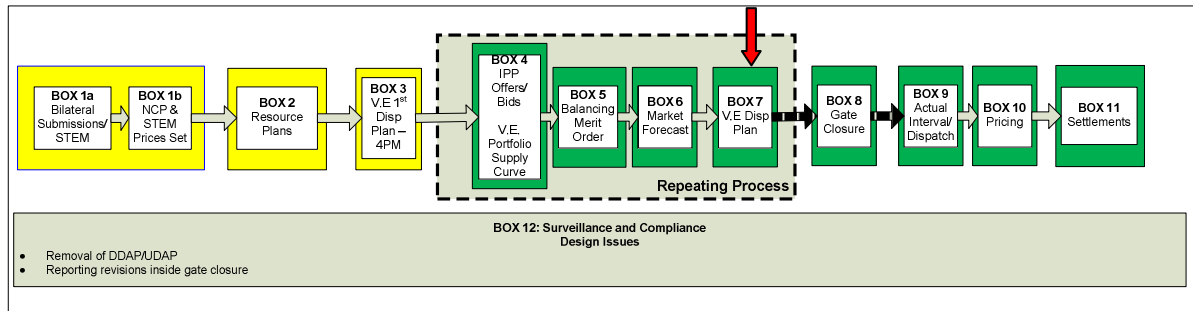
### **3.6.3 Further Work:**

- Should high/low forecasts be provided so that IPPs can see if they are close to a price collapse?
- Discussion with System Management re new systems it may require to support forecasting processes. e.g. more real time load forecasting and/or wind forecasting tools?

## **3.7 VERVE ENERGY DISPATCH PLAN (Box 7)**

### **3.7.1 Purpose:**

This section explains the ongoing need for System Management to re-calculate the Verve Energy DP over the scheduling day to account for forecasted IPP Balancing Bids/offers.

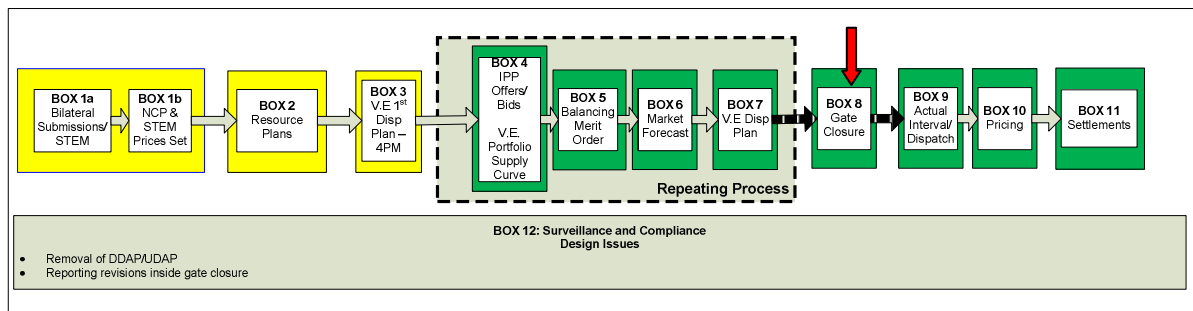


The Verve dispatch plan is prepared by System Management as a service to Verve within the hybrid design and reviewed as needed. In updating the Verve dispatch plan, System Management is in effect undertaking a review and revisions to Balancing bids/offers for facilities within the Verve Portfolio Supply Curve leading up to resubmissions (subject to Portfolio Supply Curve gate closure).

### 3.8 GATE CLOSURE (Box 8)

#### 3.8.1 Purpose:

This section explains gate closure or the time up to which Market Participants may resubmit specified market information and offers/bids.



#### 3.8.2 Proposal:

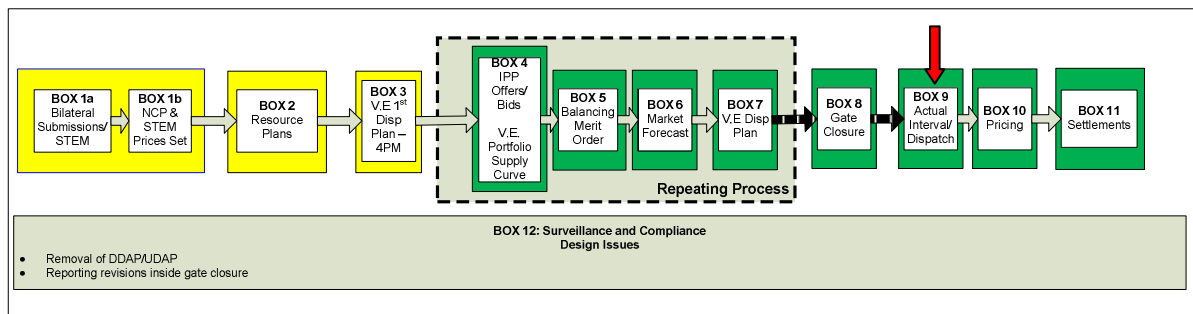
- At fixed gate closure times and/ or when a major change in circumstances occurs, such as a Facility failure or having to switch a Facility from gas to liquids Verve may update its portfolio supply curve.
- Up to a normal rolling gate closure, say 2 hours, ahead of dispatch intervals IPPs (and Verve for standalone facilities) may resubmit Facility bids and offers for Balancing/Ancillary Services relative to their Resource Plan.
- Normal Facility gate closure requirements may be relaxed if System Management issues a system security advisory indicating a supply shortfall forecast or a supply excess forecast. In these cases Market Participants would be able to increase their offered quantities inside the normal gate closure period in response to a System Management supply shortfall advisory. Market Participants would be able to increase bid quantities (e.g. to effect a de-commitment) within the normal gate closure if System Management has issued a supply excess advisory notice.

- Once normal gate closure has occurred, changes to the BMO/RTBMO will still be required (eg for bona fide physical changes to offers/ bids, responses to security advisories, actual wind generation levels etc). The RTBMO used by System Management for dispatch will be the ‘final BMO for pricing purposes.

### 3.9 GATE CLOSURE (Box 9)

#### 3.9.1 Purpose:

This section explains how the Balancing market structures outlined above would be implemented. It will explain Dispatch Instructions leading into a half hour period, real time management of load over the half hour and the role of LFAS within the new Balancing Market.



#### 3.9.2 Background:

Instantaneous supply must match instantaneous demand using production under Resource Plans, non-scheduled generation, Balancing service and Ancillary Services.

The Balancing service follows the expected trend during the half hourly dispatch interval in the difference between Resource Plans and the net of total demand, non scheduled resources and steady state requirements of plant providing Ancillary Services<sup>3</sup>. The load following Ancillary Service tracks the instantaneous difference between demand, including losses, and all other production. This principle is unchanged from the status quo.

Instructions to deliver Balancing (Balancing dispatch instructions or Balancing DIs) will be formulated just prior to the start of each half hour in accordance with the RTBMO to ramp to specified MW targets at specified ramp rates at (or from) a specified time within the interval.

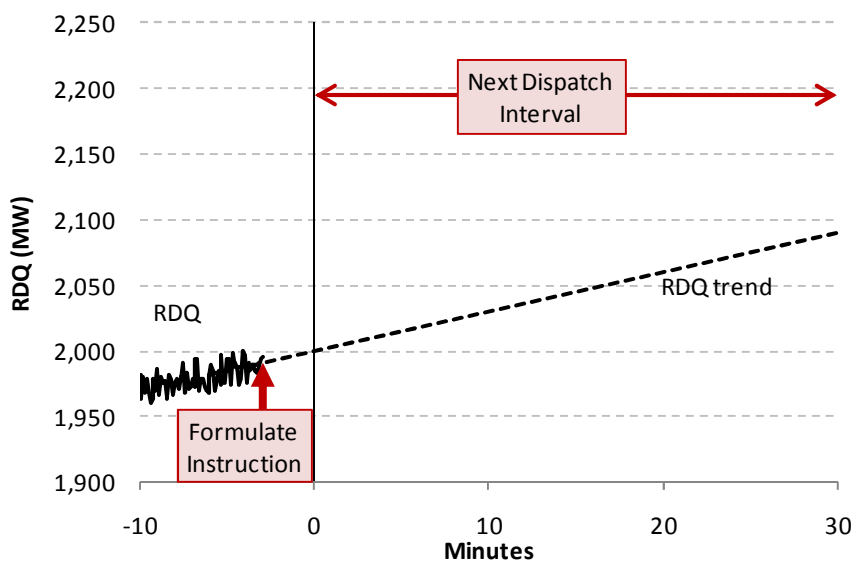
The primary objective of dispatch is to maintain security and minimise the cost of dispatch.

#### 3.9.3 Proposal:

- System Management will use the RTBMO to formulate Balancing DIs.

<sup>3</sup> See previous discussion on requirements to provide Ancillary Service Ancillary Services.

- If the facilities providing LFAS are to change, relevant LFAS providers would be instructed to enable/disable the service and System Management would bring the relevant facilities into/out of the AGC system.
- Prior to a dispatch interval, System Management will estimate the underlying MW trend in total generation requirements during the next dispatch interval.
  - This quantity is called Relevant Dispatch Quantity (RDQ) for the remainder of this paper.



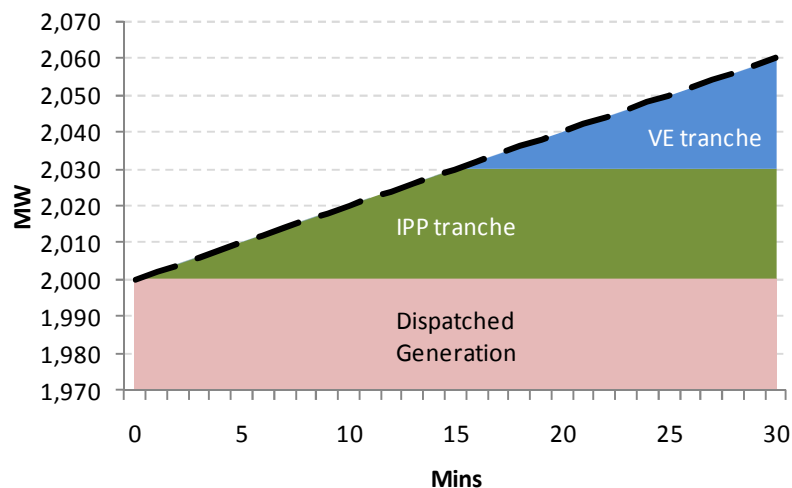
- System Management will formulate Balancing DIs in accordance with the RTBMO so as to meet the expected RDQ with the objective of minimising the cost of dispatch. System Management will need to develop systems to formulate Balancing DIs. Where a Facility is selected for LFAS, AGC capability will be required and any conjoint Balancing DI would be issued via AGC. For facilities not selected for LFAS, systems will be required for System Management to issue and for Market Participants to receive Balancing Dispatch Instructions.
- System Management will have overriding authority to intervene in order to maintain security but will be expected to follow market based processes where feasible.
- System Management would continue to monitor security and Facility responses to Balancing dispatch instructions during an interval and would issue new instructions if required.

#### Format of Dispatch Instructions:

- A Balancing DI is an instruction to a Facility to change output:
  - For an IPP or Verve standalone Facility, an instruction is relative to RP (assumed to be zero if no Resource Plan submitted).



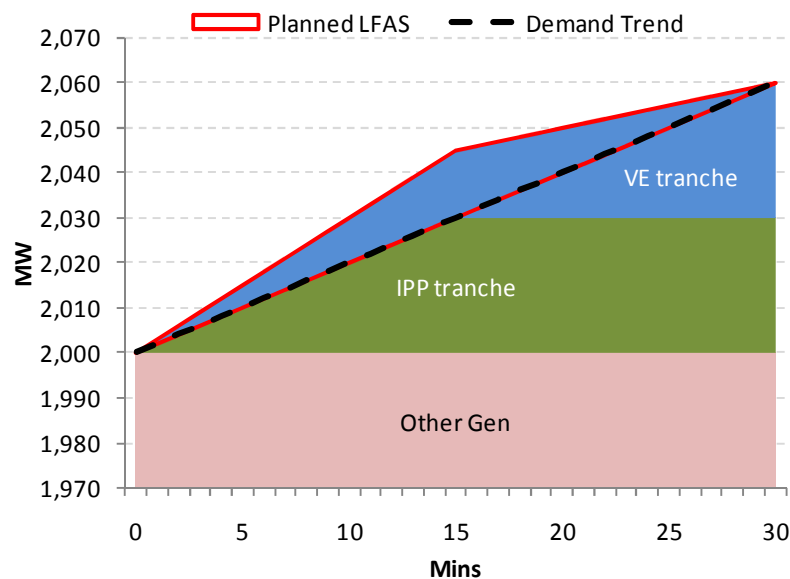
- For Verve’s portfolio, System Management will issue instructions to facilities to adjust their gross output so that the portfolio is dispatched to meet RTBMO requirements.
- A Balancing DI is an instruction to change output once and in one direction:
  - System Management will typically issue one only ramp rate and MW target to a Facility just before a trading interval (with LFAS compensating for residual imbalances within the trading interval).
  - If necessary, System Management may need to issue new instructions within a trading interval (for example, to maintain LFAS services within their offered MW regulation ranges or to address unexpected system events within a dispatch interval).
- Subject to the above, Balancing DIs will typically be issued prior to an interval and consist of:
  - A MW target;
  - A ramp rate (less than or equal to specified maximum Facility ramp up/down rates); and
  - A time to start ramping (to distinguish clearly between the Balancing and LFAS roles, under normal circumstances this time will be no later than say 15 minutes (to be confirmed) into the interval).
- These concepts are illustrated below:



- In the example shown, an IPP Facility Balancing offer is able to be dispatched at less than its specified maximum ramping rate to follow the expected trend in RDQ (the dashed line). This minimises the use of the higher priced Verve tranche.

**Planned LFAS:**

- A consequence of the above methodology is that where it is necessary to dispatch multiple offer/ bid tranches in a dispatch interval, they could be instructed to ramp up linearly to an end of interval target as illustrated below.
- As illustrated, this implies a certain level of LFAS is in effect planned (aside from variations from trend) during dispatch intervals – which is called “planned LFAS” in the remainder of the paper.



**Practical dispatch considerations:**

- It is important to recognise that Balancing DIs will be based on market parameters which do not account for all factors that affect operation of a generating Facility within a half hour. For example; to reflect automatic governor response to system frequency changes; having to put equipment in/out of service while ramping (such as coal mills, feed pumps etc); block loading/ ramping/ hold requirements when bringing a Facility into service etc; or Facility problems/ delayed start-ups etc. As a result Balancing DIs are incapable of defining sub half hour production requirements precisely. Dispatch via AGC will reduce some of the sources of imprecision but not all and is not mandatory in order for a Facility to contribute to Balancing.
- To the extent practical, offers/ bids should take all relevant factors into account (being reasonable estimates of the capability of a Facility if dispatched) and Market Participants will be expected to follow instructions to the extent practical. Consistent and material deviations from instructions developed in accordance with bids/offers would be a compliance matter. Deviations from instructed DIs are to some extent inevitable and need to be viewed in the context that half hourly dispatch in any event is inherently imprecise, being based on estimates of trends in demand and intermittent supply during a dispatch interval, and made prior to the interval.

While System Management is entitled to rely on instructions being implemented in accordance with offers through the market over a half hour, Market Participants will also be required to inform System Management of all relevant limitations on response to DIs. This will enable System Management to determine dispatch of Balancing and Ancillary Services across the power system as a whole.

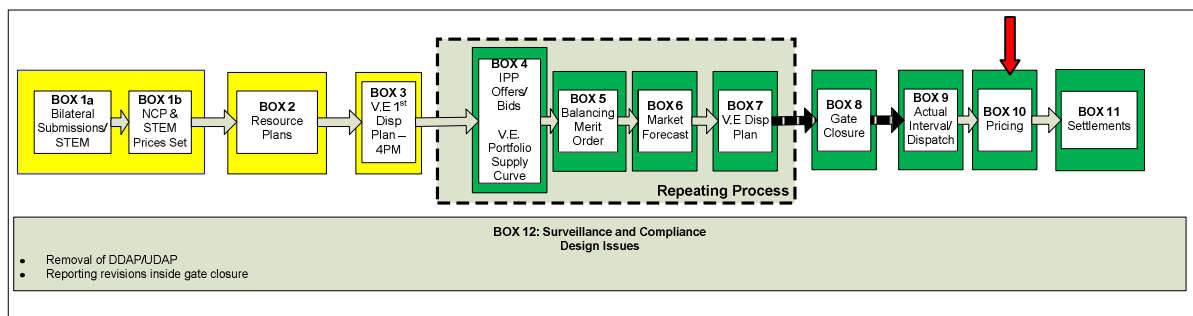
**Outstanding issues:**

- As noted above, System Management will require decision support software that incorporates the above rules with the total generation forecasts and the RTBMO. For example, to manage the potential of multiple tranches being dispatched in an interval, including one ramping down while another ramps up, to help determine the appropriate start times, targets and ramp rates for Facility instructions (taking into account Resource Plans where a Facility is already ramping to a MW target during the interval).
- Verve liquid facilities: Verve will be able to separate dual fuelled facilities from its portfolio submission, with associated resubmission flexibility up to gate closure. Verve will also be able to update Facility submissions if a material change in circumstances criterion is met (need to define). The alternative of requiring System Management to dispatch IPP submissions ahead of Verve liquid facilities (as now) and adjusting the RTBMO is could be considered further but is problematic given that the Verve Portfolio Supply Curve is not Facility specific.

**3.10 PRICING (Box 10)**

**3.10.1 Purpose:**

This section describes the calculation of prices within the short term operation of the WEM



**Balancing Price:**

Objective: Balancing price to reflect price of resources dispatched by System Management to provide actual Balancing from IPP and any Verve Facility prices and Verve Portfolio Supply Curve prices

**3.10.2 Proposal:**

- The Balancing price is to be calculated ex post based on the intersection of the Energy Relevant Dispatch Quantity (ERDQ) and the RTBMO expressed in form of tranches of Balancing energy (Energy Equivalent RTMBO) available for dispatch in half hour.

- The amount of energy able to have been dispatched in a particular interval will be determined with reference to its maximum ramp rate and actual MW (SCADA) at the start of the interval.

Constrained on/off payments will be made to participants dispatched by System Management where the price of the bid or offer dispatched is inconsistent with the Balancing price. This is discussed under Settlements.

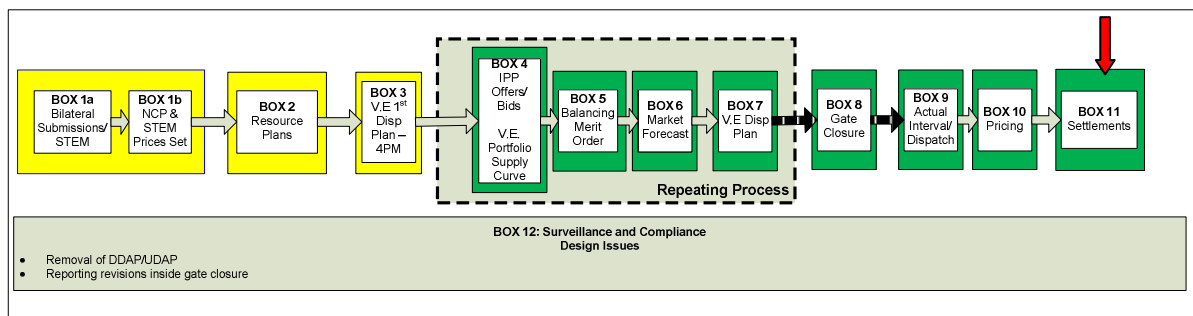
**3.10.3 Further work:**

The inclusion of load curtailment in the ERDQ.

**3.11 SETTLEMENTS (Box 11)**

**3.11.1 Purpose:**

This section describes the primary settlement transactions.



In principle settlement transactions are unchanged from the current market in that

Parties providing Balancing up are paid the Balancing price and parties Balancing down pay the Balancing price.

New transactions are to be created in relation to constrained on/off payments where payments at the Balancing price are inconsistent with participant offers. (For system security constrained on/off situations, the net result will effectively be the same under the current pay as bid constrained on/off regime).

**Principle:**

- A market transaction will exist whenever metered half hour (hh) dispatch differs from hh NCP (no change).
- A market transaction will have occurred when an IPP Facility or Verve standalone Facility output is increased or decreased from Resource Plan or when Verve’s portfolio is dispatched above or below residual NCP (i.e. NCP less any Verve standalone Facility Resource Plans) as a result of:
  - An instruction from System Management for Balancing.





- An instruction from System Management to load to a specified level, the SSASB, (consistent with the offer from the market participant in order to be capable of providing Ancillary Service (e.g. part loading for LFAS). See also constrained on/off payment).
- Automatic response from individual plant providing Ancillary Service.
- All market transactions will be paid at the Balancing price.
- Under defined circumstances a constrained on/off payment will also be made (discussed below).
- Parties selected to provide Ancillary Service will also receive an enablement payment in accordance with the design of the particular Ancillary Service.
- Market Participants dispatched by System Management to operate at an SSASB that is different to their Resource Plan will be entitled to be paid a constrained on/off payment (as appropriate) in addition to payment for the market transaction at the Balancing price as noted above.
  - Note: dispatch of energy as part of the delivery of an Ancillary Service around a relevant SSASB will not attract a constrained on/off payment (any cost impacts will be presumed to be reflected in the enablement fee submitted by the Market Participant)
- Windfarms will receive payment for being dispatched down based on difference between actual output and ex-post estimate of actual output possible during the interval

**Settlement of constrained on/ off amounts:**

Objective: To recompense Market Participants where the price of a Facility Balancing offer or bid dispatched by System Management is inconsistent with the calculated Balancing price.

- A Facility dispatched by System Management above (below) its Resource Plan will pay the market Balancing price for the quantity involved (normal settlement of Balancing amounts). Constrained on or off payments may also be required to compensate for differences between the Balancing price and the price of offers or bid tranches dispatched by System Management.
- For example, suppose the Balancing price is determined to be \$15 per MWh. An Market Participant that was dispatched down below its Resource Plan by System Management had a bid price of \$10 per MWh, would have expected to pay that amount, not \$15/MWh. So the Market Participant would receive a ‘constrained off’ compensation payment of \$5/MW to compensate for the difference.
- This holds for negative priced bids as well. For example, had the Balancing price been negative \$20 per MWh and the Market Participant’s bid price negative \$15 per MWh, the IPP would have paid negative \$20 per MWh (i.e. received \$20/MWh) but expected to have paid negative \$15 per MWh (i.e. receive \$15 per MWh) for the quantity of

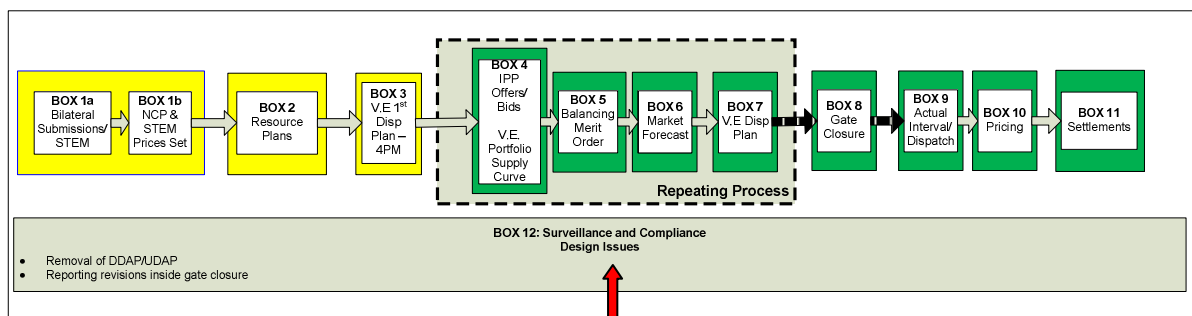
downwards Balancing it provided. In this instance, compensation would be paid at negative \$5 per MWh (the Market Participant would receive \$5 per MWh) for the quantity of downwards Balancing it was instructed to provide).

- The constrained off (or on) event may have been because of a system security situation<sup>4</sup> (in effect as now) or (a new requirement) due to approximations that must be made in formulating dispatch instructions to follow expected trends in dispatch intervals and in calculating half hourly Balancing prices ex post.

### 3.12 MARKET POWER, SURVEILLANCE AND COMPLIANCE (Box 12)

#### 3.12.1 Purpose:

This section explains the expanded role of surveillance and compliance monitoring in the context of the new competitive Balancing Market.



#### 3.12.2 Background:

Market power can have a positive or negative impact on market outcomes. The ability to exercise market power detrimentally to the objective of the market is common in many electricity markets. On the other hand the threat or actual exercise of temporary or market power can be a key incentive for competitors to enter a market or reduce costs. Detrimental market power can be managed by careful design of the market to incentivise participants to bid at SRMC and/or including provisions such as the requirement in the WEM for parties with market power to bid at SRMC, by countering the effects through contracts and also by ex post penalties or threats of penalty.

Monitoring and surveillance of a market can be used to identify both the exercise of market power and compliance with market rules. Compliance with market rules is important for the orderly conduct of an electricity market especially where coordination of operation must occur in very short timescale. Compliance is also important where rules have been designed to manage market power.

This section briefly notes the impact on market power, surveillance and compliance of the package of changes proposed in this document.

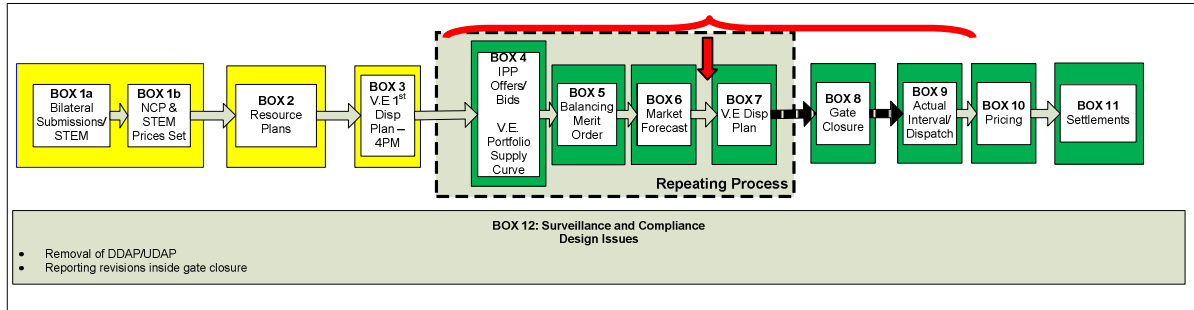
<sup>4</sup> The WEM currently provides for as bid payments for security constrained dispatch of IPP facilities. Going forward, that will still be the case  $Q_{dispatch} * PriceAsBid$  (now) is same as  $Q_{dispatch} * Price_{Balancing} + Q_{dispatch} * (Price_{Balancing} - Price_{bid})$



- Compliance with formation of Resource Plans given that UDAP and DDAP penalties are proposed to be removed and the requirement is to be relaxed when NCP changes;
- Surveillance of the basis for renominations – given the proposal to allow renominations under some circumstances such as following material change and for bona fide physical reasons specially within gate closure periods;
- Compliance with Balancing instructions;
- Compliance with provision of Ancillary Services;
- Level and reason for constrained on/off payments (to assist future development);
- Ancillary service offer prices; and
- If appropriate - Operational definition of market power and existing requirement for SRMC prices in bids/offers.

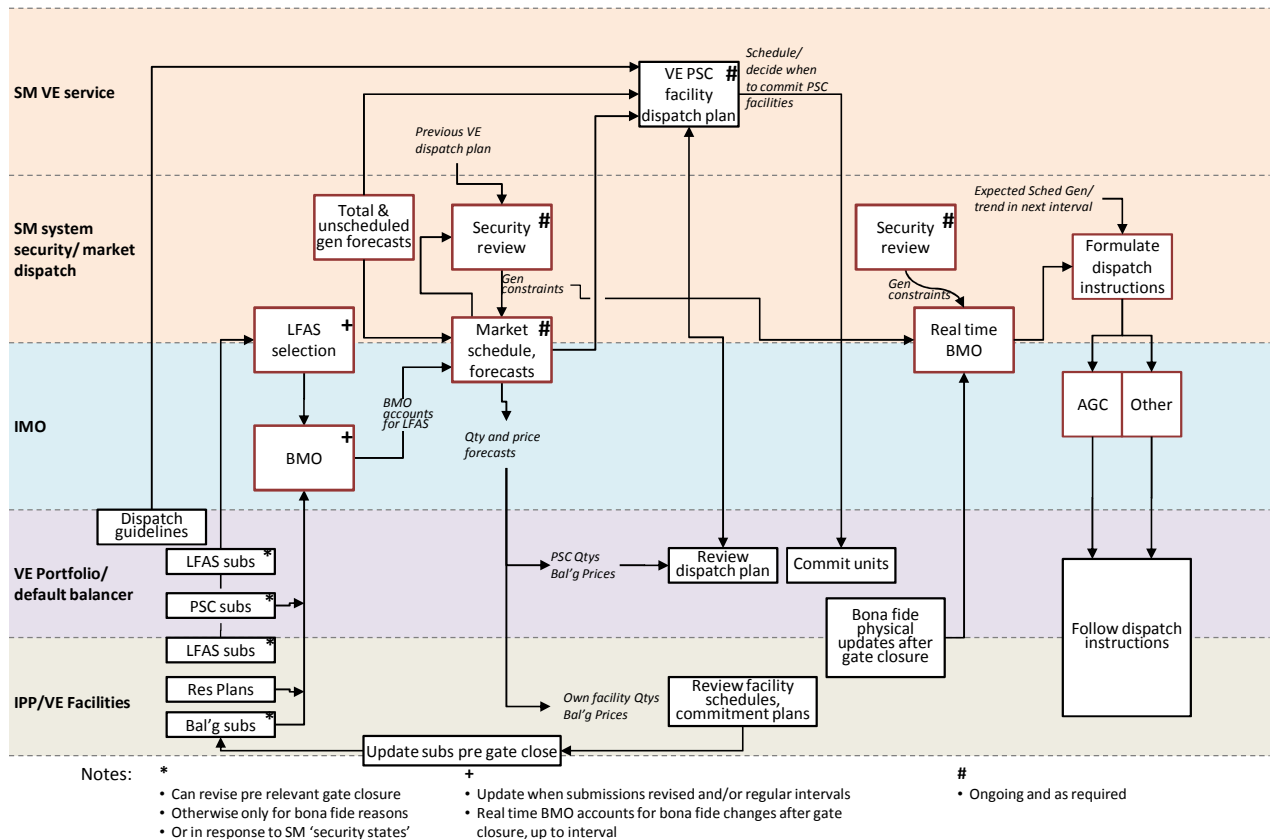


## APPENDIX A: PROCESS, ROLES AND RESPONSIBILITIES



The following diagram illustrates the processes (including where process are repeated over the course of a day) and the roles and responsibilities within the proposed design described in the 12 stages.

## Overview of Market Processes



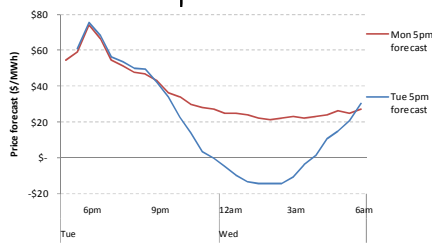


## APPENDIX B: OVERNIGHT EXAMPLE

### Overnight example

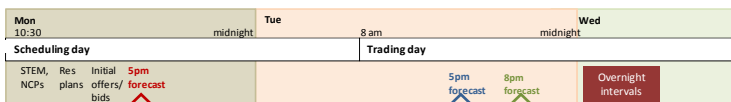


- Initial 5pm market forecast (scheduling day) indicates overnight prices of around \$20/MWh
  - Issued 30+ hours ahead of overnight intervals
  - Issued several hours after NCPs established, resource plans submitted
- 5 pm forecast (trading day) indicates lower overnight prices
  - e.g. lower demand/ higher wind than forecast 24 hours beforehand
  - 7-8 hours before overnight intervals\*

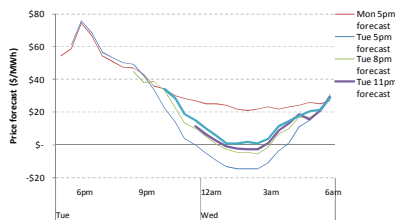
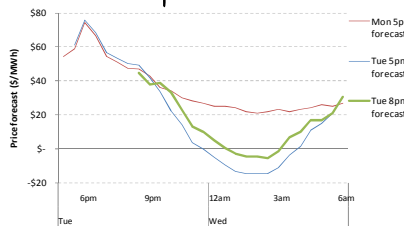


\* Had intermediate price forecasts indicated this trend, participants could have responded earlier given flexibility to revise facility submissions

### Overnight example (cont'd)



- A MP may consider it worth decommitting a facility and submit a bid that would do so (e.g. low -ve price)
- Reflected in later 8pm market forecast
- If de-commitment opportunity seen as worthwhile (taking start up into account etc), leave bid at gate closure
- If gate closure 2 hours out, could also leave decision until 11 pm





**APPENDIX C: GLOSSARY**

Balancing Merit Order (BMO)..... 2  
 Dispatch Instructions (Dis) ..... 5  
 Energy Equivalent RTBMO.....26  
 Energy Relevant Dispatch Quantity (ERDQ)..... 26  
 Net Contract Position (NCP) ..... 2  
 Real Time Balancing Merit Order (RTBMO) ..... 3  
 Relevant Dispatch Quantity (RDQ)..... 21  
 Resource Plans (RPs)..... 5  
 Steady State Ancillary Service Base point (SSASB) ..... 10

# BUSINESS REQUIREMENTS

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## User Management

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**Description:** The purpose of this document is to outline the business requirements for the establishment of a hybrid balancing market.

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**Target Audience:** IMO and PSC Teams

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### Information Fields:

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<b>Ref</b>	Reference Number for the business requirement
<b>Processes</b>	Process area of change for the business requirement specified
<b>Requirements</b>	The business requirements, single line items
<b>Criticality</b>	1: Must Have 2: Highly Desirable 3: Like to Have
<b>Project Stages</b>	
<b>Notes\Comments</b>	Any additional comments or notes

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<b>Version</b>	<b>Updated:</b>	<b>Author:</b>	<b>Comment:</b>
1.0	24/12/2010	Arthur Vernon	Document creation
1.1	5/1/2010	Arthur Vernon	Added some additional requirements
1.2	14/1/2010	Stephen Black	Peer Review
1.3	27/1/2010	Stephen Black	Changes due to feedback

## 1. Market Rules (MR)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
MR 1	Participation in the Balancing Market is mandatory	1		In order to facilitate participation in the market, default Balancing Submissions will be set up by each Market Participant for each Balancing Facility/Portfolio. These default or "Standing" Balancing Submissions will remain effective unless superseded by "Variation" Balancing Submissions.
MR 2	Balancing Submissions are made up of two or more price and quantity "pairs"	1		Quantity is specified in the form of increments and decrements, or "incs and decs". It is assumed that Market Generators are able to submit both incs and decs, whereas Market Retailers and Demand Side Participants may only submit decs Note that: <ul style="list-style-type: none"> <li>+ve quantity refers to an increase in MW (incs)</li> <li>-ve quantity refers to an decrease in MW (decs)</li> </ul>
MR 3	Balancing Submissions shall be permitted on either a Facility or Portfolio basis	1		IPP Balancing Submissions will be on a "Per Facility" basis, whereas Verve Energy is able to submit on a "Per Facility" and/or "Portfolio" basis. "Portfolio" is an aggregated collection of two or more Facilities. A single "Portfolio" for Verve energy is permissible.
MR 4	Balancing Submissions will be validated according to the market rules.	1		Specific rules and restrictions are likely to be included into the Market Rules to control the information provided by Market Participants and these will be automated within the system.
MR 5	Balancing to operate in conjunction with Ancillary and Network control services.	1		Awaiting market rule changes to evaluate.
MR 6	Need to consider the impact of Balancing on existing mechanisms in WEMS.	1		Components include: <ul style="list-style-type: none"> <li>UDAP, DDAP, MCAP</li> <li>Balancing Support Contracts, Dispatch Support Contracts</li> <li>Dispatch Merit Order</li> <li>Refunds, Credit Limits and Prudentials</li> <li>STEM Merit Order (see PSOPs)</li> </ul>



## 2. Balancing Submissions (BS)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
BS 1	The system shall allow Market Participants to submit and resubmit "simple" Balancing Submissions for one or more Trading Intervals at a time, for: a) Standing Balancing Submissions b) Variation Balancing Submissions	1		Each submission will identify, at a minimum, the: <ul style="list-style-type: none"> <li>Balancing Facility/Portfolio (unique name)</li> <li>The Trading Interval and Trading Date to which it pertains</li> <li>Between 2 and 5 (configurable) price (\$) quantity (MW) pairs</li> <li>Facility/Portfolio maximum ramp up/down rates</li> </ul> <p>"Simple" Balancing Submissions assumes that physical characteristics of plant are taken into consideration by each Market Participant when forming their Submissions, rather than including this information within each submission.</p> <p>A Standing balancing submission is like a regular Balancing Submission except that:</p> <ul style="list-style-type: none"> <li>Trading Date is NOT defined, only "Start Date"</li> </ul>
BS 2	Balancing Submissions may be "conditional"	2		Balancing submissions will be for the full or gross potential balancing range being offered and ancillary service capability, therefore Balancing Submissions may be conditional or mutually exclusive on ancillary service submissions.
BS 3	Standing Submissions will remain effective from "Start Date" until it is superseded by another Standing Submission.	1		To facilitate forward planning, numerous Standing Balancing Submissions may exist in the system with different future "Start Dates". Consider feasibility of functionality to offer at "max" or "min" price, as well as how to offer for "max residual" capacity.
BS 4	Only one Balancing Submission may be effective for a Balancing Facility/Portfolio for a specific Trading Interval and Trading Date.	1		Variation Balancing Submissions will override any applicable Standing and Variation Balancing Submissions for a specified Balancing Facility/Portfolio, Trading Interval and Trading Date.
BS 5	Each Balancing Submission shall be traceable to its source.	1		The system will provide the ability to identify whether the origin and unique identity of the Submission, be it a Variation Balancing Submission or a Standing Balancing Submission. All user and session information will be recorded and retained for logging and audit purposes.

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
BS	6	The system shall support the submission of Portfolio and Facility-based Balancing Submissions by Verve Energy.	1		The Portfolio will either need to define the facilities it contains or these will be derived by exception (i.e. The Verve Energy Portfolio will consist of “everything that is not” defined on a Facility basis). Will need to discuss the best approach with System Management.
BS	7	The system shall support the addition and removal of Facilities from a Portfolio by Verve Energy.	1		The system will provide the ability to support the addition and removal of facilities from the Verve Energy Portfolio using Start and End Dates. This is for the purpose of allowing for a transition from Portfolio to Facility-based Balancing Submissions over time.  It is likely that the system will need to restrict the frequency and ability to transfer facilities in and out of the Verve Energy Portfolio. Will need to discuss the impact of switching in and out of the Portfolio with System Management.

### 3. Resource Plans (RP)

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
RP	1	Amend Resource Plans format	1		Amend format of Resource Plans to specify MW target and ramp rate as well as a specified time.

#### 4. Calculations (CA)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
CA	1	1		Combine all IPP individual Facility and Verve Portfolio incs and decs from each price and quantity pair into a single list and order by price. Will need to also take into account accepted ancillary service offers.
CA	2	1		Same as Supply Curve (CA 1 above), however removing price information and grouping by Market Participant and Balancing Facility/Portfolio. Assumption: The current Dispatch Merit order will be deprecated.
CA	3	1		Same as Supply Curve (CA 1 above), however adjusting merit order to take into account start times, ramp rate and target MW to derive expected MWh.
CA	4	2		Generate a balancing supply curve that is composed of aggregated quantities for pre-configured price bands (price bands should be configurable– i.e. \$5 price bands would aggregate \$0-\$5, \$5-\$10, etc.).
CA	5	1		Evaluate balancing supply curve against load forecast to determine a price per trading interval in the trading day
CA	6	1		Recalculate balancing price in Settlements using actual balancing volumes.
CA	7	1		Identical price quantity pairs of incs and decs will be treated (sorted) in the following manner: 1) FIFO - Oldest submissions will take precedence over newer submissions 2) CHANCE - If price, quantity and submission time are equal, sorting will be based upon a randomly generated number.
CA	8	1		Each calculation will be scheduled within the Event Manager, with no (theoretical) limit to the frequency in which these can be configured to run (i.e. every 5 mins)
CA	9	1		Both these calculations will be removed.

## 5. Business Rules for Validation (BR)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
BR 1	Balancing Submissions must be made in advance.	1		The system will accept Balancing Submissions for future (not already started) Trading Intervals only and will not unreasonably constrain participants from making advance submissions for future Trading Dates.  To effect this, a "prescribed" number of days will be defined and configurable within the systems.
BR 2	Each Submission will be validated as follows: a) XML Validation (well-formed, schema compliance) b) Business and Market Rules	1		Any such rules will be documented and published to participants.  Business and Market Rule validation will be processed within the rules/validation engine.
BR 3	Validation shall be limited to a single Trading Interval	1		Validation does not compare values across trading intervals or facilities for consistency or anything else.
BR 4	Balancing Submissions will be validated against "Gate Closure".	1		Gate closure will be defined (configurable) within the system as the expected rolling "cut-off" period for Balancing Submissions for a particular Trading Interval.  In the event that Balancing Submissions are submitted by Market Participants within the "Gate Closure" period, all changes made by "offending" submissions will be detailed in the "audit" area of the system with copies of the original and modified submission, for future investigation.  While it is expected that Portfolio based Balancing Submissions will have certain restrictions with regards to timings and ability to resubmit, the system will not prevent such actions. Instead, the system will detail these in the "audit" area of the system for future investigation.
BS 5	Market Participants should be provided with an option which allows them to discard potential "Gate Closure" violations during the validation procedure.	2		The option will act as a "safety net" to prevent unintended submission of Balancing Submissions within the "Gate Closure" period.

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
BS	6	Market Participants should be able to choose whether, in the event of validation errors, whether to discard all or part of a Balancing Submission.	2		<p>Market Participants will be provided with the ability to:</p> <ul style="list-style-type: none"> <li>Operate in a mode that accepts valid entries and rejects invalid entries</li> <li>Operate in a mode that discards all entries if a submission contains any validation errors</li> </ul> <p>Option 1 will be the default situation.</p>
BS	7	Context-specific error messages shall be created in the validation process to assist users to identify and correct errors.	1		As information is uploaded, contextual information will be in the form of error, line and column positions.
BS	8	Validation errors, up to a max configurable amount, shall be provided to the submitter.	1		For each Balancing Submission, validation errors will be stored in order to provide feedback to the submitter. A configurable (initial 50), will avoid generation of large error logs and responses in the event of recurring errors in large submissions.
BS	9	Balancing Submission must be processed in a timely manner.	1		

## 6. MPI Web User Interface (UI)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
UI 1	The UI interface shall provide facilities to upload, view, validate and download: a) Standing Balancing Submissions b) Variation Balancing Submissions	1		File Exchange (Upload/Download) in CSV and XML formats will be supported.  All current and future Standing and Variation Submissions will be viewable. Note that due to the archiving process, past Standing and Variation Submissions will be viewable to a configurable point in the past only.  Validation will occur upon Submission upload.
UI 2	The UI interface shall provide facilities to view and download: a) Effective Balancing Submissions	1		The “Effective” Balancing Submissions refers to either the: <ul style="list-style-type: none"> <li>• Applicable Standing Balancing Submission (if no Variation Balancing Submissions have been submitted); or the</li> <li>• Most recent Variation Balancing Submission</li> </ul> The facility, trading interval and source (variation/standing) will be identifiable.  Each price/quantity pair will be displayed to the right across the screen.
UI 3	The UI will provide graph and table views of the forecast(s) and final balancing price for trading intervals for a specified time period (defaulting to today and tomorrow).	1		Default aims to provide viewing for the scheduling and trading days.  Only data that exists for each trading interval will be displayed.  Participant view will show all available forecasts and final prices.
UI 4	For a selected interval, the UI shall provide graphical and tabular displays of Aggregate Balance Supply Curve	2		See “Calculations” section for more information.
UI 5	Validation error messages shall be displayed to provide users with feedback on the upload process	1		
UI 6	A “News Ticker” will be provided to update users of recent events.	3		Information may include the system status, latest dispatch times, current prices, current faults within the system, etc.

## 7. Web Services (WS)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
WS 1	The system shall provide the following web services: <ul style="list-style-type: none"> <li>• Upload a Variation Balancing Submission</li> <li>• Upload a Standing Balancing Submission</li> <li>• Validate Balancing Submissions</li> <li>• Report Download</li> </ul>	1		Submission uploads will respond with a receipt acknowledgement  Validation of Balancing Submissions may be performed independently of a Submission Upload, with Validation Errors returned as appropriate.
WS 2	The Report Download service will use report-specific selection criteria (trading day, trading interval, etc) to return data associated with the specified report.	1		Existing service will require additional report types to be defined. Reports include: <ul style="list-style-type: none"> <li>• Download of Standing, Variation and Effective Submissions</li> <li>• Download of All Prices and Supply Curves</li> <li>• Download Balancing Merit Order (for System Management only)</li> <li>• Download of all Reports in Section 7 – Reports (RE)</li> </ul>
WS 3	Web service specifications shall be published via XML Schemas or in another similar form as agreed with Participants.	1		
WS 4	The system shall ensure that the Balancing Submission is received from its stated author without modification.	2		Source assurance may already be an inherent part of the present web service implementation
WS 5	The system shall provide assurance to the sender that the Balancing Submission was received correctly.	2		

## 8. Reports (RE)

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
RE	1	<p>Balancing Load and Price Report – Forecast and Actual:</p> <p>As applicable to the recipient:</p> <ol style="list-style-type: none"> <li>Forecast (all, latest) and the actual clean balancing price</li> <li>Forecast (all, latest) and actual (metered) total system and balancing load as derived by System Management.</li> </ol>	1		<p>Report contains the Trading Price for each Trading Interval for a specified Trading Day or Trading Month (after settlement).</p> <p>Report may contain forecast and/or final load and price information depending on the query.</p> <p>Refer to MR 10.5.1 (x) and MR 10.5.1.(vC) Monthly Balancing Energy Volume Report for current requirements</p> <p>It may be necessary to provide high and low forecasts (i.e. + or - 5%) to assist participants in scenario planning and analysis.</p>
RE	2	Non-Scheduled, Wind and Curtailment Load Report – Forecast and Actual	1		Report is at aggregated level and available to all Market Participants
RE	3	Balancing Merit Order Report – Forecast and Actual	1		Report contains a list of all IPP individual Facility and Verve Portfolio incs and decs from each price and quantity pair in order of price.
RE	4	<p>Detailed Balancing Pricing and Volumes Report – is a more detailed version of RE1 providing a level of detail down to the individual Facility or Portfolio – Forecast and Actual</p> <p>Refer to MR 7.13.1.(dA).</p>	1		<p>Provide actual balancing prices and volumes for each facility and for each interval during the period specified. This report, for:</p> <ol style="list-style-type: none"> <li>Market Participant(s): should provide information for reconciliation against balancing line items in invoices generated by the settlements system. In this respect it is important that the information correlate with the method used for calculating payments.</li> <li>Market Operator: Provides quantitative information on the performance of the balancing market from potentially a number of different perspectives</li> <li>System Management: Provides performance assessment information in terms of minimising balancing costs.</li> </ol>



REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
RE	5	Temperature Report – Forecast and Actual	1		Republishing of this information will require permission from BOM.
RE	6	Wind Generation Report – Forecast and Actual	1		Republishing of this information will require permission from BOM. The exact content needs to be determined from System Management.
RE	7	Aggregate Balance Supply Curve Report – Forecast and Actual	2		Report contains aggregated balancing quantities per price band.
RE	8	All Balancing Submissions Report	2		Report contains a detailed list of all Balancing Submissions for each Market Participant and will be published some time after the event to the public.
RE	9	Real-time SCADA	2		Report contains a detailed comparison of actual versus expected balancing quantities.
RE	10	Outages (Planned and Forced) and Advisories Report	1		Report contains a list of current and upcoming outages, system security advisories (i.e. shortfall forecasts and supply excess forecasts) from system management.
RE	11	Balancing Proportion Report – Forecast and Actual	2		Report provides interval by interval breakdown of percentage of Balancing market covered by Portfolio, IPP Facility and DSM.
RE	12	Compliance Reporting	1		As and when the market rules are defined, compliance reports should be added to the system to assist with investigation.

## 9. Settlements (SE)

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
SE	1	Export Balancing Data to Settlements	1		Current export of data to the settlements system must continue, but will require changes to the masterfile import process
SE	2	IMO Account Settlement Report	1		The existing report may require amendment to incorporate additional Balancing income and expenses, removal of UDAP and DDAP, addition of constrained on/off payments.

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
SE	3	Settlements Calculations	1		Amend Settlements to: <ul style="list-style-type: none"> <li>• Calculate sum of Verve facility resource plan</li> <li>• Calculate Verve Net Contract Position (NCP)</li> <li>• Calculate portfolio residual NCP</li> <li>• Calculate residual portfolio actual generation</li> <li>• Calculate Net residual balancing quantity</li> <li>• Calculate difference between facilities and resource plans</li> <li>• Calculate adjustment for NCP resource plan differences</li> <li>• Settle Load Following Ancillary Service (LFAS)</li> <li>• Settle balancing quantities at balancing price</li> <li>• Identify quantities dispatched out of merit order</li> <li>• Determine constrained on/off payments</li> </ul>
SE	4	Prudentials and Credit Limit Report	1		The existing report may require amendment to incorporate additional Balancing income and expenses, removal of UDAP and DDAP, addition of constrained on/off payments.

## 10. Archiving (AR)

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
AR	1	Existing information access services must be maintained for as long as is required.	1		A retention policy shall be created for information, based upon business and rule requirements. Upon the expiration of data, information should be purged (along with the corresponding data structures) or archived to allow access to historical information.  Software and services that are no longer required should not be offered to or accessible by users.

## 11. System Management Interface

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
SM	1 The following Information must be regularly communicated from the IMO to System Management: <ul style="list-style-type: none"> <li>Balancing Merit Order</li> </ul>			It is envisaged that all interfaces with System Management either use Web Services or Secure FTP
SM	2 The following Information must be regularly communicated from the System Management to the IMO: <ul style="list-style-type: none"> <li>Load Forecast</li> <li>Wind Forecast</li> <li>Amendments to Individual Facilities within each Verve Energy Portfolio</li> <li>Dispatch Instructions</li> <li>Outages (Planned and Forced)</li> <li>System and Market Advisories</li> <li>Real-time SCADA data</li> </ul>			Changes to Verve Energy Portfolio's will need to be factored into the Standing Data Process
SM	3 Where a facility is earmarked for the provision of ancillary services then System Management should be notified accordingly.	1		

## 12. Security (SE)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
SE	1 Balancing shall comply with the security provisions as defined elsewhere for the WEMS system	1		

### 13. Monitoring and Management (MM)

REF	REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
MM	1	Facilities shall be implemented to provide 24x7 monitoring of systems and services.	1	<p>Monitoring is an essential component toward achieving the level of availability specified. The system should be configured to provide suitable event notifications via SNMP to disclose problems, including:</p> <ol style="list-style-type: none"> <li>1. Database connection failures</li> <li>2. Unexpected exceptions</li> <li>3. Potential security breaches</li> <li>4. Background processes</li> </ol>
MM	2	The system shall maintain a log of service layer interactions for the purpose of assisting with identifying and resolving client related issues.	1	<p>This includes:</p> <ol style="list-style-type: none"> <li>1. Request Time</li> <li>2. Service Requested</li> <li>3. Request specific characteristics including web service version</li> <li>4. Time to complete request</li> <li>5. Request status upon completion</li> <li>6. Channel (Web UI, FTP, web service)</li> <li>7. User (if known)</li> <li>8. Market Participant (if known)</li> <li>9. Server handling the request</li> </ol>
MM	3	Key performance indicators for IMO shall be measured and reported on.	1	<p>From the IMO perspective, performance against time constraints and availability are two potential key performance indicators.</p> <p>Should KPI also be defined for other rule participants (to the extent that this information is available to IMO), e.g.:</p> <ol style="list-style-type: none"> <li>1. Occurrences of dispatch instructions against participants against submissions above the clearing price.</li> <li>2. Balancing events resulting in levels below NCPs</li> </ol>

## 14. OTHER (OT)

REF		REQUIREMENT	CRITICALITY	PROJECT STAGE	NOTES / COMMENTS
OT	1	The system shall provide 99.9% availability	1		This has consequences for the overall system design as well as the software.
OT	2	Solution is subject to evolving market rules and as such should be designed in such a manner to minimise the impact of market rule changes.	1		Timing constraints and pre-conditions are examples. Wherever possible, parameterisation shall be used to ensure flexible configuration.
OT	3	Balancing Market Opening	1		The Balancing Market Window can be configured as “Open” or “Closed”. Once first opened, it is expected to remain open continually for the entry of Balancing Submissions.
OT	4	Availability of Balancing Data in the Data Warehouse	1		All information used and created in the Balancing Market will be made available in the Data Warehouse (DWH) for internal reporting and ERA reporting purposes.

## 1.0 BALANCING SYSTEMS DESIGN / IMPLICATIONS

### Background:

As part of the preparation for the new balancing market, a high level review of the current systems architecture has been performed to assess the ability of the existing systems design to cope with the proposed high level business requirements for the project.

The intent of this document is to highlight the implications and key areas of change to the current system's design in order to facilitate a stable and reliable balancing market. This assessment will draw attention to specific areas of risk, which can then be tackled "head-on" at the start of the project.

The full and complete list of changes will be documented in the high level and detailed requirements at a later stage.

### Assessment:

The following table provides a high level summary of the current systems architecture, along with the proposed amendments required as part of the balancing market implementation:

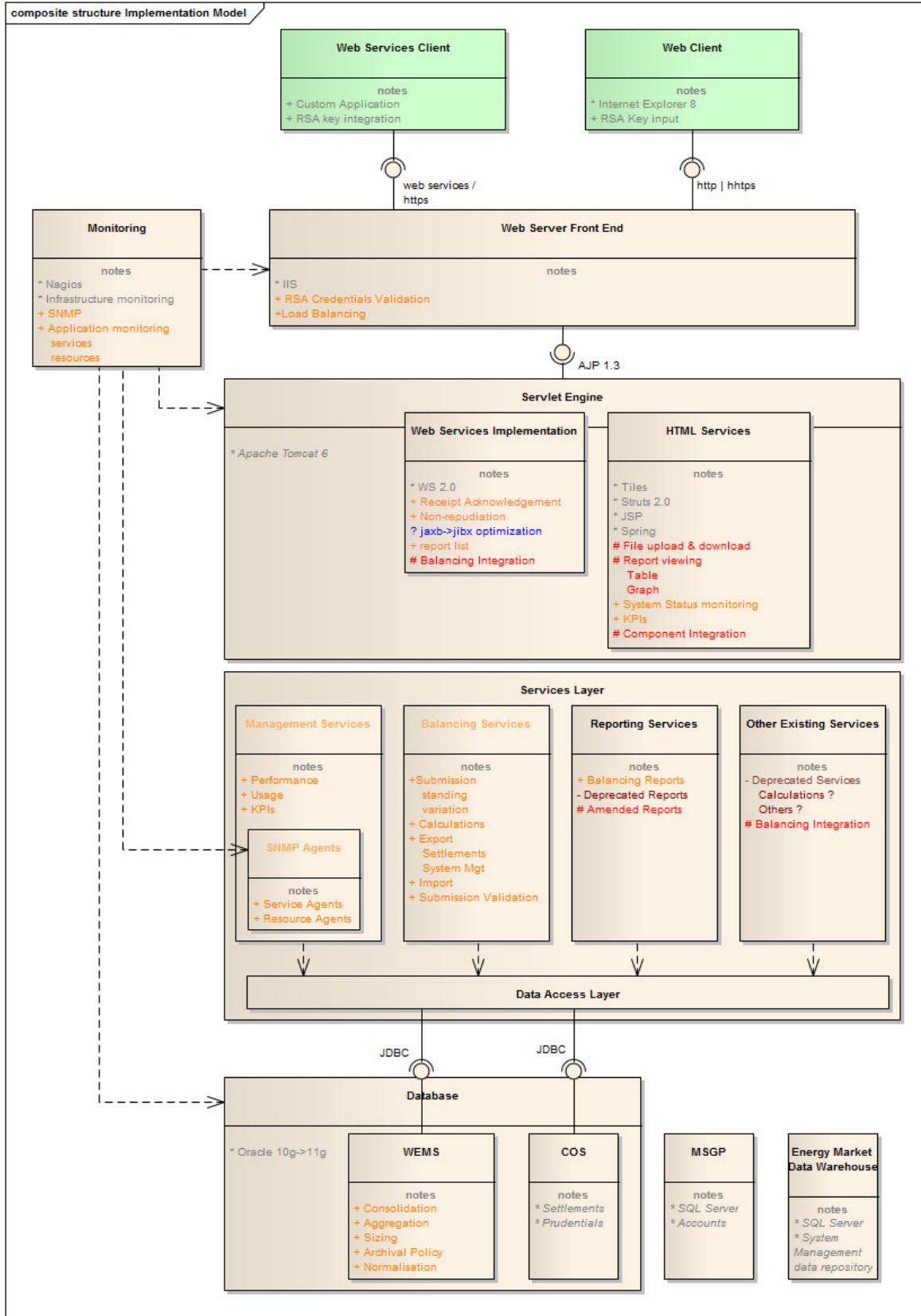
Component / Layer	Current Systems	Changes Envisaged / Design Impacts
<b>Web Security:</b>	Use of client and server certificates for authentication	<p>IMO issued certificates to be replaced with username and password authentication.</p> <p>RSA tokens are also being considered by the IMO as an additional security option.</p>
<b>Web Services: Programmable Interfaces</b>	Built as custom applications and written in J2EE technologies (WS2.0).	<p>Plans to review potential for memory usage optimisation to reduce impact of continued and increased polling by participants.</p> <p>Changes needed to ensure receipt/delivery of information through acknowledgement (requested by participants). This new functionality will be applied to existing web services also.</p> <p>Creation of "master report list availability" to allow participants this ability to know when new reports are published and available. This will eliminate the current polling "guess work", where participants poll at preset "expected" publication times.</p> <p>New web services required for exchange of balancing information with Market Participants and System Management. All information shall be available through the web services interface.</p>

<b>Web Server:</b>	Hardware redundancy and clustering	<p>The need for greater availability will require the implementation of redundant servers (2 IIS servers, 2 application servers) and the implementation of a simple load balancing solution to tie these together.</p> <p>Changes will be required to integrate the RSA security changes.</p>
<b>Web:</b>	MPI built using a combination of J2EE technologies (Spring, Struts, JSP, Tiles).	<p>Continue to use the technology stack that has been implemented with the IMO MPI.</p> <p>The Balancing Market will require significant changes, including:</p> <ul style="list-style-type: none"> <li>- Replacement of "file exchange" functionality to remove dependency on old technologies (Internet Explorer 6, Unsupported Rules Engine).</li> <li>- support for CSV as well as XML file uploads to replace current "web form" technologies.</li> <li>- new functionality to view submission history and errors within the IMO MPI.</li> <li>- new reporting and graphing functionality for all prices/schedules</li> <li>- new balancing calculations</li> <li>- new functionality to allow for improved monitoring and reporting of systems KPIs</li> </ul>
<b>Database:</b>	<p>The current systems are based upon Oracle databases for WEMS and COS (Settlements and Metering).</p> <p>No database clustering.</p> <p>Note that there are plans in place to split the COS database into separate Settlements and Metering databases.</p> <p>Disaster recovery capabilities are handled by Oracle DataGuard.</p>	<p>While the existing Oracle technology is capable of facilitating the new balancing market, the main potential design implication will be sizing, storage and archival.</p> <p>The more frequent the forecasts, the more data that will be generated. Will need to design in such a way to retain all iterations of information for a set period in WEMS and then archive this to other online (data warehouse) or offline (tape) media.</p> <p>Database clustering would be required for "mission critical highly available" systems (i.e.99.99% type requirements), however these introduce significant complexity and costs. The implementation approach we will choose will be based on "making the best of what we currently have" and this means continuing with a single production database, with a disaster recovery "backup" database available for failover within 2 hours.</p>

Component / Layer	Current Systems	Changes Envisaged / Design Impacts
<b>Rules Engine</b>	The ABB systems implemented a QuickRules business rules engine from Yasu Technologies as part of the market implementation. This technology has since been acquired by SAP and is no longer sold or supported.	QuickRules engine and associated validation will need to be re-written and migrated to an alternative validation engine. We are currently in the process of performing a technical evaluation on the best approach to this, which includes the use of a: <ul style="list-style-type: none"> <li>- Off-the-shelf rules engine</li> <li>- Simple custom validation engine</li> </ul> A decision on the approach will be made shortly.
<b>Monitoring and Management Services</b>	Basic monitoring is configured using an off-the-shelf tool called Nagios.	Comprehensive infrastructure monitoring will need to be implemented as part of the new market due to the requirement for improved systems availability to facilitate "around-the-clock" rolling trading. <p>New applications will be implemented (and old modified) to include SNMP "agents" to monitor performance of key events and applications, as well as resource usage.</p> Monitoring will be configured to proactively manage and report on these, alerting on-call staff of issues and improving response times to systems issues.



# HIGH LEVEL ARCHITECTURE DIAGRAM:



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## Agenda item 2d – Cover Paper – Initial rule change impacts (information only)

### 1. BACKGROUND

Lavan Legal has been engaged to assist the IMO with drafting the rule changes arising from the Market Evolution Program. Early work on this has commenced, and an initial set of changes that may be required, and/or clauses that require further consideration has been developed. This initial draft is attached to this paper as appendix 1.

The IMO would like to note that this paper has been presented to the RDIWG for information purposes only and is not yet for review.

### 2. RECOMMENDATIONS

The IMO recommends that the RDIWG:

- **Note** that the IMO, with assistance from Lavan Legal, has commenced its work identifying the initial set of changes that may be required, and/or clauses that require further consideration.

**WHOLESALE ELECTRICITY MARKET RULES – NEW BALANCING MARKET  
CHANGES TO CURRENT MARKET RULES (EXCLUDING NEW BALANCING CHAPTER)**

<b>Version</b>	<b>Author</b>	<b>Date</b>
1.0	Lavan Legal	25.01.11
1.1	IMO (initial review)	28.01.11

<b>Clause/ Section</b>	<b>Suggested Change/Comment</b>
<b>2. Administration</b>	
2.1.2.(b)	Use of term “balancing process” – query whether replace with new appropriately defined term “Balancing Market” or use defined term “Balancing”.
2.16.2(d)	Use of term “Balancing Data and other Standing Data prices used in Balancing” – see discussion of definition of “Balancing Data” definition under Glossary heading.
2.16.2(i)	Refers to “the capacity available through Balancing from Generators and Non-Scheduled Generators and Dispatchable Loads” – appears can be retained with current definition of “Balancing”.
2.16.2(m)	Refers to “Balancing Support Contracts that System Management enters into” - see discussion of definition of “Balancing Support Contracts” definition under Glossary heading.
2.16.4(b), (c), (d), (f), (g)	Query whether references to “Balancing” should be to appropriately defined “Balancing Market”.
2.16.9(a)	Refers to “Balancing Support Contracts” - see discussion of definition of “Balancing Support Contracts” definition under Glossary heading.
2.16.9(b)iii.	Refers to “Balancing Data price changes, and changes in other Standing Data prices used in Balancing” - see discussion of

Clause/ Section	Suggested Change/Comment
	definition of “Balancing Support Contracts” definition under Glossary heading. Query whether “Balancing” should be replaced with appropriately defined “Balancing Market”.
2.16.12(b)iv.	Query whether “Balancing” should be replaced with appropriately defined “Balancing Market”.
2.22.1(a)	Query whether “Balancing” should be replaced with appropriately defined “Balancing Market”.
2.26.3(h)	Query whether “Balancing” should be replaced with appropriately defined “Balancing Market” and whether 2.26.3 should also refer to the Balancing market equivalents of 2.26.3(e) i.e. “historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the Energy Price Limits”.
2.34.14(a)ii.	Reference to “Standard Balancing Data” to be replaced with appropriate term from the Balancing Market chapter.
2.37.4	Calculation of credit limit for each Market Participant - references to MCAP to be replaced with appropriate figure from the Balancing Market
<b>3. Power System Security and Reliability</b>	
3.11.7	See discussion of definition of Ancillary Services Contract under Glossary heading.
3.11.7A	This clause may need to be amended to add a requirement for IPPs providing Ancillary Services to provide them to a standard sufficient to enable System Management to meet its obligations.
3.11.8	See discussion of definition of Ancillary Services Contract under Glossary heading. Reference to System Management obligation to procure a least cost alternative to the Electricity Generation Corporation (for LFAS) may need to be amended.
3.11.8E, 3.11.9, 3.11.10	See discussion of definition of Ancillary Services Contract under Glossary heading.
3.11.14 and 3.11.15	The heads of power for System Management’s Power System Operation Procedure may need to be amended.

<b>Clause/ Section</b>	<b>Suggested Change/Comment</b>
3.12.1	Clause refers to chapter 7, see relevant discussion for proposed amendments.
3.13.2	Reference to “operation of the Balancing mechanism settlement process” to be replaced with term defined by reference to Balancing Market settlement.
3.21A.14	“Dispatch Schedule” needs to be replaced as it is defined by reference to clause 6.15 which is to be deleted.
<b>4. Reserve Capacity Rules</b>	
4.25.10	“Dispatch Schedule” needs to be replaced as it is defined by reference to clause 6.15 which is to be deleted.
4.26.2(e)	Definition of “DSQ” needs to be changed, as refers to “Dispatch Schedule” which is defined by reference to clause 6.15, which is to be deleted.
<b>6. The Energy Market</b>	
6.5A	Remove – to be replaced with new Balancing Market chapter.
6.6.9	Query whether “Balancing” should be replaced with appropriately defined “Balancing Market”.
6.9.4	Delete reference to “MCAP Price Curves”.
6.11A	Remove – to be replaced with new Balancing Market chapter.
6.12	Query whether this relates exclusively to balancing and therefore the term “Dispatch Merit Order” will be replaced with “Balancing Merit Order”. If this relates solely to balancing, query whether it is appropriate for this provision to be removed and replaced in the new Balancing Market chapter. (NB “Dispatch Merit Order” is also referred to in clauses 7.1, 7.5, 7.7, 7.10 and 10.6). If this section, is retained “Balancing Data” to be replaced with appropriate term from the Balancing Market chapter.
6.13 to 6.18	Remove - to be replaced with new Balancing Market chapter.

Clause/ Section	Suggested Change/Comment
6.20.1	Specification of “Energy Price Limits” - discuss whether Balancing Market prices are to be included.
6.21.2	<p>Delete reference to MCAP, UDAP and DDAP and replace with defined terms emanating from the Balancing Market provisions.</p> <p>Delete i - “Authorised Deviation Quantity” is defined in clause 6.17.2 which will be deleted.</p> <p>Delete ii. – “Upward Unauthorised Deviation Quantity” is calculated under clause 6.17.3 which will be deleted.</p> <p>Delete iii. – “Downward Unauthorised Deviation Quantity” is calculated under clause 6.17.4 which will be deleted.</p> <p>Delete v. - “Dispatch Instruction Payment” is defined in clause 6.17.6 which will be deleted.</p> <p>Delete vi.- “Commitment Compensation” is calculated under clause 6.18.2 which will be deleted.</p> <p>Query whether the entire clause should be covered in new Balancing Market chapter instead of replacing the above with newly defined terms.</p>
<b>7. Dispatch</b>	
7.6.2	Reference to “Balancing Support Contract or Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions. The Electricity Generation Corporation should be included as a Market Participant to the extent it has elected to deal with one of its facilities on a stand alone basis.
7.6.2A	Distinction to be drawn between the Electricity Generation Corporation operating on a portfolio basis and it having elected to deal with one of its facilities on a stand alone basis.
7.6.3 – 7.6.4, 7.6.6	<p>Reference to “Balancing Support Contract or Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions.</p> <p>Discuss operation of clause with respect to the Electricity Generation Corporation where it has elected to treat a facility on a stand alone basis.</p>
7.6.7 – 7.6.9	<p>Discuss power of System Management and the Electricity Generation Corporation to enter into Balancing Support Contracts with Market Participants other than the Electricity Generation Corporation in light of:</p> <ul style="list-style-type: none"> <li>• new Balancing Market; and</li> <li>• right of the Electricity Generation Corporation to treat a facility on a stand alone basis.</li> </ul>
7.6.13	Reference to “Balancing Support Contract or Ancillary Service Contract” to be replaced with references to defined terms emanating

Clause/ Section	Suggested Change/Comment
	from the Balancing Market provisions.
7.6A	Discuss the distinction to be drawn in this clause re. scheduling and dispatch of the Electricity Generation Corporation operating on a portfolio basis and it having elected to deal with one of its facilities on a stand alone basis.
7.7.1	Discuss whether Dispatch Instructions will be able to be given to the Electricity Generation Corporation in respect of those of its facilities which it has elected to treat on a stand alone basis.
7.7.4	<p>Discuss need for the carveout in (a) in light of the new Balancing Market i.e.:</p> <p style="text-align: center;"><i>System Management must determine which Facilities will be the subject of Dispatch Instructions by applying the Dispatch Merit Order relevant to the action required, except where:</i></p> <p style="text-align: center;"><i>(a) System Management believes it is not feasible to do so having regard to:</i></p> <p style="text-align: center;"><i>i. the Standing Data minimum response times; or</i></p> <p style="text-align: center;"><i>ii. transmission, ramping or other operational constraints; or</i></p> <p>In (b), reference to “Balancing Support Contract” and “Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions.</p>
7.7.5A	Delete – refers to the determination of a quantity described in clause 6.17.6(c)i. which clause will be deleted.
7.7.5D	Delete – refers to the determination of a quantity described in clause 6.17.6(d)i. which clause will be deleted.
7.10.5	<p>Reference to “Balancing Support Contract” and “Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions.</p> <p>Discuss operation of clause with respect to the Electricity Generation Corporation where it has elected to treat a facility on a stand alone basis.</p>
7.10.7	<p>Reference to “Balancing Support Contract” and “Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions.</p> <p>Discuss operation of clause with respect to the Electricity Generation Corporation where it has elected to treat a facility on a stand</p>

Clause/ Section	Suggested Change/Comment
	alone basis.
7.13.1	<p>Reference to “Balancing Support Contract” and “Ancillary Service Contract” to be replaced with references to defined terms emanating from the Balancing Market provisions.</p> <p>In (eB) and (eC), references to clauses 6.17.6(c)i. and 6.17.6(d)i. need to be amended as these clauses will be deleted and replaced with references to clauses in the new Balancing chapter.</p>
<b>9. Settlement</b>	
9.3	Data collection requirements need to include Balancing Market data – can be achieved by referring to the Balancing Market in addition to the “Energy market” and retaining the reference to clause 6.21 as amended as discussed above.
9.8	<p>Balancing Settlement calculation needs to be replaced in absence of ADQ, UUDQ, DUDQ, MCAP, UDAP, DDAP and DIP. Also note references to clauses 6.14 and 6.17 which are to be deleted.</p> <p>Query whether the above will be removed to new Balancing Market chapter.</p>
9.9	<p>Ancillary Service settlement calculation needs to be replaced – query relevance in new Balancing Market.</p> <p>Also note reference to MCAP in clause 9.9.2</p>
9.10	Commitment and Outage Compensation Settlement amount needs to be replaced – “Commitment Compensation” is calculated under clause 6.18.2 which will be deleted. Also note reference to clause 6.18.1 which will be deleted.
9.10A	Non-compliance charge – discuss expansion of non-compliance charge regime to Balancing Market
9.11	“Balancing Settlement Amount” should be defined by reference to the amended clause 9.8.
9.14	<p>Net Monthly Non-STEM Settlement amount formula needs to be reviewed having regard to the following elements currently included in its calculation:</p> <ul style="list-style-type: none"> <li>• BSA – balancing settlement amount calculated under clause 9.8</li> <li>• ASSA – Ancillary Service Settlement amount calculated under clause 9.9</li> <li>• COCSA - Commitment and Outage Compensation settlement amount calculated under clause 9.10</li> </ul>



Clause/ Section	Suggested Change/Comment
9.16.1	Settlement Cycle timelines – discuss if this provision is to be amended to incorporate Balancing Market statements, or equivalent provisions for the Balancing Market are included in the separate Balancing Market chapter.
9.17	Settlement Statements – discuss if this provision is to be amended to incorporate Balancing Market statements, or equivalent provisions for the Balancing Market are included in the separate Balancing Market chapter.
9.18	Non-STEM Settlement Statements – assuming 9.16.1 and 9.17 are amended to include the Balancing Market, or separate equivalent provisions are included in the Balancing Market chapter, amend to delete references to MCAP, UDAP and DDAP, Balancing settlement and Ancillary Services settlement.
<b>10. Market Information</b>	
10.5.1(i)	Discuss if this provision is to be amended to incorporate Balancing Market summary information, or equivalent provisions for the Balancing Market are included in the separate Balancing Market chapter.
10.5.1(j)i. and v.	Delete references to MCAP, UDAP and DDAP and shortfalls in Ancillary Services.
10.5.1(v)ii. and iii.	Replace reference to “Balancing” with appropriate defined “Balancing Market”.
10.5.1(vC)	Reference to “Balancing Support Contracts” to be replaced with references to defined terms emanating from the Balancing Market provisions.
10.5.1(x)	Amend to delete reference to MCAP, UDAP and DDAP.
10.7.1	References to “Balancing Data Submissions” and “Standing Balancing Data submissions” to be replaced with references to defined terms emanating from the Balancing Market provisions.
<b>Glossary</b>	
Definitions to be deleted or which refer to provisions proposed to be deleted	<b>Authorised Deviation Quantity (ADQ(p,d,t)):</b> For a Market Participant p for a given Trading Interval t, is as calculated under clause 6.17.2

Clause/ Section	Suggested Change/Comment
	<p><b>Commitment Compensation:</b> The amount calculated in accordance with clauses 6.18.2.</p> <p><b>Dispatch Instruction Payment (DIP):</b> Has the meaning given in clause 6.17.6.</p> <p><b>Dispatch Schedule:</b> Has the meaning given in clause 6.15.1 or 6.15.2, as applicable.</p> <p><b>Downward Deviation Administered Price (DDAP):</b> The amount calculated under clause 6.14.6.</p> <p><b>Downward Unauthorised Deviation Quantity (DUDQ (p, d, t)):</b> The amount calculated in accordance with clause 6.17.4.</p> <p><b>Facility Dispatch Tolerance:</b> The quantity by which the Metered Schedule of a Scheduled Generator registered by a Market Participant other than the Electricity Generation Corporation can deviate from the Dispatch Schedule for that Scheduled Generator before the Upward Deviation Administered Price (UDAP) or the Downward Deviation Administered Price (DDAP) will be applied to that deviation in settlement as determined under clause 6.17.9.</p> <p><b>Marginal Cost Administered Price (MCAP):</b> The dollar per MWh price calculated in accordance with clause 6.14.2.</p> <p><b>Operational System Load Estimate:</b> Has the meaning given in clause 6.14.4(a).</p> <p><b>Relevant Quantity:</b> Has the meaning given in clause 6.14.4(d).</p> <p><b>Scheduled System Load:</b> Has the meaning given in clause 6.14.4(c).</p> <p><b>Upward Deviation Administered Price (UDAP):</b> The amount calculated under clause 6.14.5.</p> <p><b>Upward Unauthorised Deviation Quantity (UUDQ):</b> The amount calculated under clause 6.17.3.</p>

Clause/ Section	Suggested Change/Comment
<p>Definitions to be inserted or amended to refer to new Balancing Market provisions</p>	<p><b>Balancing:</b> The process for meeting supply and consumption deviations from contracted bilateral and STEM positions in each Trading Interval.</p> <p><b>Balancing Data:</b> A set of prices to be used in forming Dispatch Merit Orders and in settling Balancing transactions for a Trading Day as provided by a Market Participant to the IMO in a Balancing Data Submission or as Standing Balancing Data.</p> <p><b>Balancing Data Submission:</b> A submission of Balancing Data to the IMO made in accordance with clause 6.5A.</p> <p><b>Balancing Market:</b> [TO BE INSERTED]</p> <p><b>Balancing Support Contract:</b> A contract between either the Electricity Generation Corporation or System Management and a Market Participant (other than the Electricity Generation Corporation), entered into pursuant to clause 7.6.7, that allows System Management to call upon the Facilities registered by the relevant Market Participant to assist System Management and the Electricity Generation Corporation in meeting their obligations under Chapter 7.</p> <p><b>Consumption Decrease Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Dispatchable Load and in the calculation of the Dispatch Instruction Payment for that Dispatchable Load for that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p> <p><b>Consumption Increase Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Dispatchable Load and in the calculation of the Dispatch Instruction Payment for that Dispatchable Load for that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p> <p><b>Dispatch Merit Order:</b> An ordered list of Scheduled Generators and Dispatchable Loads registered by Market Participants, other than the Electricity Generation Corporation, determined by the IMO in accordance with clause 6.12.1, indicating the order in which</p>

Clause/ Section	Suggested Change/Comment
	<p>those Scheduled Generators and Dispatchable Loads should receive Dispatch Instructions from System Management in the circumstances to which the relevant Dispatch Order applies (see comment in relation to clause 6.12 above).</p> <p><b>Energy Price Limits:</b> The set of price limits comprising the Maximum STEM Price, the Alternative Maximum STEM Price and the Minimum STEM Price (see comment in relation to clause 6.20.1 above).</p> <p><b>Liquid Supply Decrease Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Scheduled Generator declared to be operating on Liquid Fuel and in the calculation of the Dispatch Instruction Payment for that Scheduled Generator when declared to be operating on Liquid Fuel during that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p> <p><b>Liquid Supply Increase Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Scheduled Generator declared to be operating on Liquid Fuel and in the calculation of the Dispatch Instruction Payment for that Scheduled Generator when declared to be operating on Liquid Fuel during that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p> <p><b>Non-Liquid Supply Decrease Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Scheduled Generator declared to be operating on Non-Liquid Fuel and in the calculation of the Dispatch Instruction Payment for that Scheduled Generator when declared to be operating on Non-Liquid Fuel during that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p> <p><b>Non-Liquid Supply Increase Price:</b> A price specified in Balancing Data to apply in forming the Dispatch Merit Order for a Trading Interval for a Scheduled Generator declared to be operating on Non-Liquid Fuel and in the calculation of the Dispatch Instruction Payment for that Scheduled Generator when declared to be operating on Non-Liquid Fuel during that Trading Interval. Different values apply for Peak Trading Intervals and Off-Peak Trading Intervals.</p>

Clause/ Section	Suggested Change/Comment
	<p><b>Standing Balancing Data:</b> Balancing Data stored by the IMO reflecting the information described in Appendix 1 provided to the IMO in accordance with clause 2.33.3(c)(x) or clause 2.34 – actually defined in Appendix 1.</p>
<p><b>Appendix 1: Standing data</b></p>	<p>(c)v. and vi. define “Standing Balancing Data” for Scheduled Generators not registered to the Electricity Generation Corporation</p> <p>(h)vi. defines “Standing Balancing Data” for a Curtailable Load not registered to the Electricity Generation Corporation</p> <p>(i)xA. defines “Standing Balancing Data” for a Dispatchable Load not registered to the Electricity Generation Corporation</p> <p>Discuss if above definitions appropriate in new Balancing Market</p> <p>In (k)iii, reference to “Facility Dispatch Tolerance” needs to be replaced as that term is defined by reference to deleted clause 6.17.9.</p>
<p><b>Appendix 6: STEM Bid, STEM Offer and MCAP Price Curve Determination</b></p>	<p>In respect of the first part of the appendix, discuss if there will be equivalent provisions for the Balancing Market.</p> <p>Delete the second part of the appendix describing the creation of a single MCAP Price Curve.</p>
<p><b>Appendix 7: Dispatch Schedule Calculation</b></p>	<p>Referred to in, and refers to, clause 6.15 which will be deleted.</p>

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## Agenda Item 2e: Process Maps

### 1. OVERVIEW

The IMO has engaged Igniter to develop process maps of the new balancing market proposal. These maps clearly identify where flows of information exist between the IMO, SM and Market Participants.

The attached process maps show the processes for a Trading Day and for a Scheduling Day. It should be noted that the Trading Day and Scheduling Day process occur concurrently and are presented separately for illustrative purposes only.

The process maps are being developed simultaneously with the design details and as such the maps presented are in draft form only. They will evolve to incorporate changes to the design as required.

The next steps in the process mapping exercise are to document the functions of each process step, including:

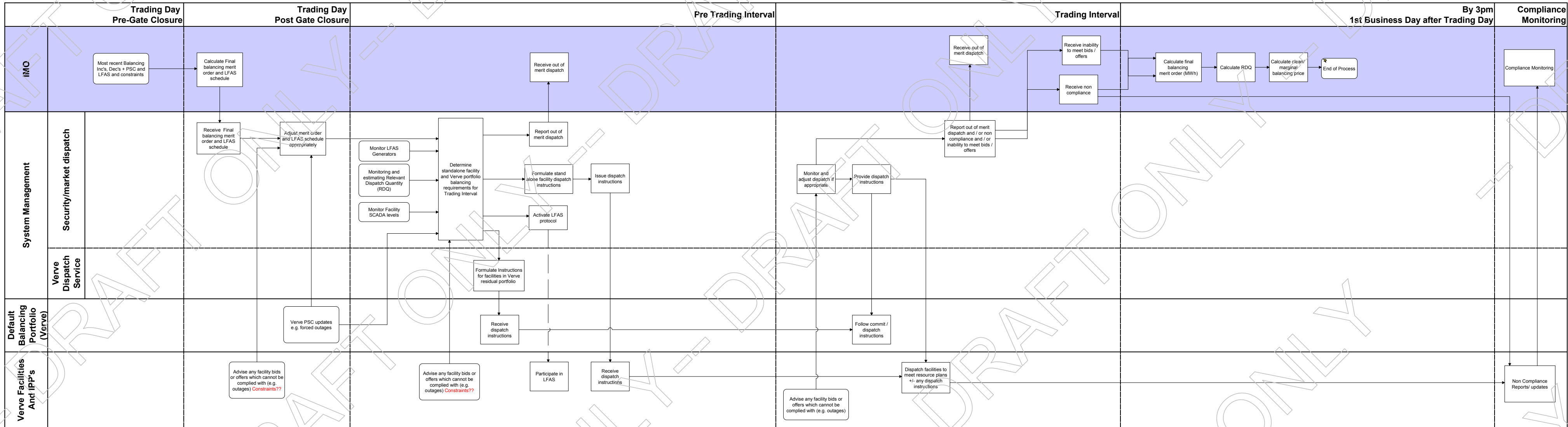
- IT aspects;
- rules development requirements;
- operational practices; and
- Rationale for each step.

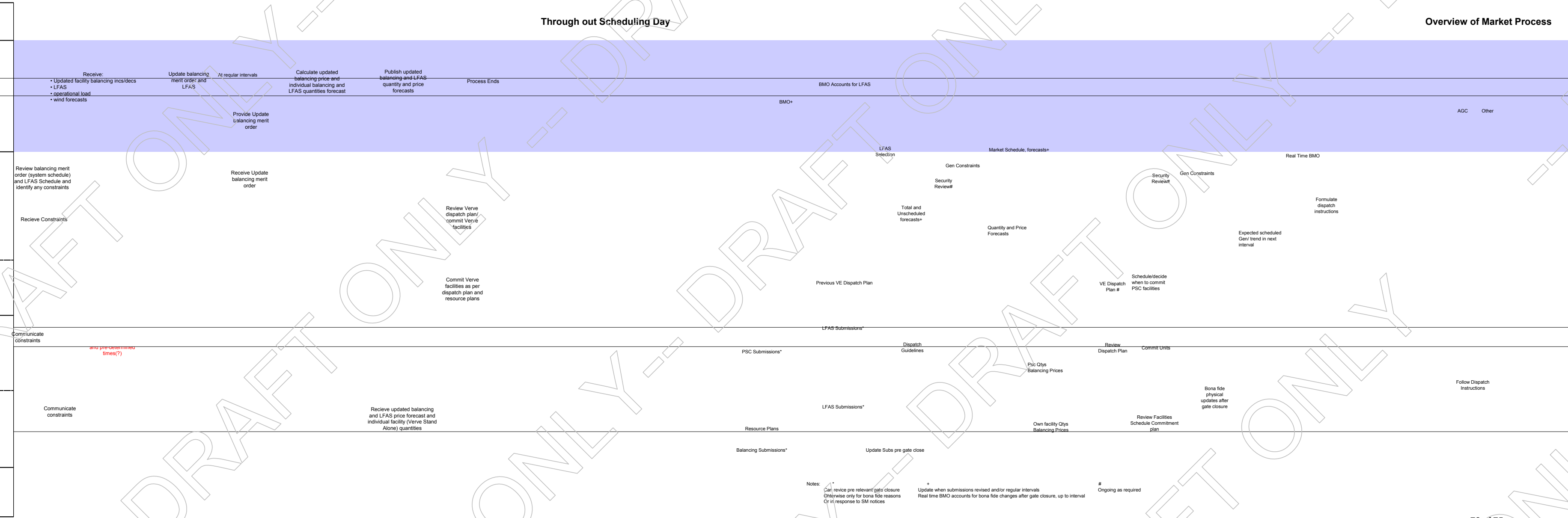
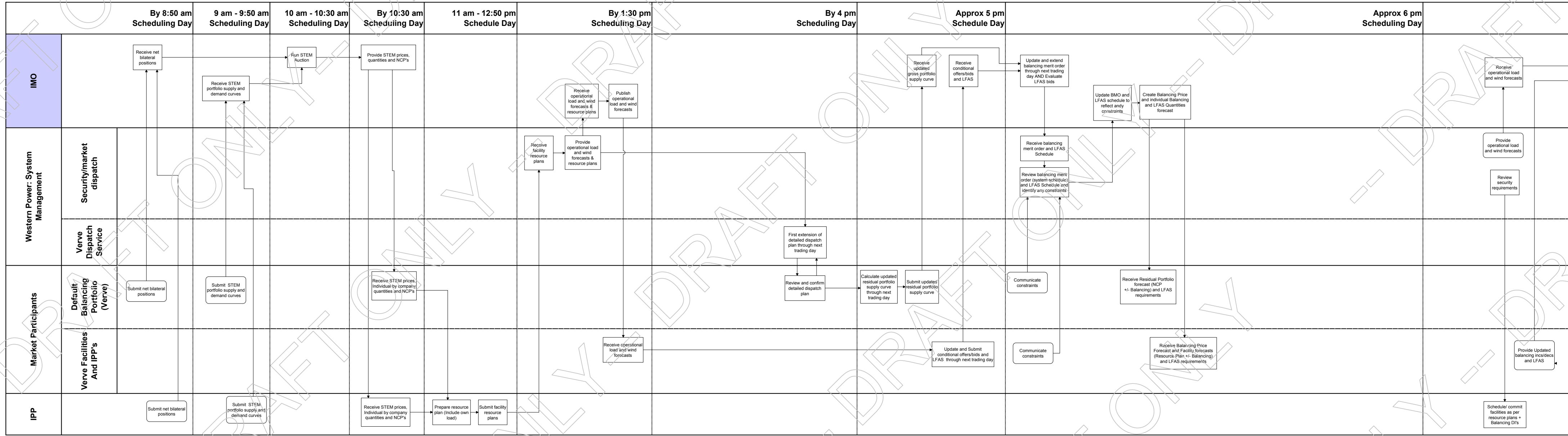
This document can be presented the RDIWG as it is developed.

### 3. RECOMMENDATIONS

The IMO recommends that the RDIWG:

- **Note** that the IMO will develop a document detailing the functions of each of the process steps.
- **Discuss** if the RDIWG would like to view this document as it evolves.









## RDIWG Action Points

**Legend:**

<b>Shaded</b>	Shaded action points are actions that have been completed since the last RDIWG meeting (contained in table 2).
<b>Unshaded</b>	Unshaded action points are still being progressed (contained in table 1).
<b>Missing</b>	Action items missing in sequence have been completed from previous meetings and subsequently removed from log.

**Table 1: Outstanding**

#	Action	Responsibility	Meeting arising	Status/Progress
11	The IMO to discuss with System Management its requirements for actual wind speed data and progress a Rule Change Proposal to ensure the provision of this data (if appropriate).	IMO/SM	2	Underway. Discussed with System Management 11 November 2010. System Management is summarizing the potential requirements for this. Once complete, an assessment will be made as to whether a Rule Change Proposal is necessary.
19	The IMO to investigate with System Management whether wind generation forecasts could be provided to participants at the same time as load forecasts.	IMO	3	
42	The IMO to offer site presentations to Working Group members and invite Working Group members to participate in the presentations.	IMO	5	Underway.

#	Action	Responsibility	Meeting arising	Status/Progress
43	The IMO to confirm the accounting advice it has received previously that its expenditure on the Market Evolution Program can all be capitalised.	IMO	6	Underway.
46	The IMO to undertake a high level cost/benefit analysis for the proposed Balancing provision solution.	IMO	6	Underway.
48	The IMO to work with System Management and potential providers of Load Following Ancillary Services (LFAS) to develop a set of principles for the provision of competitive LFAS that addresses the issues raised by RDIWG members, for presentation to the RDIWG at the 14 December 2010 meeting with the view to delivering solutions at a later meeting.	IMO with SM and potential LFAS providers	6	Underway.
51	The IMO to arrange a workshop in early 2011 with the Bureau of Meteorology (BoM) and RDIWG members, to discuss options for the enhancement of BoM forecasts and the wider usage of forecasts by Market Participants.	IMO	6	
52	The IMO and System Management to discuss System Management's dispatch system and whether it is able to accommodate future enhancements.	IMO and SM	6	Underway.
54	The IMO to expand the Reserve Capacity refunds paper to cover the use of a consolidated fund for refunds for the purposes of Supplementary Reserve Capacity.	IMO	7	Underway.

**Table 2: Completed since last meeting**

#	Action	Responsibility	Meeting arising	Status/Progress
53	The IMO to amend the minutes of Meeting No. 6 to reflect the points raised by the RDIWG and publish on the website as final.	IMO	7	Completed.

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## Agenda item 6 – Proposed additional meeting dates 2011

The previously agreed and proposed additional dates for RDIWG meetings in 2011 are contained in the tables below.

The meeting time, subject to change on some occasions, is 9.30 – 2.00 pm.

**Table 1: Previously agreed meeting schedule 2011**

Month	Meeting #	Date
February	9	22 February 2011
March	10	15 March 2011

**Table 2: Proposed additional meeting schedule 2011**

Month	Meeting #	Date
April	11	5 April 2011
April	12	3 May 2011
May	13	31 May 2011
June	14	21 June 2011