

Enhancing the Demand Response (DR) and Interruptible Load (IL) Programmes with a Demand Side Management Sandbox

The Energy Market Authority (EMA) will be launching a Demand Side Management Sandbox to enhance the DR and IL programmes, and encourage consumer participation. This factsheet explains the benefits and key features of both the DR and IL programmes and the sandbox enhancements.

What is DR?

DR enables contestable consumers to reduce their electricity demand voluntarily when wholesale electricity prices are high, in exchange for a share in the system-wide benefits. Such reductions in electricity demand typically help to reduce wholesale electricity prices.

What are the benefits of the DR Programme?

DR brings about several benefits. These include:

- **Providing an option for consumers to be rewarded for participating in the electricity market**, through demand side bidding and managing their electricity usage in response to price signals. The consumer receives a payment when it is activated in response to the price signal. This is aligned with EMA's overall objective of promoting greater consumer choice as part of the competitive market framework.
- **Reducing the wholesale electricity prices** during peak periods as more expensive generation units need not be scheduled to run.
- **Promoting more efficient power generation investments** as DR is expected to reduce 'peaks' in electricity consumption where prices are typically higher. In the long term, this reduces the need to invest in expensive generation units that are only run infrequently to meet 'peak' demand.
- **Providing an additional resource to improve system reliability** as consumers reduce consumption in response to high prices during periods when the supply condition is tight (e.g. due to unplanned power outages).

What are the features of the DR Programme?

- **Eligibility**
If you are a contestable consumer and can offer to reduce your electricity consumption, you can participate in the DR programme through your electricity retailer or a DR Aggregator. Contestable consumers who can offer to reduce their electricity consumption by at least 0.1 megawatt (MW) can also participate directly in the National Electricity Market of Singapore (NEMS).

- **Demand side bidding**

DR participants can submit demand bids, indicating their willingness to reduce their electricity demand at different price points. This is similar to how generators offer their capacity into the market.

- **Incentive payments to DR providers**

DR providers will receive one-third of the savings arising from the reduction in electricity prices as incentive payments. This ensures that most of the benefits are accrued to the broader consumer base, while providing a fair return to DR participants. The incentive payment will be up to \$4,500/MWh, which is the existing ceiling for wholesale electricity prices. The typical loads which participate in DR and a numerical example of the incentive payment is shown in Figure 1.

Figure 1. Typical loads for demand response and numerical example of incentive payment

Production Equipment	High Voltage Air Conditioning (HVAC), Chillers & Pumps	On-site Back-up Generation
Consumers with flexible production processes can choose to temporarily switch off specific non-critical production equipment.	Consumers can reduce energy consumption of specific electrical items such as HVAC, compressors, chillers or pumps for short periods.	Consumers can reduce the electricity that they draw from the grid by running on-site back-up generators for short periods.

Example – How consumers can benefit from participating in Demand Response (DR)?

Participants **reduce total demand by 25MWh**,
Resulting in a **\$10/MWh reduction** in wholesale electricity price

Assuming the system consumes 1,500MWh,
Total savings (due to reduction in price) is **\$15,000**

$$1,500\text{MWh} * \$10/\text{MWh} = \$15,000$$

1/3 of Total savings is \$5,000

$$1/3 * \$15,000 = \$5,000$$

Hence, the incentive payment to DR participants is **\$200/MWh**

$$\$5,000/25\text{MWh} = \$200/\text{MWh}$$

Additional Information

If you are interested in participating, please [complete the form here](#) and we will get back to you.

What is IL?

IL enables contestable consumers to be paid for being on standby. In exchange for payment, the consumer is obligated to reduce their electricity demand when the system requires this reduction to improve system reliability.

What are the benefits of the IL Programme?

IL brings about several benefits. These include:

- **Providing an additional option for consumers to be rewarded for participating in the electricity market**, through participation in the reserves market. The consumer receives a payment for being on standby.
- **Increased competition in the reserve market** due to more available reserve capacity, leading to lower cost for the system to procure reserves.
- **Generation capacity currently set aside for reserves can be freed up**, enabling our generators to run more efficiently.

What are the features of the IL Programme?

▪ Eligibility

If you are a contestable consumer and can offer to reduce your electricity consumption, you can participate in the IL programme through your electricity retailer or a DR Aggregator. Contestable consumers who can offer to reduce their electricity consumption by at least 0.1 MW can also participate directly in the NEMS.

▪ Bidding

IL participants can submit bids into the reserves market, indicating their willingness to be on standby at different price points. This is identical to how generators offer standby capacity into the market.

▪ Payment to IL Participants

IL participants are paid the clearing price for contingency reserves every period to be on standby in the case of tight power generation supply. Recent historical data is available on the [Energy Market Company's website](#). No additional payment is given out in the event of an activation.

Additional Information

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How will the sandbox affect the DR and IL Programmes? (Updated as of 3 Nov 2022)

The sandbox will be in force from 1 January 2023 to 31 December 2024. During the sandbox, the following changes will apply to the DR and IL programmes:

- **DR Programme:**
 - The threshold for non-compliance is lowered from 95% to 80%. For example, a DR participant will not be penalised for under-delivery of $\leq 20\%$ of its committed service.
 - The penalty regime is relaxed such that no penalties are incurred for the first two instances of under-delivery. Upon the fifth instance of under-delivery, the DR participant will be administratively suspended from the sandbox.

- **IL Programme:**
 - The maximum duration of an IL activation is limited to no more than 4 hours. Previously, no such limit was stipulated.
 - The relaxed penalty regime for the DR sandbox will also apply to IL i.e., the clawback of IL revenue would only apply from the third instance of under-delivery onwards.

More details are available in the [Annex](#).

Programme	Current Practice	Changes
Demand Response	<p>If activated:</p> <ul style="list-style-type: none"> • Only paid if curtailment meets/ exceed 100% of scheduled output. • If between 95% and 100% delivered, no payment and no penalty. • If delivered below 95%, penalty incurred, based on how much participant would have earned if compliant. <p>If bid submitted but not activated:</p> <ul style="list-style-type: none"> • No penalty if at least 95% of forecasted load was consumed. • If actual load is <95% of forecasted load, penalty applies: $2 * (USEP + HEUC) * (\text{Forecasted Load} - \text{Actual Load})$ or \$5,000, whichever is higher. 	<p>Lower the under-delivery threshold from current 95% to 80% for both delivery (when activated) and load deviation (when not activated).</p> <p>Streamline, reduce and provide more certainty on the penalties:</p> <ul style="list-style-type: none"> • For non-activations: Pay prevailing (USEP + HEUC) for the amount of load deviation or \$5,000, whichever is higher. • For activations: Pay up to prevailing (USEP + HEUC) for the quantity not delivered or \$5,000, whichever is higher. <p>Introduce a “4-strikes” penalty regime:</p> <ul style="list-style-type: none"> • Participants will not have to pay penalties for the first two instances of under-delivery by >20% (does not have to be consecutive). • Penalties will apply in the third, fourth and fifth instances of under-delivery by >20%. • Participants will also be administratively suspended in the fifth instance.
Interruptible Load	<p>ILs are activated during conditions of tight power generation supply to provide stability to the system, and are not allowed to resume usual consumption until PSO gives clearance to do so.</p> <p>Non-compliance is dealt with by the Market Surveillance and Compliance Panel on a case-by-case basis.</p>	<p>IL activations will be limited to no more than 4 hours at a time.</p> <p>Introduce a “4-strikes” penalty regime:</p> <ul style="list-style-type: none"> • Participants will not have to pay penalties for the first two instances of non-compliance. • Revenue clawback will apply in the third, fourth and fifth instances of under-delivery. • Participants will also be administratively suspended in the fifth instance.