National Electricity Market of Singapore

DETERMINATION OF THE MARKET SURVEILLANCE AND COMPLIANCE PANEL
MSCP/2011/D4

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
20 July 2011

Party
Energy Market Company Pte Ltd ("EMC")

Subject
Failure to determine, release and publish the real-time and short-term dispatch schedules for periods 8 & 9 on 6 April 2011 and failure to release on time the short-term schedules for period 7 on the same date.

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 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 EMC to commence computing the real-time dispatch schedule using the market clearing engine 5 minutes before the beginning of each 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."

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, 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."

The market operations timetable in Appendix 6A of Chapter 6 provides for EMC to release and publish the above market information 30 seconds before the beginning of each dispatch period.

4. 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.

5. 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."

6. 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 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."

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.

Facts and Circumstances

7. On 6 April 2011 at 3:04am, EMC received an alert to check the short-term schedule's approval status. In the midst of EMC's investigation, short-term schedule file for period 7 was sent late to PSO. The real-time dispatch schedule as well as short-term schedule for periods 8 and 9 had also failed to run.

8. EMC said that the root cause of the problem was related to Shareplex, a new data replication tool deployed in EMC's production environment on 1 March 2011. Thorough testing was performed in February 2011 prior to rolling it out onto the production environment. The NEMS systems worked without any problems from 01 March 2011 to 5 April 2011.

9. Shareplex is used to replicate the Production data to databases in EMC Disaster Recovery site and EMC Data Warehouse. As part of the implementation, the UNIX Scheduler is used to schedule the Shareplex monitoring tasks at 15 minutes interval to monitor the status of Shareplex. During each Shareplex monitoring task, a "lock" file is created before the monitoring can take place. Each Shareplex monitoring task ends after the "lock" file is removed. Under normal circumstances, each Shareplex monitoring task would be completed in less than a minute.

10. EMC said that after reviewing the recent changes and work done, it transpired that on 5 April 2011 at 3:35pm, the Oracle system administrator had performed a Shareplex housekeeping task on the Shareplex monitoring script log file. This action caused the relocation of the Shareplex log file to the backup (archive) folder.

11. Further analysis revealed that on 5 April 2011 at 3:35pm, the routine Shareplex monitoring task was running concurrently. The Oracle system administrator had, in the process of performing the Shareplex "housekeeping" task, inadvertently relocated the Shareplex monitoring task's "lock" file into the backup (archive) folder, before the Shareplex monitoring task could finish its operation and remove the "lock" file. EMC and Oracle did not see or anticipate this problem before.

12. Meanwhile, the UNIX scheduler continued to schedule Shareplex monitoring tasks every 15 minute but could not start because the 5 April 2011, 3:35pm task was still ongoing. These subsequent Shareplex monitoring tasks began to build up in the UNIX scheduler and the queue eventually reached the maximum setting of 100 schedules, thereafter rendering the UNIX scheduler to stop making further schedules. This in turn affected the NEMS's processes as the MCE Dispatch runs also depends on the UNIX scheduler.

13. On 6 April 2011 at 4:22am, the Oracle and UNIX system administrators quickly stopped and cleaned up the monitoring scripts which were "jammed" in the UNIX Scheduler and cleared all the spawned accumulated scheduling processes related to the monitoring script. The NEMS System dispatch runs were normalized from 4:25am onwards.

14. On the morning of 6 April 2011, the Oracle System administrators made urgent review to improve the robustness of the logic and design of the Shareplex monitoring. In the event that the Shareplex monitoring task, when starting its run finds the existence of an ongoing task, it will leave a warning message and automatically exit from the queue. These withdrawals relating to the monitoring tasks will not cause any impact on any of the systems' resources.

15. On 26 May 2011, EMC have successfully rolled out an alternate scheduler for the MCE runs in production systems. The NEMS system will now have the capability to trigger the dispatch run directly from the Oracle system, notwithstanding any issues arising in the UNIX Scheduler.

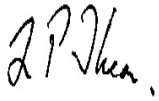
Determination

16. On 1 June 2011, 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 and 7.7.3 of Chapter 6 of the Singapore Electricity Market Rules (the "market rules") and invited EMC to make written representations. EMC replied on 10 June 2011 that it would not be making written representations.

17. 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 and 7.7.3 of Chapter 6 of the market rules.

18. However, the breach was self-reported, rectified quickly and without significant impact on the wholesale electricity markets.

19. 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
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