

Implementation Procedures for the Demand Side Management Sandbox

1 Introduction

The Demand Side Management Sandbox launched by the Energy Market Authority (“EMA”) will run from 1 January 2023 to 31 December 2024. The Sandbox aims to enhance the Demand Response (“DR”) and Interruptible Load (“IL”) programmes. With this, EMA hopes to lower the barriers to entry and encourage consumer participation in the Singapore Wholesale Electricity Market (SWEM).

This paper describes the procedures and methodology approved by the EMA for the implementation of Demand Side Management Sandbox.

2 Demand Response Program

To participate in the DR program, load facilities will have to be registered as a Load Registered Facility (“LRF”) to become dispatchable. LRFs will have to submit energy bids that indicate their willingness to pay for energy, also known as the bid price for energy. If the energy clearing price is at least equal to the bid price, the LRF will then be scheduled and activated for DR. Upon activation, LRFs will have to reduce their energy consumption.

2.1 Sandbox eligibility

The DR program’s potential target audience includes all loads that are willing to curtail consumption on short notice (e.g., non-critical industrial processes) to potentially receive incentive payments upon activation. All LRFs that are currently registered, as well as all new LRFs registered during the sandbox period are eligible to participate in the sandbox.

2.2 Lower compliance thresholds and penalty amounts

The compliance thresholds and penalty amount for DR will be lowered during the sandbox period. Table 1 below set out the compliance condition and payment/penalty amount calculation formula that are to be applied under the Sandbox scheme.

Table 1: Changes in compliance thresholds and penalty amounts

Scenario	Compliance	Existing Condition	Sandbox Condition	Payment/ Penalty	Existing Formula	Sandbox Formula
Scheduled for load curtailment	Fully compliant	Actual energy curtailment \geq Scheduled energy curtailment	Actual energy curtailment \geq Scheduled energy curtailment	Incentive payment	$LCP \times LCQ$	$LCP \times LCQ$
	Non-compliant	Actual energy curtailment $<$ $0.95 \times$ Scheduled energy curtailment	Actual energy curtailment $<$ $0.8 \times$ Scheduled energy curtailment	Financial penalty	$LCP \times LCQ$	Up to $Max [(USEP + HEUC) \times deviation\ quantity, \$5000]$
	Partially compliant	Otherwise	Otherwise	NA	-	-
Not scheduled for load curtailment	Fully compliant	Actual energy consumption \geq $0.95 \times$ Scheduled energy consumption	Actual energy consumption \geq $0.8 \times$ Scheduled energy consumption	NA	-	-
	Non-compliant	Otherwise	Otherwise	Financial penalty	$Max [2 \times (USEP + HEUC) \times deviation\ quantity, \$500]$	$Max [(USEP + HEUC) \times deviation\ quantity, \$5000]$

2.3 “4-strikes” regime

In addition to the lower compliance threshold, Participants will not have to pay penalties for the first 2 instances of non-compliance during the sandbox period. Penalties will only apply from the 3rd instance of non-compliance. For DR, each “instance” may contain multiple periods.

Table 2: “4-strikes” regime for demand response

No. of instances of non-compliance	Impact on DR participant
1	Exempted (not penalised)
2	Exempted (not penalised)
3	Penalised
4	Penalised
5	Penalised + suspended thereafter (revert to original DR conditions)

2.3.1 Definition of “an instance”

For DR, “an instance” refers to consecutive periods of non-compliance for an LRF, regardless of activation or non-activation for up to 4 hours (8 periods).

Table 3: Examples of “an instance” for DR

One instance	Period	1	2	3	4	5	6	7
	Compliance	×	×	×	×	×	×	×
Two instances	Period	1	2	3	4	5	6	7
	Compliance	×	×	✓	✓	×	×	×
Three instances	Period	1	2	3	4	5	6	7
	Compliance	×	✓	×	×	✓	×	×

2.3.2 Suspension from sandbox

Participants will be administratively suspended by the EMA from the sandbox after the fifth instance of non-compliance¹.

Participants who are administratively suspended from the sandbox will automatically revert to the original stricter DR conditions. There is no need for participants to re-register their facilities upon being administratively suspended.

2.4 Penalty refunds

During the sandbox period, all LRFs will continue to be subjected to the existing compliance thresholds and penalty amounts via Automatic Financial Penalty Scheme (“AFPS”) on a daily basis.

¹ For avoidance of doubt, by default, EMC will not process penalty refunds for the 6th instance of non-compliance onwards.

If the participant assesses that it should not have been penalised or the penalty amount should have been less under the Sandbox scheme, it will have to initiate the penalty refunds by submitting a refund request to the EMA and Energy Market Company (“EMC”).

If the applicable penalty amount turns out to be a negative number (e.g., Load Curtailment Quantity is negative), the participant is required to initiate a refund process (return monies to EMC), as if the penalty amount is zero.

Similarly, if the applicable incentive payment amount turns out to be a negative number (e.g., Load Curtailment Quantity is negative), the participant is also required to initiate a refund process (claim monies from EMC), as if the incentive payment amount is zero.

Refunds will be made on a monthly cycle.

2.4.1 Timeline for penalty refunds

EMC will recover the amount required to refund to the LRFs from the Monthly Energy Uplift Charge (“MEUC”).

Table 4 shows an illustrative example for the penalty refund procedure for Trading Day (“TD”) 20 Jan and 25 Jan, where an LRF is penalised by AFPS, but penalty amounts should be zero (or lower) under the Sandbox.

Table 4: Illustrative Penalty Refund Procedure for Trading Day (“TD”) 20 Jan and 25 Jan

<i>31 Jan</i>	End of month
<i>31 Jan + 6BD</i>	Preliminary settlement run for all trading days in January
<i>31 Jan + 10BD</i>	Final settlement run for all trading days in January
<i>By 31 Jan + 11BD²</i>	MP to submit (via email to Pearl_TAN@ema.gov.sg, Kim_JIN@ema.gov.sg, Jansen_TOH@ema.gov.sg, marketoperations@emcsg.com, and marketoperations-b@emcsg.com) penalty refund request for TD 20 & 25 Jan
<i>By end-Mar</i>	MP notified via email on approved refund request
<i>Mar</i>	EMC recovers refund amount from MEUC
<i>20 Apr</i>	EMC finishes collecting MEUC for March trading dates
<i>Apr</i>	MP invoices EMC for refund amount
<i>End-Apr</i>	MP to receive penalty refund amount from EMC

When making a DR penalty refund request, MPs may fill in and attach the Refund Request Form available [here](#), which automatically calculates the relevant refund amount.

² EMC will not be able to process late requests for DR refunds.

3 Interruptible Load Program

To participate in the IL program, load facilities will have to be registered as a Load Registered Facility (“LRF”) to become dispatchable. LRFs will have to submit primary and/or contingency reserve offers, to be ready to interrupt energy consumption if a system contingency occurs.

LRFs will be scheduled for IL if the reserve clearing price is at least equal to the offer price. When a system contingency occurs, all LRFs scheduled for IL will be activated. Upon activation, LRFs will have to reduce their energy consumption.

3.1 Sandbox eligibility

The IL program’s potential target audience includes all loads that can afford to be curtailed infrequently, but unexpectedly (e.g., commercial refrigeration), receiving reserve payments for being on standby. All LRFs that are currently registered, as well as all new LRFs registered during the sandbox period are eligible to participate in the sandbox.

3.2 “4-strikes” regime

3.2.1 If non-compliant when scheduled and activated

Participants will still be paid for scheduled reserve quantity for the first 2 instances of under-delivery. Participants will not be paid for scheduled reserve quantity from the 3rd instance of under-delivery.

Table 5: “4-strikes” regime for interruptible load

No. of instances of under-delivery	Impact on DR participant
1	Paid for scheduled reserve quantity
2	Paid for scheduled reserve quantity
3	Not paid for scheduled reserve quantity
4	Not paid for scheduled reserve quantity
5	Not paid + suspended thereafter (revert to original IL conditions)

3.2.2 Suspension from sandbox

Participants will be administratively suspended by the EMA from the sandbox after the fifth instance of under-delivery.

Participants who are administratively suspended from the sandbox will automatically revert to the original stricter IL conditions. There is no need for participants to re-register their facilities upon being administratively suspended.

3.2.3 If non-compliant when scheduled but not activated

No exemption is provided for LRFs who are non-compliant when scheduled but not activated. This means that LRFs will not be paid for any scheduled reserve during such periods.

3.2.4 Definition of “an instance”

For IL, “an instance” refers to whenever an LRF under-delivers within the periods of activation. Table 6 shows an example for when an LRF is activated for IL for periods 1 and 2 and subsequently activated again for periods 6 and 7.

Table 6: Examples of “an instance” for IL

One instance	Period	1	2	3	4	5	6	7
	Compliance	×	×	NA	NA	NA	✓	✓
One instance	Period	1	2	3	4	5	6	7
	Compliance	✓	✓	NA	NA	NA	✓	×
Two instances	Period	1	2	3	4	5	6	7
	Compliance	×	×	NA	NA	NA	✓	×

3.3 Reserve payments

During the sandbox period, all IL players will not be paid for scheduled reserve if deemed non-compliant (i.e., under-deliver during activation, or under-consumption during non-activation).

For the first and second non-compliance instances when IL is scheduled and activated, IL players will have to initiate the exemption payments by submitting a payment request to EMA and EMC. Payments will be made on a monthly cycle.

3.3.1 Timeline for payment refunds

EMC will recover the amount required to refund to the LRFs from the MEUC.

Table 7 shows an illustrative example for the payment refund procedure for TD 20 Jan and 25 Jan, where LRF is not paid for scheduled reserve, but should be paid due to the exemptions under the Sandbox.

Table 7: Illustrative Payment Refund Procedure for Trading Day (“TD”) 20 Jan and 25 Jan

<i>31 Jan</i>	End of month
<i>31 Jan + 6BD</i>	Preliminary settlement run for all trading days in January
<i>31 Jan + 10BD</i>	Final settlement run for all trading days in January
<i>By 31 Jan + 11BD³</i>	MP to submit (via email to Pearl_TAN@ema.gov.sg, Kim_JIN@ema.gov.sg, Jansen_TOH@ema.gov.sg, marketoperations@emcsg.com, and marketoperations-b@emcsg.com) payment request for TD 20 & 25 Jan
<i>By end-Mar</i>	MP notified via email on approved payment request
<i>Mar</i>	EMC recovers payment amount from MEUC
<i>20 Apr</i>	EMC finishes collecting MEUC for March trading dates
<i>Apr</i>	MP invoices EMC for payment amount
<i>End-Apr</i>	MP to receive payment amount from EMC

³ EMC will not be able to process late requests for IL payments.

When making an IL payment request, MPs may fill in and attach the Refund Request Form available [here](#), which automatically calculates the relevant payment amount.