1.0 Notice of Meeting

The Chairman called the meeting to order at 10.15am. The Notice and Agenda of the meeting were taken as read.

2.0 Confirmation of Minutes of the 87th RCP Meeting

The Minutes of the 87th RCP meeting held on 10 May 2016 were tabled, and the RCP approved the Minutes.

3.0 Matters Arising from 87th RCP Meeting held on 10 May 2016

3.1 Registration Issues Relating to Commissioning Generation Facilities

At the 87th RCP meeting held on 10 May 2016, Mr. Soh Yap Choon said that it would be good to specify a time period, e.g. 1 or 2 weeks before CGF expiry date in the forms for the Market Participants to apply for extension of the CGF.

Ms. Wang Jing informed that EMC discussed with PSO on the processing time required for PSO to approve the extension of commissioning deadline, and decided that a minimum lead time of 5 business days is required for Market Participant to apply for the extension.

EMC will propose amendments to the CGF application form to include the timeline.
4.0 Monitoring List

The RCP noted the contents of the Monitoring List.

5.0 Summary of Outstanding Rule Changes

The RCP noted the summary of outstanding rule changes.

6.0 Rules Change Work Plan Status Update

The RCP noted the update on the Rules Change Work Plan.

7.0 Appointment of Technical Working Group Member

(Paper No. EMC/RCP/88/2016/05)

Ms. Jo Ong presented the proposed appointment of Ms. Cherie Chen to replace Ms. Bai Jie as the MCE Expert on the Technical Working Group (TWG), as Ms. Bai Jie had transferred from the Market Operations team to the Market Assessment Unit team in EMC.

Ms. Ong took the Panel through Ms. Cherie Chen’s qualifications and work experience which would be relevant for her appointment to the TWG.

The Panel unanimously supported the appointment of Ms. Cherie Chen as the MCE Expert on the TWG from 15 July to 2016 to 31 December 2016.

8.0 Provision of Real-time Estimates of the Hourly Energy Uplift Rebate

(Paper No. EMC/RCP/88/2016/CP62)

Mr. Yap Yun Ben presented the paper to assess the proposal for EMC to publish real-time estimates of Hourly Energy Uplift Rebates (HEUR).

Mr. Yap took the Panel through the purpose of HEUR, and the factors contributing to variation in HEUR. The major determinants of HEUR is Net Energy Settlement Credit (NESC, which captures the difference between amount receivable and payable by EMC for energy settlement), and Net Metering Error Adjustment (NMEA, which captures any settlement imbalances arising from metering error adjustments). The following factors do not affect HEUR: NRSC, NTSC, and NFSC.

Mr. Yap clarified that it was not feasible to estimate NMEA ex-ante. Further, EMC’s analysis reveals that NMEA did not significantly affect Actual HEUR and can be excluded from Estimated HEUR.

Mr. Yap then presented the proposed formula to estimate NESC (and therefore Estimated HEUR) ex-ante. Comparison of Estimated HEUR under this proposed formula with the Actual Simplified HEUR (which is Actual HEUR but comprising only the NESC component) showed that the Estimated HEUR is generally quite close to Actual Simplified HEUR, with 88.2% of the absolute magnitude deviations below
$1.00/MWh. There is also high correlation between Estimated HEUR and Actual Simplified HEUR. Mr. Yap also presented the comparison of Estimated HEUR with the Actual HEUR arising from Senoko Energy’s comment and the comparison shows similar results with the earlier comparison.

Mr. Yap then presented the costs and benefits of publishing Estimated HEUR.

Dr. Toh Mun Heng sought clarification on how the deviation between Actual and Estimated HEUR was calculated, and asked whether there was a second-level adjustment using the previous data. Mr. Yap replied that such adjustments were not carried out.

Mr. Lim Han Kwang asked whether there was a systematic difference in the quantities for scheduled energy and actual load forecast. The Chairman replied that EMC uses a fixed factor of 0.994 to adjust the Very Short Term Load Forecast (VSTLF) obtained from the PSO to derive the load forecast. Mr. Lim commented that assuming all other factors being equal, the Estimated HEUR could be derived by MPs from the load forecast and USEP and MEP prices. Mr. Daniel Lee disagreed as the information on scheduled energy of individual facilities is not available to all market participants.

The Chairman added that it would be more efficient for EMC to compute the estimated HEUR instead of individual MPs doing so. Mr. Lim and Mr. Marcus Tan agreed that it is better to provide the market with more information.

The Panel by majority vote supported the proposal and tasked EMC to draft the relevant rule modifications. The Panel members who voted to support are:

- Henry Gan (Representative of the EMC)
- Lim Han Kwang (Representative of the Transmission Licensee)
- Marcus Tan (Representative of the Generation Licensee class of market participant)
- Priscilla Chua (Representative of the Generation Licensee class of market participant)
- Grace Chiam (Representative of the Generation Licensee class of market participant)
- Daniel Lee (Representative of the Retail Electricity Licensee class of market participant)
- Luke Peacocke (Representative of the Retail Electricity Licensee class of market participant)
- Sean Chan (Representative of the Retail Electricity Licensee class of market participant)
- Dr. Toh Mun Heng (Representative for the interests of consumers of electricity in Singapore)
- Lawrence Lee (Representative of the Market Support Services Licensee)
The following Panel member abstained:
- Soh Yap Choon (Representative of the PSO)

9. Price Assignment for Islanded Generation Facilities
   (EMC/RCP/88/2016/CP63)

Ms. Jo Ong presented the paper to assess the proposal to determine prices for
islanded generation facilities (GFs) in the real-time and forecast schedules ex-ante, instead of revising their anomalous prices in the real-
time schedules ex-post.

When the market clearing engine (MCE) solves for the market energy price
(MEP) of an islanded GF, multiple optimal solutions arise, resulting in an
anomalous MEP. Anomalous MEPs of islanded GFs are not desirable as
they are not reflective of their locational marginal prices for price signalling,
and not appropriate for use in settlement.

This issue was first addressed in 2004 where RC232 Alternate Default Bus
introduced the designation of alternate default buses to reduce the islanding
of GFs, and established the need for price revision as a contingency.

Ms. Ong summarised that practices in the U.S. electricity markets studied
aim to preserve the locational marginal pricing principle as far as possible in
the pricing of islanded nodes. She then explained the 2 options (i) derivation
of prices ex-ante by the MCE, and (ii) update of default buses by PSO; and
listed the pros and cons of each option.

Ms Ong informed the Panel that at the 28th TWG meeting, the TWG was
undecided on the proposal with one half of the members voting for Option 1
and the other half voting against. One TWG member considered that Option 1
is complex and yet, would not eliminate the need for price revisions arising
from islanded GFs, and hence preferred simpler methods in place of Option 1.
Two TWG members felt that the islanding issue happens rarely and does
not justify the cost of implementing Option 1. On the other hand, other TWG
members recognised that Option 1 would incur reasonable implementation
time and costs while preserving the SWEM’s locational marginal pricing
principle.

Mr. Luke Peacock asked whether an islanded GF would be scheduled for
energy under both the status quo and the proposed Option 1. Ms. Ong
clarified that if the GF is islanded, it would not be scheduled. She added that
this proposal would only affect the ex-ante MEPs for islanded GFs, and not
their schedules.

Mr. Soh Yap Choon referred to the diagram in Slide 31 that illustrates an
example of identifying neighbouring buses, and queried if EMC could
identify main and alternate default buses as well. He commented that if so,
the PSO can potentially not be required to inform EMC of the default buses
in future. Ms. Ong clarified that the neighbouring buses are identified based
on their connection to the main and alternate default buses, therefore the
PSO will still be required to inform EMC of the default buses in order for the
MCE to identify the neighbouring buses.
Mr. Henry Gan cautioned that implementing this proposal is quite a complex change to the MCE, and a prototype was done to scan and identify the neighbouring buses. He explained that while EMC was able to find a method to do this, the prototype still needs to undergo a lot of testing. With reference to the implementation time and costs estimates, he said that EMC Market Operations would need about 4 more man-weeks for testing than that previously communicated.

Mr. Gan commented that while Option 1 proposal is in alignment with the ex-ante locational marginal pricing principle, this proposal is not fool-proof as price revision may still need to be conducted under some scenarios. The Chairman agreed that while the proposal was not fool-proof, if Option 1 is implemented, the need for price revision for islanded scenarios would be rare. Mr. Poh added that the industry consider that the principle of locational marginal pricing is more important than price certainty, which explains why price revision is still carried out if anomalous prices occur.

Mr. Marcus Tan asked how much effort was needed for re-runs. Mr. Gan replied that under the status quo, EMC Market Operations team would have to analyse what went wrong, and identify the nearest connected bus to connect the islanded GF to the main grid. After identifying the bus, EMC have to check with PSO for their concurrence on connected bus identified by EMC. If PSO concurred, EMC would prepare and update the system for re-run to be conducted. In all, if everything went smoothly, this would take about approximately 2½ days.

Mr. Tan opined that there is low frequency of re-runs currently, and the proposed Option 1 has limited robustness and does not eliminate the occurrence when re-run is required completely. The Chairman replied that robustness of the proposal will not be an issue since EMC has already identified the situations under which price revision is still required, namely (i) if 2 adjacent substations are islanded simultaneously, and (ii) when an islanded GF’s Type B neighbouring buses are on different sides of a binding constraint.

Dr. Toh Mun Heng asked whether there is any way of foreseeing when a GF would be islanded. Mr. Soh Yap Choon clarified that it is not possible to predict when a GF would be islanded given that tripping of equipment can happen anytime.

Mr. Marcus Tan commented that price separation seems to happen quite often recently. Mr. Soh Yap Choon clarified that if there was price separation but no islanded GF, there will not be any issue on the ex-ante prices derived by the MCE under Option 1.

Mr. Gan asked if there is a simpler option to be considered, as the proposal is rather complicated, requiring a database of neighbouring buses to be maintained. The Chairman said that a simpler option suggested by one of the TWG members would be to assign to the islanded GF either USEP or weighted MEP. However, assigning such prices would be inconsistent with the locational marginal pricing principle of the market.
Mr. Henry Gan argued that the use of USEP could be appropriate, since an islanded GF’s settlement only involves the consumption of its station load. Ms. Ong however explains that locational marginal prices are used for the settlement of generators, whether for their generation or consumption, and making it an exception for an islanded GF is a deviation from the principle.

Mr. Peacocke said that it was difficult to assess the cost-benefit of the proposal without considering the cost of the status quo. If incurring the one-off cost in implementing the proposal could reduce the number of re-runs which incurs recurring costs, there would be benefits to EMC in terms of time and manpower savings.

Mr. Gan opined that we are currently making the MCE do many processes and perform new functions, e.g. demand response, and felt that this could lead to unexpected and unexplainable outcomes. Mr. Marcus Tan agreed that there would be a danger in over-automating, and given that the proposal would not eliminate re-runs entirely, the proposal may not necessarily improve the status quo.

With reference to Mr. Gan’s comment that the MCE was currently performing many functions and operations, Ms. Grace Chiam asked how much system stress was on MCE and whether we were at a point where we would need to upgrade the system to handle the increased complexity to calculate nodal prices etc. Mr. Gan replied that there was no immediate need to put in additional hardware and software, but felt that EMC have to be cautious when making changes to the MCE, hence more time would be required for testing.

Dr. Toh Mun Heng asked for the total number of re-runs in a year. Ms. Ong replied that there were 226 affected periods from 2011 to 2015, where re-runs have to be conducted due to islanded GFs. He further queried on whether the Panel had to choose between Options 1 and 2, or could choose the status quo.

Mr. Peacocke opined that in order for the Panel to make an informed decision, the simpler option, as Mr. Gan suggested, should first be assessed. He added that the implementation effort and cost estimates of Option 1 should also be appropriately updated.

Mr Sean Chan concurred and added that the option of assigning either USEP or weighted MEP to the islanded GF and the risks associated with Option 1 to the MCE should be further assessed.

The Chairman asked whether the Panel would like to defer making a decision on this proposal.

The Panel **unanimously decided** to defer the proposal.
10. Date of Next Meeting

The 89th RCP Meeting will be held on Tuesday, 6 September 2016.

There being no other matters, the meeting ended at 11.45am.

Paul Poh
Chairman

Minutes taken by:
Lynne Tan
Legal Counsel