MINUTES OF THE RULES CHANGE PANEL
124th MEETING
HELD ON WEDNESDAY, 14 JULY 2021 AT 10.00AM
VIA VIDEO-CONFERENCING

Present
Toh Seong Wah (Chairman)  Henry Gan
Soh Yap Choon             Teo Chin Hau
Tony Tan                 Calvin Quek
Carol Tan                Sean Chan
Terence Ang              Cheong Zhen Siong
Ho Yin Shan              Fong Yeng Keong

Absent with
Apologies:
Dr Toh Mun Heng
Tan Chian Khong

In Attendance:
Poa Tiong Siaw
Li Zhenhui
Joash Seng
Vincent Wise

Wang Jing
Qin Weixiao
Clarissa Ooi

1. Notice of Meeting

The Chairman called the meeting to order at 10.00am. The Notice and
Agenda of the meeting were taken as read.

2.1 Confirmation of Minutes of the 123rd RCP Meeting

The Minutes of the 123rd RCP meeting, held on 12 May 2021, were
approved by the RCP.

2.2 Matters Arising from the 120th RCP Meeting
  EMC/RCP/120/2021/CP86)

At the 120th RCP meeting, the RCP agreed, in-principle, to allow Primary
and Contingency Reserves to be provided from generation facilities with
loading below LowLoad point; and tasked the Technical Working Group
(“TWG”) to study associated issues and report its findings to the RCP.

Mr Joash Seng updated the RCP that the TWG convened on 24 June 2021
to address the RCP's request as follows:
  (i) to ascertain the usefulness of the proposal, as there is
      uncertainty on whether generators/storage facilities can operate
      below minimum stable load in a viable manner; and
  (ii) to determine the most appropriate approach to modify the
       Reserve envelop, given the impact and costs of different
       implementation options.
2.2.1 Mr Joash Seng reported the TWG’s endorsement of EMC’s recommendations as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>EMC Recommends</th>
<th>TWG’s Decision</th>
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<tbody>
<tr>
<td>1</td>
<td>Endorse the statement that it is not technically and economically viable for OCGTs / CEs to operate between 0MW (not inclusive) and MSL</td>
<td>Endorsed unanimously</td>
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<tr>
<td>2</td>
<td>Review offline Reserve proposal when sufficient performance data (across 1 year) has been collected under Fast Start Service contract</td>
<td>Endorsed unanimously; noting that differences in standards and penalties between Fast Start Services and Contingency Reserve product will be accounted for during the review</td>
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<tr>
<td>3</td>
<td>Remodel the Reserve envelope to enable BESS participation, primarily through the flexibility to set LowLoad levels below the typical MSL down to 0MW (inclusive). (see 29th TWG NoM, Para 4.1 for more info)</td>
<td>Endorsed, by majority vote; with suggestions for further study on implications to existing GRFs, and determine safeguards, if any</td>
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2.2.2 EMC recommended that the RCP task EMC to proceed to draft market rule modifications to give effect to the remodelling of the Reserve envelope for Battery Energy Storage System (“BESS”) participation.

2.2.3 Mr Soh Yap Choon noted that the TWG endorsed EMC’s recommendation to remodel the Reserve envelope to enable BESS participation, primarily through the flexibility to set LowLoad levels below the typical MSL down to 0MW (inclusive) with suggestion for further clarifications on the implications to existing Generation Registered Facility (“GRFs”) and determine safeguards if any. He sought clarifications on the implications and safeguards. Mr Joash Seng explained that there were some concerns raised during the TWG meeting if the Reserve envelope is remodelled by removing the Reserve proportion constraint. He updated that EMC has conducted further studies and concluded that the remodelling has no effect on the Reserve solution space for conventional GRFs. EMC will ensure that detrimental effect, if any, will be kept in check. Mr Seng went on to explain the remodelling of the Reserve solution space for low load like batteries, which has no impact for GRFs.
2.2.4 Mr Henry Gan noted that the recommendation was endorsed by majority vote and asked if there are any specific reasons why it was not endorsed unanimously. Ms Wang Jing replied that there was only 1 TWG member who had abstained as further studies may be needed before deciding whether to introduce a more complicated or matured modelling for BESS. Mr Poa Tiong Siaw added that it is not a concern but a preference of a TWG member to model the BESS separately as a new type of facility. EMC informed the TWG that it is a long-term goal for EMC. A working group under the Market Advisory Panel that is looking at emergent technology is looking into that. This proposal is a short-term solution while EMC works with the industry towards a finer and more matured model for facilities like BESS.

2.2.5 Mr Soh Yap Choon noted that there is not much BESS in the market now but there could be potentially more in the future. He would like to know the plan or timeline for the study and implementation of the BESS modelling in the MCE. Ms Wang Jing replied that both PSO and EMC have been in discussion for some time now on how to treat or model BESS in the market. It was noted that there are several issues that have to be sorted out on both sides before EMC can propose a model that is both conceptually sound and implementable. Mr Soh suggested that this item be included in the mid-year RCP prioritisation plan. EMC noted Mr Soh’s suggestion.

2.3 The Chairman called for a vote on EMC’s recommendations as stated above.

2.3.1 The Panel **unanimously supported** EMC’s recommendations.

3. **Monitoring List**

The RCP noted the content of the Monitoring List.

4. **Summary of Outstanding Rule Changes**

The RCP noted the summary of outstanding rule changes.

5. **Rules Change Work Plan Status Update**

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

6. **Review of Constraint Violation Penalty**

(Paper No. EMC/RCP/124/2021/CP88)

Ms Wang Jing presented the paper that reviews the constraint violation penalty (CVP) settings in the Singapore Wholesale Electricity Market (SWEM) for the energy, reserve and regulation. She gave a background on the proposal received and went on to present EMC’s analysis on the proposal and potential solutions.

6.1 Ms Wang Jing informed the RCP that the concept paper was published on 8 June 2021 for consultation. EMC responded to comments received from Tuas Power Generation, Keppel Merlimau Cogen, Senoko, YTL PowerSeraya, PacificLight Power and the PSO.
6.2 Mr Henry Gan noted that there are fewer contingency reserve shortfalls with the participation of Demand Response in the market from 2020. He commented that the demand in 2020 had decreased and as such the likelihood of tight supply is lower.

6.3 Why Reserve deficit happened despite sufficient generation capacity

6.3.1 Mr Soh Yap Choon asked if a tight supply situation refers to insufficient offers. Mr Henry Gan explained that the 25% supply cushion refers to the spare supply in the market at higher price tranches that is not cleared.

6.3.2 Mr Sean Chan noted the main reason for reserve deficit despite sufficient generation capacity was the price difference between energy and reserve in a tight supply situation. A reserve shortfall happens when energy price is too high compared to the reserve price, as resources will be channelled to provide energy instead of reserves.

6.4 Potential Solutions Explored – Proposed Solution 1

6.4.1 Mr Soh Yap Choon asked if the cost of $46,958 for each MW of reserve deficit reduced is the average energy price for the year. Ms Wang Jing said that the cost is an estimate of the increase in cost to consumers for each MW of reserve deficit eliminated and is derived from simulation of about 60 selected periods. In the simulation runs, it was observed that while the reserve deficits (MW) were reduced, the price for energy increased significantly. The cost of $46,958 for each MW of reserve deficit reduced was calculated by the increase in the energy payment (energy price multiplied by demand) divided by the MW of reserve deficit reduced.

6.4.2 In response to Mr Soh Yap Choon’s query about the impact of the proposed increase in Block 1 CVP for regulation to $3,000 in the simulation, Ms Wang Jing replied that the simulation was based on the most conservative case where the full regulation requirement is regarded as essential. However, if only part of the requirement is essential, the regulation price is expected to be lower.

6.4.3 Mr Sean Chan would like to understand if essential requirement is not a consideration, would an increase in the primary and contingency reserve CVP, instead of the Energy CVP, be able to resolve the issue. Ms Wang Jing explained that it would have addressed the problem faced in 2018 and 2019. But there will be a need to revisit the abnormality problem during scarcity periods, where energy deficit was incurred while all reserve requirements were fully met, which may recur in the future.

6.4.4 Mr Tony Tan asked for the background on why regulation was capped at $300/MWh. Mr Henry Gan said that it was a EMA directed rule change in 2007 when the market had observed frequent high regulation prices. EMA had commissioned a study that proposed the Regulation price cap of $300/MWh.

6.4.5 Mr Tony Tan opined that no Market Participants (“MPs”) will provide regulation if the CVP settings are revised while keeping the regulation price cap at $300/MWh. He foresees that MPs would rather put the MW power
in contingency reserve and energy instead of regulation. Mr Tan notes that the MCE will find a dispatch solution where the regulation clearing price is higher than $300/MWh but at the point of settlement, the regulation clearing price will be capped at $300/MWh. Ms Wang Jing responded that the simulation was based on several cases in 2018 and 2019. EMC is unable to assume how offer pattern will change in the future. EMC has assumed in its simulations that offers will stay the same in all periods. Ms Wang added that there is also no guarantee that when offer pattern changes in the future, the deficit will be eliminated. Hence, EMC further proposed Solution 2 to cap energy price at $2000/MWh, so that there is more certainty that all resources will be dispatched. Ms Wang noted Mr Tan’s comments and that EMC will take into consideration that change in offer pattern can have impact on dispatch outcomes.

6.4.6 Mr Terence Ang also noted that in proposed Solution 1 the regulation settlement price cap will remain at $300. He asked about the implications to the market when the regulation CVP is violated due to insufficient regulation offers in the future. Ms Wang Jing said that less regulation will be procured when regulation CVP is violated and regulation deficit incurred, and depending on the extent, it could have some impact on power system operation. Mr Soh Yap Choon explained that the regulation reserve is to maintain the system frequency around 50Hz. If there is insufficient regulation reserve, there will be periods or time where the system will have difficulty trying to maintain the frequency within the band of +/-0.2Hz. In the worst-case scenario, the system will consume into the primary reserve and there will be less reserve in the system.

6.4.7 With respect to the PSO’s comments on Proposed Solution 1 that all reserve and regulation requirements are essential requirements to be procured by the MCE, Mr Soh Yap Choon clarified that it is important that the current procurement hierarchy (or prioritisation) of ancillary services and energy is maintained. If the Block 1 CVP for regulation is set at $3,000/MWh, the order of prioritisation will be affected. There will also be a tie-break situation if the Block 1 CVP for regulation is set at the same level as contingency reserve. Hence, the Block 1 CVP for regulation should be set lower than that for reserves. EMC noted Mr Soh’s clarification.

6.4.8 Mr Soh Yap Choon noted that the deficit primary reserve CVP was set at $2,550/MWh in the simulation and asked if there will be any difference in the outcome if the amount is lowered. Ms Wang Jing replied that EMC ran simulations of the CVP below $1,000/MWh and it did not significantly reduce the number of deficits. In order to eliminate deficits, the CVP needs to be set at about $2000/MWh.

6.4.9 Mr Soh Yap Choon asked how the prices for Block 1 CVP for primary reserve and contingency reserve were set in the 2013 study. Ms Wang Jing explained that the CVPs first need to meet Condition 1 to address the price abnormality during the scarcity period and the deficit reserve CVP is lesser than $500/MWh, which is the difference between energy deficit CVP and energy price cap. The $500/MWh is to be shared among primary, secondary and contingency reserves. At that time, EMC also considered whether it is possible to increase the deficit energy CVP. However, the
6.4.10 In response to Mr Soh Yap Choon’s query about the amount of deficit energy CVP, Ms Wang Jing said that it is currently fixed at $5000/MWh. EMC is proposing that this amount be increased to $10,000/MWh to enlarge the solution space for deficit reserve CVP.

6.5 With respect to the potential activation of fast start in an emergency operating state, Mr Terence Ang asked if fast start will be activated if the proposed changes are adopted and in the event of a regulation shortfall. Mr Soh Yap Choon replied that fast start will not be activated because it is clearly stated in the System Operation Manual that fast start is only activated when there is a shortfall in reserve and energy.

6.6 Mr Henry Gan asked if the PSO foresees that there will be non-essential requirements in the next 5 to 10 years. Mr Soh Yap Choon replied that he is unable to quantify that.

6.7 Potential Solutions Explored – Proposed Solution 3

6.7.1 Mr Soh Yap Choon noted that the Operating Reserve Demand Curve ("ORDC") proposed in Solution 3 is a replacement for the current stepwise CVP curve. He asked whether any jurisdiction has adopted this approach. Ms Wang Jing shared that the ORDC is being used by PJM to improve reserve procurement during tight supply situations. By making procurement more flexible, it is easier to channel resources to energy instead of reserve. PJM will be prepared to procure more reserve when there are adequate resources because they recognise it would increase the objective value if a contingent event should occur. The expected loss of load would be lower and cost savings to the consumer will justify the additional reserve procured.

6.8 Mr Soh Yap Choon asked if there is any schedule around the review CVP settings. Mr Poa Tiong Siaw said that there is no fixed framework as the value-based constraints and price limits are invariably affected by MPs’ offer behavior. As such, Mr Poa opined that it makes more sense to base the merit of CVP review on observed market outcomes and behaviour, rather than a schedule.

6.9 Mr Teo Chin Hau noted that the PSO has clarified that all requirements should be procured if there is sufficient supply, and that the reserve CVP should be adjusted to $1,950/MWh to eliminate 99% of reserve shortfall. He suggested that the RCP should vote on whether to fix or increase the reserve CVP to $1,950/MWh and task EMC to conduct further studies on adjustment of the Block 1 CVP for regulation, in order not to change the dispatch priorities of ancillary services.

6.10 Mr Poa Tiong Siaw commented that further studies are needed for the Proposed Solution 3 and that EMC will work closely with the PSO to study the various implications that needs to be considered. As for Proposed Solution 1, EMC will also have to work with the PSO and MPs on the exact CVP settings to ensure that current prioritisation of products is preserved.
6.11 The Chairman said that tweaking CVP values has profound impact on the outcome of the MCE, and therefore should minimally be subjected to further testing or simulation, to confirm that the values are achieving the intent or objective. The Chairman called for a vote on Proposed Solution 1 to adjust CVP settings to secure dispatch for Essential Requirements. When modifying the rules to effect it, EMC shall additionally review the CVP value for Regulation, reserve and energy to preserve the current dispatch prioritization of products.

6.11.1 The Panel **unanimously supported** EMC’s recommendation.

6.12 The Chairman went on to call for a vote for RCP to support EMC to continue the study on how ORDC can be adapted to Singapore’s context and its impact on market outcomes.

6.12.1 The RCP **by majority vote supported** EMC’s recommendations.

The following RCP members **supported**:

- Mr Teo Chin Hau (Representative of Generation Licensee)
- Mr Tony Tan (Representative of Generation Licensee)
- Ms Carol Tan (Representative of Transmission Licensee)
- Mr Sean Chan (Representative of Retail Electricity Licensee)
- Mr Cheong Zhen Siong (Representative of Wholesale Electricity Trader)
- Ms. Ho Yin Shan (Representative of the Market Support Services Licensee)
- Mr YK Fong (Representative of Consumers of Electricity in Singapore)

The following RCP member **did not support**:

- Mr Soh Yap Choon (Representative of the PSO)
- Mr Calvin Quek (Representative of Generation Licensee)

The following RCP members **abstained**:

- Mr. Henry Gan (Representative of EMC)
- Mr Terence Ang (Representative of Retail Electricity Licensee)

There being no other matters, the meeting ended at 12.40pm.

**Toh Seong Wah**

**Chairman**

Minutes taken by:
Angeline Tan
Executive, Legal and Corporate Secretariat