



## Transmission Constraint Groups Valid from 10<sup>th</sup> June 2011

### 1. Operating Reserve Requirements

| Category         | All Island Requirement<br>% Largest<br>In_Feed | EirGrid Minimum <sup>1</sup><br>(MW) | SONI Minimum<br>(MW) |
|------------------|--|--------------------------------------|----------------------|
| POR <sup>2</sup> | 75%  | 120 / 75                             | 50                   |
| SOR              | 75%  | 120 / 75                             | 50                   |
| TOR 1            | 100%   | 120 / 75                             | 50                   |
| TOR 2            | 100%   | 120 / 75                             | 50                   |

1. EirGrid Lower values apply from 22:30 -08:30 inclusive
2. Minimum values of POR in each jurisdiction must be supplied by dynamic sources

### Operating Reserve Definitions

|                   | Delivered By | Maintained Until |
|-------------------|--------------|------------------|
| Primary (POR)     | 5 seconds    | 15 seconds       |
| Secondary (SOR)   | 15 seconds   | 90 seconds       |
| Tertiary 1 (TOR1) | 90 seconds   | 5 minutes        |
| Tertiary 2 (TOR2) | 5 minutes    | 20 minutes       |

### Sources of Reserve

|                 | EirGrid  | SONI                            |
|-----------------|--|---------------------------------|
| Dynamic Reserve | Synchronised Generating Units  |                                 |
| Static Reserve  | Turlough Hill Units when<br>in pumping mode<br><br>Interruptible Load<br>(30 MW 07:00 – 00:00) | Moyle Interconnector<br>(75 MW) |

Due to the real time nature of system operation this data may change from time to time. We cannot accept any responsibility or liability howsoever caused by reliance on the information presented here.

## 2. Tie Line Limits

### Tie line flow limits after reserve execution in either jurisdiction

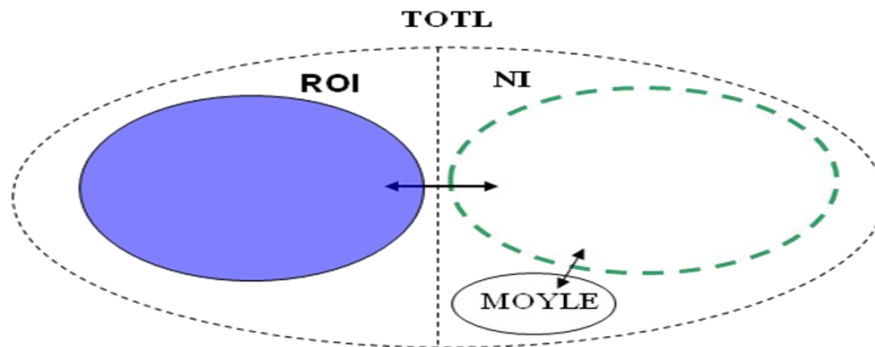
Tie line flows in both directions have physical limits, the maximum flow that can be sustained without breaching system security rules (line overloads, voltage limits etc) after a credible transmission event

The limits are referred to as the Total Transfer Capacity (two values one N-S and one S-N)  
When determining minimum system cost, RCUC respects the TTC values by not allowing the reserve holding in either jurisdiction + the tie line flow to exceed the TTC

|                                   |         |        |
|-----------------------------------|---------|--------|
| Present values (normal operation) | N-S TTC | 450 MW |
|                                   | S-N TTC | 400 MW |

### Transmission Constraint Groups

- TOTL is of MW type which contains all units on the island and is used to balance total generation with total demand
- ROI is of MWR type which contains all EirGrid units and is used to control the flow S-N
- NI is of MWR type which contains all the SONI units (including Moyle) and is used to control the flow N-S
- Moyle is of MW type which contains the Moyle interconnector units and is used to limit it's import to NI and export to GB



### Most Common TCGs

The most common constraints that are modelled are:

- North – South Tie line export / import constraint: MWR type
- Moyle Import/Export constraint: MW type
- Requirement to keep a minimum number of units on in an area: NB type
- Requirement to limit the output of the generators in an area to limit short circuit levels or overloads: MW type or NB type
- Requirement to enforce the minimum output from the generators in an area to support the voltage or to avoid overloads: MW type or NB type
- Requirement to limit the output of stations due to salmon spawning: MW type

## Active SONI TCGs

| Name          | TCG type | Limit type | Limit  | Resources                                | Description  |
|---------------|----------|------------|--|--|--|
| <b>MINNIU</b> | NB       | N:>=       | 4 units<br>Monday to Thursday<br>08:00 – 19:30 hrs<br>and Friday<br>08:00 – 12:30<br>3 units at all other times.<br>3 units on Bank or public Holidays | All units in NI (excluding GTs)          | There must be a least 4 units synchronised in NI during the periods detailed.<br>Required for system security.                             |
| <b>B31B32</b> | NB       | N:>=       | 1 unit at all times  | B31 and B32 at Ballylumford              | Due to an ongoing technical issue it is required to have at least one of B31 or B32 on load at all times.<br>Required for system security. |
| <b>CPS</b>    | MW       | B          | Unit must be producing at least 260 MW and no more than 430 MW   | C30                                      | The unit must be on load at all times.<br>Required for system security.  |
| <b>NI_GT</b>  | MW       | X:<=       | 195 MW all day   | BGT1, BGT2, CGT8, KGT1, KGT2, KGT3, KGT4 | Combined MW output of all OCGTs must be less than 195 MW.<br>Required for system security.   |
| <b>KILROO</b> | NB       | N:>=       | 1  | K1, K2                                   | There must be at least one unit synchronised in Kilroot at all times.<br>Required for system security.                                     |

## Active EirGrid TCGs

| Name                       | TCG Type | Limit type | Limit                      | Resources  | Description  |
|----------------------------|----------|------------|----------------------------|--|--|
| System Stability           | NB       | N:>=       | 5 units                    | AD1, AD2, DB1, HNC, HN2, MP1,MP2,MP3, PBC, TB3, TB4, TYC, WG1      | There must be at least 5 high inertia machines on-load at all times in ROI<br><br><i>Required for dynamic stability</i>                              |
| Replacement Reserve        | MW       | X:<=       | 489 MW                     | AT11, AT12, AT14, ED3, ED5, MRC, NW5, RP1, RP2,TP1,TP2             | Combined MW output of OCGTs must be less than 489MW (out of a total of 789 MW) in ROI at all times<br><br><i>Required for replacement reserve</i>    |
| Dublin Generation          | NB       | N:>=       | 2 in winter<br>3 in summer | DB1, HNC, HN2, PBC   | There must be at least 2/3 large generators on-load at all times in Dublin area<br><br><i>Required for voltage control</i>                           |
| <u>Poolbeg</u><br>Must Run | NB       | N:>=       | 1 unit                     | PBC  | PBC must remain on-load at all times<br><br><i>Required for system security (voltage control, reserve contribution and transmission support)</i>     |
| South West Generation      | NB       | N:>=       | 3 by day<br>2 by night     | AD1, AD2, AT11, AT12, AT14, MRC, SK3, SK4, TB1, TB2, TB3, TB4, WG1 | There must be at least 3 units on load in the South West<br><br><i>Required for voltage stability</i>  |
|                            | MW       | N:>=       | 240 MW by day only         | AD1, AD2, AT11, AT12, AT14, MRC, SK3, SK4, TB1, TB2, TB3, TB4, WG1 | There must be at least 240 MW of generation on-load in the South West by day<br><br><i>Required for system security (overload security criteria)</i> |
| Cork Generation            | MW       | X:>=       | 800 MW                     | AD1, AD2, AT11, AT12, AT14, WG1                                    | This restricts the amount of generation in the Cork area to 800 MW<br><br><i>Required due to transmission congestion</i>                             |
| Moneypoint                 | NB       | N:>=       | 1 unit                     | MP1, MP2, MP3  | There must be at least one Moneypoint unit on load at all times<br><br><i>Required to support the 400 kV network</i>                                 |