

**DETERMINATION OF THE MARKET SURVEILLANCE AND COMPLIANCE PANEL
MSCP/2009/D5**

Market Surveillance and Compliance Panel (“MSCP”)

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

Date of Determination

21 August 2009

Party

Energy Market Company Pte Ltd (“EMC”)

Subject

Failure to determine, release and publish information on 5 March 2009 for

- a. Real-time dispatch schedules for periods 3, 4 and 5;
 - b. Short-term dispatch schedules for periods 4, 5 and 6; and
 - c. Pre-dispatch schedule for period 9
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Applicable Rule(s) in the Singapore Electricity Market Rules

1. Section 9.2.1 of Chapter 6

“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...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 for the EMC to begin computing a real-time dispatch schedule using the market clearing engine 5 minutes prior to the beginning of the dispatch period.

The market operations timetable in Appendix 6A of Chapter 6 provides for the EMC to release the real-time dispatch schedule to the PSO prior to 30 seconds before the beginning of the dispatch period.

2. Section 9.2.3 of Chapter 6

“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.”

The market operations timetable under Appendix 6A of Chapter 6 provides for the EMC to release the real-time dispatch schedule and real-time pricing schedule prior to 30 seconds before the beginning of the dispatch period.

3. Section 9.2.4 of Chapter 6

“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...;
- 9.2.4.6 the uniform Singapore energy price...;
- 9.2.4.7 reserve prices for each reserve class and reserve provider group...;
- 9.2.4.8 regulation prices...;
- 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.”

The market operations timetable in Appendix 6A of Chapter 6 provides that the EMC must publish the market information set out in section 9.2.4 of Chapter 6 prior to 30 seconds before the beginning of the dispatch period.

4. Section 7.4.1 of Chapter 6

“The EMC shall, in accordance with section 7.6 and Appendix 6A, determine three pre-dispatch schedule scenarios corresponding to the nodal load forecast described in section 7.2.1 adjusted where applicable under section 7.2.3.”

5. Section 7.4A.1 of Chapter 6

“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.”

According to the market operations timetable, the EMC is required to commence computing the short-term schedule 4 minutes prior to the beginning of the dispatch period.

6. Section 7.7.2 of Chapter 6

“Not later than 15 minutes prior to the commencement of the first dispatch period of each of the three pre-dispatch schedule scenarios referred to in section 7.4.1, the EMC shall, for each dispatch period included in each of those three pre-dispatch schedule scenarios:

7.7.2.1 release to the dispatch coordinator for each registered facility the projected schedules for energy, regulation and reserve, by reserve class, for that registered facility;

7.7.2.2 publish the information described in section 7.7.3; and

7.7.2.3 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. Section 7.7.2A of Chapter 6

“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.”

8. Section 7.7.3 of Chapter 6

“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 the projected total load;

7.7.3.2 the projected transmission losses;

7.7.3.3 total reserve requirements by reserve class;

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....;

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

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

7.7.3.8 projected regulation prices....;

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.”

Facts and Circumstances

9. According to the EMC, on the evening of 4 March 2009, one of the three Un-interruptible Power Supply (UPS), UPS1, at its Production site was faulty.
10. EMC said that based on the industry recommended procedure and to avoid risk to the NEMS Systems, the load from UPS1 was swung to the UPS2 and UPS3. This activity was completed successfully and tested to ensure sufficient power supply to the Production site Data Centre facilities and servers.
11. Upon completion of the load transfer to UPS2 and UPS3 around 0:33 hrs on 5 March 2009, there was a further alarm from UPS2 and UPS3 that power supply to the facilities and servers was insufficient from UPS2 and UPS3. Within 12 minutes of the alarm, the power supply to the Data Centre facilities and servers was cut off and then automatically resumed immediately. To prevent any further interruption to the power supply, the UPS power supply was switched to external power.
12. Due to the interruption of the power supply to the Production site facilities and servers, the NEMS Trading Systems failed. EMC then tried to restart the Production site facilities and servers. In the meantime, EMC informed the PSO and the market participant of the incident and unavailability of the NEMS Trading Systems.
13. A similar incident had occurred on 22 February 2009. It also caused a power supply trip. Due to the repeated issue occurring at the Production site Data Center, EMC decided to swing all NEMS system from the Production site to its Disaster Recovery (DR) site. The DR site database was recovered up to 00:34 hr and EMC verified that there was no potential data loss from 00:34 hr to 00:44 hr. The entire switchover process to the DR site was completed around 01:55 hr and the NEMS Systems were released to the market at 02:14 hr after the verification of all interfaces and dispatch runs results.
14. The investigation by EMC and its vendor found that the root cause was the misalignment of the connection between the UPS frames and the UPS modules which were replaced during the 22 February 2009 incident.
15. As NEMS Systems were not available during the incident, the following dispatch schedules were not determined and released and the relevant information was not published as required under the market rules:
 - a. Real-time dispatch schedules for periods 3, 4 and 5;
 - b. Short-term dispatch schedules for periods 4, 5 and 6; and
 - c. Pre-dispatch schedule for period 9.
16. For the purposes of dispatch, the PSO, in the absence of the real-time schedule, used the relevant short-term schedule in accordance with the system operation manual. Price was determined by EMC re-running the market clearing engine in accordance with the market rules.
17. On 9 June 2009, the MSCP issued a letter informing EMC that it considered that EMC had prima facie breached sections 9.2.1, 9.2.3, 9.2.4, 7.4A.1, 7.7.2A, 7.4.1 and 7.7.2 of Chapter 6 of the Singapore Electricity Market Rules (the ‘market rules’) and invited EMC to make written representations.

18. EMC submitted written representations on 22 June 2009, the relevant parts of which are in these terms:-

"Investigations by the vendor showed that the likely root cause for the incident was the hardware failure in one of the connector pins of a UPS module. The affected connector pin was broken and stuck to the UPS backplane connector connected to the L2 or Yellow phase wiring in the backplane. After the 22 February 2009 incident the UPS modules were replaced. Arising from the replacement there was a physical contact against the connector pins of the UPS module and the UPS backplane. This physical contact and movement caused physical stress to the connector pins (such as hairline cracks in the pins). In this case the fault did not show up immediately. Such faults could surface days or week after.

For remedial actions, EMC's vendor replaced the UPS Systems from the Modular UPS to the Conventional UPS which are more robust and less sensitive. The circuit breakers were also replaced to support the higher capacity of Conventional UPS.

To avoid a possible recurrence, EMC arranged for a firm to do an independent review of the configuration of the UPS at its Production Data Center before the NEMS systems were switched back to the Production Data Centre. The independent review identified no major issues. However, it had made some recommendations such as the implementation of external isolation transformer at outgoing PDU level to eliminate all harmonics and floating neutrals from the equipment. EMC has accepted these recommendations which are scheduled to be performed in August 2009.

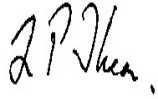
EMC monitored the robustness and reliability of the UPS at the Production Data Centre before the NEMS Systems were switched back from the backup DR site on 15 April 2009. Since then the NEMS Systems have been running in full operation without any issue being reported in respect of the UPS.

EMC stresses that it has performed the proper and regular maintenance of the equipment in accordance with the industry's recognized standards and practice and there was no issue found during the last maintenance. EMC is committed to regular testing of its disaster recovery plan the efficacy of this demonstrated in the quick recovery following these two instances of UPS failure. We have comprehensive maintenance contracts in place for all NEMS systems to ensure extended hours technical support is available and replacement parts are held. EMC recognizes the crucial importance of the NEMS systems and is committed to work towards a zero tolerance of rule breaches. EMC has taken steps as stated above to further improve the NEMS systems and to ensure that this breach does not re occur.

EMC submits to the MSCP that EMC has shown utmost due diligence and commitment to ensure the smooth and reliable operation of the NEMS systems."

19. The MSCP determined on the basis of the facts referred to above that EMC breached sections 9.2.1, 9.2.3, 9.2.4, 7.4A.1, 7.7.2A, 7.4.1 and 7.7.2 of Chapter 6 of the market rules.
20. However, the breach was self-reported, rectified quickly and without significant impact on the wholesale electricity markets.

21. Therefore, the MSCP determined that the appropriate action to be taken was to issue a letter of non-compliance to EMC and to direct EMC to pay costs, fixed at \$1,300.



Thean Lip Ping
Chair
Market Surveillance and Compliance Panel