

Ramp Rate Multiplier Issue – Options for Resolution

The following describes three options for resolution of the 12 times ramp rate issue. At this time, there is no significance to the order or method of presentation. All three options listed below will be evaluated. After discussions with the Market Pricing Working Group, the IESO will follow the normal process for taking a recommendation to the IESO Board. The Board will make its own evaluation, and will not be restricted to the IESO recommendation, or even the three options which are presented here.

These options have been developed based on discussions at the market pricing working group and discussions among IESO staff. All of the options presented here are based on the assumption that the current uniform clearing price regime remains in place (i.e. no LMP).

Option 1 – Change the ramp rate multiplier to a lower value that more closely aligns with unit capabilities.

Pricing algorithm changes:

- Ramp rate multiplier of less than 12
- No MIO

A lower ramp rate will tend to lead to increased price volatility. In addition, as the ramp rate approaches 1, there is upward pressure on the average price.

It has been demonstrated by simulations that the increase in average price due to a lower ramp rate multiplier is most significant between 3 and 1, and much less significant between 12 and 3.

There is very little theoretical justification for any ramp rate multiplier other than 1. However, if it were possible to achieve agreement among stakeholders on a lower ramp rate multiplier, then this option may provide an appropriate resolution to this issue.

This option would not require any rule or software changes and can be implemented relatively easily.

Additional Variation on Option 1

- Respect all unit capabilities (unit minimums, forbidden regions, steady operation periods) for units that are required for the unconstrained dispatch.

The unconstrained (pricing) algorithm currently ignores the unit physical capabilities of minimum loading point, forbidden regions of operation and steady state operation. We can modify the unconstrained algorithm to respect these physical limitations for units that are needed online in an unconstrained Ontario (i.e. ignore limitations for units which are online because of transmission limitations rather than economics). While this modification would mitigate the upward impact on average price caused by a ramp rate multiplier reduction from 12 to 1, that impact is expected to remain significant. It is expected that data analysis or simulations can be done to get some idea of the impact on price.

It should be noted that any simulations of price impact are approximations only. Differences in the supply and demand profile on any given day taken together with market design

changes such as CAOR and shared reserve will also impact prices. In addition, any simulation cannot account for changes in market participant behaviour that will occur. For example, an increase in price could lead to a reduction in exports and an increase in imports that will provide some mitigation of the upward price impact.

Option 2 – Make the unconstrained algorithm as close as possible to actual dispatch.

Pricing algorithm changes:

- Ramp rate multiplier of 1
- Multi-interval optimization (MIO)
 - A MIO price calculation method must be chosen (e.g. pure incremental, modified incremental, high slice price)
- Respect all unit capabilities for units that are required for the unconstrained dispatch.
 - Do not respect minimum loading point for units that are online due to transmission limitations.

The simple extension of the existing MIO algorithm to the unconstrained would not allow any online unit to be scheduled below its minimum load or within a forbidden region. Some additional effort would be required to modify the algorithm to ignore the minimum loading point of non-quick start units that are online for transmission limitations.

This option would remove two of the causes of CMSC (different ramp rates, MIO vs. no MIO) and therefore should reduce CMSC uplift.

The choice of a MIO price calculation method is not a simple task and it has been the focus of considerable effort by IESO staff supporting the market pricing working group over the past year. There are significant differences between the various pricing options studied so far. There is a paper posted on the MPWG page which outlines the three different MIO price calculation methods currently being reviewed.

http://www.theimo.com/imoweb/pubs/consult/mep/MP_WG-20060120-price-calculation-methods.pdf

Previous simulations of MIO pricing respected unit minimums for all online units - including those units online for transmission limits only, if any. If there were any units online for transmission limitations, then ignoring their minimums would result in higher prices than those produced by the simulation. Data analysis or further simulations may be possible to provide some insight into the price effect.

Additional Variation on Option 2

- Do not respect all unit capabilities for units that are required for the unconstrained dispatch.

Incorporate MIO into the unconstrained algorithm but allow units to be scheduled below their minimum loading point (or within a forbidden region). Not respecting these unit capabilities results in upward pressure on price so this variation would result in higher prices than that of option 2 above. Data analysis or simulations may be possible to provide some insight into the price effect of this variation.

DRAFT FOR DISCUSSION PURPOSES

Option 3 – Provide Additional Compensation for Ramping Units

A description of a method to provide compensation for ramping units has been written by AMPCO and is posted on the MPWG web page at the following link:

http://www.theimo.com/imoweb/pubs/consult/mep/MP_WG-20060120-AMPCO-response.pdf