Enduring Connection Policy (ECP) 2.5

Assumptions Document

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Contents

Revision History						
Revision	**Date**	**Description**	**Originator**	**Reviewer**	**Checker**	**Approver**
RO	28.08.2025	Release of draft assumption for ECP 2.5	ECP Team	ECP Lead	ECP Senior Lead	Economic Analysis Manager
R1	01/10/2025	Figure 3: Added 3 Study Scenarios and 3 pro-rata studies as per Industry request Table 1 interim column updated were additional information available, this will be update again Table 3 update to rated export capacity of Celtic Update text to section 3.2	ECP Team	ECP Lead	ECP Senior Lead	Economic Analysis Manager

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ABBREVIATIONS AND DEFINITIONS

BES	Battery Energy Storage
CRU	Commission for Regulation of Utilities
ECP	Enduring Connection Policy
ECP - GSS	Generation and System Services
GW	Giga watt
IC	Interconnector
IE	Ireland
NI	Northern Ireland
NDP	Network Delivery Portfolio
NRAA	National Resource Adequacy Assessment
NS	North South
ORESS	Offshore Renewable Energy Support Scheme
PD	Priority Dispatch
RE-HUB	Renewable Hubs
RES	Renewable Energy Sources
SEM	Single Electricity Market
SOEF	Shaping Our Electricity Future
TDD	Total Dispatch Down
TER	Total Electricity Requirement
TSO	Transmission System Operator
50%	Generation scenario is formulated by adding half of the difference between the initial and ECP scenarios to the initial study
System Non-Synchronous Generation	There is a requirement to limit the instantaneous penetration of asynchronous generation connected to the All-Island system.
Operational Limit for Inertia	There is a requirement to have a minimum level of inertia on the All-Island system.
Minimum Sets	There is a requirement to have a minimum number of conventional generators in Ireland and Northern Ireland.
Reserve	The amount of spare capacity in the system to manage any system disturbance.
Future Grid	A future network scenario which includes reinforcement which are part of NDP and SOEF 1.1 but may not have capital approval.

1 EXECUTIVE SUMMARY

The Enduring Connection Policy (ECP) 2.5 is the fifth batch of connection offers planned under ECP-2 by the Commission for Regulation of Utilities (CRU) to facilitate opportunities for connections of Renewable Energy Sources (RES) on to the Irish electricity network. The decision on the 5th batch of connection application under the ECP 2 decision paper was cited in the Electricity Connection Policy - Generation and System Services (ECP-GSS) decision paper[1]. As per the ECP-GSS decision paper the ECP-2.5 Constraints Analysis is carried out by the TSO as directed by CRU/20/060 decision[2] to forecast dispatch down levels for wind and solar projects. Upon completion of this constraint forecast analysis, EirGrid will publish 12 regional constraints reports, which provide developers with information on forecasted dispatch down levels in each region.
While the progression offshore wind applications are considered separately from ECP process, EirGrid has include offshore-based study scenarios in the previous version of constraint forecast analysis. ECP-2.5 constraint forecast will include similar offshore sensitivities in line with the current offshore strategy.
Additional sensitivities are considered as a part of the ECP 2.5 constraint forecast depending on the industry feedback (see Section 3).

1.1 Total Dispatch Down

Total Dispatch Down (TDD) is the sum of Surplus, Curtailment, and Constraints, where:

- Surplus represents dispatch down applied for energy balancing when the available generation exceeds demand plus interconnector export.
- Curtailment represents dispatch down applied to ensure operational limits are met.
- Constraints represent dispatch down applied to manage localised congestion on the grid, whereby variable generator output is constrained to stay within overload limits of the transmission lines. This is applied at a nodal level.

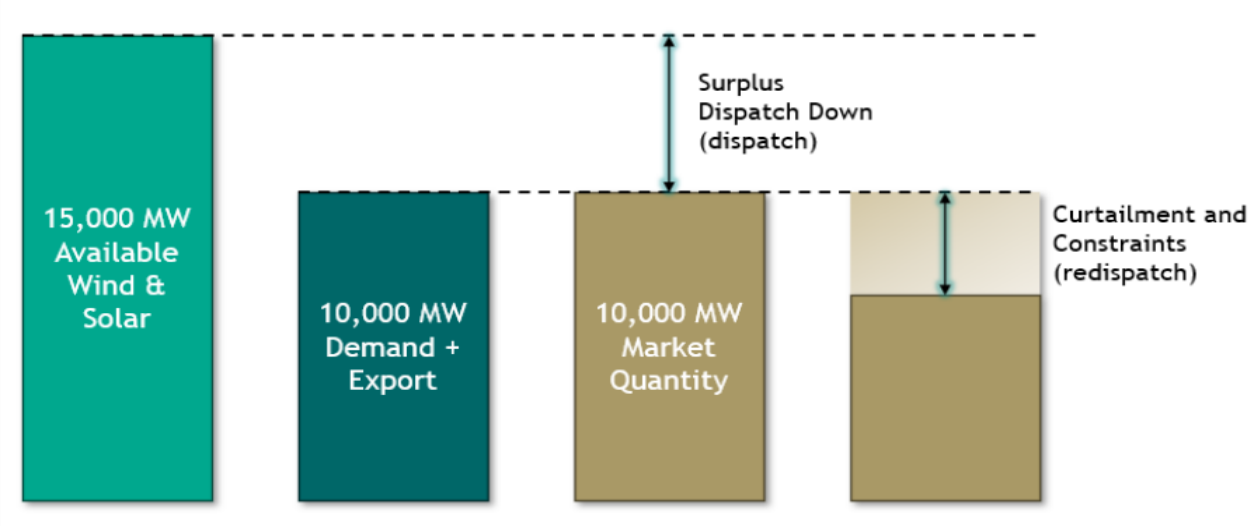

Figure 1 Illustration of Surplus, Curtailment and Constraints in the SEM

[1] https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU2034101_Electricity_Connection_Policy_Generation__System_Services_Decision_Paper.PDF
[2] https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU20060-ECP-2-Decision.pdf

1.2 Analysis Process

The constraint forecast modelling will use PLEXOS software to model the generation, loads, transmission lines and operational constraints. Three studies will be run sequentially, as shown in the Figure 2, to simulate the dispatch down of RES generation at each stage. A post calculation methodology will be employed in the final stage to process the results according to the assumptions.

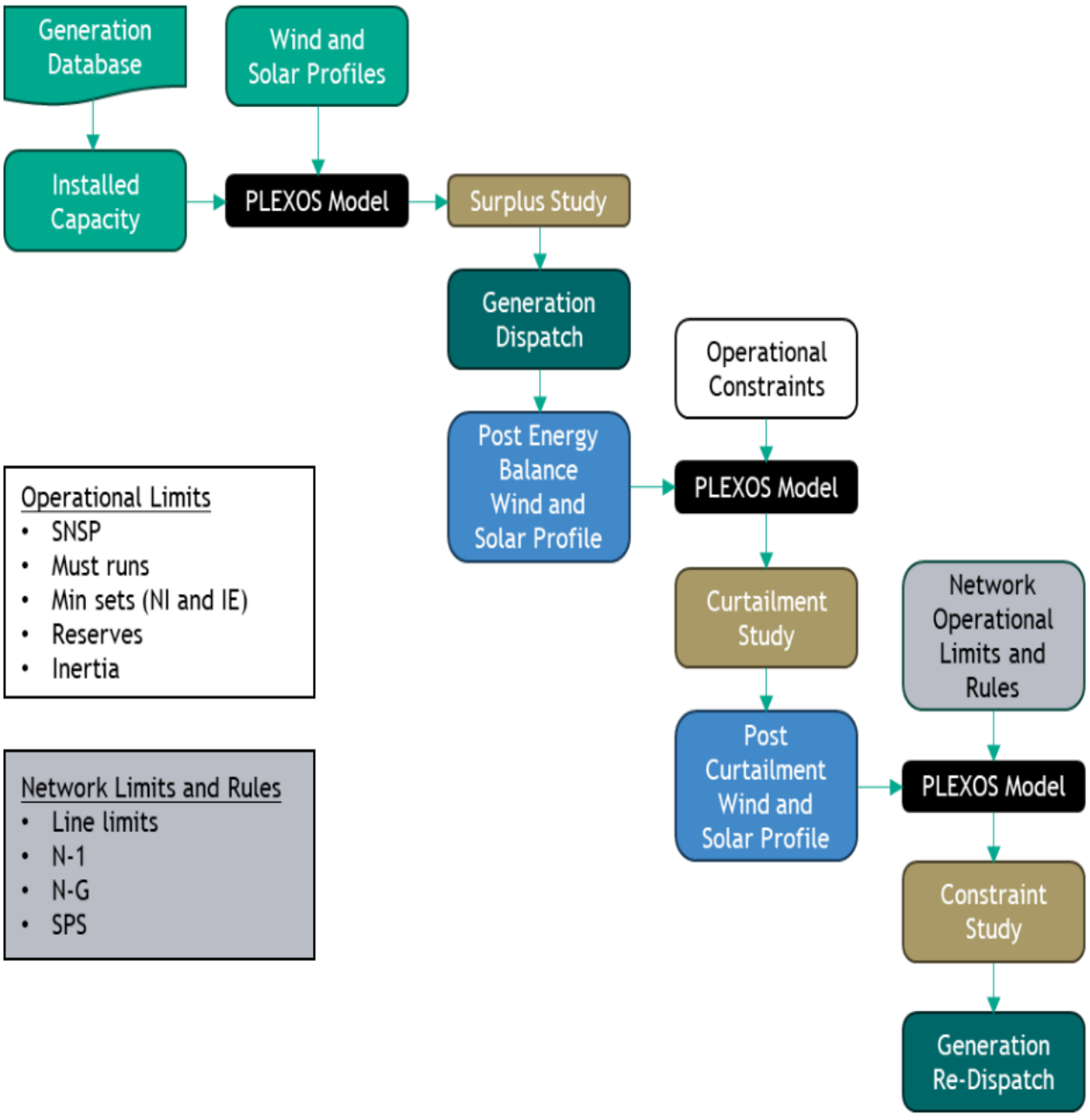

Figure 2 Process Flow Chart

1.3 Modelling Approach

The main modelling approach for each of the ECP-2.5 constraint forecast studies is outlined below.

Renewable generation is modelled at 110 kV stations:

A 110 kV station can have wind/solar Priority Dispatch (PD), non-Priority Dispatch (non-PD) or Uncontrolled generation connected to it.

Wind and solar hourly profiles are used to calculate RES generation within the model.

Batteries are modelled

Short-duration batteries (batteries with a storage duration of up to 2 hours) are modelled to supply reserve, and any residual short-duration batteries are used for energy arbitrage once the reserve requirements are met.

Other batteries (greater than 2hrs storage duration) are used within the model for energy arbitrage.

The cycling of these batteries is decided by PLEXOS's Battery Optimisation tool, which identifies the optimal charge and discharge times to maximise financial returns. Furthermore, a limit of maximum 2 cycle per day is applied to all batteries.

The batteries are modelled to have a round-trip efficiency of 81%.

Surplus

Applied if there is not enough demand or export capability to accommodate renewable generation. For each hour, non-PD renewable generators are initially dispatched down (applied pro-rata across the All-Island grid). If the surplus situation cannot be resolved by non-PD reduction alone, PD generators are then dispatched down. This method is termed as grandfathering.

Curtailment

Following dispatch down for surplus reasons, curtailment is applied to meet operational limits e.g. SNSP, Inertia, Min. Sets Rules, Generator Must Runs and Operating Reserve.

For each hour, the reduction in output due to curtailment is shared equally between PD and Non-PD renewable generators (applied pro-rata across the All-Island grid).

Constraints

Following curtailment, reduction in output due to generation constraint is applied to resolve localised transmission issues.

The model dispatches down by individual station to mathematically minimise the total renewable generation dispatch down. For annual energy, the results are then averaged across adjacent 110 kV stations.

In the grandfathering based approach, non-PD renewable generators are dispatched down first (applied pro-rata across renewable generators that are effective in managing a particular network limitation). If the constraint situation cannot be resolved by non-PD reduction alone, PD generators are then dispatched down.

In the pro-rata constraints approach, all priority and non-priority units are dispatched down on a pro-rata basis at relevant nodes to manage the network constraints.

1.4 Study Scenario Matrix

- The core ECP-2.5 study horizons are 2028, 2030 and Future Grid.
- The RES generation capacities in the initial study for 2028 include all renewable generation currently connected, plus all renewable generation expected to connect before the end of 2027.
- The 50% generation scenario is formulated by adding half of the difference between the initial study and ECP scenarios.
- The ECP generation scenario includes all the RES generation in the pipeline up to and including ECP-2.5 applicants (including ECP2.5.1 applicants) (some of whom may not have received offers at this point in time but are still considered within these studies).
- All studies will include a representative maintenance schedule. The maintenance sensitivity removes the representative maintenance schedule from the model and compares the results to the core ECP study (which includes the representative maintenance schedule).

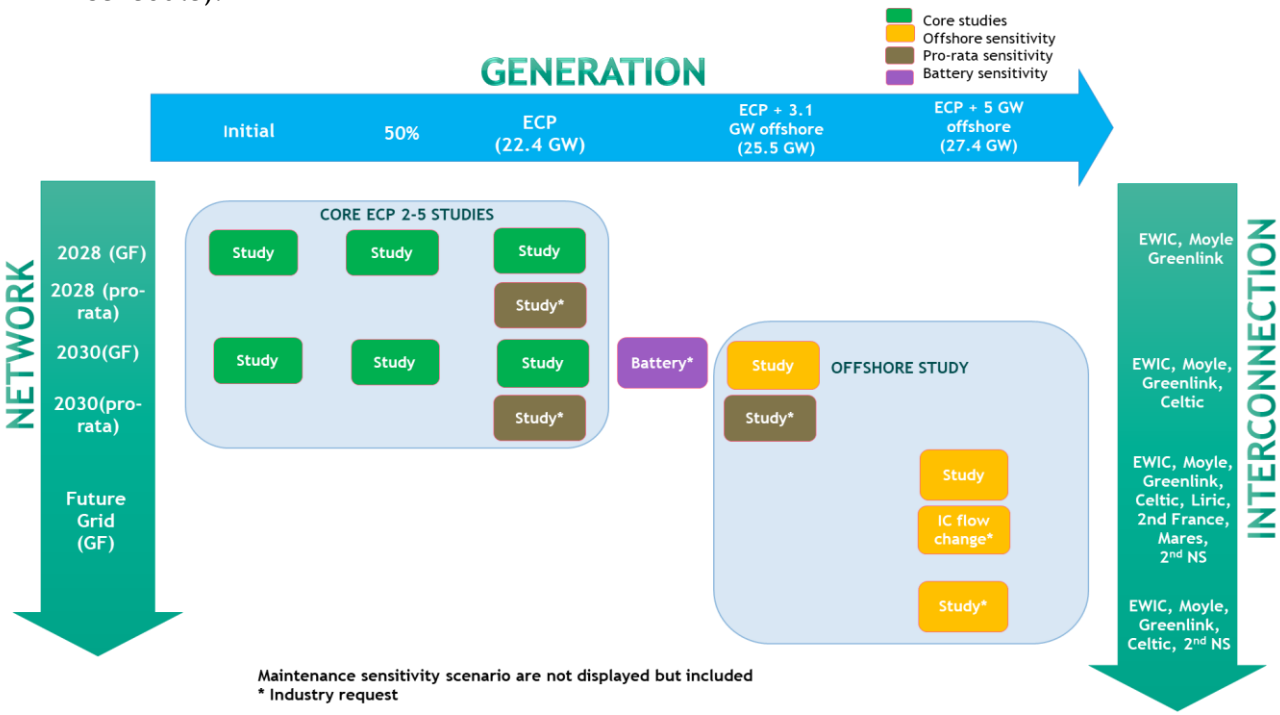

Figure 3: ECP-2.5 Study Scenarios

- The "ECP + 3.1 GW offshore" offshore sensitivity studies include a study with the ORESS 1 auction qualified offshore projects in addition to the ECP generation on 2030 network and Future Grid.
- The "ECP + 5 GW offshore" generation scenario is also included to align with the SOEF 1.1 offshore assumptions; this is based on a Future Grid network.

The study sensitivities in the future grid are presented as follows:

- ECP scenario 2028 (pro-rata) and 2030 (pro-rata) will have constraint allocation based on pro-rata.
- ECP + 3.1 GW offshore scenario for 2030 (pro-rata) will have constraint allocation based on pro-rata.
- 2030: ECP wo battery sensitivity has all installed wind and solar as of 2030 ECP scenario but without the non-connected batteries.
- ECP scenario + 5 GW offshore with "IC flow change" scenario will include an alternate flow profile for the interconnectors.
- ECP scenario + 5 GW offshore with interconnector sensitivity, i.e., without Mares, LirIC and 2nd France interconnector.

2 Assumption Inputs

2.1 Criteria

Outlined below in table all source of inputs and criteria.

Assumption for ECP2.5	Draft	Interim	Final
Study period	2028		
	2030		
	Future Grid as per SOEF	2035	
Core ECP-2.5 scenarios	2028 – Initial, 50%, and ECP scenario (constraint allocation based on grandfathering).		
	2030 – Initial, 50%, and ECP scenario (constraint allocation based on grandfathering).		
Sensitivities	2028 – ECP scenario (constraint allocation based on pro-rata).		
	2030 – ECP scenario (constraint allocation based on pro-rata).		
	2030 – ECP scenario + 3.1 GW offshore (constraint allocation based on pro-rata).		
	2030: ECP wo battery sensitivity – non connected batteries removed		
	2030 ECP + 3.1 GW offshore - offshore (constraint allocation based on grandfathering).		
	Future Grid + 5 GW offshore - offshore sensitivity study		
	Future Grid ECP scenario + 5 GW offshore with “IC flow change” with alternate flow profile for the interconnectors.		
	Future Grid ECP scenario + 5 GW offshore interconnector sensitivity, i.e., without Mares, LirIC and 2nd France interconnector.		
Northern Ireland	NI generation and network data to be added		
Demand	AIRAA 2026-2035 To be added		
Conventional Generation	AIRAA 2026-2035 To be added		

RES generation (Ireland)	The total generation capacity to be studied under ECP-2.5 and ECP-2.5.1 batch is 5.4 GW (1.2 GW battery, 0.6 GW gas, 2.6 GW solar and 1.0 GW onshore wind		
	The total IE generation capacity (wind, solar and battery) considered in this study is 27.4 GW, including up to 5 GW of offshore wind in Ireland.		
	The list of Priority and Non-priority units are to be updated with recent updates.		
Interconnector	2028 – EWIC, Greenlink, Moyle		
	2030 – EWIC, Greenlink, Moyle, Celtic.		
	Future Grid – EWIC, Greenlink, Moyle, LirIC, Celtic, Mares, 2nd NS, 2nd France		
Operational Constraints	Inertia 2028 – 23,000 MWs 2030 – 23,000 MWs Future Grid – 23,000 MWs		
	Minimum Sets (SEM) 2028 – 7 2030 – 3 Future Grid – 0	2028 – 4,3 2030 – 2,1	
	Reserve (IE, NI) POR /SOR/TOR I/TOR II	100% of LSI/LSO	
	Non-Synchronous Generation 2028 – 85% 2030 – 95% Future Grid – 100%		
Outage assumptions (Transmission)	Using ECP 2.4 baseline additional updates to extend the period from 9 months to 12 months.		
Network developments	2028 and 2030: Network Delivery Portfolio Q2 2025: To be confirmed		
	Future Grid: SOEF 1.1 Roadmap and NDP		
Interconnector Model	The price model for the IC's will be updated to reflect the regional price differentials currently observed in the SEM, GB and France Markets.		
	The flows will be fixed from the Surplus model for to be used in the Curtailment and Constraint model.		

Solar Profile	The solar profile for the three regions in Ireland – North, Middle and South – will use 2020 data procured from an external vendor.		
Onshore Wind Profile	Profiles from 2020. Each node using a representative profile from that area.		
Offshore Profile	Synthesised 2020 offshore profile (procured from an external vendor).		
BES Profile	Based on current offers and applications.		
	Used for maintaining reserve (POR, SOR, TOR1 & TOR2).		
	2 cycle per day limit.		
	Portion of the long duration storage to provide energy arbitrage		
RE-HUB	TBC		
LCIS (Low Carbon Inertia Service)		Sync comp: 7,000MWs for IE and 4,000MWs for NI	
DLR (Dynamic Line Rating)		Up to 30% additional loading on transmission line.	
SDES (Short Duration Energy Storage)			
LDES (Long Duration Energy Storage)			
Hybrid Connections			

Table 1 Assumption data

2.2 Breakdown

ECP 2-5 Breakdown of IE Generation Capacity (MW)					
	Initial Study	**50% Study**	**ECP All Study**	**ECP + 3.1 GW offshore**	**ECP + 5 GW offshore**
Battery	946	2,758	4,570	4,570	4,570
Solar	1,664	5,592	9,519	9,519	9,519
Wind	5,524	6,906	8,288	8,288	8,288
Wind Offshore	25	25	25	3,099	5,025
Totals	**8,160**	**15,281**	**22,402**	**25,476**	**27,402**

Table 2: Generation Capacities for Ireland (IE)

Interconnector Capacity (MW)	Export/Import	2028	2030	Future Grid
Moyle	Export	400	500	500
	Import	450	500	500
EWIC	Export	500	500	500
	Import	500	500	500
Celtic	Export	-	700	700
	Import	-	700	700
Greenlink	Export	500	500	500
	Import	500	500	500
LirIC	Export	-	-	700
	Import	-	-	700
2nd France-Ireland	Export	-	-	700
	Import	-	-	700

Table 3: Interconnector Export/Import Capacities

3 Timelines

Live document will be updated throughout ECP-2.5 cycle as per timeline below.

3.1 Overview

3.2 Details

- Industry stakeholder engagement meeting – 22.08.2025 Completed
- Submit study scenario for consideration - 05.09.2025 Completed
- Industry stakeholder engagement meeting –19.09.2025Completed
- **Assumption document to be updated- 07.10.2025** Completed
- Webinar – 12.12.2025 **Next due date**
- Publication of Results – 19.12.2025
- Area wise webinar – 12.01.2026
- Closing date to submit queries – 19.01.2026
- **Assumption document to be updated- 31.12.2025**
- Closing date to respond to queries – 30.01.2026

4 Appendix

4.1 Draft Assumption Industry Webinar engagement 22.08.2025

https://cms.eirgrid.ie/sites/default/files/publications/ECP-2.5-Industry-Draft-Assumptions-Presentation-slides.pdf