Definition of Curtailment and Constraint

Version 1.0 February 2013

EIRGRID AND SONI DEFINITION OF CURTAILMENT AND CONSTRAINT

Operational Rule for determination of Constraint or Curtailment

If the Control Centre assumed it had control over every price taking generation unit in tie break on the island of Ireland and the security issue presented could only be resolved by reducing the output of one or a small group of price taking generation units in tie break then that reduction is deemed a constraint and logged as such.

If the Control Centre assumed it had control over every price taking generation unit in tie break on the island of Ireland and the security issue presented could be resolved by reducing the output of any or all of the price taking generation units in tie break then that reduction is deemed a curtailment and logged as such.

For the avoidance of doubt, if there are control decisions that need to be made, at a time, for curtailment and constraint reasons, the constraint decisions must be dealt with first. When the constraint has been dealt with any remaining price taking generation unit in tie break that need to have their output reduced will be curtailed.

Once a Curtailment instruction has been issued it is possible, and even likely, that this will mask the need for a subsequent Constraint instruction (and vice versa). It is not possible, even with post event analysis, to unmask the level of Constraint or Curtailment that would have occurred in the absence of a previous instruction. Therefore, by definition, the categorisation of the dispatch down instruction and resulting energy will only be determined by the appropriate cause at the time of application.

General

Curtailment and Constraint instructions are issued as Active Power Control setpoints – i.e. the price taking generation unit in tie break should reduce/increase its output to the Active Power Control setpoint and the units Active Power output should not exceed this level. A single price taking generation units in tie break can have concurrent Curtailment and Constraint Active Power Control setpoints.

Principles of Application of Curtailment or Constraint Setpoints

When applying a Curtailment or a Constraint to a price taking generation unit in tie break or group of price taking generation units in tie break the Active Power Control setpoints are both calculated on the basis of distributing a reduction in output between price taking generation unit in tie break using the Active Power output[1] of each price taking unit in tie break to be curtailed or constrained.

[1] In cases when the level of Curtailment/Constraint required is low and ramping capability is required, setpoints may be calculated on the basis of distributing a reduction in output between wind farms using the difference between Active Power output and Design Minimum Operating Level rather than Available Active Power. Design Minimum Operating Level (DMOL) is the minimum Active Power output of a Controllable WFPS where all WTGs are generating electricity and capable of ramping upwards at any of the specified ramp rates (given available wind), and shall not be greater than 12% of Registered Capacity.

For Application of Curtailment or Constraint

X_A = Reference Quantity = Actual Active Power output[1] of price taking unit in tie break Farm A
Y = Maximum active power output allowable from all relevant price taking unit in tie break after Curtailment or Constraint is applied
Z = Sum of Reference Quantities of all price taking unit in tie break to be constrained or curtailed

Active Power Control setpoint for price taking unit in tie break A= X_A * [Y/Z]

In general, when Curtailment and Constraints are required simultaneously, the Constraint is applied first and then Curtailment.

Principles of <u>Removal</u> of all or part of a Curtailment or Constraint Setpoint

When removing Curtailment, Active Power Control setpoints are calculated on the basis of distributing an increase in output between ***price taking unit in tie break*** on a pro-rata basis whilst ensuring that following the removal of a curtailment the Active Power Control setpoint for no unit exceeds any constraint setpoint that was already in place. The following equation sets out the calculation that is used:

For Removal of Curtailment

*X_A = Reference Quantity = Min [Available Active Power **and** Constraint Active Power Control setpoint] **-** Actual Active Power output[1].*
Y = Maximum active power output allowable from all relevant price taking unit in tie break after Curtailment is removed
Z = Sum of Reference Quantities of all price taking unit in tie break where Curtailment is to be removed

Active Power Control setpoint for price taking unit in tie break A= X_A * [Y/Z]

When removing Constraints, Active Power Control setpoints are calculated on the basis of distributing an increase in output between price taking unit in tie break using the difference between Available Active Power and the Active Power output as follows

For Removal of Constraint

X_A = Reference Quantity = [Available Active Power - Actual Active Power output] of price taking unit in tie break A
Y = Maximum active power output allowable from all relevant price taking unit in tie break after Constraint is removed
Z = Sum of Reference Quantities of all price taking unit in tie break where Constraint is to be removed

Active Power Control setpoint for price taking unit in tie break A= X_A * [Y/Z]

In general, when Curtailment and Constraints are active simultaneously, Curtailment is removed first and then Constraints.

Principles to Calculate Volume of Energy Constrained and/or Curtailed for Reporting Purposes

When there is either Curtailment or Constraint (but not both active), the energy Constrained or Curtailed is Available Active Power less Active Power output. When a number of Curtailment and Constraint setpoints have been issued which overlap in time, the curtailment/curtailment volume is defined as the difference between the relevant setpoints limited by Available Active Power at the time applied.