RCP PAPER NO.	:	**EMC/RCP/XXX/2026/CP104**
SUBJECT	:	**GATE CLOSURE EXEMPTION FOR ADDITIONAL OFFER OF ALL PRODUCTS DURING SHORTFALL SITUATIONS**
FOR	:	**CONSULTATION**
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DATE OF MEETING	:	**TBC**

Executive Summary

Gate closure requirements and the associated exemptions in the Singapore Wholesale Electricity Market are set out in Chapter 6 Section 10.4 of the Market Rules. Of interest in this paper are gate closure exemptions that exempt offer variations within gate closure where the intention is to contribute positively to the resolution of energy, reserve, or regulation shortfalls. EMC received a proposal to establish that the exemptions should apply for offer variations within gate closure to increase supply for products not experiencing the shortfall (for e.g., during an energy shortfall, allow for increased offers submitted within gate closure for reserves and/or regulation).

EMC's assessment is that allowing this has the potential upside of allowing more optimal dispatch solutions even though its ability to resolve shortfalls cannot be guaranteed. EMC therefore recommends to amend the relevant gate closure exemptions to exempt offer variations that increase the supply of **any** product and are intended to contribute positively to system supply during a shortfall situation.

We would like to seek industry views on the above subject. We appreciate receiving comments by **30 April 2026.**

1. Introduction

This paper discusses the proposal to review the gate closure exemption for offer variations made during a shortfall situation intended to contribute positively to the shortfall situation.

2. Background

2.1 Gate Closure and Exemptions

Chapter 6 Section 10.4.1 and 10.4.2 of the Market Rules stipulate that no offer or bid variation shall be submitted by market participants (MP) within 65 minutes immediately prior to the dispatch period to which the offer/bid variation applies ("gate closure"), except for certain conditions where exemptions apply. While gate closure provides dispatch certainty and facilitates unit commitment in the Singapore Wholesale Electricity Market (SWEM), gate closure exemptions exist for the primary reason of system security – for a specific facility to better reflect its physical capability, or for all facilities to respond positively to a system stress.

The list of such gate closure exemptions has been reviewed and expanded several times[1] since the start of the market. In assessing new gate closure exemptions, system security considerations always take priority. The current list of gate closure exemptions is:

for offer changes,

a) To reflect a generation registered facility's (GRF) expected ramp profiles during periods following synchronisation or preceding de-synchronisation;

b) To reflect a GRF's revised capability for the three consecutive dispatch periods immediately following a forced outage or its failure to synchronise;

c) To reflect an import registered facility's (IRF) revised capability for the three consecutive dispatch periods immediately following a forced outage, including a forced outage or failure to synchronise of any part of the IRF;

d) To decrease energy supply in an energy surplus situation, for which a market advisory notice has been issued;

e) To increase energy, reserve or regulation supply if it improves a shortfall situation, for which a market advisory notice has been issued;

f) To increase energy, reserve or regulation supply if it improves a shortfall situation, for which a high-risk operating state (HROS) or an emergency operating state (EOS) system status advisory notice is in effect; and

g) To reflect a load registered facility's (LRF) revised reserve capability during a forced outage or following a decrease in energy withdrawal from reserve activation,

for bid changes,

h) To reflect a LRF's revised capability during a forced outage or following a decrease in energy withdrawal from reserve activation;

i) To increase quantities in energy bids if it improves an energy shortfall situation, for which a market advisory notice has been issued; and

j) To increase quantities in energy bids if it improves an energy shortfall situation, for which a HROS or an EOS system status advisory notice is in effect,

[1] Refer to RC314: Exceptions to Gate Closure During an Emergency Operating State https://www.emcsg.com/f1027,77844/EMC314-EMA-LL.pdf, Rules Modification for EMA's "Implementing Demand Response in the National Electricity Market of Singapore" https://www.emcsg.com/f127,112211/335-ImplementingDR__Publication__-_Market_Rules.pdf, RC357: Gate Closure Exemptions https://www.emcsg.com/f1841,136648/EMC357-JO-EMA.pdf, and Rules Modification for EMA's "Gate Closure Exemption for Electricity Imports" https://www.emcsg.com/f127,164023/Rules_Modification.pdf

and subject to the price so offered or bidden, other than for additional quantities, being the same as that previously offered or bidden for that period.

All offer and bid changes made after gate closure will be reported by the EMC to the Market Assessment Unit (MAU). MPs that are dispatch coordinators of the relevant facilities are then required to submit a report explaining their reasons for the offer and bid changes made after gate closure. Based on the report and additional information (if any), the MAU will provide its analyses and recommendations for all gate closure violations to the Market Surveillance and Compliance Panel (MSCP) for the MSCP's determination.

2.2 Shortfalls

In this paper, shortfalls refer to situations where the security-constrained economic dispatch schedule produced by the Market Clearing Engine (MCE) indicates that there is a deficit in one or more market products. For example, a reserve shortfall occurs when the MCE schedules insufficient reserves to meet prevailing reserve requirements.

Shortfalls typically occur when there is insufficient quantity offered into the market for a given product. However, depending on various factors such as prevailing offer prices and the constraint violation penalties (CVP)[2], shortfalls may also occur despite there being sufficient quantity for a specific product.

When a shortfall is detected, EMC will issue market advisories pertaining to the incidence and extent of the shortfall.

3. Analysis

The rule change proposal received by EMC sought to establish that when a shortfall for a certain product occurs, gate closure exemption should also apply for offer variations that increase supply for products **not** experiencing the shortfall (for e.g., during an energy shortfall, to allow for increased offers submitted within gate closure for reserves and/or regulation).

3.1 What does the relevant gate closure exemption apply to today?

Before assessing the merits of the proposal, we re-examine what is allowed under the relevant sections of the Market Rules regarding gate closure exemptions. An excerpt of the relevant Market Rules is provided below for reference.

Chapter 6 – Market Operation

10.4 GATE CLOSURE

10.4.1 Notwithstanding sections 5.1.5, 5.1.6 and 5.1.7, no *offer variation* or revised *standing offer* shall be submitted by or for a *market participant* within 65 minutes immediately prior to the *dispatch period* to which the *offer variation* or revised *standing offer* applies, except:

10.4.1.1 where it is intended:

…

e. to contribute positively to the resolution of *energy*, *reserve* or *regulation* shortfall situations pertaining to which the *EMC* has issued *advisory notices* under section 9.3.1, by allowing for increased supply of *energy*, *reserve* or *regulation*; or

[2] The CVP, simply put, is the "price" the MCE associates with violating a constraint, which includes product deficits. The current CVP settings are set to pre-define a priority order for resolving potential dispatch conflicts between different constraints. For more details, please read 370: Review of Constraint Violation Penalty.

With input from EMC's legal counsel, EMC determines that there is vagueness in the rule drafting on whether the exemption is for offer variations that increase supply solely for the product experiencing a shortfall, or if it allows offer variations to increase supply for other products.

Given this vagueness, a rule change to clarify what is covered by the exemption(s) is warranted. Further analysis on the approach to this gate closure exemption – whether to allow for offer variations only for the product experiencing the shortfall or otherwise - is likewise appropriate.

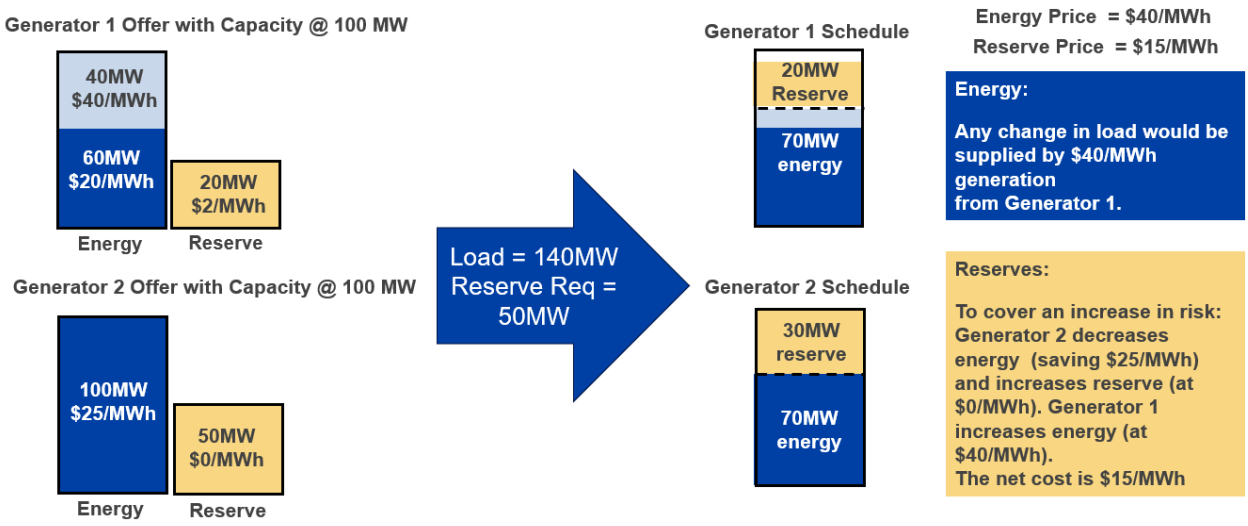
3.2 Understanding Market Clearing and Co-optimisation: How the supply situation of one product may affect that for other products

To understand how offers for a product can affect the supply situation for another product, we need to understand, broadly, how the MCE works, and its co-optimisation methodology.

The MCE produces security-constrained economic dispatch schedules. It is programmed to maximise net system benefit while respecting operational constraints of all facilities and the transmission system. The net system benefit can be understood as the sum of producer surplus and consumer surplus in the SWEM.

In doing so, the MCE performs co-optimisation, where it solves for an optimal dispatch solution for energy, regulation, and reserves collectively. The implication is then that the scheduling of any given product can be affected by the supply situation of another product. A worked example illustrating co-optimisation is provided below as Figure 1.

Figure 1: Illustration on Co-optimisation



3.3 Potential benefits from allowing, during a shortfall situation, offer variations within gate closure to increase supply of products not experiencing the shortfall

3.3.1 Net system benefit is likely to increase

Provided the offer variations are strictly to increase supply, such offer variations will expand the solution space when the MCE solves for the globally optimal solution. The MCE will schedule these additional offers if it leads to increased net benefit; if it does not, the MCE can fall back on the previous optimal solution. And due to co-optimisation, increased offers for one product may also expand the solution space for another product.

Therefore, in theory, adopting the proposal has potential upside with no downside to net system benefit.

However, it should be noted that the existing gate closure exemption is meant for offer variations intended to contribute positively to the resolution of a shortfall situation specifically. The MCE

optimises net system benefit. The resolution of a shortfall is in isolation a positive to net system benefit. However, depending on the interactions between offer prices, the current CVP settings, the MCE's adoption of co-optimisation, etc, the solution with higher net system benefit may not be the solution with the fewest shortfalls.

To verify the above hypothesis and better understand the impact of adopting the proposal on product shortfalls, EMC conducted simulations. These simulations were conducted for selected periods in 2025 where product shortfalls occurred. The treatment was to increase the supply of a product not experiencing the shortfall from a unit that is already offered, via an increase in offers at the highest price tranche. The main metrics measured were the impact of the treatment on the net system benefit and on the product shortfall. The results are summarised in Table 1 below.

Table 1: Simulation Results

Reserve Shortfall, 31 July 2025 Period 42			
No	Treatment	Impact on Net System Benefit	Impact on Reserve Shortfall
1	Add energy offers	Improved by 292988	Primary Reserves shortfall reduced by 100.00% Contingency Reserves shortfall increased by 20.63%
2	Add regulation offers	Improved by 9502	Primary Reserves shortfall reduced by 43.12% Contingency Reserves shortfall reduced by 50.03%
Regulation Shortfall, 27 June 2025 Period 18			
No	Treatment	Impact on Net System Benefit	Impact on Regulation Shortfall
3	Add energy offers	Improved by 704	Regulation Shortfall reduced by 100%
4	Add (contingency) reserve offers	Improved by 1263	Regulation Shortfall unchanged
Energy Shortfall, 17 February 2025 Period 33			
No	Treatment	Impact on Net System Benefit	Impact on Energy Shortfall
5	Add reserve offers	Improved by 236	Energy shortfall unchanged
6	Add regulation offers	Improved by 143	Energy shortfall unchanged

The simulations show that net system benefit is improved across all scenarios. The impact on the product shortfall however is mixed, and due to the nature of co-optimisation it is not always straightforward to single out the reason(s) behind this.

The results from Scenario 1 are noteworthy in that the additional energy offers resulted in a significant, relative to the other scenarios, improvement in net benefit, but worsened the shortfall in contingency reserves. Upon further investigation, it was observed that the USEP for this period fell by 68.92% from $4473.40/MWh to $1390.40/MWh. This is likely due to how the prevailing CVPs are set, where the MCE "preferred" the outcome in which energy is procured at a much

lower price, despite incurring a worse contingency reserves shortfall (the CVP to incur a "minor" contingency reserve shortfall is $185[3]).

The results from other scenarios, such as in Scenario 5, showed an improvement in the net benefit without a reduction in the energy shortfall. Upon further investigation, the improvement in net benefit coincided with the price of Primary Reserves being reduced by 87.69%. Lower prices in other products not experiencing the shortfall brought about an improvement in the net system benefit.

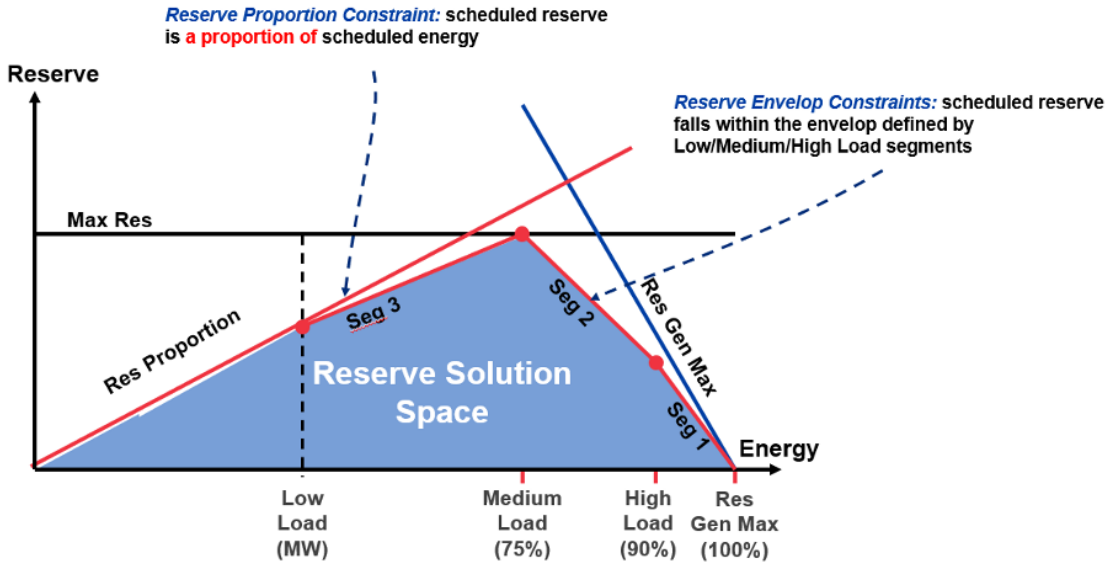
The simulations consistently demonstrate that offer variations made during a product shortfall by increasing supply to other products not experiencing the shortfall can have a positive impact on net system benefit. What is less clear is how the MCE can arrive at the globally optimal solution – be it from alleviating a product shortfall, or from procuring other products at lower prices, etc.

3.3.2 Allows unoffered units to be offered in during a reserve shortfall

In addition to cases where facilities may only want to increase supply to the products that is not experiencing the shortfall, there are also cases where facilities would have to increase supply to other products if it wants to offer more of the product experiencing the shortfall. For example, for non-ESS generators to be scheduled reserves, they must first be scheduled for energy, due to reserve proportion constraints. Hence, for units not previously offered into the market to contribute during a reserve shortfall, these units must offer not just reserves, but also energy.

The reserve proportion constraint limits a non-ESS generator's scheduled reserve to a proportion of scheduled energy. This is depicted in Figure 2 below.

Figure 2: Illustration on Reserve Envelope Constraints



3.4 Evaluating the case for the proposal and any need to adjust existing gate closure exemptions

The original proposal seeks for it to be made clear that, in relation to existing gate closure exemptions for offer variations made during shortfall situations, that offer variations made into **any** product, not just the product experiencing the shortfall, should be allowed. EMC finds that allowing this has notable upsides with no downside. Its impact on net system benefit can be positive, and

[3] The current associated CVP for the 1st block of deficit for Contingency Reserves (which is at 0.3 * Contingency Reserve Requirement) is $185.

at worst neutral from a theoretical standpoint. It also clearly establishes that not limiting offer variation to the shortfall product would allow unoffered units to increase their offers for both energy and reserves during a reserve shortfall, which is helpful. Given the intent of the gate closure exemption is to encourage more resources to be offered into the market to improve the supply situation and alleviate the shortfall, such offer variations should be allowed to be made within gate closure.

However, the existing gate closure exemptions can be read to be for offer variations that help to resolve shortfall situations. Meanwhile, as shown in our analysis in section 3.3.1, additional offers made during a shortfall situation to increase supply for other products not experiencing the shortfall may not resolve the shortfall. In fact, it cannot be guaranteed that additional offers of a product in shortfall would resolve that shortfall. It would therefore be unreasonable to expect facility operators to be able to ascertain that their offer variations can result in an alleviation of the shortfall situation. Therefore, EMC would recommend amending the exemption such that it is predicated on the offer variations being intended to contribute positively to the overall system supply, and not to alleviate shortfalls.

EMC would therefore recommend that the relevant gate closure exemptions be amended to clearly establish that offer variations made to contribute positively to the overall system supply situation during a shortfall situation via allowing for increased supply of **any or all of energy, reserves, or regulation** would be exempted from gate closure. The onus will be on the facility operator to establish, to the satisfaction of the Market Surveillance and Compliance Panel (MSCP) that any offer variations within gate closure are consistent with the exemption.

4. Conclusion and Consultation

This paper assesses the proposal to clearly establish that offer variations intended to contribute positively to the resolution of product shortfalls by allowing increased supply into **any** of the products should be exempted from gate closure. EMC's assessment is that allowing this has the potential upside of allowing for more optimal dispatch solutions even though its ability to resolve shortfalls cannot be guaranteed. EMC therefore recommends to amend the relevant gate closure exemptions to exempt offer variations that increase the supply of **any** product and are intended to contribute positively to system supply during a shortfall situation.

We would like to seek industry views on the above subject. We appreciate receiving comments by **30 April 2026.**