RCP PAPER NO.	:	**EMC/RCP/148/2025/CP100**
SUBJECT	:	**EXCLUDE PROVISIONAL PRICES FROM TEMPORARY PRICE CAP (TPC) MOVING AVERAGE PRICE (MAP) CALCULATION**
FOR	:	**DECISION**
PREPARED BY	:	**VINCENT WISE** **SENIOR ECONOMIST**
REVIEWED BY	:	**POA TIONG SIAW** **SVP, MARKET ADMINISTRATION**
DATE OF MEETING	:	**15 MAY 2025**

Executive Summary

When activated, the Temporary Price Cap (TPC) lowers the price caps on products to achieve price stability. The Moving Average Price (MAP) and the Moving Average Price Threshold (MAPT) govern the activation of the TPC. The MAP is a 48-period rolling average of the Reference Uniform Singapore Energy Price (RUSEP), while the Energy Market Authority (EMA) updates the MAPT biweekly based on combined cycle gas turbines' costs. The TPC activates when the MAP exceeds the MAPT. It then deactivates when the MAP falls to or below the MAPT, after having been active for at least 48 periods.

EMC considers that TPC activations and de-activations are inherently ex-ante events that should not be tempered by ex-post events such as price provisionalisation. Therefore, EMC proposes that provisional prices should not be excluded from the calculation of the MAP universally.

Exceptions may apply for situations that can be anticipated, where the intervention is restricted to a removal of the affected periods from the MAP calculation. Today, the exception cases are when EMC conducts system maintenance, and when the MCE fails to generate a Real-Time Dispatch Schedule.

While we cannot think of any, there could nevertheless yet be other events that warrant exception handling for MAP calculation of the type described in Section 3.2. EMC sought industry views on the proposal and whether there are other events that may warrant exception handling for MAP calculation. The industry did not provide any specific event that warrants exception handling for MAP calculation.

Hence, EMC proposes not to exclude provisional prices from MAP calculation. At the 148th RCP meeting held on 15 May 2025, the RCP supported EMC's proposal as above.

1. Introduction

This paper reviews the proposal to exclude provisional prices from the calculation of the Moving Average Price (MAP) for the Temporary Price Cap (TPC) mechanism.

2. Background

2.1 Background on the Temporary Price Cap Mechanism

In July 2023, the Energy Market Authority (EMA) directed a rule change[1] to introduce the TPC mechanism. It was implemented as one of the "guardrail measures" after the Singapore Wholesale Electricity Market (SWEM) experienced high price volatility in 4Q2021.

The TPC is activated when energy prices are high over a prolonged period. It temporarily lowers the respective price caps on products traded in the SWEM. The TPC will be lifted after prices have stabilised.

The activation and de-activation of the TPC depends on two parameters. First, the Moving Average Price (MAP) is a 48-period rolling average of the Reference Uniform Singapore Energy Price (RUSEP)[2] derived from the Real-Time Dispatch Schedule (RTDS). Second, the EMA updates the Moving Average Price Threshold (MAPT) bi-weekly based on the long-run marginal costs of combined cycle gas turbines. The triggers for TPC activation and de-activation are as such:

- On-Trigger: The TPC activates in Period T+1 if the MAP is higher than the MAPT at Period T.
- Off-Trigger: The TPC deactivates in Period T+1 when 1) the MAP is equal to or lower than the MAPT at a given Period T, and TPC activates for at least 48 periods.

The MAP is calculated as such:

$$MAP_{\tau} = \frac{\sum_{t=\tau-A+1}^{\tau} RUSEP_t}{A}$$

Where:

A = *TPC Trigger Period*, currently set at 48 periods

Details of the TPC mechanism and its parameters can be found in Annex 1 and 2.

2.2 Background on Provisional Prices

While the SWEM adopts an ex-ante pricing regime[3], there are provisions for ex-post price revision for specific cases.

Under the Market Rules, EMC must confirm by noon each day whether the prices determined for the previous trading day are final or provisional. Provisional prices may then be subject to price revision following investigation by EMC.

3. Analysis

During the 2024 Rules Change Work Plan Prioritisation Exercise, EMC received a proposal to exclude provisional prices from MAP's calculation. This paper assesses its merits and feasibility.

[1] You can view the EMA determination paper here: https://www.ema.gov.sg/partnerships/consultations/2023/consultation-on-temporary-price-cap

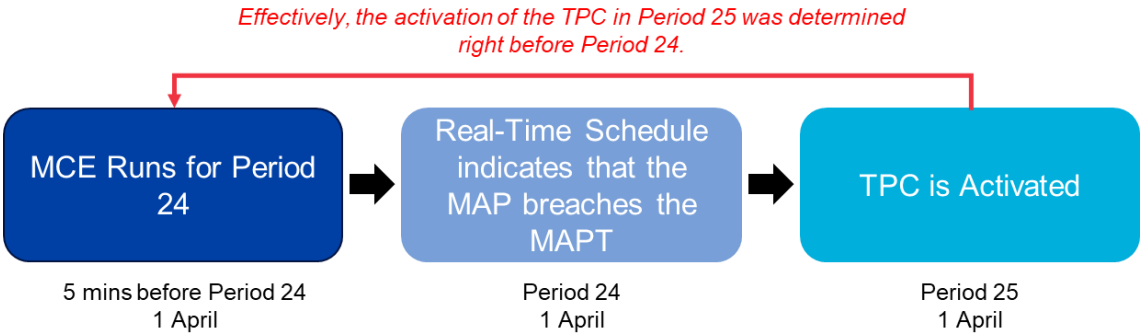
[2] The RUSEP is the USEP that is not subjected to the lower TPC price caps.

[3] Prices are discovered before the period in an ex-ante pricing regime.

3.1 *Assessment on the Appropriateness and Practicality of Excluding All Provisional Prices from MAP Calculation*

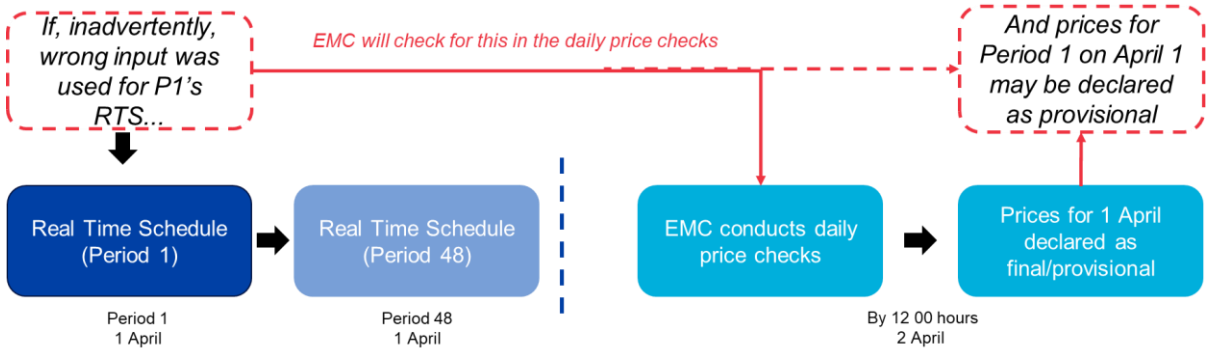
The TPC Activation/Deactivation event is an ex-ante event. EMA stated in their determination paper that the TPC is activated "for the next and subsequent TPs (trading periods) in the SWEM when the MAP (based on the USEP in the current and preceding TPs) exceeds the MAPT". As the Market Clearing Engine (MCE) starts RTDS's computation 5 minutes before Period T, this implies that the events that occur right before Period T-1 will determine whether TPC activates in Period T, as depicted in Figure 1 below. The same logic applies to TPC Deactivation.

Figure 1: Depiction of Events Leading to the Activation of the TPC



The provisional declaration of prices is an ex-post event. EMC checks on the RTDSs daily to determine if price revision is required. Should these checks reveal specific issues requiring further investigation, EMC will provisionalise the prices for the relevant periods by noon the next day. Afterwards, further detailed investigations will be carried out by EMC before the provisional prices are determined to remain firm or if they require revision. Figure 2 depicts the flow below.

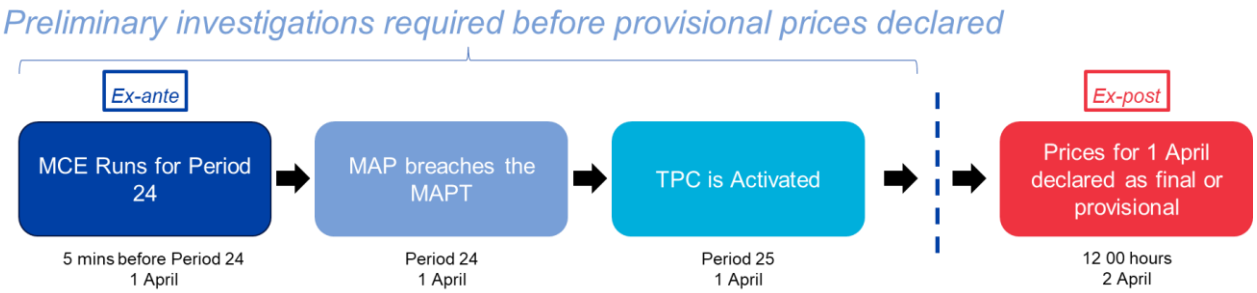
Figure 2: Process Flow for the Declaration of Prices as Provisional



Considering the above, having TPC Activation/De-activation events tempered by ex-post events, such as the provisionalisation of prices, is neither consistent with the mechanism's design nor practicable. The SWEM adopts an ex-ante pricing regime, and any price revisions must fall within specific cases[4] defined in the Market Rules. EMC requires time to ascertain that the trading periods in question fall within the specific cases before provisionalising the prices in those periods. EMC cannot complete the checks before the MCE runs to generate the latest RTDS. Figure 3 below illustrates the above point.

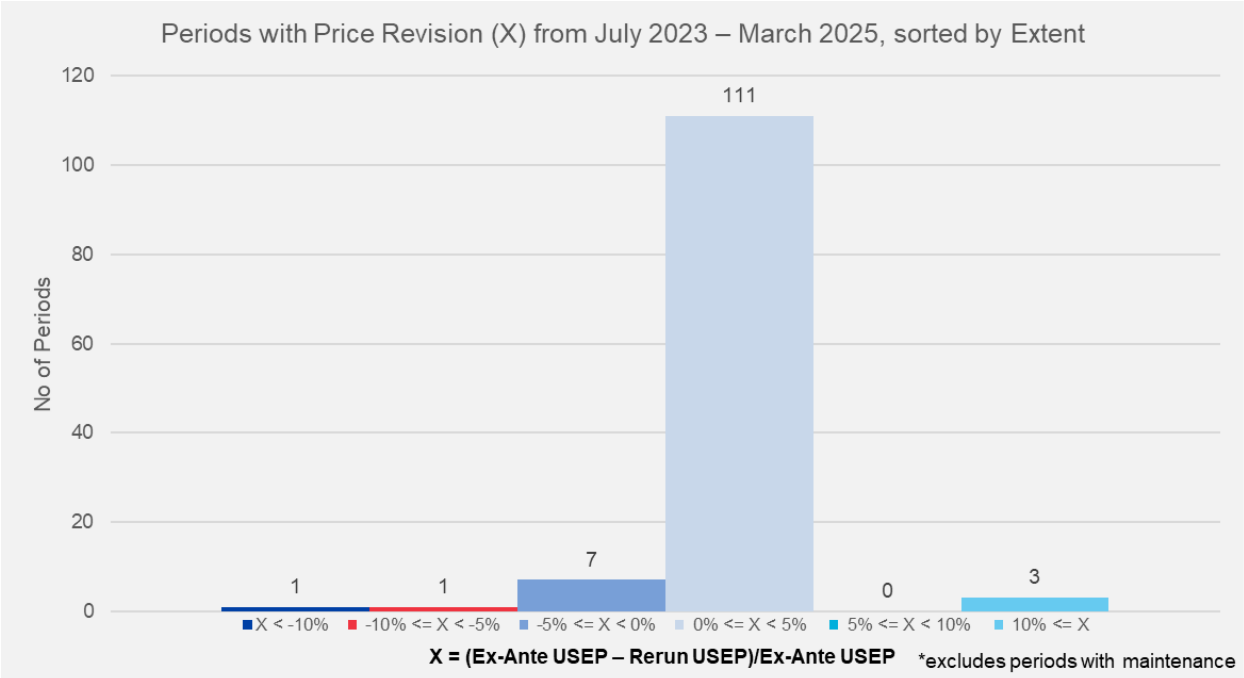
[4] Please refer to the paper on the "Review of Price Revision in the NEMS" for more details on the specific cases that warrant price revision today, available online via this link: https://www.home.emcsg.com/publications/-/media/Comms/Thought-Leadership-Articles/Review_of_Price_Revision_in_the_NEMS.pdf

Figure 3: Depiction of the Ex-Ante Determination of TPC Activation Contrasted with the Ex-Post Provisionalisation of Prices



To assess the hypothetical impact of excluding provisional prices from MAP calculation, we also review the statistics on reruns since the TPC's implementation from July 2023 to March 2025. Figure 4 below illustrates the instances of price revision, sorted by the extent of price revision.

Figure 4: Periods with Price Revision from July 2023 – March 2025, Sorted by Extent



From July 2023 – March 2025, 0.70% of the trading periods were not finalised in real-time. System maintenance accounted for 0.29% of these trading periods[5], while 0.41% of the trading periods (123 periods) saw bona fide price provisionalisation and subsequent revision. This suggests the hypothetical impact of excluding these periods from the MAP calculation would be limited and infrequent.

3.2 Exception Handling for MAP Calculation

At present, there are identified exceptions in which EMC will calculate the MAP differently. They are:

1. For periods that fall within a planned system maintenance carried out by EMC; and
2. Instances where the MCE fails to produce a Real-Time Dispatch Schedule (RTDS), as was determined in the EMA-directed rule changes introducing the TPC mechanism.

[5] When EMC conducts maintenance, the trading periods within this window are not finalised in real time.

In both cases, EMC will treat these periods as “missing” periods and exclude them from MAP calculation[6].

For these two cases, exception handling for MAP calculation is workable only because of two reasons. First, EMC is able to pre-identify the affected periods and intervene before the MCE generates the RTDS. This is done by pre-flagging periods that fall within system maintenance windows, or pre-coding automatic adjustments when the MCE fails to produce a RTDS. Second, the intervention, which is pre-programmed in the MCE, is strictly a removal of the affected periods from the MAP calculation. Note that these are pure ex-ante actions that exclude selected input values (for the affected periods), not adjust or replace them.

4. Consultation

The concept paper was published for consultation on 10 April 2025. Industry views were sought on EMC’s proposal and whether there are other events that may warrant exception handling for MAP calculation. Please see Senoko Energy’s comment and EMC’s response in Table 1 below.

Table 1: Industry Comments and EMC Responses

No	Relevant Section	Comment Received	EMC Response
Comments from Senoko Energy			
1	**4. Conclusion and Consultation** EMC therefore would like to seek industry views on EMC’s proposal and whether there would be other events that may warrant exception handling for MAP calculation.	Although non-explicit, exceptions should occur when there is a known issue with data quality used in the MCE ahead of time.	Given the breadth of input data used by the Market Clearing Engine (MCE), it would not be feasible to extend the exception handling for MAP calculation to deal with all data quality issues. Exception handling is feasible only if the trigger event is specific and can be pre-programmed in the MCE.

5. Conclusion and Recommendation

EMC evaluated the proposal to remove provisional prices from the MAP calculation. We conclude that TPC Activation and De-activation are designed to be ex-ante events. It is not practicable nor appropriate to temper them with ex-post considerations like excluding provisionalised prices in the calculation of MAP.

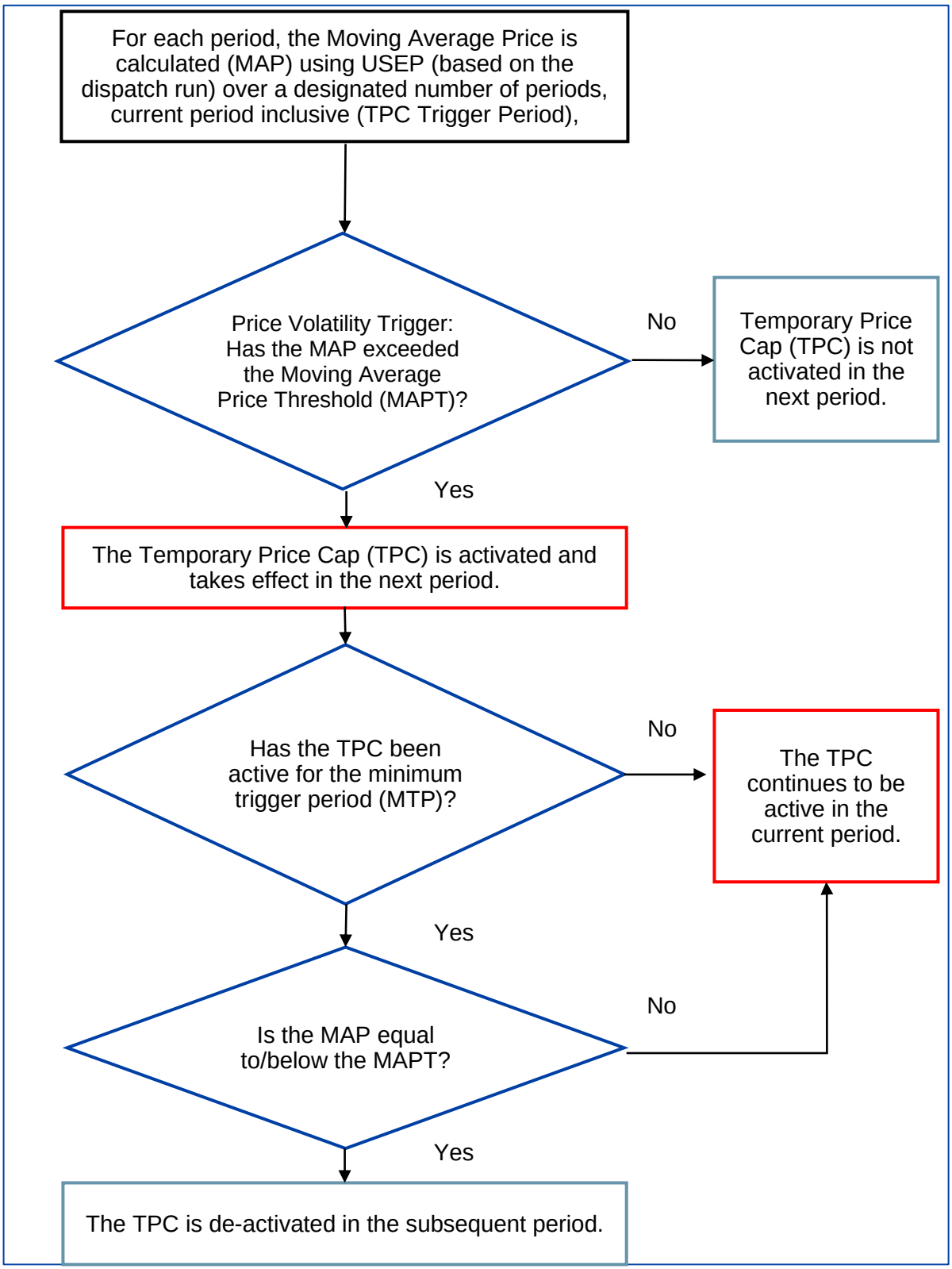
While we cannot think of any, there could nevertheless yet be other events that warrant exception handling for MAP calculation of the type described in Section 3.2. EMC sought industry views on the proposal and whether there are other events that may warrant exception handling for MAP calculation. The industry did not provide any specific events that warrant exceptional handling for MAP calculation. Hence, EMC proposes not to exclude provisional prices from MAP calculation.

6. Decision at the 148th RCP Meeting

The concept paper was discussed at the 148th RCP meeting, the panel unanimously supported EMC’s proposal to not exclude provisional prices from MAP calculation.

[6] The RUSEP from these “missing” periods will be excluded from the MAP calculation, and the denominator of the MAP will decrease by the number of these “missing” periods.

Annex 1: Overview of the TPC Mechanism



Annex 2: Prevailing TPC Parameters

TPC	MAPT	MAP Period	MTP
Multiplier x CCGT LRMC The multiplier will be set in accordance with Table VI below.		48 periods	48 periods

The TPC Multiplier will be set depending on the Gas Spread, which is the difference between Spot LRMC and Term LRMC, as per the table below:

Multiplier	Gas Spread (S$/mmbtu)
3x	Gas Spread ≤ 2.31
2.5x	2.31 < Gas Spread ≤ 14.39
2x	14.39 < Gas Spread ≤ 29.54
1.5x	29.54 < Gas Spread

For example, here are the parameters effective from 16 April 2024 up to 30 April 2024[7].

Item	**Value**	Remarks
Spot LRMC	**$164.16/MWh**	Based on JKM Prices
Term LRMC	**$188.20/MWh**	Based on term gas contract prices
Multiplier	**3.0**	Based on gas spread
CCGT LRMC (also referred to as TPC Price Parameter)	**$188.20/MWh**	= Max[Spot LRMC, Term LRMC]
MAPT	**$564.60/MWh**	= 3 * 188.20
TPC (Energy)	**$564.60/MWh**	= 3 * 188.20
TPC (Primary Reserves)	**$533.23/MWh**	= 564.60 * 4250/4500 (4250 is the primary price cap for primary reserves)
TPC (Contingency Reserves)	**$407.77/MWh**	= 564.60 * 3250/4500 (3250 is the primary price cap for contingency reserves)
TPC (Regulation)	**$37.64/MWh**	= 564.60 * 300/4500 (300 is the primary price cap for frequency regulation)

[7] Historical TPC parameter figures can be found on EMA's website here: https://www.ema.gov.sg/resources/statistics/data-for-the-temporary-price-cap-mechanism