

## ISSUE 05: SIMULTANEOUS USE OF RAMPING GENERATION UNITS FOR ENERGY AND OPERATING RESERVE

### **Date Raised**

Late 2002.

### **Description**

Generating units' can increase (or decrease) their output at no more than their physical ramping capability. Consequently, if a unit is increasing its energy output in response to a dispatch instruction, the amount of additional energy that it could provide, if it was activated as operating reserve is limited by the unit's total ramping capability.

### **Background**

The pre-dispatch Dispatch Scheduling and Optimisation (DSO) sequences include a constraint that limits a units output to the sum of the energy and all types of operating reserve in any hour up to the units maximum output using its initial output and its energy ramp capability. This will ensure that the facility is not scheduled to provide more energy and/or OR than it is physically capable of providing in the predispatch time frame.

In the real time constrained sequence of the DSO actual ramp rates are used to schedule the amount of energy and OR that can actually be delivered by a generating unit. If a generating unit has an energy and OR ramp rate of 5 MW/min and is currently producing 100 MW the maximum amount of energy that it can be dispatched to produce in the next dispatch interval is 125 MW. With a 125 MW dispatch for energy the maximum 10 minute OR that this unit can provide is 25 MW ( $10 \text{ min} * 5 \text{ MW/min} = 50 \text{ MW} - 25 \text{ MW energy dispatch}$ ). The constraint is similarly applied to 30 minute reserve schedules. None of the other control areas impose this constraint.

In the real time unconstrained sequence of the DSO a unit's ramp rate for energy is effectively multiplied by a factor of 12. The ramp rate multiplier allows a generating unit to provide approximately 12 times the amount of energy than it can actually produce. Thus, when calculating an energy dispatch the DSO assumes that a unit with a 5 MW/min energy ramp rate can provide 300 MW of energy in a single 5 minute interval ( $5 \text{ MW/min} * 5 \text{ min} * 12$ ). The same multiplier is not applied to a unit's OR schedule and a generating unit can only be scheduled to provide as much OR as the unit can actually deliver in the OR time period.

Contrary to the real time constrained sequence, a generating unit's OR schedule in the real time unconstrained sequence is not adjusted by its energy dispatch. A generating

unit that is producing 100 MW of energy and has a ramp rate of 5 MW/min can be dispatched to 400 MW (a 300 MW increase) for energy and receive an OR schedule of up to 50 MW for 10 min OR (5 MW/min \* 10 min).

### **Why a Pricing Issue**

The simultaneous use of ramping generation units for energy and operating reserve impacts the real time energy price as a unit can be providing both energy and operating reserve with the same output. This would apply downward pressure on the real time energy and OR prices.

### **Impact of Issue**

#### *Market Impact*

With the presence of a ramp rate multiplier in the real time unconstrained sequence it is the IESO's belief that there is a negligible pricing impact of allowing a ramping unit to provide OR.

#### *Participant Impact*

[To be developed]

#### *IMO Processes and Procedures Impact*

Changes to the Market Rules and the DSO would be required.

### **Related Issues**

004: Use of the 12-times ramp rate in the dispatch unconstrained algorithm

016: Historical analysis of nodal prices

017: Comparison of operating reserve prices in congestion pricing and uniform pricing regimes