
Agenda Item 9a: Curtailable Loads - Relevant Demand Analysis

1. BACKGROUND

At the 12 May 2010 Market Advisory Committee (MAC) the IMO presented an issues paper on Curtailable Loads in the Wholesale Electricity Market (WEM) Rules (Market Rules). One of the issues presented in the paper was the measurement of Curtailable Load performance. The following outlines the issue in more detail.

The Rule Change Proposal titled "Demand Side Management- Operational Issues" (RC_2008_20) introduced a new concept for measuring the curtailability of Curtailable Loads. This is known as the Relevant Demand (RD) level. The RD level determines the median value that a Curtailable Load consumes during 32 Trading Intervals of highest demand during the preceding Hot Season, reflecting a normal operating level during the intervals when the Demand Side Programme (DSP) is most likely to be dispatched.

As the RD level is based on a small number of Trading Intervals there is currently a potential for double payment. This could be achieved by a Curtailable Load conducting maintenance over what it assumes will be peak intervals, resulting in a reduction in the Curtailable Load's Individual Reserve Capacity Requirement (IRCR) while maintaining a high RD level. The Facility would already have been receiving a benefit associated with its reduced IRCR.

It is also possible that the aggregated DSP (comprising of the Curtailable Load) will already be operating at below its RD level when dispatched and may not be required to curtail consumption at all to meet the Dispatch Instruction. This could impact system reliability by overestimating the amount of available capacity. System Management may then allow more outages than should be permitted to maintain reliability standards. Some alternative measurement options for DSPs are listed below in order of increasing desirability.

1. The curtailment of a DSP could be calculated based on the consumption of the Curtailable Loads immediately before the Dispatch Instruction to curtail, and compared to the consumption of the Curtailable Loads during the duration of the Dispatch Instruction. This methodology would be complex and may introduce problems associated with the normal consumption variations that occur across a day. That is a Dispatch Instruction may be received at a time of the day in which consumption is typically lower. This methodology is not considered appropriate for the Reserve Capacity Mechanism as capacity to be provided by a Facility is locked in for an entire Capacity Year.
2. The RD level could be calculated based on the consumption of the DSP as a whole using the current method. If a component Curtailable Load is under maintenance, the DSM provider would apply for a Planned Outage or Forced Outage. In the event that the available curtailment in the DSP dropped below the Reserve Capacity Obligation Quantity (RCOQ), the DSM provider would pay refunds associated with the reduction in curtailability. This will ensure that the market is not relying on capacity that is not actually available during the maintenance period. This also accounts for the fact that outage of one or more Curtailable Loads may not actually reduce the curtailability of

the DSP if it is oversubscribed. This methodology may result in financial benefits to Curtailable Loads if the interval relates to an IRCR interval.

3. The RD level could be calculated based on the consumption of the DSP during a larger number of peak demand times over the Hot Season. This would reduce the volatility in the measure and the potential for receiving double payment (as discussed previously). If the outage of one of more Curtailable Loads within the DSP would reduce the ability to curtail below their RCOQ, the DSM provider can apply for a Planned Outage or Forced Outage.

The MAC agreed that the IMO should undertake additional analysis to compare the three options presented above. This was with the view to basing the RD calculation on the consumption of the whole DSM Programme during the peak demand times over the Hot Season.

2. ANALYSIS

The IMO contracted Data Analysis Australia (DAA) to assist in the comparison of the alternative RD calculation methodologies. The objective of the comparison of alternative RD calculation methodologies is to devise an RD methodology that is both stable and reliable. The RD level should be stable in that the same facilities will receive similar RDs year on year and reliable in that the RD will represent the actual available capacity a facility will be able to curtail at the time of peak demand.

DAA has undertaken an initial investigation of a number of alternative RD methodologies for a number of test cases. In particular, DAA compared the RD values for a number of DSM programmes. This was calculated by summing the RC for individual NMIs, (current methodology) and also by aggregating the NMIs then calculating the RD (proposed methodology). Furthermore, four different methodologies were used to calculate the RD as outlined below:

1. The current method – this method takes the median of 32 Peak Trading Intervals (PTIs). Eight intervals are taken from the day with the highest system load in each month of the Hot Season (December through March). The intervals selected are the eight consecutive intervals summing to the largest Curtailable Load on a given trading day.
2. IRCR (proxy)– this method takes the median of 12 PTIs for each Hot Season. The three consecutive intervals with the highest load are selected from the four days with the highest daily System load during the Hot Season.
3. Trading Intervals during Business hours over the Hot Season – this method calculates the RD as the median of all intervals between 8am and 10pm, Monday to Friday (excluding public holidays). There are approximately 2,200 half-hour intervals that occur between 8am and 10pm, Monday to Friday (excluding public holidays) each Hot Season. This number varies due to the shift of the Easter public holidays from year to year, in and out of the Hot Season.
4. Top Peak Market Intervals – this method calculates the RD as the median of the top 250, 500 and 750 PTIs in the Hot Season from the System load.

In its paper, DAA's initial conclusions are:

1. It is the methodology used to calculate the RD that is the main driver of the stability and reliability of the RD rather than the order by which the aggregation of the RD is conducted into DSM groups;

2. The greater the number of intervals included in the methodology the less effect a Facility attempting to reduce it's IRCR has on the RD;
3. The greater the number of intervals included when determining the RD, the greater the stability of the RD value year-on-year; and
4. When a greater number of intervals are included a negative bias is introduced into the RD evaluation which would result in a potential under estimation of future curtailability.

The IMO has requested that further analysis be undertaken to determine which of the above methodologies best represents the curtailability of a DSP at peak demand times during the Hot Season.

3. RECOMMENDATIONS

The IMO recommends that the MAC:

- **Discuss** DAA's four alternative proposed methodologies for determining RD;
- **Discuss** DAA's initial conclusions; and
- **Note** that DAA will be undertaking further analysis of the identified methodologies for determining the RD.