

Information Note on Inter-Area Flow (North-South Tie Line) Constraints

(S_MWR_ROI and S_MWR_NI in the monthly
Operational Constraints Update)

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Inter-Area Flow Constraints

Scheduled flows between the Ireland and Northern Ireland systems are limited by constraints to ensure they do not exceed the limitations of the North-South tie line, including a 20 MW margin of safety. It takes into account the rescue/reserve flows that could occur immediately post-fault inclusive of operating reserve requirements.

For positive flows from South to North:

$$T_{S-N} + \text{Min}(POR_{IE}, LSI_{NI} - 25\% POR_{NI}) \leq S_MWR_ROI - 20 \text{ MW Margin of Safety}$$

For positive flows from North to South:

$$T_{N-S} + \text{Min}(POR_{NI}, LSI_{IE} - 25\% POR_{IE}) \leq S_MWR_NI - 20 \text{ MW Margin of Safety}$$

Where:

- T_{S-N} is positive scheduled flow from South to North across the North-South Tie Line, i.e. the scheduled generation in Ireland less the scheduled demand in Ireland;
- T_{N-S} is positive scheduled flow from North to South across the North-South Tie Line, i.e. the scheduled generation in Northern Ireland less the scheduled demand in Northern Ireland;
- POR_{IE}/POR_{NI} are the scheduled Primary Operating Reserves in Ireland/Northern Ireland (including dynamic reserve, interruptible load and interconnector reserve);
- LSI_{IE}/LSI_{NI} is the scheduled MW output of the Largest Single Infeed in Ireland/Northern Ireland; and
- S_MWR_ROI/S_MWR_NI are the maximum allowed flows including rescue/reserve flows that could occur immediately post-fault inclusive of operating reserve requirements.

The reserve capacity needed on the North-South tie line to address a fault in a jurisdiction is the amount that must be able to flow across the tie-line in the event of the loss of the largest single infeed in the jurisdiction. It is calculated as the lesser of:

1. the primary operating reserve in the other jurisdiction; and
2. the largest single infeed in the jurisdiction less 25% of the primary operating reserve in the jurisdiction

Where the S_MWR_ROI or S_MWR_NI constraints are binding, any unit that is contributing to the constraint will be flagged. For example, if the S_MWR_ROI constraint is binding then all Ireland units are SO flagged as an increase in these units' scheduled output would increase T_{S-N} and breach the constraint. An exception to this is when POR_{IE} is less than $(LSI_{NI} - 25\% POR_{NI})$, an Ireland unit has a POR decrement rate of -1 and scheduled at a MW level whereby a change in its MW output would reduce the unit's POR. In this case the Ireland unit is not SO flagged because an increase in MW output would reduce its POR provision proportionally which would not lead to a breach of the constraint. If $(LSI_{NI} - 25\% POR_{NI})$ is less than POR_{IE} then the Largest Single Infeed(s) in Northern Ireland, and any Northern Ireland unit that is scheduled at a MW level whereby a change in their MW output would reduce the unit's POR will also be SO flagged. The converse applies to S_MWR_NI .