

**DETERMINATION OF THE MARKET SURVEILLANCE AND COMPLIANCE PANEL  
MSCP/2014/D1**

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**Market Surveillance and Compliance Panel ("MSCP")**

Mr Thean Lip Ping, Chair  
Professor Lim Chin  
Mr Lee Keh Sai  
Mr TPB Menon  
Mr Philip Chua

**Date of Determination**

9 April 2014

**Party**

Energy Market Company Pte Ltd ("EMC")

**Subject**

Energy Market Company's failure to determine, release and publish real-time and short-term dispatch schedules on 25 November 2013

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**FACTS AND CIRCUMSTANCES**

1. EMC submitted a self-report on 8 January 2014 that it did not determine, release and publish the real-time dispatch schedule for period 6 and the short-term dispatch schedule for period 7 on 25 November 2013 as required under the Singapore Electricity Market Rules (the "market rules").
2. Under normal operating condition, the market clearing engine (MCE) servers will generate the following dispatch schedules at pre-defined intervals by connecting to the NEMS databases to fetch the data for processing as well as to store results in the NEMS database:
  - a. Real-time schedules RTS (generate 1 file once at every T-30 sec prior to the start of each period)
  - b. Short-term schedules STS (generate 1 file once at every T+5 min)
  - c. Pre-dispatch schedules PDS (generate 3 files at 45 min of every odd hours, eg 01:45, 03:45, and so forth) and
  - d. Market Outlook Scenario MOS (generate 3 files at 02:00hr daily)
3. There are 6 units of MCE servers to cater for concurrent processing of RTS, STS, PDS and MOS.

4. EMC said its investigation showed that on 24 November 2013, 5 out of the 6 units of MCE servers were disconnected from the NEMS database between 23:46hr and 23:47hr, and only one MCE server was available for processing dispatch schedules. The single MCE server was able to cope with the processing of RTS, STS and PDS files between 23:47hr on 24 November and 02:00hr on 25 November 2013 as each schedule was able to be completed in time before the next one began. However, at 02:00hr on 25 November 2013 the MOS (which covers the market outlook for the next 7 days) took a longer time to complete. The single MCE server could not complete processing the MOS before 02:25, the time when the RTS was scheduled to start, and followed by STS at 02:26hr. Being disconnected, all the other 5 MCE could not be activated to process the RTS and STS concurrently with the MOS.
5. The incident was effectively resolved at 03:23hr on 25 November 2013.
6. As the RTS for period 6 on 25 November 2013 was not sent to the Power System Operator, the Power System Operator dispatched the generating units for the affected period based on the latest available short-term schedules files.
7. EMC conducted a re-run to re-establish the RTS for period 6. There was no significant impact on the wholesale electricity markets.
8. EMC said that the disconnection of the MCE servers coincided with the restart of the network firewalls (Firewalls) which interconnect the MCE and the database servers. The Firewalls were restarted in order to resolve a network-related glitch. Normally, the Firewalls restart would not disrupt the MCE and database servers as the Firewalls restart were designed and tested to be disruption free.
9. The network glitch was due to a problem with the inter-site connectivity between its production and backup sites. The connectivity issue was caused by misconfiguration (wrong information entered) on the network setup by EMC's vendor. To resolve this issue, EMC's vendor recommended restarting the firewalls at its backup site.
10. On 18 December 2013, EMC tested the technical procedures to restart the Firewalls in a Test Environment. For the test, EMC designed test scenarios to push the limits of the Firewalls including disruption-free restart procedures. The test results showed that connectivity for the 6 MCE servers was not disrupted when the Firewalls were restarted.
11. EMC said that it was not able to provide the reason why the restart of the firewalls on 24 November 2014 caused the disconnection of the 5 MCE servers during the incident.
12. However, EMC said that it would be prudent that the Firewalls not to be restarted when critical NEMS systems are in operation as the connectivity that passes through the Firewalls may be disrupted. If there is a need to restart the Firewalls, there would be a planned change request (CR) to the market for a window to restart the Firewalls. The CR will require testing and the approval of the IT management where the risk level will be assessed.
13. On 5 March 2014, the MSCP wrote to inform EMC that it considered EMC has prima facie breached sections 7.4A.1, 7.7.2A, 7.7.3, 9.2.1, 9.2.3 and 9.2.4 of Chapter 6 of the market rules and invited EMC to make written representations.
14. EMC replied on 17 March 2014 that it would not be making written representations. However, EMC urged the MSCP to take into consideration EMC's diligence in resolving the matter expeditiously with negligible adverse impact to the market.

## APPLICABLE MARKET RULES

15 Section 7.4A.1 of Chapter 6 provides that:

“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.”

The market operations timetable in Appendix 6A of Chapter 6 provides for EMC to commence computing the short-term schedules using the market clearing engine 4 minutes before the beginning of each dispatch period.

16 Section 7.7.2A of Chapter 6 provides that:

“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.”

17 Section 7.7.3 of Chapter 6 provides that:

“In accordance with sections 7.7.1, 7.7.2 and 7.7.2A, the EMC shall publish the following information for each dispatch period and for each market outlook scenario, pre-dispatch schedule scenario and short-term schedule:

7.7.3.1.1 the projected total load;

7.7.3.1.2 the projected transmission losses;

7.7.3.1.3 total reserve requirements by reserve class;

7.7.3.1.4 total regulation requirements;

7.7.3.1.5 projected energy prices associated with each market network node at which a generation registered facility or generation settlement facility is located....;

7.7.3.1.6 the projected uniform Singapore energy price....;

7.7.3.1.7 projected reserve prices for each reserve class and reserve provider group....;

7.7.3.1.8 projected regulation prices....;

7.7.3.1.9 any predicted system energy shortfalls;

7.7.3.1.10 predicted system reserve shortfalls, by reserve class;

7.7.3.1.11 predicted system regulation shortfalls; and

7.7.3.1.12 list of security constraints and generation fixing constraints applied.”

The market operations timetable in Appendix 6A of Chapter 6 provides for EMC to publish the above short-term dispatch market information 5 minutes after the beginning of each dispatch period.

18 Section 9.2 of Chapter 6 of the market rules provides that

- 9.2.1 The EMC shall, prior to the commencement of each *dispatch period* and in accordance with the *market operations timetable*, use the *market clearing engine* to determine for that *dispatch period*:
- 9.2.1.1 a *real-time dispatch schedule*, containing schedules of *energy, reserve and regulation for registered facilities*, to be released to the *PSO*, which in accordance with section 9.1.2 of Chapter 5 shall be deemed to constitute the *dispatch instructions* issued by the *PSO* to the applicable *dispatch coordinators* unless and until further *dispatch instructions* are issued by the *PSO* to a given *dispatch coordinator* pursuant to section 9.1.3 of Chapter 5; and
- 9.2.1.2 a *real-time pricing schedule* determined by the *market clearing engine* in accordance with section D.24 of Appendix 6D, including:
- a. *energy prices for each market network node*;
  - b. *the uniform Singapore electricity price*;
  - c. *reserve prices for each reserve class and for each reserve provider group*; and
  - d. *regulation prices*.

The market operations timetable in Appendix 6A of Chapter 6 provides that the EMC shall issue real-time dispatch schedules to the PSO prior to the beginning of each dispatch period.

19 Section 9.2.3 of Chapter 6 of the market rules provides that

The *EMC* shall, in accordance with the *market operations timetable*, release to the *dispatch coordinator* for each *registered facility* a *real-time dispatch schedule* comprising that portion of the *real-time dispatch schedule* referred to in section 9.2.1.1 that describes the quantities of *energy, reserve by reserve class and regulation* scheduled in respect of that *registered facility*.

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| Explanatory Note: Participants will be sent the specific schedule quantities that pertain to them under section 9.2.3 and will be provided with the associated prices under section 9.2.4. |
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20 Section 9.2.4 of Chapter 6 of the market rules provides that

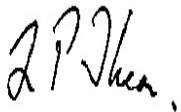
The *EMC* shall, in accordance with the *market operations timetable*, *publish* the following information as it pertains to each *dispatch period*:

- 9.2.4.1 total *load*;
- 9.2.4.2 total transmission losses;
- 9.2.4.3 total *reserve requirements by reserve class*;
- 9.2.4.4 total *regulation requirements*;
- 9.2.4.5 *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;
- 9.2.4.6 the *uniform Singapore energy price*, determined in accordance with section D.24.6 of Appendix 6D;
- 9.2.4.7 *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;

- 9.2.4.8 *regulation prices*, determined in accordance with sections D.24.4 and D.24.5 of Appendix 6D;
- 9.2.4.9 any system *energy* shortfalls reported by the *market clearing engine*;
- 9.2.4.10 any system *reserve* shortfalls, by *reserve class*, reported by the *market clearing engine*;
- 9.2.4.11 any system *regulation* shortfalls reported by the *market clearing engine*; and
- 9.2.4.12 a list of *security constraints* and *generation fixing constraints* applied.

## **ENFORCEMENT**

- 21 The MSCP determines on the basis of the facts referred to above that EMC breached sections 7.4A.1, 7.7.2A, 7.7.3, 9.2.1, 9.2.3 and 9.2.4 of Chapter 6 of the market rules.
- 22 This incident was self-reported and had no significant impact on the wholesale electricity markets. EMC has also taken remedial actions to prevent a recurrence of the problem.
- 23 The MSCP hereby issues a letter of non-compliance to EMC and directs EMC to pay costs, fixed at \$1,500.



Thean Lip Ping  
Chair  
Market Surveillance and Compliance Panel