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SUBJECT : **PARTICIPATION OF FAST START UNITS**

FOR : **CONSULTATION**

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Executive Summary

This concept paper introduces a proposal aimed at enhancing clarity and transparency regarding the treatment and participation of Fast Start (“FS”) units.

At present, market participants do not have a clear view of the treatment, operation and activation of FS units. EMC evaluates the participation of these units for consistency with established market principles.

From the perspective of fair and efficient market outcome, EMC is of the view that FS units should not offer into the market during both types of activation: emergency activations and testing activities.

EMC also recommends that information on the activation of FS units be published and disseminated to market participants through an advisory notice issued by the PSO.

EMC notes that current practices allow FS units to submit market offers in certain scenarios. The proposed approach seeks to change the existing practices.

Accordingly, EMC invites industry stakeholders to provide views on the rationale and potential benefits, if any, of allowing FS units to offer into the market under the different types of activations. We appreciate receiving comments by **26 June 2026**.

1. Introduction

This concept paper aims to provide clarity on the treatment and participation of Fast Start units, particularly in relation to their activation and to ensure that their participation remains consistent with fair and efficient market outcomes.

2. Background

EMC received a proposal to evaluate how demand forecast, Market Clearing Engine (“MCE”) dispatch and price determination are impacted when fast start (“FS”) units are activated and called upon by the Power System Operator (“PSO”). In the proposal, an efficient market re-run methodology was proposed, to ensure that market integrity and the price formulation process are not affected by artificial out-of-market activities.

EMC considers it necessary to first establish clarity around the participation of FS units before assessing their market impacts. Currently, market participants are not clear about the treatment and operation of FS units.

In particular, this includes assessing what constitutes fair and appropriate participation behaviour that is aligned with market principles, and evaluating how such behaviour may impact market outcomes. Establishing clarity on this will ensure consistency in any subsequent evaluation of market impact and possible re-run methodology.

3. What are fast start units?

3.1 Overview of Ancillary Service Market

Ancillary services are power system resources which are required to ensure the security, reliability and stability of the Singapore power system. These include products such as regulation, reserve, black start and fast start services.

While regulation and reserve are procured through the real-time spot market, fast start service is procured through contractual arrangements. Table 1 below outlines the differing characteristics of regulation, reserve, black start and fast start services.

Table 1: Ancillary service market, by products

Service	Market	Details	Response Time
Regulation	Real-time spot market	Used to fine tune demand supply variations in the grid and minimise grid frequency deviation (from 50Hz)	In seconds
Reserve	Real-time spot market	Standby generation capacity or resources (e.g. interruptible load) that can be called upon when there is an unforeseen supply disruption (e.g. power plant outage)	Primary (In seconds) Contingency (In minutes)
Black Start	Negotiated contracts	Resource that can self-start without any source of off-site electric power and maintain adequate voltage and frequency while energising isolated transmission facilities and auxiliary loads of other generating units	In minutes

Fast Start	Negotiated contracts	Resource that can be called upon quickly to begin generation at a set level. A secondary safety net in the event scheduled reserves are insufficient (e.g. depleted)	In minutes
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3.2 Procurement of FS units

According to Section 8.1.1 of Chapter 5 of the Market Rules, EMC, on behalf and at the request of the PSO, shall procure, primarily through contracts, certain physical services that are needed to maintain reliable PSO controlled system operations but are not available in the real-time markets.

Additionally, Section 8.2.2 of Chapter 5 of the Market Rules states that EMC may procure the following principal contracted ancillary services:

1. Reactive support and voltage control service;
2. Black start capability;
3. Fast start service; and
4. Reliability must-run service.

FS service directly qualifies as one of these physical services that may be procured by EMC. The procurement process is generally done through a Request for Proposal (“RFP”) called by PSO through EMC, or a PSO-directed negotiated contract.

Throughout the contracted term, in return for providing FS service, the FS service provider will receive annual capability payments (“ACP”) based on projected capacity expenditure (“CAPEX”) and fixed operating expenditure (“OPEX”).

When FS units are activated, any revenue earned through the Singapore Wholesale Electricity Market (“SWEM”) will instead be used to offset the running cost incurred during the activated periods. Any other variable OPEX incurred during the month, shall be subsequently claimed by the FS service provider as well. As such, FS service providers recover their costs through monthly claims of variable OPEX, with the excess market-earned revenue returned or deficit topped up, via the Monthly Energy Uplift Charge (“MEUC”). Any profits earned from the SWEM through activations, are not retained by the FS service providers.

This reflects that FS units are not intended to earn revenue through the market clearing process in SWEM but are instead compensated for their availability and capability to provide fast start services when required.

3.3 Purpose of FS units

FS units are called upon to restore reserve lost following an outage of online generating units. They may also be activated to address shortfalls due to start-up failures of other generation units. FS units aim to address system security issue such as quick restoration of supply during major system disturbances.

It is thus reasonable to infer that, outside of testing activities, FS units are activated during system stress conditions such as tight supply, unexpected outages, etc., rather than activated under normal system market conditions.

Operationally, the role of FS units is distinct from conventional generation plants. These FS units are resources that can be rapidly activated to deliver output at a specified level, serving as a backup when primary or scheduled reserves are unavailable or depleted. Also, these

FS units serve as reliability safety nets and are not designed for sustained base load operations.

3.4 Requirements of FS units

Fast Start units must comply with the performance standards set out in the Market Rules, as well as the specific requirements detailed in the FS service contract. At a minimum, FS units must meet the following operational criteria:

- Initially offline and not synchronised to the transmission system;
- Synchronise to the transmission system within 10 minutes upon receipt of instruction from PSO;
- Ramp up to instructed output level within 15 minutes of synchronisation;
- Must be able to maintain its instructed output for at least 4 hours after synchronisation; and
- Stay online until the system until the power system normalises in the event of major system disturbances.

3.5 Conditions of Dispatch

According to Section 8.3.5 of Chapter 8 of the System Operation Manual (“SOM”), the PSO shall schedule and dispatch fast start unit under the following conditions:

- a) Forced outage of generating unit and reserve falls below the level required to cover forced outage of the remaining generating unit with largest output level; and
- b) Failure to start-up or delay synchronisation of a generating unit, scheduled by the Market Clearing Engine earlier, and reserve falls below the level required to cover forced outage of the generating unit with largest output level.

Actual real-time emergency activation is determined by PSO’s standard operating procedure (“SOP”) and EMC is not privy to the exact market conditions under which FS units are activated.

4. Types of FS unit activations

The various types of FS unit activations can be categorised into the following:

1. Emergency activation
2. Testing activities

4.1 Emergency activation

FS units are primarily procured to address system security needs during major system disturbances. Emergency activation is the fundamental purpose for which these units exist.

In such situations, FS units are deployed to rapidly restore system balance and stability, including during shortfall recovery events. Emergency activations are determined by the PSO in accordance with its SOPs, considering real-time market conditions and system requirements.

4.2 Testing activities

EMC understands from FS service providers that there are currently two types of testing activities: surprise tests and scheduled tests. EMC notes that a test is classified as a ‘surprise’ only if notification to the FS service provider is provided less than 3 hours in advance. Where notification exceeds 3 hours, the activation is considered a scheduled test.

The 3 hour timestamp shall be referenced based on the delivery of the PSO's instruction letter or memo.

4.2.1 Surprise test

In the event of surprise tests, FS units are required to start up and ramp up within the specified timeframe without any prior notice.

Surprise tests serve as critical readiness assessments, evaluating whether FS units can start, synchronise and ramp up as required under prevailing actual real-time market and operational conditions.

These tests provide confidence that the units can and will respond reliably and as intended when urgently required by the system, particularly during system stress and other emergency events.

4.2.2 Scheduled test

During scheduled tests, FS units are scheduled to run under controlled conditions to stress-test performance and verify operational capabilities and readiness. Operators of FS units are provided with the PSO's instructions and details (e.g., date, periods, duration, etc.) for activation in advance.

In line with the 3-hour threshold established above to distinguish between surprise and scheduled tests, instructions from the PSO should be notified and received at least 3 hours in advance of the activation period.

5. Analysis

5.1 How should the fast start units behave?

EMC observes that participation behaviour during testing activities varies, at times FS units offer in upon activation, and at other times they do not. This inconsistency stems from a lack of clear stipulation in the Market Rules. Consequently, to address this gap, EMC evaluates what constitutes fair and appropriate participation behaviour in alignment with market principles, and assesses how such behaviour may impact market outcomes. In the following sections, EMC considers the behaviour of FS units across the different types of activation.

5.1.1 Offering in quantities during emergency activation?

EMC considers that FS units should not offer into the market during emergency activations.

During emergency activations, the priority during emergency activations is to urgently address system security issues. FS units are called upon as reliability safety nets in such cases. The operators of the FS units are expected to comply with the PSO's directions and are not required to offer into the market.

This participation behaviour preserves real-time market price signals, ensuring they accurately reflect tight supply conditions. Real-time price signals can attract additional offers and supply from other units, enabling the market to restore demand-supply balance through efficient market clearing.

By not offering in, the dispatch process is not interfered and avoids unintentionally displacing units already expected to run (e.g., due to unwithdrawn offers during forced outages).

5.1.2 Offering in quantities during testing activities?

EMC considers that FS units should not offer into the market during testing activities.

As the tests are designed to simulate emergency activations, FS units should behave in the same manner as during actual emergency activations. They must ensure the units are operationally ready to comply with the PSO's directions.

The primary objective is a technical validation, requiring FS units to demonstrate and verify their operational capabilities and readiness under prevailing market conditions.

EMC evaluates that FS units do not participate in a manner comparable to conventional generation units. Conventional generation units submit offers in each trading period within the SWEM. They are dispatched based on their offers and earn revenue through the nodal prices determined by the market clearing and scheduling process.

In contrast, FS units operate under a fundamentally different cost recovery framework. As noted above, FS service providers earn pre-determined annual capability payments and recover costs through monthly variable OPEX claims under contractual arrangements. In addition, the monthly claim on variable OPEX is administered through the MEUC, which is borne by market participants. These payments are designed to compensate for the availability and capability of FS units to provide system security services, rather than for energy supplied through market dispatch.

EMC understands that, in practice, FS units may offer their scheduled testing quantities at \$0/MWh or negative price levels to ensure dispatch. However, such behaviour does not reflect competitive market-based bidding, but rather the operational and contractual characteristics of FS units.

As a result, there exists a structural misalignment with market participation principles. The injection of non-competitive supply associated with FS unit activation alters the supply-demand balance faced by the conventional generation units, which continue to compete on a price-based basis under market conditions. This highlights that FS units, by design, are not intended to function as conventional generation units.

Furthermore, due to the nature and purpose of FS units, EMC assumes that they are not part of the risk-setting framework for the PSO's procurement of N-1 contingency requirements. FS units serve as additional reliability safety net, outside of the N-1 contingency calculations.

EMC therefore considers that FS units are inherently out-of-market given their pre-determined remuneration structure, and should therefore not be considered as part of the competitive supply stack in the market.

6. Proposal

To ensure that the participation of FS units remains consistent with fair and efficient market outcomes, EMC proposes that FS units should not offer into the market during both types of activations, namely emergency activations and testing.

EMC also recommends that information on the activation of FS units be published and disseminated to market participants through an advisory notice issued by the PSO.

7. Conclusion

This proposal aims to provide clarity and transparency on the treatment and behaviour of FS units, ensuring that their participation remains consistent with their role of maintaining system security, while upholding market integrity and achieving efficient market outcomes.

8. Consultation

EMC notes that current participation behaviour varies, with instances of FS units offering into the market during specific scenarios that differ from the proposed approach.

Accordingly, EMC invites industry stakeholders to provide feedback on the proposal and views on the rationale and potential benefits, if any, of allowing FS units to offer into the market under the different types of activations.

We appreciate receiving comments by **26 June 2026**.