

Paris Session 2022



Multi-Criteria Assessments of Options for New Network Reinforcements

SC C1 PS3 Q3.2.2

Worldwide the economic impact of new power lines has to be weighed between environmental impact, economic consideration as well as technical capability. With this in mind, what is the general methodology followed when designing new power lines or refurbishment of existing lines both underground and overhead?

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Group Discussion Meeting

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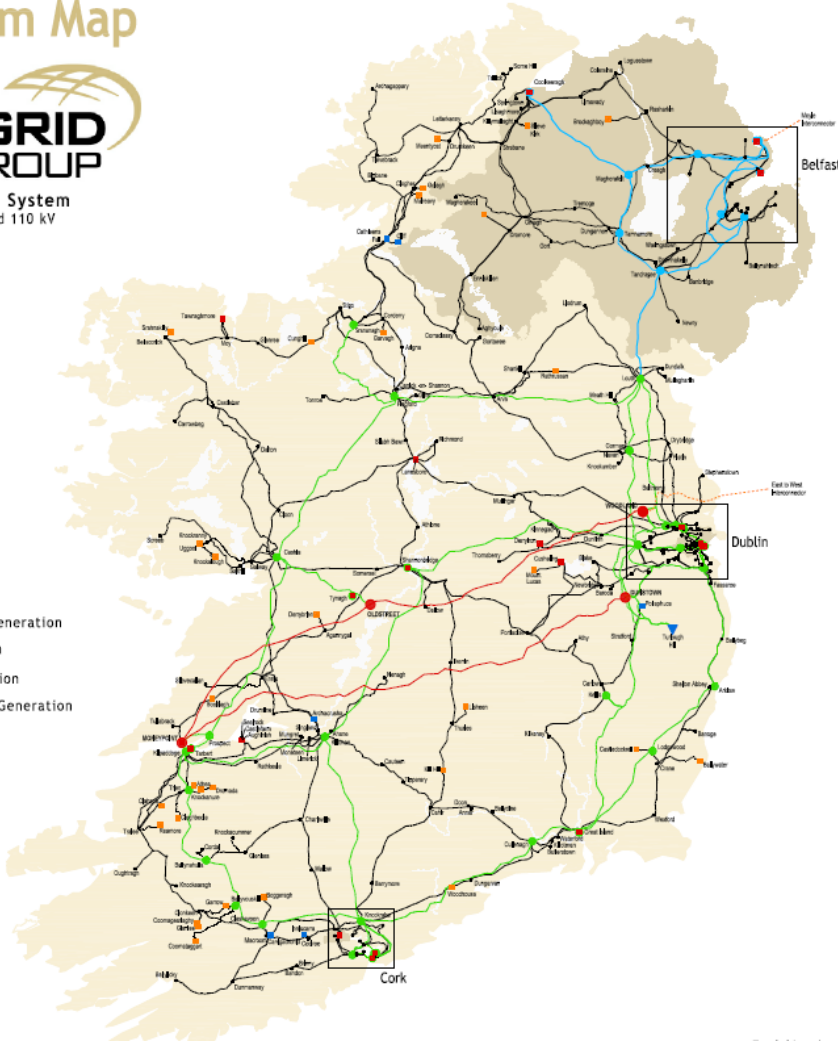
Background

Transmission System Map



Transmission System
400, 275, 220 and 110 kV
January 2020

- 400kV Lines
 - 275kV Lines
 - 220kV Lines
 - 110kV Lines
 - 220kV Cables
 - 110kV Cables
 - HVDC Cables
 - 400kV Stations
 - 275kV Stations
 - 220kV Stations
 - 110kV Stations
- Transmission Connected Generation
- Hydro Generation
 - Thermal Generation
 - ▼ Pumped Storage Generation
 - Wind Generation



All Island system

- **Synchronous island**
 - Currently operation with 75% System Non-Synchronous Penetration (SNSP). *Paper C4_PS3_11016_2022*
- **Ambitious Renewable Energy Targets**
 - 80% electricity from renewable resources by 2030
 - At least 7GW offshore wind generation
 - Up to 8GW onshore wind generation
 - Approx. 5.5GW solar PV (grid scale and micro level)
 - c.7.8 GW peak
 - 95% SNSP
- **Network Reinforcement Projects**
 - Upgrades of existing grid
 - New circuits & substations
 - Stakeholder engagement & acceptability

Six Step Framework for Developing the Grid in Ireland



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Multi – Criteria Assessment for Options

For network reinforcement projects five main criteria are used.

- Technical Performance,
- Economic Performance.
- Environmental,
- Socio-Economic, and
- Deliverability.

Sub-criteria of the main criteria can be selected as appropriate.



This scale is clarified by text, as follows:

High: dark blue;

Moderate-high: blue;

Moderate: dark green;

Low-moderate: green; and

Low: cream.

Sample Multi – Criteria Assessment for Four Options

- Comparative analysis across options and criteria
- Carried out in each step where options must be assessed

	Option 1	Option 2	Option 3	Option 4
Technical Performance	Green	Blue	Light Green	Green
Economic Performance	Light Green	Blue	Light Green	Blue
Deliverability	Dark Blue	Dark Blue	Dark Blue	Blue
Environmental	Green	Light Green	Blue	Green
Socio-Economic	Green	Light Green	Blue	Green
Combined Performance	Dark Blue	Dark Blue	Dark Blue	Green