Notice of market rule modification

Paper No.	EMC/RCP/11/2004/227
Rule reference:	Chapter 6, App 6A, 6B, 6D and 6G, and Chapter 8
Proposer:	EMC
Date received by EMC:	15 December 2003
Category allocated:	3
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Effective Date:	3 Mar 2004
Summary of proposed rules change:	

This is a rule change proposal by the EMC to implement a new Short-Term Schedule (STS). The proposed STS incorporates the most recent dispatch-related information and hence, it enables the market participants to make more informed decisions. It will also allow the Gencos and the PSO to manage the generating units more effectively.

Date considered by Panel:	06 January 2004
Date considered by EMC Board:	29 January 2004
Date considered by Energy Market Authority:	25 February 2004
Proposed Rule Modification:	

Refer to attachment

Reasons for rejection/Reasons for referral back to Panel (if applicable):

PAPER NO.	:	**EMC/BD/01/2004/03(b)**

RCP PAPER NO.	:	**EMC/RCP/11/2004/227**

SUBJECT	:	**SHORT TERM SCHEDULE**

FOR	:	**DECISION**

PREPARED BY	**:**	**TEO WEE GUAN**

VETTED FOR QUALITY BY	**:**	**DR CHIAO YEN-SHONG** **Chief Economist**

APPROVED BY	:	**PAUL POH LEE KONG** **General Manager, Market Administration**

DATE	:	**29 January 2004**

Executive Summary

This is a rule change proposal by the EMC to implement a new Short-Term Schedule (STS).

The PTRCP had earlier approved the extension of 'gate closure' period from 2 to 4 hours as an interim measure to solve the 2-hour 'blind spot' in the pre-dispatch schedule (PDS). The PTRCP also noted that the STS was a long-term solution then; however, the STS was not chosen because it would require substantial system modifications which could not be completed prior to market start. It was noted by the PTRCP that the STS would be developed and implemented after market-start.

The proposed STS incorporates the most recent dispatch-related information and hence, enables the market participants to make more informed decisions. In view that the STS will lead to improved decision-making, the RCP recommends that the EMC Board **adopts** EMC's proposed STS rule changes.

1.   Introduction

This is a rule change proposal by the EMC to implement the Short-Term Schedule (STS). The proposed rule changes on STS are attached in Annex 1.

In advocating for the implementation of STS, this paper first refers to a rule change relating to the 2-hour 'blind spot' in the pre-dispatch schedule (PDS) approved by the PTRCP earlier. It then proceeds to analyze the benefits of STS.

2.   PTRCP's Earlier Decision on the 2-Hour 'Blind Spot' Issue

Prior to the rule change (EMC/PTRCP/193/2002) on offer change limits made in November 2002, there existed a two-hour 'blind spot' where offer variations submitted by the Gencos might not be reflected in the PDS which the Gencos or PSO received. This means the PDS may not reflect all relevant information necessary for the Gencos and PSO to manage the generating units effectively. The Gencos and PSO will need accurate and reliable pre-dispatch information to best prepare for actual dispatch in real-time.

The PTRCP deliberated on the above problem at the 14th PTRCP meeting held on 22 November 2002. Two options were being explored to overcome the abovementioned problem:

1. Extending the 'gate closure' period from two to four hours; and

2. Introducing a STS that would be produced more frequently than the PDS.

(Please refer to Annex 2 for the background on the 2-hour 'blind spot' issue and the pros and cons of each of these two options).

In its deliberation, the PTRCP noted that the STS offered the most desirable solution to the 2-hour 'blind spot' issue. In short, the STS would be able to provide the Gencos and PSO with enhanced information for them to effectively manage the generation units without having to impose a longer 'gate closure' period. However, the STS would require major system modifications which could not be completed prior to market-start.

Given this, the PTRCP supported the alternative of extending the 'gate closure' period. The PTRCP was informed that this would be used as an interim measure to solve the 2-hour 'blind spot' issue. Meanwhile, the STS, which offered the long-term solution, could be developed and implemented after market-start. For reference, the relevant part of the minutes on the 14th meeting PTRCP is attached in Annex 3.

3.   Benefits of STS

The proposed STS will incorporate the most recent dispatch-related information and hence, enhance decision-making of the MPs. The table below highlights the differences in the RTS, PDS and STS in terms of their information contents:

	Updating of dispatch-related Information	Periods Cover	Frequency of release
RTS	Updated ½ hourly; most recent information included	1 dispatch period	½ hourly

PDS	Updated 2-hourly; may not include the most recent information (e.g. changes in load forecasts, grid configurations, etc.)	Muiti-period (covers at least 12 hours and not more than 36 hours of time)	2 hourly
STS	Updated ½ hourly; include most recent information like the RTS.	Multi-period (covering 12 consecutive periods immediately after the period in which the STS is being published)	½ hourly

The PSO is supplying EMC with the very short term load forecast (VSTLF) half hourly for 7 hours (compared to 3 hours initially). The System Operation Manual has recently been amended to reflect this. These VSTLF will be used in the production of the STS.

In short, the STS provides enhanced information to the MPs because:

- the MCE incorporates the most recent dispatch-related information (e.g. load forecasts, dispatch network lines, etc) and Gencos' offers when it runs to produce the STS; and

- the STS is run and released to the MPs and PSO more frequently (i.e. every half-hourly).

The enhanced information enables the MPs to make more informed and efficient decisions, subject to the current rules on 'gate closure' period. It also enables the Gencos and the PSO to manage the generating units more effectively.

4.   Review of Gate Closure Period

One outstanding matter which remains is the review of the 'gate closure' period. It is possible to shorten the gate closure period with the introduction of STS. This will allow the MPs to react to changing market conditions closer to real-time, thus promoting dynamic efficiency.

The initial market rules (Chapter 6, Section 10.4.2.1, dated 20 Feb 2002) had a 1-hour gate closure period. This was subsequently amended to 2-hour (EMC/PTRCP/044/2002). At the 14th PTRCP meeting, the 2-hour 'gate closure' period was further extended to 4-hour to remove the 2-hour 'blind spot' in the PDS. With the implementation of STS, EMC will need to review the gate closure period again.   However, EMC recommends that such review be conducted within 6 months after the STS has been implemented.   This will give the MPs time to familiarize themselves with the STS, before any change to the gate closure period is further proposed.

5.   Assessment against Section 46(4) of the Electricity Act

This rules modification proposal is consistent with the functions and duties of EMA under section 3(3)(b) to promote the economic efficiency in the electricity industry.

The proposal does not discriminate in favour of or against a market participant or a class of market participants.

6.   Conclusion

The improved information contained in the STS would enable MPs to make more efficient decisions. This is because the proposed STS incorporates the most recent dispatch-related information and offers when it is being run and produced by the MCE. In view that the STS will lead to improved decision-making, EMC recommends that the Panel supports the proposed STS rule changes.

7.   Impact on market systems

New hardware and software were required for the implementation of STS. These included secure FTP and MCE Box Servers.

8.   Implementation

The STS required approximately 226 man-days (both external and internal) to develop and implement. EMC had already conducted a pilot test on the STS production among the MPs and the PSO.

9.   Consultation

We have published the proposed text of modifications on the EMC website for comments. No comments have been received for consideration.

10.   Legal sign off

Text of rule modification has been vetted by EMC's external legal counsel whose opinion is that the modification reflects the intent of the rule modification as expressed in the analysis section of this paper.

11.   Recommendations

The RCP has accepted by consensus the rule change proposal and recommends that the EMC Board
   a.   **adopt** EMC's proposed rule modifications to implement the STS as set out in Annex 1 of this paper;

   b.   **seek** EMA's approval of the proposed rule modifications;

   c.   recommend that the proposed modification come into force **2 weeks** after the date on which the approval of the Authority is published by the EMC; and

   d.   note that a review of the gate closure period will be conducted **within 6 months** after the STS has been implemented.

Annex 1: Proposed Modifications to he Market Rules endorsed by the Rule Change Panel in its 11th meeting and the EMC Board
EMC Ref: EMC/RCP/11/2004/227
Paper Title: Short Term Schedule

[Reason for modifications: The proposed rule modifications set out below in this Annex are for the implementation of short-term schedules (STS). The STS will be published every half-hourly and will incorporate the most recent dispatch-related information. Thus, the STS will be valuable to the Gencos and the PSO in allowing them to manage the generators and the power system more effectively. It will also enable the Gencos to make more informed and efficient decisions based on the improved contents of the STS.

Existing Market Rules Chapter 6	Proposed Rule Modifications (Addition marked by underline and deletion by strikethrough) Chapter 6

1.1.1   This Chapter sets forth the obligations and responsibilities of the *EMC*, the *PSO* and *market participants* relative to the establishment, operation and suspension of the *real-time markets* and the *procurement markets*, including:
 	
   1.1.1.1   the submission of *standing offers* and *offer variations* by *market participants*;
 	
   1.1.1.2   the operation of the *market clearing engine*;
 	
   1.1.1.3   the development of *market outlook scenarios* and *pre-dispatch schedule scenarios* and the associated pricing schedules;
	1.1.1 This Chapter sets forth the obligations and responsibilities of the *EMC*, the *PSO* and *market participants* relative to the establishment, operation and suspension of the *real-time markets* and the *procurement markets*, including:
	
	   1.1.1.1 the submission of *standing offers* and *offer variations* by *market participants*;
	
	   1.1.1.2 the operation of the *market clearing engine*;
	
	   1.1.1.3 the development of *market outlook scenarios*, ~~and~~ *pre-dispatch schedule scenarios* and *short-term schedules* and the associated pricing schedules;

1.1.1.4   the development of *real-time dispatch schedules* and *real-time pricing schedules*;

1.1.1.5   the issuance of *advisory notices*; and

1.1.1.6   the description of data to be provided to the settlement process.

3.5.1   The *EMC* shall, prior to the *market commencement date*, develop an *electronic communications system* that allows for:

     3.5.1.1   the submission of *standing offers* and *offer variations* by *dispatch coordinators*;

     3.5.1.2   the communication by the *EMC* to each *dispatch coordinator* of the acceptance or rejection of *standing offers* and *offer variations*;

     3.5.1.3   the issuance by the *EMC* of *market outlook scenarios*, *pre-dispatch schedule scenarios* and *real-time dispatch schedules* and the associated pricing schedules,

on a timely basis and in a manner consistent with these *market rules*.

1.1.1.4   the development of *real-time dispatch schedules* and *real-time pricing schedules*;

1.1.1.5   the issuance of *advisory notices*; and

1.1.1.6   the description of data to be provided to the settlement process.

3.5.1   The *EMC* shall, ~~prior to the *market commencement date*, develop~~ have an *electronic communications system* that allows for:

     3.5.1.1   the submission of *standing offers* and *offer variations* by *dispatch coordinators*;

     3.5.1.2   the communication by the *EMC* to each *dispatch coordinator* of the acceptance or rejection of *standing offers* and *offer variations*;

     3.5.1.3   the issuance by the *EMC* of *market outlook scenarios*, *pre-dispatch schedule scenarios*, <u>short-term schedules</u> and *real-time dispatch schedules* and the associated pricing schedules,

on a timely basis and in a manner consistent with these *market rules*.

4.2.1   *Standing offers* shall comply with the requirements of Appendix 6F and:

    4.2.1.5   shall be used in the production of any *market outlook scenarios*, *pre-dispatch schedules* or *real-time schedules* for those *dispatch periods* for which no valid *offer variations* are held by the *EMC*; and

    4.2.1.6   shall not, in the case of a revised *standing offer,* be guaranteed to supersede the pre-existing *standing offer* for a *dispatch period* if the revised *standing offer* is received and accepted as valid by the *EMC* less than 5 minutes prior to the commencement of the production by the *EMC* of any *market outlook scenarios*, *pre-dispatch schedules* or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the revised *standing offer* applies.

4.2.1   *Standing offers* shall comply with the requirements of Appendix 6F and:

    4.2.1.5   shall be used in the production of any *market outlook scenarios*, *pre-dispatch schedules*, <u>*short-term schedules*</u> or *real-time schedules* for those *dispatch periods* for which no valid *offer variations* are held by the *EMC*; and

    4.2.1.6   shall not, in the case of a revised *standing offer,* be guaranteed to supersede the pre-existing *standing offer* for a *dispatch period* if the revised *standing offer* is received and accepted as valid by the *EMC* less than 5 minutes prior to the commencement of the production by the *EMC* of any *market outlook scenarios*, *pre-dispatch schedules*<u>*, short-term schedules*</u> or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the revised *standing offer* applies.

4.3.1 *Offer variations*:	4.3.1 *Offer variations*:
4.3.1.5 shall, if accepted by the *EMC*, be stored by the *EMC* and used in the production of *market outlook scenarios*, *pre-dispatch schedules* and *real-time schedules* unless and until superseded, in respect of a given *dispatch period*, by another valid *offer variation*;	4.3.1.5 shall, if accepted by the *EMC*, be stored by the *EMC* and used in the production of *market outlook scenarios*, *pre-dispatch schedules*, *short-term schedules* and *real-time schedules* unless and until superseded, in respect of a given *dispatch period*, by another valid *offer variation*;
4.3.1.6 shall, if accepted by the *EMC*, be guaranteed to be used in the production of *market outlook scenarios*, *pre-dispatch schedules* and *real-time schedules* for the *dispatch period* to which the *offer variation* applies only if received and accepted as valid at least 5 minutes prior to the commencement of the production of the applicable *market outlook scenarios*, *pre-dispatch schedules* or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the *offer variation* applies; and	4.3.1.6 shall, if accepted by the *EMC*, be guaranteed to be used in the production of *market outlook scenarios*, *pre-dispatch schedules*, *short-term schedules* and *real-time schedules* for the *dispatch period* to which the *offer variation* applies only if received and accepted as valid at least 5 minutes prior to the commencement of the production of the applicable *market outlook scenarios*, *pre-dispatch schedules*, *short-term schedules* or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the *offer variation* applies; and

4.3.1.7 shall not be used in the production of any *market outlook scenarios*, *pre-dispatch schedules* or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the *offer variation* applies if submitted after the commencement of such *dispatch period.*	4.3.1.7 shall not be used in the production of any *market outlook scenarios*, *pre-dispatch schedules, short-term schedules* or *real-time schedules* containing the *dispatch period* within the current *market outlook horizon* to which the *offer variation* applies if submitted after the commencement of such *dispatch period.*
4.4.7 Where revised *standing capability data* in respect of a given *dispatch period* pertaining to a *registered facility*: 4.4.7.1 is rejected by the *PSO*; or 4.4.7.2 is not or cannot for any reason be communicated by the *PSO* to the *EMC* within such time as may be necessary to allow actions to be taken by the *EMC* to revise its records of the *standing capability data* in accordance with section 4.4.8, then the most recent valid *standing capability data* applicable to that *dispatch period* that is held in the records of the *PSO* for that *registered facility* shall apply for the purpose of determining *market outlook scenarios*, *pre-dispatch schedule scenarios,* and *real-time dispatch schedules*.	4.4.7 Where revised *standing capability data* in respect of a given *dispatch period* pertaining to a *registered facility*: 4.4.7.1 is rejected by the *PSO*; or 4.4.7.2 is not or cannot for any reason be communicated by the *PSO* to the *EMC* within such time as may be necessary to allow actions to be taken by the *EMC* to revise its records of the *standing capability data* in accordance with section 4.4.8, ~~then~~ then the most recent valid *standing capability data* applicable to that *dispatch period* that is held in the records of the *PSO* for that *registered facility* shall apply for the purpose of determining *market outlook scenarios*, *pre-dispatch schedule scenarios*, short-term schedules and *real-time dispatch schedules*.

	(Note: This is a new section to be inserted immediately after section 7.1.2)
	7.1.2A The *short-term horizon* shall, at any given point in time, cover twelve consecutive *dispatch periods* commencing immediately after the end of the current *dispatch period*.
7.1.3 The *EMC* shall determine *market outlook scenarios* and *pre-dispatch schedule scenarios* in order to provide itself, the *PSO* and *market participants* with advance information and projections necessary to plan the physical operation of the *PSO controlled system* and *registered facilities* and to manage *load* over the *market outlook horizon*.	7.1.3 The *EMC* shall determine *market outlook scenarios*, ~~and~~ *pre-dispatch schedule scenarios* and *short-term schedules* in order to provide itself, the *PSO* and *market participants* with advance information and projections necessary to plan the physical operation of the *PSO controlled system* and *registered facilities* and to manage *load* over the *market outlook horizon*.
(Note: This explanatory note is meant for Section 7.2.1 of Chapter 6) **Explanatory Note: If the demand forecast was for 5000 MW and the load sensitivity factor was 600 MW then we would have load scenarios for 4400 MW, 5000 MW, 5600 MW. The MCE will be solved with the 4400 MW, 5000 MW and 5600 MW loads for market outlook scenarios and pre-dispatch schedule scenarios. The results of these schedules give participants some idea as to how schedules will differ if the load differs from the expected value.**	(Note: This explanatory note is meant for Section 7.2.1 of Chapter 6) **Explanatory Note: If the demand forecast was for 5000 MW and the load sensitivity factor was 600 MW then we would have load scenarios for 4400 MW, 5000 MW, 5600 MW. The MCE will be solved with the 4400 MW, 5000 MW and 5600 MW loads for market outlook scenarios and pre-dispatch schedule scenarios. The results of these ~~schedules~~ scenarios give participants some idea as to how the schedules will differ if the load differs from the expected value. However, for the short-term schedules, the MCE will only solve with the 5000 MW demand forecast (i.e. the normal load forecast).**

	(Note: These provisions are new sections to be inserted immediately after section 7.4)
.	**7.4A DETERMINING SHORT-TERM SCHEDULE** 7.4A.1 The *EMC* shall, in accordance with section 7.6 and Appendix 6A, determine a *short-term schedule* corresponding to the *nodal load forecast* described in section 7.2.1.1. 7.4A.2 The *short-term schedule* shall include all *dispatch periods* in the *short-term horizon* current at the time when the *short-term schedule* is due to be released in accordance with section 7.7.2A. **Explanatory Note: The short-term schedule will always cover 12 consecutive dispatch periods.**

7.5 **INFORMATION USED IN EACH SCENARIO**

7.5.1 The *EMC* shall use the following information to determine and revise each of the scenarios referred to in sections 7.3 and 7.4 using the most current valid information:

    7.5.1.1 *offers* for the relevant *dispatch period* held by the *EMC*;

    7.5.1.2 *standing capability data* as applicable to each *dispatch day* represented within the *pre-dispatch horizon* and the *market outlook horizon*, as the case may be, held by the *EMC;*

    7.5.1.3 the applicable *nodal load forecasts* referred to in section 7.3.1 or 7.4.1, as the case may be;

    7.5.1.4 the *dispatch related data* referred to in section 6.1.1.3 received from the *PSO*;

7.5 **INFORMATION USED IN EACH SCENARIO OR SCHEDULE**

7.5.1 The *EMC* shall use the following information to determine and revise each of the scenarios or schedule referred to in sections 7.3, and 7.4 and 7.4A using the most current valid information:

    7.5.1.1 *offers* for the relevant *dispatch period* held by the *EMC*;

    7.5.1.2 *standing capability data* as applicable to each *dispatch* day *period* represented within the *short-term horizon,* *pre-dispatch horizon* and the *market outlook horizon*, as the case may be, held by the *EMC*;

    7.5.1.3 the applicable *nodal load forecasts* referred to in section 7.3.1, or 7.4.1 or 7.4A.1, as the case may be;

    7.5.1.4 the *dispatch related data* referred to in section 6.1.1.3 received from the *PSO*;

7.5.1.5	the initial loading of each *generation facility*, determined:	7.5.1.5	the initial loading of each *generation facility*, determined:
	a. in the case of each *market outlook scenario*, on the basis of the end of the last *dispatch period* represented in the most recently *published pre-dispatch schedule* which was determined using the same *nodal load forecast* and that contains the applicable *dispatch period*; and		a. in the case of each *market outlook scenario*, on the basis of the end of the last *dispatch period* represented in the most recently *published pre-dispatch schedule* which was determined using the same *nodal load forecast* and that contains the applicable *dispatch period*; and
	b. in the case of each *pre-dispatch schedule scenario*, on the basis of the later of the *real-time dispatch schedule* for the period after the current *dispatch period* (if available) and the *real-time dispatch schedule* for the current *dispatch period*;		b. in the case of each *pre-dispatch schedule scenario*, on the basis of the later of the *real-time dispatch schedule* for the period after the current *dispatch period* (if available) and the *real-time dispatch schedule* for the current *dispatch period*;
7.5.1.6	the *import limit* and *export limit*;	7.5.1.6	the *import limit* and *export limit*;
7.5.1.7	the applicable price limits from Appendix 6J; and	7.5.1.7	the applicable price limits from Appendix 6J; and
7.5.1.8	such other parameters or data as may be required to enable the *market clearing engine* to determine the required outputs.	7.5.1.8	such other parameters or data as may be required to enable the *market clearing engine* to determine the required outputs.

7.6	**SOLVING EACH SCENARIO**	**7.6**	**SOLVING EACH SCENARIO OR SCHEDULE**
7.6.1	The *EMC* shall determine and revise as required each *market outlook scenario* and *pre-dispatch schedule scenario* by sequentially running the *market clearing engine* for each *dispatch period* specified in section 7.3.2 or 7.4.2, as the case may be, using the information described in section 7.5. When preparing each *pre-dispatch schedule scenario*, the *market clearing engine* shall be run for each *dispatch period* from the end of the relevant *dispatch period* for which the *real-time dispatch schedule* used in Section 7.5.1.5(b) applies, until the end of the relevant *pre-dispatch horizon*.	7.6.1	The *EMC* shall determine and revise as required each *market outlook scenario*, ~~and~~ *pre-dispatch schedule scenario* and *short-term schedule* by sequentially running the *market clearing engine* for each *dispatch period* specified in section 7.3.2, ~~or~~ 7.4.2 or 7.4A.2, as the case may be, using the information described in section 7.5. ~~When preparing each pre-dispatch schedule scenario, the market clearing engine shall be run for each dispatch period from the end of the relevant dispatch period for which the real-time dispatch schedule used in Section 7.5.1.5(b) applies, until the end of the relevant pre-dispatch horizon.~~
		7.6.1A	When preparing each *pre-dispatch schedule scenario*, the *market clearing engine* shall be run for each *dispatch period* from the end of the relevant *dispatch period* for which the *real-time dispatch schedule* used in Section 7.5.1.5(b) applies, until the end of the ~~relevant~~ *pre-dispatch horizon* to which such *pre-dispatch schedule scenario* relates.
		7.6.1B	When preparing each *short-term schedule*, the *market clearing engine* shall be run for each *dispatch period* from the end of the current *dispatch period*, until the end of the ~~relevant~~ *short-term horizon* to which such *short-term schedule* relates.

	Explanatory note: This means that for the short-term schedule, the market clearing engine is always run from the best current estimates of data. However, when reporting the actual schedule, only the dispatch periods in the short-term horizon are reported – the initial period that is run in order to get to the start of the short-term horizon is not reported.
	
	(Note: The following is a new section to be inserted immediately after section 7.7.2)
	
	7.7.2A Not later than 25 minutes prior to the commencement of the first *dispatch period* of the *short-term schedule* referred to in section 7.4A, the *EMC* shall, for each *dispatch period* included in the *short-term schedule:*
	
	    7.7.2A.1 release to the *dispatch coordinator* for each *registered facility* the projected schedules for *energy*, *regulation* and *reserve*, by *reserve class*, for that *registered facility;*
	
	    7.7.2A.2 *publish* the information described in section 7.7.3; and
	
	    7.7.2A.3 communicate to the *PSO* the projected schedules for *energy*, *regulation* and *reserve*, by *reserve class*, for each *registered facility*, together with the information described in section 7.7.3, in accordance with the *system operation manual* and any applicable *market manual.*

7.7.3 In accordance with sections 7.7.1and 7.7.2, the *EMC* shall *publish* the following information for each *dispatch period* and for each *market outlook scenario* and *pre-dispatch schedule scenario*:	7.7.3 In accordance with sections 7.7.1,~~and~~ 7.7.2 and 7.7.2A, the *EMC* shall *publish* the following information for each *dispatch period* and for each *market outlook scenario*, ~~and~~ *pre-dispatch schedule scenario* and *short-term schedule*:
7.7.3.1 the projected total *load*;	7.7.3.1 the projected total *load*;
7.7.3.2 the projected total transmission losses;	7.7.3.2 the projected total transmission losses;
7.7.3.3 total *reserve* requirements by *reserve class*;	7.7.3.3 total *reserve* requirements by *reserve class*;
7.7.3.4 total *regulation* requirements;	7.7.3.4 total *regulation* requirements;
7.7.3.5 projected *energy* prices associated with each *market network node* at which a *generation registered facility* or *generation settlement facility* is located, determined in accordance with sections D.24.1 and D.24.5 of Appendix 6D;	7.7.3.5 projected *energy* prices associated with each *market network node* at which a *generation registered facility* or *generation settlement facility* is located, determined in accordance with sections D.24.1 and D.24.5 of Appendix 6D;
7.7.3.6 the projected *uniform Singapore energy price,* determined in accordance with section D.24.6 of Appendix 6D;	7.7.3.6 the projected *uniform Singapore energy price,* determined in accordance with section D.24.6 of Appendix 6D;
7.7.3.7 projected *reserve prices* for each *reserve class* and *reserve provider group*, determined in accordance with sections D.24.3, D.24.5 and D.24.7 of Appendix 6D;	7.7.3.7 projected *reserve prices* for each *reserve class* and *reserve provider group*, determined in accordance with sections D.24.3, D.24.5 and D.24.7 of Appendix 6D;
7.7.3.8 projected *regulation prices*, determined in accordance with sections D.24.4 and D.24.5 of Appendix 6D;	7.7.3.8 projected *regulation prices*, determined in accordance with sections D.24.4 and D.24.5 of Appendix 6D;
7.7.3.9 any predicted system *energy* shortfalls;	7.7.3.9 any predicted system *energy* shortfalls;

7.7.3.10 any predicted system *reserve* shortfalls, by *reserve class*; 7.7.3.11 any predicted system *regulation* shortfalls; and 7.7.3.12 a list of security constraints and generation fixing constraints applied.	7.7.3.10 any predicted system *reserve* shortfalls, by *reserve class*; 7.7.3.11 any predicted system *regulation* shortfalls; and 7.7.3.12 a list of *security constraints* and *generation fixing constraints* applied.
7.7.4 The *market outlook scenarios* and *pre-dispatch schedule scenarios* reflect indicative forecasts, are released for information purposes only and are not binding on the *EMC*, the *PSO* or any *market participant*.	7.7.4 The *market outlook scenarios*, ~~and~~ *pre-dispatch schedule scenarios*, and *short-term schedules* reflect indicative forecasts, ~~which~~ are released for information purposes only and are not binding on the *EMC*, the *PSO* or any *market participant*.
9.3.1 The *EMC* shall issue, as soon as practicable and in such manner as will provide adequate notice, using electronic means or in the case where electronic means are not available, by any other means it considers suitable, *advisory notices* pertaining to the incidence and extent of any of the following events for any *dispatch period* included in the current *market outlook horizon* in respect of which such event is indicated by the *market outlook scenarios* and *pre-dispatch schedule scenarios* described in sections 7.3 and 7.4, and containing the applicable information described in Appendix 6H: 9.3.1.1 any *energy* surplus; 9.3.1.2 any *energy* shortfalls; 9.3.1.3 any *reserve* shortfalls, by *reserve class*; and 9.3.1.4 any *regulatio*n shortfalls.	9.3.1 The *EMC* shall issue, as soon as practicable and in such manner as will provide adequate notice, using electronic means or in the case where electronic means are not available, by any other means it considers suitable, *advisory notices* pertaining to the incidence and extent of any of the following events for any *dispatch period* included in the current *market outlook horizon* in respect of which such event is indicated by the *market outlook scenarios*, ~~and~~ *pre-dispatch schedule scenarios* and *short-term schedule* described in sections 7.3, ~~and~~ 7.4 and 7.4A respectively, and containing the applicable information described in Appendix 6H: 9.3.1.1 any *energy* surplus; 9.3.1.2 any *energy* shortfalls; 9.3.1.3 any *reserve* shortfalls, by *reserve class*; and 9.3.1.4 any *regulatio*n shortfalls.

9.3.2   The *EMC* shall issue, as soon as practicable and in such manner as will provide adequate notice, using electronic means, or in the case where electronic means are not available, by any other means it considers suitable, and containing the applicable information described in Appendix 6H:

    9.3.2.1   system status *advisory notices* for the current *dispatch period* or any *dispatch period* of the current *pre-dispatch horizon* in respect of which it has been informed by the *PSO* that a major equipment *outage, load shedding* or other abnormal condition on the *PSO controlled system* that the *PSO* considers material is occurring or is likely to occur;

    9.3.2.2   communications warning *advisory notices* for the current *dispatch period* or any *dispatch period* of the current *pre-dispatch horizon* in respect of which *market participants* are experiencing, or the *EMC* considers that there is a significant probability that *market participant*s will experience, difficulties in delivering communications to, or receiving communications from, the *EMC*, or that the *EMC* will experience, difficulties in delivering communications to, or receiving communications from, the *PSO*; and

9.3.2   The *EMC* shall issue, as soon as practicable and in such manner as will provide adequate notice, using electronic means, or in the case where electronic means are not available, by any other means it considers suitable, and containing the applicable information described in Appendix 6H:

    9.3.2.1   system status *advisory notices* for the current *dispatch period*, any *dispatch period* of the current *short-term horizon* or any *dispatch period* of the current *pre-dispatch horizon* in respect of which it has been informed by the *PSO* that a major equipment *outage, load shedding* or other abnormal condition on the *PSO controlled system* that the *PSO* considers material is occurring or is likely to occur;

    9.3.2.2   communications warning *advisory notices* for the current *dispatch period*, any *dispatch period* of the current *short-term horizon* or any *dispatch period* of the current *pre-dispatch horizon* in respect of which *market participants* are experiencing, or the *EMC* considers that there is a significant probability that *market participant*s will experience, difficulties in delivering communications to, or receiving communications from, the *EMC*, or that the *EMC* will experience, difficulties in delivering communications to, or receiving communications from, the *PSO*; and

9.3.2.3 price warning *advisory notices* for the current *dispatch period,* any *dispatch period* of the *pre-dispatch horizon* or any *dispatch period* of the *market outlook horizon* for which the prices calculated or released to *market participant*s may be subject to revision.	9.3.2.3 price warning *advisory notices* for the current *dispatch period,* <u>any *dispatch period* of the current *short-term horizon,*</u> any *dispatch period* of the *pre-dispatch horizon* or any *dispatch period* of the *market outlook horizon* for which the prices calculated or released to *market participant*s may be subject to revision.

APPENDIX A- MARKET OPERATIONS TIMETABLE

A.1   INTRODUCTION

A.1.1   This Appendix sets forth certain obligations respecting actions to be taken, and the time at which such actions must be taken, by the *EMC*, the *PSO* and *market participants* in respect of *real-time market operations*.

A.1.2   In this Appendix:

   A.1.2.1   "D" shall refer to a *trading day*;
   A.1.2.2   "T" shall refer to the beginning of a *dispatch period*; and
   A.1.2.3   "PDS" shall refer to a *pre-dispatch schedule*.

A.2   THE MARKET OPERATIONS TIMETABLE

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
		Standing Capability Data				
Prior to facility registration	As specified in the applicable *market manual*	Provide initial *standing capability data* where such data shall have been provided to the *PSO* by a *market participant*, and approved by the *PSO*, in accordance with the *systems operations manual*.	*PSO*	*EMC*	From first day of participation and until superseded.	Once
Before day D	As specified in the applicable *market manual*	Provide revised *standing capability data* where such data shall have been provided to the *PSO* by a *market participant*, and approved by the *PSO*, in accordance with the *systems operations manual*.	*PSO*	*EMC*	From day D until superseded	As required
		Standing Offers for Energy, Reserve and Regulation				
Prior to facility registration	Any	First *standing offer* submitted	*Market participant*	*EMC*	Until superseded	Once
Any time, until D	T-4 hours	Last time at which valid revised *standing offer* may be submitted without being subject to review in accordance with section 10.4 of Chapter 6.	*Market participant*	*EMC*	Until superseded	On going/as required

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
Any time, until D	T-5 minutes.	Last time at which a valid revised *standing offer* is guaranteed to be included in the *real-time scheduling* process.	*Market participant*	*EMC*	Until superseded	On going/as required
		Offer Variations for Energy, Reserve and Regulation				
D-8 days	9:00	*EMC* begins accepting *offer variations* for *dispatch periods* during *trading day* D.	*EMC*		D	On going
D-8 days to D	From 9:00 on D-8, within 5 minutes of receipt	Notification of acceptance/rejection of *offer*.	*EMC*	*Market participant*	D	On going
D	T-4 hours	Last time at which valid *offer variation* may be submitted without being subject to review in accordance with section 10.4 of Chapter 6.	*Market participant*	*EMC*	T	On going

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
D	T-5 minutes.	Last time at which a valid *offer variation* is guaranteed to be included in the *real-time scheduling* process.	*Market participant*	*EMC*	T	On going
		Market Outlook Scenarios				
D-7 days	21:00	Last time at which valid *offer variations* are guaranteed to be included in *market outlook scenarios* run at 21:00 on D-7 days.	*Market participant*	*EMC*		Daily
D-7 days	By 21:00	*Dispatch-related data* issued for D, and revised data issued for days D-5 to D-1.	*PSO*	*EMC*	2 to 7 days hence	Daily
D-7 days	From 21:00	*EMC* runs *market outlook scenarios* for period from beginning of D-5 to end of D.	*EMC*		End of current *pre-dispatch horizon* (beginning of D-5 to end of D)	Daily
D-6 days	9:00	*Market outlook scenario* results for period from the beginning of D-5 to end of D *published*.	*EMC*	Some just to *market participant*s, some *published*. All to *PSO*.	D-5 00:00 to D 23:30	Daily

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
		Pre-Dispatch Schedules				
D-1 day/ D	PDS publication time – 125 minutes	Latest time at which *offer variations* are guaranteed to be included in PDS run.				Every 120 minutes
D-1 day/ D	PDS publication time – 120 minutes	Latest time to complete updating of *PSO* data to be used in the PDS.	*PSO*	*EMC*	*pre-dispatch horizon* as at that time.	Every 120 minutes
D-1 day / D	PDS publication time – 120 minutes	Computation begins of PDS using the *market clearing engine*.	*EMC*		*pre-dispatch horizon* as at that time.	Every 120 minutes
D-1 day	By 11:45	First PDS information released for *trading day*.	*EMC*	Some just to *market participant*s, some *published* All to *PSO*.	12:00 on D-1 day to 23:30 on D	Daily
D-1 day to D	Every 120 minutes from 11:45 on D-1 day.	PDS information released for remaining periods in day D.	*EMC*	Some just to *market participant*s, some *published* All to *PSO*.	PDS *publication* time plus 15 minutes to 23:30 on D	Every 120 minutes

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
D	21:45	Final PDS information released for last *dispatch period* in day D. (Information for D+1 also included.)	*EMC*	Some just to *market participant*s, some *published* All to *PSO*.		Daily
		Short-Term Schedule				
D	T-4 minutes	Latest time at which *offer variations* are guaranteed to be included in *short-term schedule* run.	*Market participant*	*EMC*		Every 30 minutes
D	T–4 minutes	Latest time to complete updating of *PSO* data to be used in the *short-term schedule.*	*PSO*	*EMC*	13 consecutive *dispatch periods* commencing at T. (Note: The first dispatch period will not be published. This is covered in the RTS.)	Every 30 minutes
D	T-4 minutes	Computation begins of *short-term schedule* using the *market clearing engine*.	*EMC*		13 consecutive *dispatch periods* commencing at T. (Note: The first dispatch period will not be published. This is covered in the RTS.)	Every 30 minutes

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
D	T+5 minutes	*Short-term schedule* information released.	*EMC*	Some just to *market participants*, some *published* All to *PSO.*	12 consecutive *dispatch periods* commencing at T+30 minutes	Every 30 minutes
		Real-Time Dispatch				
D	T-5	Latest time to complete updating of *dispatch-related data* to be used in the *real-time dispatch schedule*.	*PSO*	*EMC*		Every 30 minutes
D	T –5	Computation begins of *real-time dispatch schedule* using the *market clearing engine*.	*EMC*			Every 30 minutes
D	Prior to T – 30 seconds	Issuance of *real-time dispatch schedules*, *real-time pricing schedule*, and the market information set out in section 9.2.4 of this Chapter.	*EMC*	Some just to *market participant*s, some *published*. *Real-time dispatch schedules* to *PSO.*	T + 30 minutes, or until revised.	Every 30 minutes
D	Prior to T	Where necessary, *PSO* issues dispatch instructions.	*PSO*	*Market participants.*	T + 30 minutes, or until revised.	Every 30 minutes

Day	Time of Day	Event	Provided By/ Who does it	Provided To	Period Covered	Frequency
D	All times	In accordance with Chapter 5, *PSO* monitors dispatch and may intervene by issuing *dispatch instructions* via *AGC* or voice communications.	*PSO*	*Market participant*s	T + 30 minutes	On going
		After Real-Time Dispatch				
D+1 day	12:00	Issue report as required for day D.	*EMC*	*Market Surveillance and Compliance Panel*	Previous *trading day*	Daily

Existing Market Rules Appendix 6B	Proposed Rule Modifications (Addition marked by underline and deletion by strikethrough) Appendix 6B
B.9.1 Such parameters as may be required to indicate the sources of input data and the destinations of output data for the production of each of the *market outlook scenarios*, the *pre-dispatch schedule scenarios* and the *real-time dispatch schedule*.	B.9.1 Such parameters as may be required to indicate the sources of input data and the destinations of output data for the production of each of the *market outlook scenarios*, the *pre-dispatch schedule scenarios*, the *short-term schedule* and the *real-time dispatch schedule*.

D.6.5   In the case where the *dispatch period* is involved in the calculation of a *pre-dispatch schedule scenario* or *market outlook scenario*, or where the *dispatch period* is involved in the calculation of a *real-time dispatch schedule*, then the *EMC* shall make the following changes to the dispatch network for the *dispatch period* in respect of each *generation unit* for each *generation registered facility* which is not represented as *synchronised* in the status data on the network elements received from the *PSO*:

D.6.5.1   Add an artificial *dispatch network node* and connect the *generation unit* to the *dispatch network node*.

D.6.5.2   Add an artificial *dispatch network line* connected to the *artificial dispatch network node* described in D.6.5.1, and the default bus for the *generation unit* described in section D.7.2 or D.7.3, as the case may be. The artificial *dispatch network lines* used for this purpose shall not include constraint D.16.2.3, 21.1.1, 21.1.2, 21.1.3 and 21.1.4, and shall have a conventional direction defined to be from the artificial *dispatch network node* to the default bus, and shall use a negative value specified by *EMC* for the parameter $LineMaxReverse_k$, and a value determined by the *EMC* for all such artificial *dispatch network lines* as $LineMaxForward_k$.

Explanatory Note: The effect of this section is that in the preparation of dispatch, pre-dispatch and market outlook scenarios the MCE will model all units as if they are connected, and hence the offers for the period will determine whether they generate in the schedule. The allowance for a very small reverse capability on the artifical dispatch network lines is to allow a shadow price to be derived at the artificial dispatch network node which is based on the local system marginal price.

D.6.5   In the case where the *dispatch period* is involved in the calculation of a _short-term schedule, pre-dispatch schedule scenario_ or *market outlook scenario*, or where the *dispatch period* is involved in the calculation of a *real-time dispatch schedule*, then the *EMC* shall make the following changes to the dispatch network for the *dispatch period* in respect of each *generation unit* for each *generation registered facility* which is not represented as *synchronised* in the status data on the network elements received from the *PSO*:

D.6.5.1   Add an artificial *dispatch network node* and connect the *generation unit* to the *dispatch network node*.

D.6.5.2   Add an artificial *dispatch network line* connected to the *artificial dispatch network node* described in D.6.5.1, and the default bus for the *generation unit* described in section D.7.2 or D.7.3, as the case may be. The artificial *dispatch network lines* used for this purpose shall not include constraint D.16.2.3, 21.1.1, 21.1.2, 21.1.3 and 21.1.4, and shall have a conventional direction defined to be from the artificial *dispatch network node* to the default bus, and shall use a negative value specified by *EMC* for the parameter $LineMaxReverse_k$, and a value determined by the *EMC* for all such artificial *dispatch network lines* as $LineMaxForward_k$.

Explanatory Note: The effect of this section is that in the preparation of real-time dispatch schedule, short-term schedule, pre-dispatch schedule and market outlook scenarios, the MCE will model all units as if they are connected, and hence the offers for the period will determine whether they generate in the schedule. The allowance for a very small reverse capability on the artifical dispatch network lines is to allow a shadow price to be derived at the artificial dispatch network node which is based on the local system marginal price.

D.6.6 For the purpose of determining when the status data on the network elements is no longer recent enough for use in the preparation of a *real-time dispatch schedule* in accordance with section D.6.5, the *EMC* shall define, prior to the *market commencement date* and in consultation with the *PSO*, and shall thereafter maintain and update as required, in consultation with the *PSO*, the parameter StatusDataLifeMax.	D.6.6 For the purpose of determining when the status data on the network elements is no longer recent enough for use in the preparation of a *short-term schedule* or a *real-time dispatch schedule* in accordance with section D.6.5, the *EMC* shall define, prior to the *market commencement date* and in consultation with the *PSO*, and shall thereafter maintain and update as required, in consultation with the *PSO*, the parameter StatusDataLifeMax.

D.8.3 In the case where the *dispatch period* is being produced for a *real-time dispatch schedule*, then the initial generation levels StartGeneration$_g$ for *multi-unit facilities* shall be calculated from the initial generation levels of the constituent *generation units*, subject to section D.8.3.1, in accordance with the following table:

For *multi-unit facilities g* comprising one gas turbine and one steam turbine which is not shared with another *generation registered facility*: $\text{StartGeneration}_g = \sum_{u \in \text{UNITS}_g} \text{StartGeneration}_u$

For *multi-unit facilities g* comprising one gas turbine and one steam turbine which is shared with another *generation registered facility*, which other *generation registered facility* comprises a gas turbine and the shared steam turbine:

$$\text{StartGeneration}_g = \text{StartGeneration}_{u(GT)} + \frac{\text{StartGeneration}_{u(GT)}}{\text{StartGeneration}_{u(GT)} + \text{StartGeneration}_{u(GT2)}} \times \text{StartGeneration}_{u(ST)}$$

where:

StartGeneration$_{u(ST)}$ is the initial generation of the shared steam turbine.

D.8.3 In the case where the *dispatch period* is being produced for a *real-time dispatch schedule*, or where the *dispatch period* is the first *dispatch period* of the multiple *dispatch periods* involved in the calculation of the *short-term schedule*, then the initial generation levels StartGeneration$_g$ for *multi-unit facilities* shall be calculated from the initial generation levels of the constituent *generation units*, subject to section D.8.3.1, in accordance with the following table:

For *multi-unit facilities g* comprising one gas turbine and one steam turbine which is not shared with another *generation registered facility*: $\text{StartGeneration}_g = \sum_{u \in \text{UNITS}_g} \text{StartGeneration}_u$

For *multi-unit facilities g* comprising one gas turbine and one steam turbine which is shared with another *generation registered facility*, which other *generation registered facility* comprises a gas turbine and the shared steam turbine:

$$\text{StartGeneration}_g = \text{StartGeneration}_{u(GT)} + \frac{\text{StartGeneration}_{u(GT)}}{\text{StartGeneration}_{u(GT)} + \text{StartGeneration}_{u(GT2)}} \times \text{StartGeneration}_{u(ST)}$$

where:

StartGeneration$_{u(ST)}$ is the initial generation of the shared steam turbine.

StartGeneration$_{u(GT)}$ is the initial generation of the gas turbine for the current *generation registered facility*.

StartGeneration$_{u(GT2)}$ is the initial generation of the gas turbine for the *generation registered facility* which shares the steam turbine with the current *generation registered facility*.

However, if the initial generation of both gas turbines is zero, then the following formula will be used to calculate StartGeneration$_g$ for the *generation registered facility*:

$$\text{StartGeneration}_g = 0.5 \times \text{StartGeneration}_{u(ST)}$$

For *multi-unit facilities g* comprising two gas turbines and one steam turbine which is not shared with another *generation registered facility*:

$$\text{StartGeneration}_g = \sum_{u \in \text{UNITS}_g} \text{StartGeneration}_u$$

StartGeneration$_{u(GT)}$ is the initial generation of the gas turbine for the current *generation registered facility*.

StartGeneration$_{u(GT2)}$ is the initial generation of the gas turbine for the *generation registered facility* which shares the steam turbine with the current *generation registered facility*.

However, if the initial generation of both gas turbines is zero, then the following formula will be used to calculate StartGeneration$_g$ for the *generation registered facility*:

$$\text{StartGeneration}_g = 0.5 \times \text{StartGeneration}_{u(ST)}$$

For *multi-unit facilities g* comprising two gas turbines and one steam turbine which is not shared with another *generation registered facility*:

$$\text{StartGeneration}_g = \sum_{u \in \text{UNITS}_g} \text{StartGeneration}_u$$

D.8.6 In the case where the *dispatch period* is involved in the calculation of a *pre-dispatch schedule scenario* or a *market outlook scenario,* but is not the first *dispatch period* of the multiple *dispatch periods* involved in the calculation of the *pre-dispatch schedule scenario* or *market outlook scenario*, then the initial generation levels StartGeneration$_g$ for *multi-unit facilities* shall be the same as the corresponding values Generation$_g$ for the same *generation registered facility* for the immediately preceding *dispatch period* in that *pre-dispatch schedule scenario* or *market outlook scenario*.	D.8.6 In the case where the *dispatch period* is involved in the calculation of a <u>*short-term schedule,*</u> a *pre-dispatch schedule scenario* or a *market outlook scenario,* but is not the first *dispatch period* of the multiple *dispatch periods* involved in the calculation of the <u>*short-term schedule, pre-dispatch schedule scenario*</u> or *market outlook scenario*, then the initial generation levels StartGeneration$_g$ for *multi-unit facilities* shall be the same as the corresponding values Generation$_g$ for the same *generation registered facility* for the immediately preceding *dispatch period* in that <u>*short-term schedule,*</u> *pre-dispatch schedule scenario* or *market outlook scenario*.

D.12.1 In the case where a *real-time dispatch schedule* is being produced, values of StartGeneration$_g$ for each *generation registered facility* in the applicable *dispatch period,* except *multi-unit facilities*, shall be the values received from the *PSO* in accordance with Appendix 6G section G.3.1.

        D.12.1.1 In the event that a value of StartGeneration$_g$ for any *generation unit* that is not part of a *multi-unit facility* is not updated by the *PSO* or provided to the *EMC* during the *dispatch period* for the time being when the calculation of the *real-time dispatch schedule* commences, the initial generation level of StartGeneration$_g$ for the *generation registered facility* shall be the same as the corresponding value of Generation$_g$ for the same *generation registered facility* in the *real-time dispatch schedule* for the *dispatch period* with respect to the time when the calculation of the *real-time dispatch schedule* commences. In the event that no such *real-time dispatch schedule* is available, then the *EMC* shall use a value of zero for StartGeneration$_g$ for the *generation registered facility*.

D.12.1 In the case where a *real-time dispatch schedule* is being produced, or where the *dispatch period* is the first *dispatch period* of the multiple *dispatch periods* involved in the calculation of the *short-term schedule*, then the values of StartGeneration$_g$ for each *generation registered facility* in the applicable *dispatch period,* except *multi-unit facilities*, shall be the values received from the *PSO* in accordance with Appendix 6G section G.3.1.

        D.12.1.1 In the event that a value of StartGeneration$_g$ for any *generation unit* that is not part of a *multi-unit facility* is not updated by the *PSO* or provided to the *EMC* during the *dispatch period* for the time being when the calculation of the *real-time dispatch schedule* or the first *dispatch period* of the multiple *dispatch periods* involved in the calculation of the *short-term schedule* commences, the initial generation level of StartGeneration$_g$ for the *generation registered facility* shall be the same as the corresponding value of Generation$_g$ for the same *generation registered facility* in the *real-time dispatch schedule* for the *dispatch period* with respect to the time when the calculation of the *real-time dispatch schedule* or *short-term schedule* commences. In the event that no such *real-time dispatch schedule* is available, then the *EMC* shall use a value of zero for StartGeneration$_g$ for the *generation registered facility*.

D.12.4 In the case where the *dispatch period* is involved in the calculation of a *pre-dispatch schedule scenario* or a *market outlook scenario*, and is not the *first dispatch period* of the multiple *dispatch periods* involved in the calculation of the *pre-dispatch schedule scenario* or a *market outlook scenario*, the values of StartGeneration$_g$ for each *generation registered facility*, except *multi-unit facilities*, shall be the corresponding values of Generation$_g$ for the immediately preceding *dispatch period* in the *pre-dispatch schedule scenario* or *market outlook scenario* respectively.

D.12.4 In the case where the *dispatch period* is involved in the calculation of a *short-term schedule,* a *pre-dispatch schedule scenario* or a *market outlook scenario*, and is not the *first dispatch period* of the multiple *dispatch periods* involved in the calculation of the *short-term schedule, pre-dispatch schedule scenario* or a *market outlook scenario*, the values of StartGeneration$_g$ for each *generation registered facility*, except *multi-unit facilities*, shall be the corresponding values of Generation$_g$ for the immediately preceding *dispatch period* in the *short-term schedule, pre-dispatch schedule scenario* or *market outlook scenario* respectively.

D.18.1.3   Regulation Max Constraint:

$$\text{Generation}_{g(l)} + \text{Regulation}_l - \text{ExcessRegGen}_l \leq \text{RegulationMax}_{g(l)}$$

$$\{ l \in \text{REGULATIONOFFERS}\}$$

Constraint D10.1.4 shall only be applied in the preparation of *real-time dispatch schedules* pursuant to section 9.2 of this Chapter, and shall not be applied for the preparation of *market outlook scenarios* or *pre-dispatch schedule scenarios*.

D.18.1.3   Regulation Max Constraint:

$$\text{Generation}_{g(l)} + \text{Regulation}_l - \text{ExcessRegGen}_l \leq \text{RegulationMax}_{g(l)}$$

$$\{ l \in \text{REGULATIONOFFERS}\}$$

~~Constraint D10.1.4 shall only be applied in the preparation of *real-time dispatch schedules* pursuant to section 9.2 of this Chapter, and shall not be applied for the preparation of *market outlook scenarios* or *pre-dispatch schedule scenarios*.~~

D.22.1.1 If the value of SysError calculated in accordance with section D.22.4 is less than the system loss error tolerance established by the *EMC* pursuant to section D.22.2, then the *EMC* may accept the current linear program solution and use the results for the *dispatch period* in the relevant *real-time dispatch schedule*, *pre-dispatch schedule* or *market outlook scenario*.	D.22.1.1 If the value of SysError calculated in accordance with section D.22.4 is less than the system loss error tolerance established by the *EMC* pursuant to section D.22.2, then the *EMC* may accept the current linear program solution and use the results for the *dispatch period* in the relevant *real-time dispatch schedule*, <u>*short-term schedule*</u>, *pre-dispatch schedule* or *market outlook scenario*.
D.22.1.3 If the number of repetitions of the procedures in this section D.22, in respect of a particular *dispatch period* and particular *pre-dispatch schedule* or *market outlook scenario*, is equal to the maximum number of iterations for the loss calculation correction established by the *EMC* pursuant to section D.22.2, then the *EMC* may accept the current linear program solution and use the results in the relevant *pre-dispatch schedule* or *market outlook scenario*.	D.22.1.3 If the number of repetitions of the procedures in this section D.22, in respect of a particular *dispatch period* and particular <u>*short-term schedule*</u>, *pre-dispatch schedule* or *market outlook scenario*, is equal to the maximum number of iterations for the loss calculation correction established by the *EMC* pursuant to section D.22.2, then the *EMC* may accept the current linear program solution and use the results in the relevant <u>*short-term schedule*</u>, *pre-dispatch schedule* or *market outlook scenario*.

Existing Market Rules **Appendix 6G**	Proposed Rule Modifications (Addition marked by underline and deletion by strikethrough) **Appendix 6G**
G.1.1 The information listed in sections G.2 to G.7 of this Appendix describes the *dispatch related data* referred to in sections 6.1 and 8.1 of this Chapter which the *PSO* must produce, revise as required, and communicate to the *EMC* in accordance with those sections and the applicable *market manuals*. Except as otherwise specified in these *market rules,* the *EMC* shall utilise the latest *dispatch related data* received from the *PSO*. In the event that such latest *dispatch related data* is not uploaded in time for the imminent *market clearing engine* run, the *EMC* shall utilise the latest available and uploaded *dispatch related data* for that *market clearing engine* run. **Explanatory note: The main area where the EMC may deviate from using the latest available and uploaded dispatch related data received is the StartGeneration of the generation units, for which Appendix 6D contains provisions to use previous dispatch or pre-dispatch runs to forecast the initial generation of facilities instead of out of date PSO data if necessary.**	G.1.1 The information listed in sections G.2 to G.7 of this Appendix describes the *dispatch related data* referred to in sections 6.1 and 8.1 of this Chapter which the *PSO* must produce, revise as required, and communicate to the *EMC* in accordance with those sections and the applicable *market manuals*. Except as otherwise specified in these *market rules,* the *EMC* shall utilise the latest *dispatch related data* received from the *PSO*. In the event that such latest *dispatch related data* is not uploaded in time for the imminent *market clearing engine* run, the *EMC* shall utilise the latest available and uploaded *dispatch related data* for that *market clearing engine* run. **Explanatory note: The main area where the EMC may deviate from using the latest available and uploaded dispatch related data received is the StartGeneration of the generation units, for which Appendix 6D contains provisions to use previous dispatch ~~or pre-dispatch~~ runs to forecast the initial generation of facilities instead of out of date PSO data if necessary**.

G.7.1   Notwithstanding any other provisions of this Appendix, the *PSO* shall advise the *EMC* of any circumstances relating to one or more *registered facilities*, or to the *electricity system* as a whole, which have caused or are likely to cause the *PSO* to do any of the following within the current *pre-dispatch horizon*:

    a.   impose *security constraints, generation fixing constraints* or *generic constraints* that differ significantly from those that are normally applied;

    b.   adjust any *reserve* or *regulation* parameters used as inputs to the *market clearing engine* in ways that differ significantly from the values normally applied by the *PSO* at each time of day;

    c.   significantly revise its expectations of *load*, of any *energy* surplus or of any *energy*, *reserve*, or *regulation* shortfall; or

    d.   impose *constraint violation costs* that differ significantly from the values normally applied by the *PSO* at each time of day.

G.7.1   Notwithstanding any other provisions of this Appendix, the *PSO* shall advise the *EMC* of any circumstances relating to one or more *registered facilities*, or to the *electricity system* as a whole, which have caused or are likely to cause the *PSO* to do any of the following within the current *pre-dispatch horizon* or *short-term horizon*:

    a.   impose *security constraints, generation fixing constraints* or *generic constraints* that differ significantly from those that are normally applied;

    b.   adjust any *reserve* or *regulation* parameters used as inputs to the *market clearing engine* in ways that differ significantly from the values normally applied by the *PSO* at each time of day;

    c.   significantly revise its expectations of *load*, of any *energy* surplus or of any *energy*, *reserve*, or *regulation* shortfall; or

    d.   impose *constraint violation costs* that differ significantly from the values normally applied by the *PSO* at each time of day.

Existing Market Rules (Version 01 July 2003)	Proposed Market Rules Modifications (Addition marked by underline and Deletion by strikethrough)
Chapter 8	Chapter 8
	1.1.223 *short-term horizon* has the meaning ascribed in section 7.1.2A of Chapter 6; 1.1.224 *short-term schedule* means a schedule determined by the *EMC* in accordance with sections 7.4A, 7.5 and 7.6.1B of Chapter 6 for the normal *load* forecast over the *short- term horizon*;

ANNEX 2

Background to the 2-hour blind spot Issue

The chart below illustrates the 2-hour blind-spot problem:

Two Hour Gate Closure with Offer Blind Spot
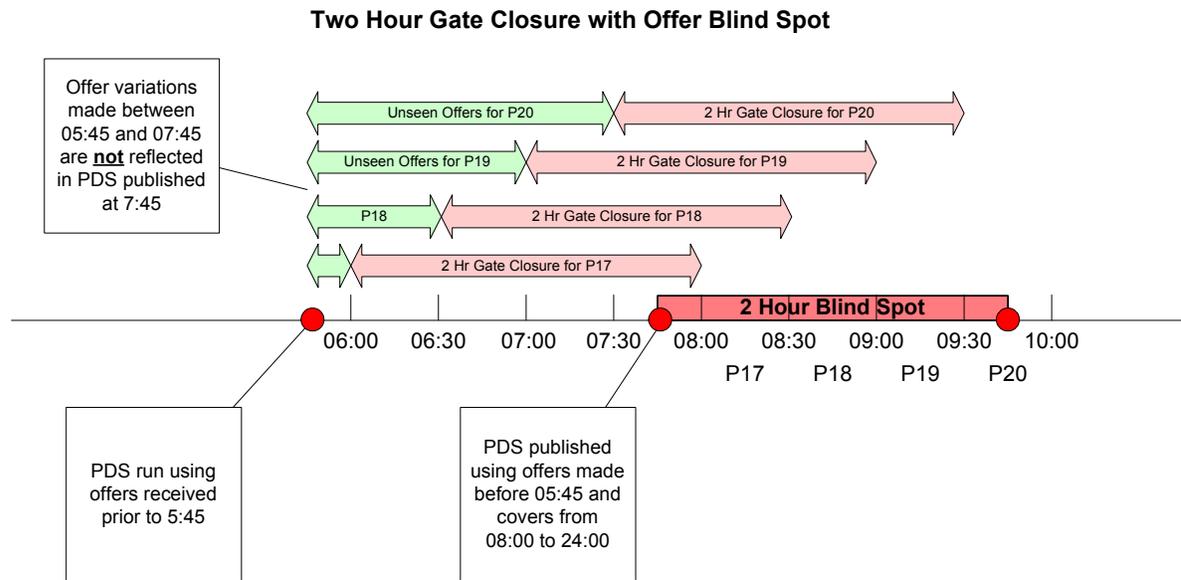
Source: Extracted from *EMC/PTRCP/193/2002*, dated 7 Nov 2002.

The green arrows show that while generators may submit offers prior to the 'gate closure', such offers will not be used in the production of the PDS that is issued prior to commencement of the relevant dispatch periods (i.e. periods 17-20). This means the PDS may differ materially from the Real Time Dispatch Schedule (RTS). The unseen offers create a 2-hour 'blind spot' where generators will not have accurate information with which to manage the operation of their plants (e.g. whether the generation units need to be synchronized with the transmission system prior to the commencement of a dispatch period).

Pros and Cons of each option

Options	Pros	Cons
Extending Gate Closure	• solve the 2-hour 'blind spot' • relatively simple system configuration and rule changes	• reduces amount of time available for generators to revise their offers prior to dispatch (hence, less trading flexibility) • PDS may not be accurate and reliable, if there are any changes in the offers or load forecasts to the first 4 dispatch periods of the PDS during the 4-hour gate closure period.
Introducing STS	• solve the 2-hour 'blind spot' • no need to extend gate closure period • MPs can vary their offers closer to real-time (i.e. more trading flexibility) • more timely and accurate information to MPs and PSO prior to real-time dispatch	• significant changes to system reconfiguration and rules

Annex 3: Minutes of the 14th PTRCP Meeting

3.6   **Paper EMC/PTRCP/193 – Category 2**
        Offer Change Limits

EMC presented a paper on a proposed rules change submitted by EMC (Chapter 6, Section 10.4.2 and Appendix 6A) to extend the offer change "gate closure" from two to four hours to eliminate a two hour "blind spot" where generators can make offers before the offer "gate closure" that would not be captured in the pre-dispatch schedule.

This "blind spot" means that it is difficult for generators and the PSO to effectively and securely manage generation unit requirements.

Extension of the gate closure from 2 hours to 4 hours is a temporary solution to the 'blind spot' problem. The implementation of a Short Term Schedule (e.g. runs half-hourly and covers 12 periods) to be developed and implemented after market start would be a long term solution.

EMC recommended that the Panel consider and support the amended proposed rules change.

A Panel member noted that by only changing the gate closure, a generator will only have 15 minutes notice after the information from the pre-dispatch schedule (PDS) is known before the real time dispatch period. This was considered inadequate.

The Panel requested EMC, in consultation with the PSO, to investigate the changes required to publish pre-dispatch schedules as soon as possible after they are run rather than waiting for two hours to publish to solve the short notice problem. In the event that the publishing time can not be altered, the Panel requested that EMC promote a rules change to extend the gate closure to four and a half hours.

EMC

[**After note:** The final decision was to extend the gate closure from two to four hours.]

The Panel **supports** EMC's recommendation and to make the necessary recommendation to the EMC Board.