An Coimisiún
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Commission for
Regulation of Utilities

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Commission for Regulation of Utilities

Ireland’s Electricity Sector Risk Preparedness Plan (2026-2029)

Final Decision Paper

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The Exchange, Belgard Square North, Tallaght, Dublin 24, Ireland
T +353 1 4000 800 | F +353 1 4000 850 | www.cru.ie

CRU Strategic Plan 2025-27

Public/ Customer Impact Statement

Regulation EU 2019/941 on risk preparedness in the electricity sector (RPR) sets out requirements for each EU Member State to ensure that consistent plans are in place to prevent, prepare for and manage crisis events that may result in a loss of electricity supply to customers.

For example, these events might include:

- extreme weather conditions,
- technical failures,
- malicious actions,
- supply chain or adequacy issues.

Where there is advance notice that one of these events may occur, an 'Early Warning' may be issued.

If such an event occurs, a 'Crisis' may be declared.

As part of the work required under the RPR, the CRU has collaborated with EirGrid, the electricity Transmission System Operator (TSO), to develop a set of potential 'crisis' scenarios under which a loss of electricity supply might occur in Ireland, and to assess the level of risk associated with each scenario.

The scenarios were subject to consultation in line with Article 7(2) of the RPR, which involved the CRU completing a series of workshops with the system operators, the Department of Climate, Energy and the Environment (DCEE), representatives from industry and from Northern Ireland (DfE-NI, URNI and SONI). The identified scenarios have been used here to document the detailed preparations that are in place to manage such events. The CRU consulted on the draft Risk Preparedness Plan in accordance with Article 10 of the RPR.

This Risk Preparedness Plan sets out the procedures that will be followed by actors in the electricity sector during crisis situations, such as those described by the scenarios, to minimise the disruption caused to customers, and builds on the previous plan, published in May 2023.

This Plan also covers the preventive and mitigating steps to be taken that will help to avoid crises occurring. The roles and responsibilities of different stakeholders, the communications procedures, and the calendar for regular testing of the system are included in the Plan, along with a description of consultations to date.

The TSO (EirGrid), as part of its day-to-day function to protect security of supply in Ireland, has specific procedures in place to deal with emergency situations, and the plans presented here draw heavily on the existing measures. The purpose of the RPP is to meet the requirements of the RPR, and to bring the relevant information together in a form that is common across Europe so that potential crisis scenarios, both national and regional can be identified, assessed and subsequently managed in an enhanced and coordinated manner. This Plan also comprises recent mitigation measures put in place to ensure security of electricity supply, including those under the Electricity Security of Supply Programme.

Executive Summary

In accordance with Article 10 of the Risk Preparedness Regulation (EU) 2019/941 (RPR), the CRU, as Competent Authority, has developed Ireland's Electricity Sector Risk Preparedness Plan ('the Plan'). The Plan includes the set of electricity crisis scenarios developed under Article 7 of the RPR which were consulted on by the CRU with operators and market participants between October and November 2024. These scenarios are based on the 23 regional electricity crisis scenarios developed by the European Network for Transmission System Operators ('ENTSO-E'), and incorporate additional locally relevant scenarios, developed by the CRU and EirGrid. The updated set of national scenarios consists of a total of 25 scenarios falling into the categories of: weather, natural, malicious actions, technical, supply chain, human, and adequacy. It is important to note that most scenarios have been considered as individual events in accordance with the ENTSO-E methodology, and that whilst the likelihood of simultaneous occurrences of multiple scenarios is lower, the impact would be more significant. Scenarios that have higher likelihood of simultaneous occurrence have been indicated in this update to the Plan.

The CRU has developed this plan in close collaboration with EirGrid. We have developed a plan which looks at 'crisis' type scenarios that could occur and lead to significant national scale impacts on the electricity system and electricity customers. The CRU has invested significant resources to improve and further develop the plan. The plan establishes a common framework for the prevention, preparedness, and management of possible electricity crisis events. It plays a vital role in preparing Ireland's electricity system for such potential crisis events. The CRU considers that this is an important and legally necessary document to identify risks and to prepare the electricity system for possible crisis events. As recent experience in Europe has demonstrated, crisis events can and do occur, for example, from weather, technical and malicious events. The CRU keeps matters of interests in this regard under review through its involvement in the Electricity Coordination Group ('ECG').

The RPR includes a provision under Article 10(7) to ensure the confidentiality of sensitive information, specifically referencing malicious scenarios. In the context of the heightened risk environment around malicious attacks on energy infrastructure, undersea cable and pipeline sabotage it was considered appropriate for the CRU to develop a public and non-public version of the document for this RPP cycle. Details and risk assessment results from the malicious scenarios are considered as sensitive and have been omitted from the public version of the plan.

In addition to the set of electricity crisis scenarios, the Plan documents the steps to be taken by the electricity sector to prevent, prepare for and manage emergency situations such as those defined by the scenarios. The Plan includes the roles and responsibilities of the Competent Authority and other bodies in developing the plan, details of the national procedures and measures that are in place to be followed in the case of an electricity crisis, preventive and preparatory measures that aim to reduce the likelihood and improve the outcome of such crises, and mitigating steps that will help to avoid or minimise the severity of a crisis.

An electricity crisis is defined by the RPR as "*a present or imminent situation in which there is a significant electricity shortage*". Various measures, implemented in real-time to prevent and/or mitigate such a crisis, are documented in detail in the System Defence Plan ('SDP') and the Power System Restoration Plan ('PSRP'), as required under Regulation (EU) 2017/2196 *Establishing a Network Code on Electricity Emergency and Restoration* ('NCER'). These measures, designed to be deployed when conditions arise that result in the violation of Operating Security Standards[1], are summarised in this Plan. They include manual and automatic interventions to manage power system frequency, voltage, power flows, demand, and dynamic stability. Many of these measures, such as demand control (load shedding), may be deployed in response to multiple crisis scenarios. Operational procedures and business continuity plans are also in place to prevent and mitigate the potential impact of specific electricity crisis scenarios. These include preparations for foreseeable conditions such as extreme weather events, and cross-sector responses to incidents that could impact the broader energy sector over extended periods of time due to significant damage to critical infrastructure (such as an extreme natural gas emergency).

The prevention of electricity crises is addressed by the operators and asset owners through a range of plans and programmes including those related to network development, climate adaptation and cybersecurity.

Assessments related to the outlook for the power system are published at pre-defined intervals. The Winter Outlook produced annually by EirGrid, highlights potential adequacy risks over the winter period. The All-Island Resource Adequacy Assessment 2025 - 2034[2] forecasts the adequacy outlook for two different scenarios, the Base and Secure scenarios. The results for both scenarios indicate adequacy challenges in 2025 and 2026 considering in-market measures only. The position improves as Celtic is delivered[3] and new gas fired electricity generation capacity comes online. From 2028, the Base scenario indicates the system is operating within standard on average, and therefore no additional capacity is required. The Secure scenario considers, inter alia, low imports - indicating the system will be outside of standard, and additional capacity is required across the study horizon.

In response to concerns identified regarding Ireland's adequacy position in 2021, a Security of Supply programme was put in place by the CRU to address the risk of a shortfall in capacity to meet demand. The measures implemented were market-based where possible but also include non-market measures, developed in accordance with Article 16(2) of the RPR. In particular, the CRU directed EirGrid to procure Temporary Emergency Generation and Retention of Existing Units to be called upon in the event of a shortfall in market-based capacity and where alerts on the system are likely. The requirements for activating these non-market measures are addressed in this Plan, based on enhancements made since publication of the previous Plan in 2023.

This Plan further documents coordination of the Energy Sector response in the event of an electricity crisis, as well as coordination with government sector departments and cross-border agencies. This response includes methods for coordinating communication with the public during an electricity crisis, to be led by the Energy Press Officers Network ('EPON') in close cooperation with the crisis-coordinator and the appropriate Joint Energy Emergency Response Team

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[1] Operating Security Standards (Version 3) 2025

[2] All-Island Resource Adequacy Assessment 2025-2034

[3] *The most up to date All-Island Resource Adequacy Assessment (2025–2034) at the time of the RPP's publication is based on a freeze date of 30 April 2024, and at that time the expectation was that the Celtic Interconnector would be commissioned in 2027. Where recommendations from the AIRAA have been referenced in this document, they are based on Celtic's 2027 commissioning date. In July 2025, EirGrid revised the commissioning date to spring 2028. – Celtic Interconnector Updates*

('JEERT'). This includes detailed information provided by ESB Networks to customers via the PowerCheck website. Enhancements to the integration of the Energy Sector response with national emergency structures through the National Emergency Coordination Group ('NECG'), made since the RPP in 2023, are outlined in this plan. The Plan also describes the calendar, participants, and actions for testing the operational, tactical, and strategic response to the occurrence of a crisis scenario. It also addresses key lessons learned from simulation exercises and tests conducted since May 2023.

The Irish electricity system is part of the Single Electricity Market ('SEM') operating on the island of Ireland. Close cooperation between the two jurisdictions in the event of a crisis is provided for through a number of mechanisms, set out in this Plan. There are technical, legal and financial measures agreed through various existing processes and instruments that cover the provision of support across the SEM. In addition, the SEM is connected to the electricity system in Great Britain through three HVDC interconnectors. Each interconnector operates via an Interconnector Operating Protocol, which governs the provision of support to and from each connected system – proactively through day-ahead adjustments to the Net Transfer Capacity and in real time during periods if the system entered an Alert, Emergency or Blackout/Restoration state. This plan includes solidarity provisions using non-market generation to support the power system in Northern Ireland in the event of an electricity crisis.

The Plan includes a summary of the consultations undertaken by the CRU in the development of the RPP. Under Article 7(2) of the RPR on the establishment of the national scenarios, the CRU conducted a series of workshops with EirGrid, ESB Networks the electricity Distribution System Operator ('DSO'), Gas Network Ireland ('GNI'), the gas Transmission and Distribution System Operator ('TSO'), and the Department of Climate, Energy and the Environment ('DCEE'). The CRU also held an industry workshop, and a workshop with representatives from organisations in Northern Ireland (including DfE-NI, URNI and SONI). The objective of the consultation workshops was to facilitate the collection of comprehensive feedback on the full range of the national crisis scenarios and their risk assessments.

To address the requirements of Article 10(1) of the RPR, the CRU held a public consultation on the draft RPP, between July and September 2025 where stakeholders were invited to provide feedback on the draft plan. In response to the consultation paper, the CRU received seven submissions. Prior to the submission of the draft Plan for consultation, the draft Plan was issued to the electricity and gas system operators (EirGrid, ESB Networks, and GNI) for review, and their feedback was integrated into the document before issuing for the public consultation. Consultation on the draft RPP was also undertaken with DCEE and the Department of Defence (DoD). The CRU submitted the draft RPP for consultation to the competent authorities of all Member States via the Electricity Coordination Group (ECG). The draft RPP was also shared with DfE-NI, URNI and Ofgem (UK). Engagements with the DfE-NI and SONI included discussions on alignment of scenarios, cross-border support, and joint exercises

The CRU, in collaboration with EirGrid, will undertake desktop annual reviews of the RPP and publish an updated version where an update is warranted.

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Glossary of Terms and Abbreviations

Abbreviation or Term	Definition or meaning
ACER	European Union Agency for the Cooperation of Energy Regulators
AIRAA	All Island Resource Adequacy Assessment
ARHL	Annual run-hour limits
BETTA	British Electricity Trading and Transmission Arrangements (GB market)
BMPS	Balancing Market Principles Statement
BNE	Best New Entrant
CCGT	Combined Cycle gas Turbines
CER	Critical Entities Resilience Regulation (EU) 2022/2557
CRM	Capacity Remuneration Mechanism
CRU	Commission for Regulation of Utilities
CSIRT-IE	Computer Security and Incident Response Team for Ireland
DAFM	Department of Agriculture, Food and the Marine
DCEE	Department of Climate, Energy and the Environment
DESNZ	Department for Energy Security and Net Zero (UK)
DfE-NI	Department for the Economy, Northern Ireland
DJHAM	Department of Justice, Home affairs and Migration
DM	Daily Metered (gas customer)
DSO	Distribution System Operator – ESB Networks (ESBN)
E.DSO	European Distribution System Operators
ECG	Electricity Coordination Group
EDIL	Electronic Dispatch Instruction Logger
EENS	Expected Energy Not Served
EERT	Electricity Emergency Response Team
EGN SAP	Electricity and Gas Networks Climate Change Sectoral Adaptation Plan
EMS	Energy Monitoring System
ENTSO-E	European Network of Transmission System Operators for Electricity
EPON	Energy Press Officers Network
EWIC	East-West Interconnector

FOR	Forced Outage Rate
FRR	Frequency Restoration Reserve
GB	Great Britain
GCS	Generation Capacity Statement
GERT	Gas Emergency Response Team
GNI	Gas Networks Ireland
HVDC	High Voltage Direct Current
ICT, IT	Information (and Communications) Technology
IE	Ireland
JEERT	Joint Energy Emergency Response Team
LDM	Large Daily Metered (gas customer)
LEU	Large Energy User
LFC	Load Frequency Control
LFCBOA	LFC Block operational agreement
LOLE	Loss of Load Expectation
LSI	Largest Single Infeed
MDC	Mandatory Demand Curtailment
NAF	National Adaptation Framework
NCC	National Control Centre
NCEG	National Cyber Emergency Group
NCEP	National Cyber Emergency Plan
NCER	Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration
NCSC	National Cyber Security Centre of Ireland
NDCC	National Distribution Control Centre
NDFEM	National Directorate of Fire and Emergency Management
NDM	Non-Daily Metered (gas customer)
NECG	National Emergency Coordination Group
NESO	National Energy System Operator, the energy system operator for Great Britain
NGEP	Natural Gas Emergency Plan
NGET	National Grid Electricity Transmission
NI	Northern Ireland
NIE	Northern Ireland Electricity, DSO for NI
NIS-D	Network and Information Systems Directive

NIST CSF	National Institute of Standards Cybersecurity Framework
NRA	National Risk Assessment for Ireland
OEP	Office of Emergency Planning (Department of Defence)
OES	Operators of Essential Services
PPM	Power Park Module
PSECP	Power System Emergency Communications Plan
PSRP	Power System Restoration Plan
RPP	Risk Preparedness Plan
RPR	Risk Preparedness Regulation (EU) 2019/941
RTE	Réseau de Transport d'Électricité
SAOA	Synchronous Area operational agreement
SAP	Sectoral Adaptation Plan
SCADA	Supervisory Control and Data Acquisition
SDP	System Defence Plan
SEM	Single Electricity Market (Irish all-island market)
SEM-O	Single Electricity Market Operator
SGU	Significant Grid User
SOGL	Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (System Operation Guideline or SOGL)
SONI	System Operator Northern Ireland
SVC	Static Variable Compensator
TAO	Transmission Asset Owner – ESB Networks (ESBN)
TDP	Transmission Development Plan
TSC	SEM Trading and Settlement Code
TSO	Transmission System Operator – EirGrid (IE) and SONI (NI)
TYFS	Ten-year Forecast Statement
URNI	Utility Regulator, Northern Ireland
UVLS	Under Voltage Load Shedding
VDR	Voluntary Demand Reduction

General information

The designated Competent Authority in Ireland for the preparation of this plan under Regulation (EU) 2019/941 on risk-preparedness in the electricity sector (RPR) is the Commission for Regulation of Utilities (CRU).

The Annex of the RPR sets out the template adopted in the development of this plan.

Definition of Electricity Crisis

An electricity crisis is defined under Article 2(9) of the RPR as "*a present or imminent situation in which there is a significant electricity shortage as determined by the Member States and described in their risk-preparedness plans, or in which it is impossible to supply electricity to customers*".

A crisis may be called on the electricity system in Ireland when a scenario arises (or is considered very likely to arise) where the expected impact rating based on the LOLE or EENS will be 'major', 'critical' or 'disastrous', according to the ratings procedure set out in Appendix I of the Methodology for Identifying Regional Electricity Crisis Scenarios, approved by the Agency for the Cooperation of Energy Regulators ('ACER') on 8 March 2024 (Decision No. 02/2024).[4] Events with less significant expected ratings may also be designated as crises, depending on the circumstances, i.e., expected duration, cross-border impact, and / or potential for spill-over into other sectors[5].

In accordance with Article 14(2) of the RPR, the CRU will, after consulting with EirGrid as the transmission system operator ('TSO'), determine whether a threat or incident on the power system is classified as an electricity crisis and, in the event of such a crisis being identified, will communicate this to the appropriate stakeholders. This classification is separate from but may be informed by the system states issued by the TSO in accordance with Regulation (EU) 2017/1485 on establishing a guideline on electricity transmission system operation.[6]

The CRU may also issue an Early Warning where a seasonal adequacy assessment or other qualified source provides concrete, serious and reliable information that an electricity crisis may occur, as required under Article 14(1) of the RPR.

Connected Regions

The Irish electricity system is not directly connected to that of another Member State at the time of publication of this plan. This will change when the operation of the Celtic Interconnector commences, expected to connect Ireland with France in 2028.

[4] The relevant ratings have been included in Appendix 1 of this Plan for easy reference.
[5] For example, but not limited to, oil (for secondary fuel), gas, water.
[6] For clarity, a system Emergency State may not give rise to classification of an incident as an electricity crisis in terms of the RPR, for example where Demand Control may be required for an hour or two over a system peak, the TSO will issue an Emergency State on the power system, but this is unlikely to be classified as a national electricity crisis.

A synchronous system and single electricity market are in operation over two jurisdictions within the island of Ireland – Ireland and Northern Ireland. Following Brexit, the Northern Ireland Protocol ensures the continued operation of the SEM and application of EU energy market rules in Northern Ireland. The island of Ireland is connected to Great Britain ('GB') via three HVDC (High Voltage Direct Current) interconnectors, namely Moyle Interconnector (Northern Ireland), the East-West Interconnector (Ireland), and the Greenlink Interconnector (Ireland), which commenced operation in 2025.

Ireland has been included as part of the Central System Operation Region by ACER and its obligations for tasks under the Regional Coordination Centres shall come into effect at the commencement of operations on the Celtic Interconnector.

Related Documents

- Regulation (EU) 2019/941 on risk preparedness in the electricity sector[7]
- S.I. 342 of 2020, designating CRU as Competent Authority[8]

[7] Regulation (EU) 2019/941 on risk preparedness in the electricity sector

[8] S.I. 342 of 2020, designating CRU as Competent Authority

1. Background to the Electricity Crisis Scenarios

1.1 Development of the scenarios

A set of regional electricity crisis scenarios was developed by ENTSO-E under Article 6 of the RPR. A set of national electricity crisis scenarios, consistent with the regional scenarios, was developed in a parallel process for Ireland under Article 7, in close collaboration with the Irish Transmission System Operator (TSO, EirGrid). The CRU conducted a consultation process in October and November 2024 in accordance with Article 7(2) of the RPR, *"the competent authority shall consult the transmission system operators, the distribution system operators that the competent authority considers to be relevant, the relevant producers or their trade bodies".* Further details on the consultation are described in Section 7 of this document.

The impact, likelihood, risk and crisis scenario ratings assigned to each scenario follows the Methodology for Identifying Regional Electricity Crisis Scenarios[9] (the 'Methodology') developed by ENTSO-E and approved by ACER in March 2020 and updated in March 2024 (decision 02/2024[10]). The combinations of likelihood and risk have been derived based on the following:

- Likelihoods have, where possible, been based on the classifications from the most recent National Risk Assessment for Ireland (2023),[11] (NRA) but modified to reflect impact on the electricity system and different scenario assumptions where required. The NRA has considered the effects of climate change in certain weather-related risks, reflecting potential increase in the occurrence of extreme weather events. Where possible, the RPP likelihood assessment has incorporated the NRA analysis to account for potential variations in the risk assessment. The Irish Department of Defence was consulted on the likelihood of the malicious actions scenarios. Other expert judgement, available statistics and the TSO's own experience were also considered for the likelihood assessments, this is discussed further under each scenario.
- The level of impact associated with each scenario is based predominantly on the expert judgement of the TSO and known outcomes from historical events. In some cases, likely future trends have been considered. During the risk assessment process, two factors were estimated to help categorise the impacts: Expected Energy Not Served (EENS), the Loss of Load Expectation (LOLE), as per requirements of the Methodology.

The final risk rating is assessed from the combination of ratings assigned to the impact and likelihood of each scenario, as detailed in the Methodology and also included in an Appendix I to this document.

An additional rating, the cross-border severity, is estimated to provide an indication of how likely the risk is to 'spill over' into connected Member States and other connected regions, based on

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[9] Methodology for Identifying Regional Electricity Crisis Scenario
[10] Decision No 02/2024 of ACER
[11] National Risk Assessment for Ireland (2023)

expert judgement. In this case it is primarily Northern Ireland, with some impact possible on Great Britain and France and vice versa.

Article 4 of the Methodology outlines the requirements for managing cross-border dependencies in the context of electricity crises. A cross-border dependency is defined as a situation where actions or incidents in one Member State have the potential to aggravate or trigger a crisis in another Member State.

The main types of cross-border dependencies outlined in the Methodology are outlined below:

- **Power System Dependencies**: These involve issues such as the unavailability of multiple interconnectors, constraints on internal lines to support cross-border flows, generation shortages and overall lack of adequacy in the power system, and power system stability incidents that could affect the interconnected power system.
- **Electricity Market Dependencies**: These are dependencies that affect the functioning of electricity markets.
- **Supply Chain Dependencies**: These include dependencies related to primary energy sources and equipment from other Member States.

It is important to note that most scenarios have been considered as individual events, and that whilst the likelihood of simultaneous occurrences of multiple scenarios at any given point in time is lower, the impact would be more significant. Combined scenarios are discussed in Section 1.4 'Approach to Electricity Crisis Scenarios' below.

1.2 Overview of the Irish power system

Context plays an important role in the identification and evaluation of crisis scenarios in undertaking the risk assessment for the RPP. The electricity transmission network of IE and NI is outlined in Figure 1. It highlights the three interconnectors (Moyle, EWIC, and Greenlink) that link the Island of Ireland's grid to Great Britain ('GB'), each adding 500 MW of additional capacity to the power system. The Celtic Interconnector, currently under construction, will connect Ireland to France upon completion, contributing an additional 700 MW of capacity.

The fuel mix for Ireland in 2024 was diverse, as shown in Figure 2. Gas was the largest energy source, accounting for 40.9% of total power generation in Ireland. Renewables followed closely, comprising 40.1% of electricity generation, with wind being the predominant source, representing 33.2% of renewable generation.

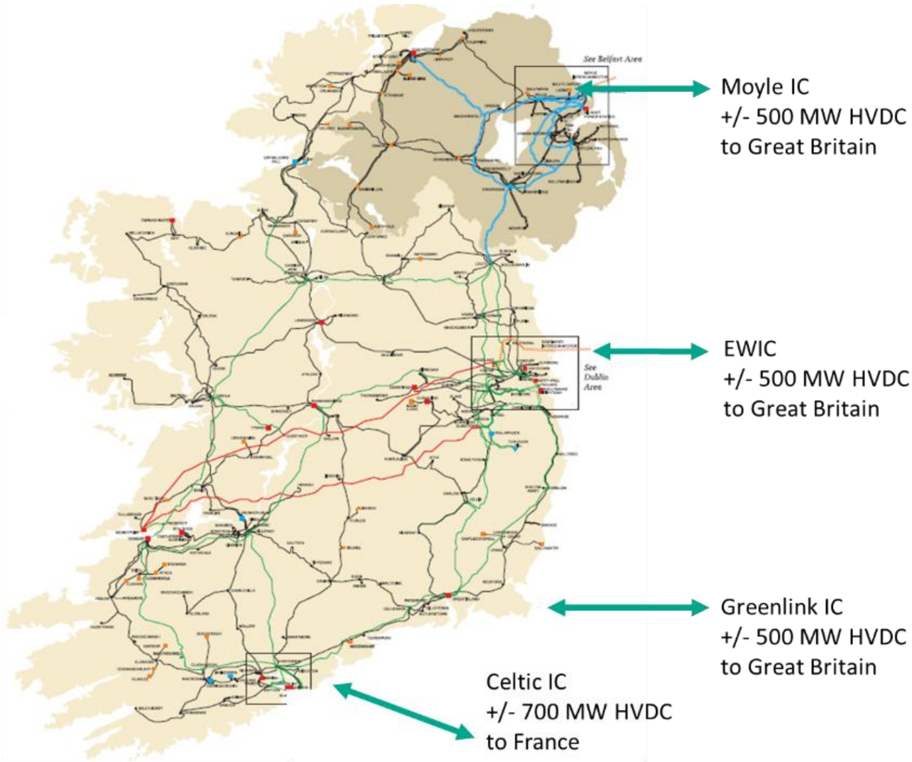

Figure 1: Electricity interconnection of the all-island power system with Great Britain and France (the Celtic Interconnector planned for 2028)

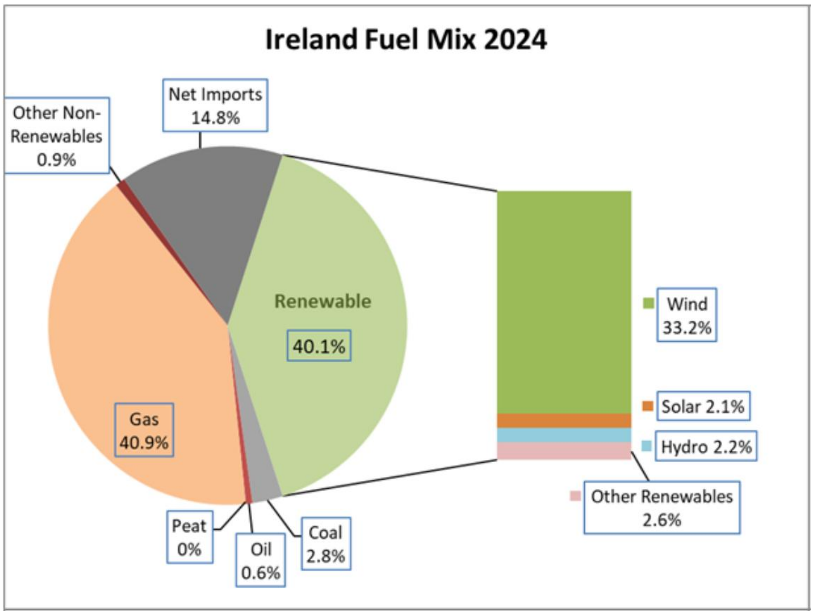

Figure 2: Ireland's fuel mix in 2024

1.2 (a) Generation

The power system in Ireland is characterised by the following:

1. Ireland's generation mix is described in the All-Island Resource Adequacy Assessment (AIRAA) 2025-2034
2. Individual generators, LEUs, and interconnector capacities tend to be relatively large relative to system demand in Ireland (i.e. loss of capacity due to a forced or scheduled outage on a large CCGT or interconnector can approach 10% of system demand).
3. Summer is the outage season for generators and transmission assets in Ireland.
4. All remaining coal plants exited the market on 30 June 2025.

1.2 (b) Demand

Demand has continued to grow in Ireland. The table below summarises the maximum and minimum demand over the last 4 years.

Table 1 – Actual values in the last 4 years (as of 31 December 2025).

Maximum Peak Demand (Evening, 1 Min)	6,025 MW
Maximum Midday Demand (Midday, 1 Min)	5,603 MW
Maximum Valley Demand (Night, 1 Min)	3,949 MW
Maximum GWh (24 hrs)	119.34 GWh
Minimum GWh (24 hrs)	72.68 GWh

1.2 (c) Adequacy

The All-Island Resource Adequacy Assessment ('AIRAA') 2025-2034

The adequacy forecast presented in the AIRAA 2025-2034[12] examines two scenarios: the base scenario and the secure scenario.

The Base scenario considers the balance between electricity generation and demand, taking into account climate conditions, plant availability, renewable energy forecasts and the need for sufficient capacity to meet system reserve requirements.

The Secure Scenario considers more challenging conditions, such as reduced imports via interconnectors and operating restrictions on new units. It assumes that imports are limited to 70% of total capacity and simulates extended outages of interconnectors or French nuclear units. This scenario helps to plan for a range of possible future situations.

The AIRAA 2025 outlines the new methodology adopted to better adapt to the evolving electricity system by incorporating interconnections and a higher level of renewables.

The key findings identified by EirGrid in the 2025 AIRAA are outlined below:

[12] All-Island Resource Adequacy Assessment (AIRAA) 2025-2034

- **2025 to 2027**: Both scenarios indicate that the system is below standard and additional capacity is required. This is addressed by the CRU's Security of Supply Programme measures (including non-market generation).
- **2027 to 2028**: The new Celtic interconnector[13] and additional gas fired capacity improve the outlook and reduce the Loss of Load Expectation (LOLE) in both scenarios.
- **2028 to 2032**: The Base scenario meets the standard, indicating sufficient capacity under normal conditions. However, the Secure scenario remains below the standard, requiring an additional 600-800 MW to balance supply and demand under challenging conditions. This additional capacity is required for system reserves and to manage network outages during new generation and infrastructure connections.

It is important to note that the current RPP covers the period from 2026 to 2029. Consequently, projections beyond 2029 fall outside the scope of this RPP and should be evaluated in the next RPP.

EirGrid recommends the use of the Secure scenario for capacity planning to ensure the sustainable operation of the electricity system. This scenario takes into account low imports, operating limits and the need for sufficient capacity to meet operational requirements. Additional analysis accounts for uncertainties in demand, renewable capacity, storage and flexibility forecasts.

Capacity market auctions remain an option for procuring new generation to meet shortfalls. However, the results of the 2028/2029 T-4 capacity auction, which awarded 560 MW of new de-rated capacity, are not included in the AIRAA due to the freeze date of the report.

The Base and Secure scenario assessments and sensitivity studies reported on in the AIRAA do not include the contribution of the non-market generation units outlined in this RPP pursuant to Article 16(2) of the RPR. Section 6.4.6 of the AIRAA on "mitigating measures" provides assurance to stakeholders that the significant capacity shortfalls identified by the AIRAA in the short-term are addressed by the actions implemented under the CRU-led Security of Supply Programme (including these non-market generation units).

[13] *The most up to date All-Island Resource Adequacy Assessment (2025–2034) at the time of the RPP's publication is based on a freeze date of 30 April 2024, which at that time assumed the Celtic Interconnector would be commissioned in 2027. Where the AIRAA has been referenced in this document, it is based on that assumption. In July 2025, EirGrid revised the commissioning date to spring 2028.*

1.3 Significant developments impacting crisis scenarios since RPP 2023

1.3 (a) Coal units

All coal units exited the All-Island Single Electricity Market by 30 June 2025. The last 3 units have all been converted to heavy fuel oil and retained as non-market measures under Article 16(2) of the risk preparedness regulation.

From a fossil fuel perspective, coal supply chains no longer play a role in risk preparedness - while reliance on gas, distillate (diesel), and (as a backup) heavy fuel oil has increased.

1.3 (b) Increased electricity interconnection

Increased interconnection to Great Brittain (500 MW via the Greenlink Interconnector from 29th January 2025) and to France (700 MW via the Celtic Interconnector from 2028) increases the volumes of exports, as well as the diversity of imports during periods when both the island and Great Britain are impacted by similar scenarios (e.g. weather and gas scenarios). Scenarios related to malicious acts affecting undersea infrastructure highlight the relevant risks during periods of increased reliance on imports.

1.3 (c) Non-market generation

Non-market generation has been procured and has become commercially available from 2023 to address adequacy risks over the subsequent four years. This includes:

- Temporary Emergency Generation ('TEG'): 649 MW (243 MW gas fired and 406 MW oil fired)
- Retained generation: 750 MW of Moneypoint coal-fired generation exited the market on 30 June 2025. This has been converted to operate on heavy fuel oil and has been contracted to remain available to the TSO from 1 July 2025.

These units are not considered as available capacity when the annual outage plan is developed and are called on only under the conditions outlined in Article 16(2) of the RPR and section 4.2 of this plan.

1.3 (d) National Risk Assessment for Ireland

The National Risk Assessment for Ireland ('NRA') was last updated in 2023, and that version is referred to as 'NRA 2023' in this document. The NRA 2023 includes scenarios which are relevant to the national electricity crisis scenarios. While these have been considered in this RPP, the likelihood and impact ratings from an electricity perspective may differ from the scenarios in the NRA, as in some cases the power system may be less impacted than other critical services, and therefore the risk would be considered to be lower in those instances.

The National Risk Assessment for Ireland encompasses risk identification, analysis and evaluation and is completed on a three-year rolling cycle. The NRA follows the risk assessment techniques described in *I.S. EN IEC 31010:2019 Risk management - Risk assessment techniques.* This National Risk Assessment also meets the EU reporting requirements set out in *EU Decision 1313/2013/EU on a Union Civil Protection Mechanism*.

The National Risk Assessment for Ireland is part of Ireland's risk management strategy and complements the work completed by the Department of the Taoiseach's annual *National Risk Assessment - Overview of Strategic Risks*[14], the most recent of which is the *National Risk Assessment - Overview of Strategic Risks 2024*[15], which is referred to in this document as the 'NRA 2024'. The *National Risk Assessment - Overview of Strategic Risks* aims to provide a systematic overview of strategic risks facing Ireland to serve as the basis for political and public discussion and deliberation about their implications.

1.3 (e) Ireland's Energy Security Package

The Department of Climate, Energy and the Environment ('DCEE') in November 2023 published the *Energy Security in Ireland to 2030: Energy Security Package*[16] (see roadmap of actions in Figure 3). Several of the 28 actions[17] identified in this document have relevance to the crisis scenarios, some of which have seen significant progress being made in addressing the mitigations required. These include development of secondary fuel replenishment capability, learning from exercises related to extreme energy events, and in March 2025 the Government approved the development of a State-led strategic gas emergency reserve (SGER)[18].

[14] National Risk Assessment - Overview of Strategic Risks
[15] National Risk Assessment - Overview of Strategic Risks 2024
[16] Energy Security in Ireland to 2030: Energy Security Package November 2023
[17] Energy Security in Ireland to 2030 Annex of Actions
[18] Government approved the development of a State-led strategic gas emergency reserve (SGER)

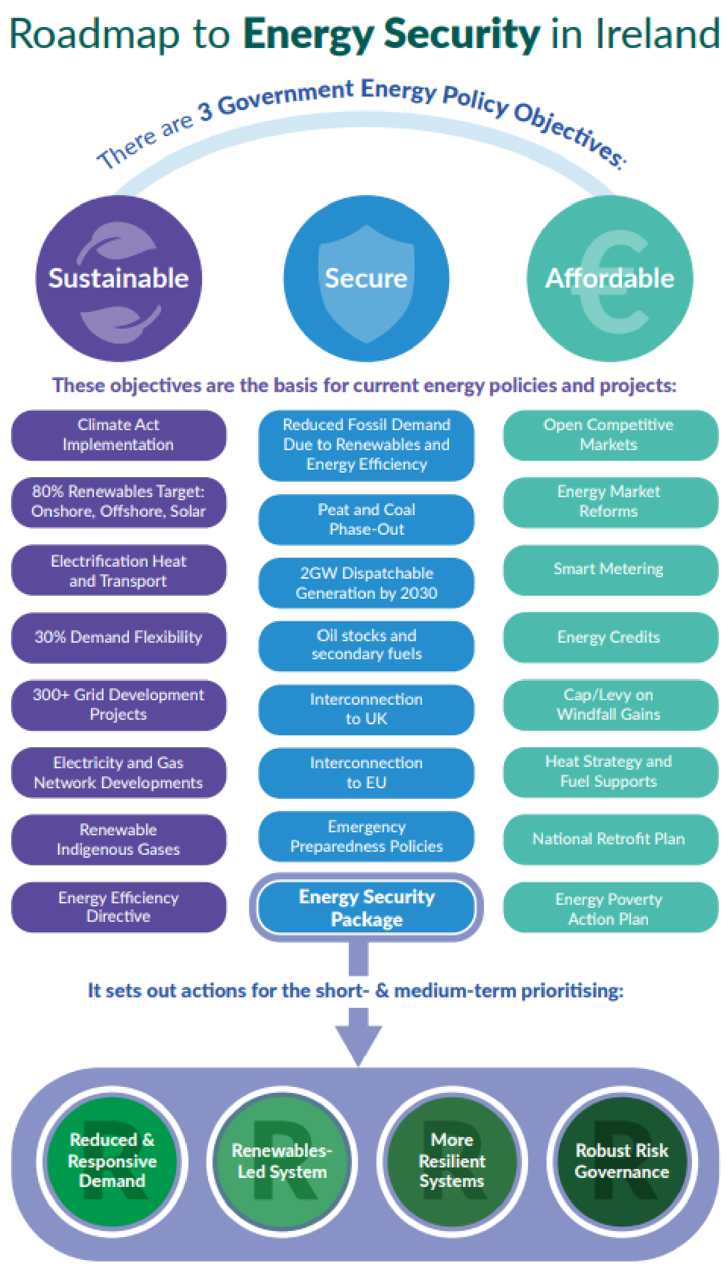

Figure 3: Roadmap of actions contributing to energy security, outlined on the Energy Security Package

1.3 (f) Critical Entities Resilience and NIS2 Directives

In line with Directive (EU) 2022/2557[19] on the resilience of critical entities (CER Directive), the Department of Defence (DoD) is developing Ireland's National Resilience Strategy to strengthen the resilience of critical entities and essential services. This strategy will establish a whole-of-government framework to ensure essential services remain robust against natural, man-made, and hybrid threats across sectors, including energy.

A key focus is enhancing the National Risk Assessment (NRA) to meet EU regulatory standards, by updating its methodology to incorporate horizon scanning and emerging risk forecasting. It will also address cross-sectoral and cross-border risks, align outputs with EU reporting obligations, and inform sector-specific resilience planning.

In line with the CER regulation, the National Resilience strategy will ensure consistent identification of critical entities, establish resilience requirements and provide cross-sectoral coordination, while recognising interdependencies between sectors, in order to prevent cascading effects. Additionally, alignment with NIS 2 will provide a coherent approach to cybersecurity, reflecting its critical role in overall resilience.

Article 6(1) of the CER Directive requires Member States to identify critical entities within each sector and subsector by 17 July 2026. The CRU has been designated by the Minister for Defence as the competent authority for the energy sector under S.I. No. 559 of 2024[20] ("CER Regulations) and is responsible, inter alia, for identifying the energy sector critical entities. DCEE are the Lead Government Department for the energy sector. Critical entities are required to carry out a risk assessment (informed by the NRA) within nine months of notification, and no later than 17 May 2027. Competent Authorities are required to report risks identified in their sector to the Department of Defence to inform the subsequent iteration of the NRA. CRU will engage in further detail on resilience and risk preparedness with critical entities during the implementation of the CER Regulations.

Risks arising from the electricity crisis scenarios outlined in this RPP can also be expected to inform future iterations of the NRA and the implementation of the CER Directive in Ireland.

In relation to cyber security, legislators and regulators are seeking to address this threat through the introduction of legislation mandating a minimum set of cyber security controls. The Network and Information Systems Directive 2 (NIS2), which replaces the NIS1 Directive, establishes a unified legal framework to enhance security across 18 critical sectors in the EU, including energy. An update from the National Cyber Security Centre (NCSC) in June 2025[21] indicated that the NIS2 transposition was ongoing and that NIS1 continues to apply to already designated Operators of Essential Services within the State. The CRU expects to be appointed as the Competent Authority for Energy, Water and Wastewater under NIS2, assuming the appropriate resourcing and funding

[19] Directive (EU) 2022/2557 of the European Parliament and of the Council of 14 December 2022 on the resilience of critical entities (CER Directive)
[20] S.I No. 559 of 2024
[21] NIS 2

arrangements are in place. The RPP will be reviewed in relation to NIS2 and National Cyber Risk Assessment[22] updates in line with the annual RPP desktop revision process.

1.3 (g) European developments

Key elements from the results of the public consultation on the fitness check of the EU energy security framework (February 2025) considered relevant to the national scenarios are as follows[23]:

- The EU's over-dependence on fossil fuels, which exposes Europe to geopolitical risks and price volatility.
- Cybersecurity concerns by the growing use of clean technologies from non-EU suppliers
- The need to invest in technologies such as batteries and pumped storage to increase energy storage. This will balance supply and demand and provide back-up power at times of high demand.

The European Commission subsequently published a call for evidence in September 2025 and open public consultation for the revision of the EU energy security architecture, to address identified shortcomings[24] based on addressing ten action areas - consumer protection, storage and supply standard, infrastructure standards, risk assessments, plans, diversification, critical entities resilience, monitoring and transparency, crisis management and solidarity.

1.4 Approach to Electricity Crisis Scenarios

1.4 (a) Regional Electricity Crisis Scenarios

In accordance with Article 6(2) of the RPR, ENTSO-E is required to submit the relevant regional electricity crisis scenarios to the relevant parties, including competent authorities and regulatory authorities. Pursuant to Article 6(3) of the RPR, ENTSO-E is required to update the regional electricity crisis scenarios every four years, unless circumstances warrant more frequent updates.

In the previous RPP cycle, ENTSO-E in 2020 identified a set of 31 regional electricity crisis scenarios. For the current RPP cycle, in September 2024, ENTSO-E identified 23 regional scenarios in accordance with the Methodology. The original list of scenarios was updated, with a focus on more extreme events, the combination of some scenarios, and the addition of new scenarios, such as those related to periods of low renewable generation (dunkelflaute) and targeted malicious acts by adversarial states.

The 23 regional electricity crisis scenarios are listed in Table 2 below, and their related scenario(s) from the 2020 list of regional electricity scenarios is also shown.

[22] National Cyber Risk Assessment 2025 will be considered for subsequent iterations as it was published in December 2025, which was after the approval process of the final RPP
[23] Energy security architecture – public consultation on the fitness check
[24] EU energy security framework (revision)

Table 2 - Electricity crisis scenarios

ID	Scenario Name 2025	Related Scenario 2020
Weather		
W.SS	Severe summer	Dry period, Forest fires, Heatwave
W.SW	Severe winter	Cold spell, Winter incident
W.ST	Severe storm	Storm, Multiple failures caused by extreme weather
W.IL	Heavy ice loading	*New*
W.FL	Heavy flooding	Precipitation and flooding, Multiple failures caused by extreme weather
W.DF	Dunkelflaute (extremely low wind/solar)	*New*
W.FE	Unusually high demand/RES forecast errors	Unusually big RES forecast errors
Natural		
N.EQ	Earthquake	Earthquake
N.VE	Volcanic eruption	Volcanic Eruption
N.SW	Space weather	Solar storm
Supply Chain		
S.FF	Fossil fuel shortage	Fossil fuel shortage
S.NF	Nuclear fuel shortage	Nuclear fuel shortage
Technical		
T.IA	Large nuclear/ industrial accident	Industrial / nuclear incident
T.SD	Serial technical defects	Serial equipment failure
Human		
H.PA	Pandemic	Pandemic
H.IA	Industrial action, strikes, riots	Strike, Riots, Industrial action in power supply chain
H.IM	Unforeseen interaction of energy markets	Unexpected/unforeseen interaction of energy market rules
Malicious Actions		
M.AA	Physical attack on critical assets	Physical attack on critical assets
M.AC	Physical attack on control centres	Physical attack on control centres
M.AE	Attack on entities not connected directly to the grid	Cyber-attack on entities not connected to the grid
M.CA	Loss of ICT systems to cyber-attack	Loss of ICT systems for real-time operation, Cyber-attack on entities connected to the electrical grid
M.UA	Unauthorised action by personnel	Unexpected/unforeseen interaction of energy market rules
M.AS	Targeted political malicious actions by adversarial states	*New*

1.4 (b) National Electricity Crisis Scenarios

Article 7(1) of the RPR requires the CRU, as the Competent Authority, to identify the most relevant national electricity crisis scenarios. Following a consultation in accordance with Article 7(2), 25 relevant national electricity crisis scenarios were identified for this cycle of the RPP, and these are discussed in detail in section 2 below . In the previous cycle of the RPP, 28 national electricity crisis scenarios were identified, which formed the basis of the RPP published by the CRU in May 2023[25].

The national electricity crisis scenarios were developed in accordance with Article 7(3) of the RPR, and are consistent with the regional scenarios identified in the Methodology. For the national electricity crisis scenarios identified in this cycle, in some cases, the CRU and EirGrid adapted the regional scenarios to Irish conditions, taking into account for example, the characteristics of the Irish power system and national weather conditions.

The Earthquake and Volcanic Eruption regional scenarios identified in the Methodology are not considered relevant to Ireland (as reflected by the ENTSO-E regional scenario risk ratings), which is consistent with their treatment in Ireland's previous RPP.

The following scenarios have been identified in addition to the regional electricity crisis scenarios identified in the Methodology, as locally relevant scenarios:

- Simultaneous forced outage of two or more power plant/ interconnectors for extended periods
- Non-delivery of planned infrastructure projects accounted for in TSO system planning
- Rapid above-trend growth in electricity demand
- Grid instability caused by unanticipated/uncontrolled interactions between new technologies.

1.4 (c) Approach to sensitive information

The RPR includes a provision under Article 10(7) to ensure the confidentiality of sensitive information, specifically referencing malicious scenarios. In the context of the heightened risk environment around malicious attacks on energy infrastructure, undersea cable and pipeline sabotage it was considered appropriate for the CRU to develop a public and non-public version of the document for this RPP cycle. Details and risk assessment results from the malicious scenarios are considered as sensitive and have been omitted from the non-public version of the plan.

1.4 (d) Approach to individual scenarios

Taking the above into consideration, the following approach has been adopted for the identification and evaluation of the scenarios for the four-year period of this RPP:

- The Regional Electricity Crisis Scenarios identified by ENTSO-E have all been considered in the identification of national electricity crisis scenarios, together with the set of assumptions proposed. Scenarios that are considered relevant have been expanded on and assumptions have been adjusted as necessary to reflect conditions in Ireland and the region.
- Normal scheduled and forced outage rates are considered, to the extent that these are not impacted by the assumptions related to a specific scenario (higher forced outage rates are associated with some of the scenario descriptions).

[25] Risk Preparedness Plan Ireland – May 2023

- Temporary Emergency Generation has been included in the scenario evaluation - to the extent that this would be available under a given scenario (for example, some TEG units may not be available in the event of a natural gas emergency as these are powered by gas and do not have a secondary fuel capability).
- Retained units (Moneypoint) are also considered in the scenario evaluation – including the longer notice and ramp times of these oil-fired units (i.e. notice times can be over 48 hrs depending on the heat state of the units).
- While cross-border capacity over interconnectors and the North-South tie line is anticipated to reach c.2 GW from mid-2028, regional conditions (and to a lesser extent local system constraints) may in some scenarios give rise to low imports on the day.
- Post non-market generation period: the Moneypoint non-market generation units are expected to cease operations in mid-2029, before the end of this RPP period at the end of 2029. The outlook for non-market generation is regularly monitored through the AIRAA and related processes.

1.4 (e) Potential for concurrent scenarios

Given the nature of some of the scenarios, there is the potential that some of these could occur concurrently, these are outlined at a high level below. Detailed scenario descriptions are presented in Section 2 below.

Potential overlap of multiple large unit outages with severe weather scenarios

For instance, if long-term forced outages of two large CCGT units were to occur (over and above normal forced outage statistics), this could lead to operational challenges. In the summer, the TSO may have the option to recall outages to manage system adequacy, but deferred outages could in turn lead to reduced dependability of these units going into the winter season. If the multiple outages occurred in the winter season, reduced margins would increase the need for imports and utilisation of units with limited annual run-hours.

Potential overlap of renewable energy shortage

Ireland's electricity system has a relatively high penetration of renewable energy, particularly wind power, which is known to be variable in output. Generally, in the case where a calm period arises (typically considered to be when the wind output is below around 500 MW), sufficient dispatchable generation is required to compensate for the reduced wind power availability. However, the availability of such generation may be impacted by reliability concerns with fossil fuel generators on the system, as well as the termination of a number of planned new generation projects . This situation leads to a higher likelihood of a calm period (with low wind generation) corresponding with a period of insufficient dispatchable generation. The combination of events has a more significant impact on the security of electricity supply than either occurring alone. Other compounding factors such as simultaneous low wind in Great Britain (GB), low availability of conventional generation in GB, and limited availability of interconnector support, will exacerbate the situation and the risk of not being able to meet demand increases particularly during peak hours. In the case of a long-duration outages of large dispatchable generators, or the delivery of new capacity, the increased risk of not being able to meet demand is increase over a prolonged period.

Implications of capacity market (CRM) performance

If the capacity market (CRM) did not deliver the expected and necessary capacity over the period of assessment for the purpose of this plan (i.e. 2026 to 2029 inclusive), it could lead to broader systemic issues. Insufficient availability of capacity would apply across various scenarios, including the three 'Adequacy' scenarios in Section 2.7, and the scenario 'Renewable energy source shortage, including Dunkelflaute' (Section 2.1(f)).

2. Electricity Crisis Scenario Descriptions

This section sets out the basis and key assumptions applied for the risk assessments under each category of electricity crisis scenarios.

For each scenario, a description of the scenario and its initiating event are given, broadly following the Methodology description framework. Each scenario is described by the potential duration of the crisis, the initial condition of the system, the initiating event, the evolution of the scenario, and any specific response measures to be taken. The potential cross-border impact is also described. Finally, the evaluations and assumptions for deriving the likelihood of occurrence and approximate Loss of Load Expectation (LOLE) and Expected Energy Not Served (EENS) are presented. These estimates form the basis of the risk assessment for each scenario.

A total of 25 regional scenarios were considered for the risk assessment, under the following categories

- Weather
- Natural
- Malicious Actions
- Technical
- Supply Chain
- Human
- Adequacy

A summary table describing each scenario and its corresponding measures is presented in Table 15.

A summary of the assessment for each scenario is presented in Table 3, outlining the likelihood, expected energy not served (EENS), loss of load expectation (LOLE), cross-border dependency rating, and overall scenario rating for the full range of scenarios.

Table 3 – Scenarios risk assessment summary

	Name of the scenario	Likelihood	EENS Impact	LOLE Impact	Cross-border	Scenario rating
	Weather					
W.SS	Severe summer	Unlikely	Minor	Major	Minor	Medium
W.SW	Severe winter	Possible	Major	Major	Major	High
W.ST	Severe storm	Unlikely	Critical	Disastrous	Major	High
W.IL	Heavy ice loading	Unlikely	Insignificant	Minor	Minor	Low
W.FL	Heavy flooding	Unlikely	Major	Major	Minor	Medium
W.DF	Renewable Energy Source Shortage, including Dunkelflaute	Possible	Major	Major	Major	High
W.FE	Unusually big demand / RES forecast errors	Possible	Major	Major	Major	High
	Natural					
N.EQ	Earthquake	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE
N.VE	Volcanic eruption	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE
N.SW	Space weather	Very unlikely	Major	Major	Major	Low
	Malicious Acts					
M.AA	Physical attack on critical assets	Unlikely	Critical	Critical	Major	Medium
M.AC	Physical attack on control centres	Unlikely	Critical	Disastrous	Major	High
M.AE	Cyber-attack on entities not connected directly to the grid	Possible	Minor	Major	Major	Medium
M.CA	Loss of ICT systems to cyber-attack	Possible	Critical	Critical	Major	High
M.UA	Unauthorised action by personnel	Unlikely	Critical	Major	Major	Medium
M.AS	Targeted political malicious actions by entity/ adversarial states	Unlikely	Disastrous	Disastrous	Major	High

	Technical					
T.IA	Large nuclear/industrial accident	Extremely unlikely	Insignificant	Insignificant	None	Low
T.SD	Serial technical defects	Unlikely	Minor	Minor	Minor	Low
T.GI	Grid instability caused by unanticipated interaction with new technology.	Possible	Critical	Major	Major	High
	Supply chain					
S.FF	Fossil fuel shortage	Unlikely	Disastrous	Disastrous	Major	High
S.NF	Nuclear fuel shortage	Extremely unlikely	Insignificant	Insignificant	Minor	Low
	Human					
H.PA	Pandemic	Possible	Major	Minor	Minor	Medium
H.IA	Industrial action, strikes, riots potential international	Unlikely	Major	Major	Minor	Medium
H.IM	Unforeseen interaction of energy markets	Possible	Minor	Minor	Major	Medium
	Adequacy					
E.SO	Simultaneous forced outage of 2 or more power plant/ interconnector	Likely	Major	Major	Major	High
I.NI	Non-delivery of planned infrastructure projects	Likely	Major	Major	Major	High
I.GD	Rapid above trend growth in electricity demand	Likely	Minor	Major	Major	High

2.1 Weather

Table 4 – Summary of weather scenarios risk assessments

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario rating
Severe Summer	Unlikely	Minor	Major	Minor	Medium
Severe Winter	Possible	Major	Major	Major	High
Severe Storm	Unlikely	Critical	Disastrous	Major	High
Heavy Ice Loading	Unlikely	Insignificant	Minor	Minor	Low
Heavy Flooding	Unlikely	Major	Major	Minor	Medium
Renewable Energy Source Shortage, including Dunkelflaute	Possible	Major	Major	Major	High
Unusually high demand / RES forecast errors	Possible	Major	Major	Major	High

2.1 (a) Severe Summer [W.SS]

Description of the scenario

High and extreme temperatures well above seasonal averages over a two-week period, affect most of the region (Ireland, Northern Ireland and Great Britian) simultaneously, leading to increased demand, lower generation availability, and reduced transmission capacities. Such a period could also correspond with fires.

Summer is the outage season in Ireland, Northern Ireland and Great Britian; generation and transmission plant outages are scheduled during this period. Some of these may be long outages, which do not allow plant to be returned in response to severe weather predictions. The outage schedule is planned to maximise the outages that can be facilitated in the context of an ambitious build and maintenance programme and tight margins on the system over the next years.

While summer temperatures in Ireland are generally lower than mainland Europe and the use of air conditioning is not as widespread, the growth in data-centre demand to 2030 is expected to result in an increase air-conditioning load. Currently, data centre load is estimated to increase by c.14 MW per degree C in summer.

There is not a universally agreed-upon definition to describe a heatwave, but it is typically recognised as a period of unusually high temperatures lasting several days. In Ireland, a heatwave is defined as: "*A heatwave occurs at a Met Éireann station when the daily maximum shaded air temperature is greater than twenty-five degrees Celsius (> 25.0°C) for five or more consecutive days*[26]*"* Heatwaves in Ireland have generally been observed in the past in the months of June, July and August. The longest heatwave on record in Ireland was 14 days in August 1976. Therefore, the Methodology scenario of a two-week incident is considered applicable to Ireland, though this would be at the higher end of the range for heatwave in Ireland i.e. an extreme scenario.

National electricity crisis scenario risk assessment:

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario rating
Severe Summer	Unlikely	Minor	Major	Minor	Medium

[26] Met Éireann - Summer Centre

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian may be impacted simultaneously.
Seasonal relevance	Summer (mainly June, July and August in Ireland)
Likely advance warning	Days, weeks
Potential crisis duration	Days to weeks
Considerations	The National Risk Assessment for Ireland 2023 indicates extreme and sustained heatwaves as an emerging risk due to climate change, noting a significant rise in heat stress from increasingly frequent and prolonged heatwaves. Advanced warning duration would be based on weather forecasts and outage planning.

Preconditions and initiating event(s)

Initial conditions

The power system is operating normally with sufficient power reserves in place.

Several conventional generators (and possibly interconnectors) are on scheduled outages as part of the summer maintenance programme. Some of these may be long outages that cannot be returned at short notice. Forced outages may also have occurred with extended return times.

A heatwave of this nature would be forecast several days ahead of time. The TSO would have time to undertake measures to prepare the system in advance.

The Department of Agriculture Food and the Marine (DAFM) issue Fire Danger Notices to describe the level of forest fire risk. Should a Red level notice be issued by DAFM, ESBN would turn off automatic reclosing of circuits that run through hotspot locations.

Initiating event and chain of events

During extended periods of extreme temperatures, the operation of the power system will face several limitations. The effects of these limitations are detailed below.

- Low wind generation on some days
- Reduced transmission capacity during the summer (internal and cross-border), which cannot be resolved by normal grid and system operation.
- Generation capacity may further be limited due to thermal ratings on transmission and distribution assets (lines, cables, transformers).
- N-1 capabilities may be impacted by reduced power lines capacity, increased heating of transformers, and fires.
- Cross-border imports from GB may be impacted, where the heatwave extends to the region.
- Limited hydro availability as a result of a long dry spell.

Evolution of the scenario

The expected duration of the high temperature heatwave event is up to two weeks**.** It is noted that a dry spell (i.e. a prolonged period of low rainfall) may last significantly longer based on experience, but the key impacts on the electricity system are likely to be experienced during the overlapping period of the extreme temperatures and the dry spell events.

If this scenario was to escalate towards a crisis, the TSO would expect to experience an increase in summer demand, as well as a decrease in internal and cross-border generation availability. If these issues could not be resolved through standard (market) grid and system operations, then (non-market) measures would have to be taken to provide capacity.

Scenario likelihood assessment

This scenario is rated as unlikely as significant demand increases have not been experienced during heatwaves to date in Ireland, and system Alerts over summer have not been a direct result of severe summer weather. The significant increase in roof-top solar PV installation would further reduce the potential demand during daylight hours on many days.

In the 2023 NRA[27], it was considered that risks for Drought and High Temperatures were below the threshold for inclusion on the National Risk Matrix (i.e. they were not considered to be sufficiently high risk for inclusion) and that these risks were considered most appropriately managed at departmental, agency or regional level. This view is considered to support the assessment rating of unlikely.

Such events may increase in frequency in coming decades as a result of the risk of climate change.

Scenario impact assessment

EENS Impact: **Minor** impact, estimated at between 0.002% and 0.01% of average annual consumption, in the range of 0.6 to 3 GWh. The non-market measures would be available under this scenario, these units are not included in the TSO's scheduled outage programme

LOLE Impact: Considered to be **Major**, given an aggregated period of lost load of between 12 and 48 hours.

Cross-border dependency: Rated as **Minor**. High and extreme temperatures likely to be impacting in NI and GB at the same time due to proximity/climate. Impacts could include reduced cross-border support between jurisdictions.

[27] NRA 2023 – 4.8 – Risks Bellow the threshold for inclusion in the NRA

2.1 (b) Severe Winter [W.SW]

Description of the scenario

This scenario is based on a prolonged period of very cold temperatures well below seasonal averages in Ireland and the region, leading to increased demand and reduced renewable generation. The coldest average temperatures are observed over a three-week period, resulting in above-average demand. Renewable energy supply (RES-E) may be low due to a high-pressure weather system. The scenario assumes that there is a 20% forced unavailability of thermal power plants.

The ENTSOE scenario describes a two-week event, however, Ireland's NRA 2023 describes a three-week event as the reasonable worse-case scenario, and therefore the latter has been considered for this assessment. The NRA 2023 also states that "*Due to the influence of the Atlantic Ocean, Ireland does not usually suffer the extremes of temperature experienced by other countries at similar latitude*" which supports the considerations for this scenario.

National electricity crisis scenario risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario rating
Severe Winter	Possible	Major	Major	Major	High

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian may be impacted simultaneously.
Seasonal relevance	Winter
Likely advance warning	Days, weeks
Potential crisis duration	Days, weeks
Considerations	The worst-case scenario considered for Ireland in the NRA is a 3-*week period of prolonged low temperatures combined with low wind speeds and little precipitation.* Wind generation might be lower due to high pressure conditions. Demand is much higher than average given the low temperatures and increased use of electric heating.

Preconditions and initiating event(s)

<u>Initial conditions</u>
The initial conditions assume colder winter temperatures, affecting most of IE, NI and GB. At the same time, system demand is considered typical for winter on initiation (the system is N-1 secure with no unusual / excessive outages, and sufficient power reserves are available).

Initiating event and chain of events:

Cold spells are generally forecast several days in advance allowing for preparation and planning, and appropriate actions in response to the weather are taken.

The following conditions may occur:

- Temperatures in IE, NI and GB fall well below seasonal averages (over 50 years).
- System demand increases, primarily due to increased use of electric heating. It is estimated by the TSO that in Ireland, for each drop in temperature by 1 degree, depending on wind chill, an additional 50 MW of demand is anticipated on the system[28].
- Wind generation is reduced (to less than 500 MW and at times less than 100 MW) due to a due to a corresponding high air pressure system.
- There may be a decline in thermal generation availability due to operational problems with generating units' equipment.
- In line with the ENTSOE scenario, this scenario assumes that there is a 20% forced unavailability of gas and oil power plants due to cooling and forced outages.
- Under normal conditions, the TSO's Winter Outlook 2025/26 described a continued high outage rate of the dispatchable generation fleet, as follows "*The dispatchable generation (excluding DSUs) forced outage rate in Ireland has increased significantly over the last number of years. For January to June 2025, it stands at 18%. This has led to tight margins at times and has impacted the system's ability to accommodate generator and transmission planned outages.*".

Evolution of the scenario

The scenario is likely to persist for a duration of up to three weeks before temperatures begin to rise again.

- Travel for personnel can be challenging, resulting in longer response times and reduced availability.
- Transport logistics in relation to the delivery of diesel to remote generating units may be impacted by iced roads, while the need for the increases.
- In the event that this scenario progress to an extreme scenario (as experienced in Ireland during 2009/10 and 2010/11 winter), there may be an issue with the cooling of conventional plants due to frozen cooling water bodies. In the past, a number of generators experienced difficulties with cooling water,
- The impact on hydropower (i.e. reduced generation) from frozen water bodies is not considered significant on the overall system, due to the low reliance on hydropower in Ireland.

Scenario likelihood assessment

Scenario likelihood is rated as **possible** (i.e. could occur in 5 to 10 years). This likelihood rating is based on the NRA 2023 assessment of such a weather event occurring within 1 to 10 years, and

[28] EirGrid Winter Outlook 2025/2026

expert judgement that the likelihood of a consequential electricity crisis event would be at the higher end of this range i.e. in the 1 in 5 to 10 year period.

Scenario Impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: Considered to be **Major,** likely resulting in loss of load over an aggregated period of between 12 and 48 hours.

Cross-border dependency: Rated as **Major** due to risk of generating a cross-border crisis in NI due to electricity system interdependencies with NI. There is also possible impact on interconnector flows between IE and GB as weather assumed to simultaneously affect GB which would be under similar power system conditions.

2.1 (c) Severe Storm [W.ST]

Description of the scenario

This scenario assumes an extreme storm with high winds, which would result in extensive failure of electrical infrastructure components and high-speed shutdown of wind generation. Ireland's national scenario broadly aligns with the regional scenario developed by ENTSOE, with details provided below on the Irish context of the scenario.

The Methodology's regional scenario originally considered a storm with an average wind speed of greater than 150 km/h and wind gusts greater than 200 km/h i.e. a 1-in 50 year type event. Historical data indicates that Ireland has not experienced such extreme weather conditions. According to the Irish Meteorological Service - Met Éireann[29], the highest record for wind speed in Ireland was recently (24 January 2025) set by Storm Eowyn at 142 km/h for highest sustained wind speed, and 184 km/h for highest gust wind speed. The previous records had stood since 1945 of 131 km/h sustained wind and 182 km/h gust.

According to Met Éireann, Storm Éowyn reached hurricane force on the Beaufort land-wind scale[30]. This extreme weather event caused widespread and significant damage to the electricity distribution infrastructure, resulting in 768,000 customers being left without power. ESBN (Ireland's DSO) stated that[31] *"This is by far the worst storm experienced by ESB Networks both in terms of customers losing supply and the scale of damage across the network."* Furthermore, due to electricity shortages, approximately 130,000 customers experienced a complete loss of water supply, while an additional 750,000 were identified as being at risk of water service disruption. Water Treatment Plants (WTP) and Wastewater Treatment Plants (WWTP) were also affected with a total of 286 WTP and 293 WWTPs impacted. In addition, telecommunications infrastructure was significantly impacted, with an estimated 2,052,100 mobile service users and 281,000 fixed network users affected as described in the Review of Storm Éowyn report published in October 2025 by the Department of Housing, Local Government and Heritage[32].

The last four major storms from an electricity customer impact perspective have been Storm Éowyn (January 2025), Storm Darragh (December 2024), Storm Ophelia (October 2017) and Storm Darwin (February 2014). Storms Darragh[33], Ophelia and Darwin are considered to represent a 1 in 10 year storm, and Storm Éowyn to be more representative of a 1 in 50 year storm event, and hence Storm Éowyn has been referenced in the development of the risk assessment for this scenario. The measures developed to respond to a storm event apply equally to the lower intensity, more frequent storms. In Ireland, Met Eireann[34] notes that the impact of climate change on the

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[29] Weather Extreme Records for Ireland - Met Éireann - The Irish Meteorological Service

[30] Beaufort Scale

[31] Unprecedented damage to the electricity network by Storm Éowyn - ESB Networks publishes estimated restoration times on PowerCheck.ie

[32] Review of Storm Éowyn

[33] Storm Darragh was impactful as a consequence of its unusual wind direction.

[34] Met Éireann - Why are we seeing so many storms this season?

future frequency and intensity of storms affecting Ireland remains uncertain due to significant year-to-year variability in storm patterns, with no clear pattern emerging. This cycle of the RPP relates to the period 2026 to 2029 inclusive, therefore, this scenario is focused on this time period only. Further details on the impact of climate change on electricity crisis scenarios can be found in Section 3.1(f) of this plan *Electricity Crises and Climate Change.*

This scenario is structured under three headings – transmission level, distribution level and communications.

Transmission Level Risks

In addition to high-speed shut down of wind generation, risks to the transmission system include damage to and loss of transmission lines, generation assets, interconnectors (converter stations), and demand, as well as the temporary loss of significant LEU demand due to faults on the transmission system. As noted previously, Ireland's generator capacities and LEU demand loads are high in comparison to the overall size of the system, which presents risks in terms of system stability should the loss of multiple large generation units or demand customers occur in a storm scenario following multiple contingencies. Such risks are managed through ongoing investment in transmission infrastructure and protection schemes, the dispatch of additional thermal generation in order to respond to anticipated high-speed shutdown, control room operational procedures and real-time responses to changing conditions on the power system (supported by tools and additional staffing of the control room), as well as special protection schemes and system defence measures such as over- and under-frequency protection schemes.

Wind direction can also have an influence on the impact of a storm. Storm Darragh (111 km/h highest sustained wind speed) in December 2024, which generated unusually strong north-westerly winds, damaged one of the chimney stacks at Ballylumford power station in Northern Ireland, leading to a temporary shutdown of the station for several months while repairs were undertaken[35].

There may be an impact to the gas network from a severe storm, where a possible gas shortage could then impact the generation of electricity from gas fired power stations. However, to date, despite a number of recent significant storms, the gas network (as managed by the gas TSO, GNI) has not been interrupted and has demonstrated resilience to such events.

Distribution Level Risks

Ireland's population is more spread out compared to the UK and Europe, which has resulted in a need for more distribution network infrastructure per customer in Ireland. Ireland has approximately 165,000 km of overhead distribution lines, which is four times the EU per-capita average. Further to this, due to the dispersed rural nature of ESB Network's customers, the ratio of overhead to underground network is 6:1, which is significantly higher that the European average of 2:1 Therefore, in the event of a severe storm, where a large number of customers are impacted, restoration times may be prolonged due to the length of overhead distribution lines impacted. A

[35] BBC - Thousands still without power after Storm Darragh

loss of electricity at the distribution level will also impact other services, such as the provision of water (at a household and local level), and communications (mobile and broadband).

Telecommunication Risks

Following a severe storm event and a prolonged loss of electricity supply, there is a risk of loss of communications from mobile and broadband, which are reliant on an electricity supply to operate. The loss of these communications channels can directly impact the remote operation of energy infrastructure assets in electricity and gas. For example, in relation to the gas system, there is a risk to gas supply (e.g. from Corrib and/or Moffat) and to gas distribution from the remote operation of the network. However, to date, despite a number of recent significant storms, the gas network (as managed by the gas TSO, GNI) has not been interrupted and has demonstrated resilience to such events. Communications could also be impacted within and between organisations involved in managing the electricity and gas networks.

TSO's Severe Storm response objectives

EirGrid's key objective in responding to storms of Storm Éowyn's nature is to ensure that the Power System as a whole remains secure and stable throughout the storm, while operating in line with their operational and safety protocols. This objective is pursued in close collaboration with ESB Networks during the preparation, response, and recovery stages of the storm. Ensuring the resilience of the 220 kV system (as the backbone of the transmission system in Ireland) is particularly important in meeting this objective. During the post-storm recovery phase, EirGrid and ESB Networks closely coordinate the priorities and resources related to restoring transmission circuits for system security and the restoration of distribution demand.

DSO's Severe Storm response objectives

ESB Networks' main objective during severe storms is to ensure public safety and maintain the continuity of electricity supply. This involves a multi-faceted approach that includes pre-storm preparation, rapid response during storms, and post-storm restoration efforts and communication plans, all while prioritising safety.

National electricity crisis scenario risk assessment:

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario rating
Severe Storm	Unlikely	Critical	Disastrous	Major	High

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian may be impacted simultaneously.
Seasonal relevance	Any season (most intense storms are typically observed from September to March)
Likely advance warning	Hours, days
Potential crisis duration	Days, weeks - depending on the level of infrastructure damage
Considerations	High winds caused by a severe storm have the potential to affect the entire island of Ireland. This can result in multiple network components being affected, impacting both generation and demand.

Preconditions and initiating event(s)

Initial conditions

The power system is assumed to be operating normally when the notice of a potentially severe storm is issued. The forecast will indicate the likely timing of a severe storm three to five days in advance, allowing for preparation of resources. Met Eireann will issue a colour coded warning to describe the intensity of the storm, with a 'red' warning being the most severe.

Initiating event and chain event

The storm is likely to impact transmission and distribution infrastructure, as well as anticipated generation forecasts (notably high-speed shut down of wind generation). The storm duration is assumed to be one to two days.

EirGrid will initiate its Severe Weather Emergency Protocol to maximise transmission network resilience in advance of the storm. This would include engaging with ESB Networks, and possibly generators, to cancel or return planned outages. Additional generation capacity will be requested to prepare for likely high-speed shutdown of wind generation and potential loss of some generation units. Key storm-related control room functions will be resourced, including additional technical and support staff on site and in local hotels.

National Emergency Coordination Group (NECG) will be activated, with EirGrid providing transmission grid updates and, (if necessary) issuing a System Alert. EirGrid also prepared for the activation of its Power System Emergency Communications Plan in the event that the transmission system is severely impacted.

Evolution of the scenario

Transmission Level Impact

The impact of a severe storm on the transmission system could result in multiple transmission circuit faults, some of which can lead to subsequent forced outages. Load loss due to the tripping of transmission lines is also likely. Demand would be expected to be reduced due to the national Red Weather Warning advising people to stay at home. Significant wind generation reduction would be expected due to high speed shut down and disconnection of wind generation due to the impact on transmission infrastructure. High voltages may be experienced in some areas of the transmission network as a result of the significant demand reduction.

Severe storms can also lead to sudden ramps in renewable generation (RES ramps), especially in the case of wind generation. RES ramps must also be managed by the TSO. The TSO's role is to ensure that sufficient ramping capacity and control room capabilities are available to maintain grid stability.

Following the storm, the operational focus would shift to prioritising the restoration of key transmission circuits still on outage and supporting the DSO demand restoration effort. An assessment of the impact transmission assets will be undertaken (including circuits not on outage but that may have experienced damage due to the storm).

Post-storm impacts may also include salt / sand deposits on transmission infrastructure that could lead to faults in the days following the storm. Such a fault occurred, for example, following Storm Éowyn when a fault (short circuit) on a 220 kV reactor caused a significant voltage disturbance across the power system in the greater Dublin area. This fault, while rapidly cleared, resulted in a significant reduction in large load of data centre demand due to the fault ride-through characteristics of such loads (i.e. transfer of demand to UPS backup systems).

In the event of a severe storm on the east coast of Ireland (Storm Éowyn mainly impacted the west coast), faults in the Dublin area could give rise to repeated voltage and frequency events on the system for the TSO to manage. This is discussed further under the scenario '*Grid instability caused by unanticipated/uncontrolled interactions between new technologies*'.

Generators and interconnectors could also be impacted by a severe storm through direct damage to assets such as chimneys and converter halls, or forced outages of connecting circuits.

Distribution Level Impact

The impact of a severe storm on the DSO system can result in widespread outages and extensive damage to the Distribution Network. Such damage can mean elongated disruptions to residential, commercial and industry customers.

Safety to the public and staff are priority in all restoration efforts. Full repair could take two to three weeks in a severe scenario due to the expected significant length of distribution lines expected to be affected, potential damage and obstruction to roads, and access difficulties in the event of damage to infrastructure and fallen trees. The magnitude of the damage has the potential to exceed the capacity of local restoration efforts, which may be accompanied by a shortage of essential materials and components.

Storm Éowyn caused substantial damage to the electricity infrastructure, resulting in 768,000 customers losing power, full restoration took 18 days. ESB Networks deployed over 2,500 local crews and partner contractors, supported by staff from the south and east of Ireland and experienced retirees. Additional technical support was provided by partners from Austria, Finland, France, Germany, the Netherlands, Norway and the UK.

Gas Network Impact

The gas network may be impacted during a storm event. During Storm Éowyn, GNI experienced a loss of power to a number of transmission AGIs on the island, including both compressor stations located in Scotland. To address these issues, a combination of gas-fired and diesel back-up generators have been installed at critical locations to maintain power supply and the supply of gas to the network was maintained during the storm.

Communications

Maintaining the stability of TSO telecommunications systems is important during a severe storm particularly given movement restrictions of ground crews. These provide system visibility and the ability to restore circuits remotely.

A dedicated communications network (Optel) is in place for the TSO, DSO / DAO and electricity system entities such- as power stations, which can be used as backup communications system in the event of a severe storm. The gas TSO also has the Optel system in place for backup communication with gas fired generators if required in the event of communication issues.

The Tetra network provides an additional backup communications network between TSO, DSO and electricity system entities. Tetra also serves as a backup for voice communications for execution of the Power System Emergency Communications Plan (PSECP). The resilience of these communications systems are under review following the recent storm events.

Scenario likelihood assessment

According to the Weather and Climate Extreme Events in a Changing Climate report published by the Intergovernmental Panel on Climate Change[36], there is low confidence in confirming an increasing trend in the frequency and intensity of extreme storms. The report highlights that the impact of climate change on extreme weather events is complex and varies by region. In Ireland, Met Eireann[37] notes that the impact of climate change on the future frequency and intensity of storms affecting Ireland remains uncertain due to significant year-to-year variability in storm patterns, with no clear pattern emerging. Further details on the impact of climate change on electricity crisis scenarios can be found in Section 3.1(f) of this plan *Electricity Crises and Climate Change*.

Overall, therefore, there is a lack of definitive information to enable a precise conclusion on the frequency (and therefore the likelihood) of extreme storms, such as Storm Éowyn in Ireland,
The NRA 2023 suggests that less intensive storms than Storm Éowyn are likely to occur at a 1 in 10 year frequency. The most severe scenario considered by the NRA was a storm of a similar magnitude to Storm Ophelia, which impacted Ireland on 16 October 2017. The storm reached a highest gust wind speed of 156 km/h, with a mean wind speed of 115 km/h. Based on the NRA's assignment of likelihood for this event, it considered Ophelia to be representative of a 1 in 10 year event. It would seem reasonable to assume that storms of a greater intensity (such as Éowyn) could occur at a frequency higher than 1 in 10 years. Prior to Storm Éowyn, the record wind speeds

[36] Intergovernmental Panel on Climate Change – Report (11.7.4) Extreme Winds
[37] Met Éireann - Why are we seeing so many storms this season?

had stood since 1945. Therefore, the likelihood of the most severe storm events (such as Éowyn) for the purpose of this RPP, is considered to be greater than a 1 in 10 year event, and to therefore fall into the ‘unlikely’ classification (1 in 10 to 100 years), but the likelihood would be considered to be towards the lower end of this range. Should information on severe storm frequency change, then an update to this scenario should be considered. Therefore, this scenario has been rated as **unlikely**.

If this risk assessment was undertaken based on the lower intensity more regular storms (i.e. the 1 in 10 year type events), then the likelihood would be higher and in the ‘possible’ (5 to 10 year) range, but the impact would be lower.

Scenario impact assessment

EENS Impact: **Critical** impact, estimated at between 0.05% and 0.25% of average annual consumption, in the range of 16 to 84 GWh.

LOLE Impact: **Disastrous** impact, as period to restore all load is likely to take more than a week (i.e. greater than 168 hours).

Cross-border dependency: Considered to be **Major**. Storm likely to affect NI and GB simultaneously, also reducing the ability for mutual support.

2.1 (d) Heavy Ice Loading [W.IL]

Description of the scenario

The scenario is based on the occurrence of high winds during a snowfall event that causes ice loading and/or the formation of sticky snow, which can result in a fault in multiple overhead lines. In an extreme case, the accumulation of ice could cause a failure leading to the dropping of conductors and subsequent collapse of the towers.

Wind and solar PV generation are impacted. Multiple network components affected, impacting both generation and demand.

In an Irish context, there have been very few incidents of severe ice accretion on transmission power lines in the last 30 years.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Heavy ice loading	Unlikely	Insignificant	Minor	Minor	Low

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian may be impacted simultaneously.
Seasonal relevance	Autumn, Winter, Spring
Likely advance warning	Hours, days
Potential crisis duration	Hours, days
Considerations	This new scenario, not present in the RPP 2023, may arise under conditions distinct from extreme winter weather, significantly influenced by humidity and wind-chill factors. These elements can impact multiple network components, affecting both generation and demand.

Preconditions and initiating event(s)

Initial conditions

The system is operating within normal parameters despite the high winter demand. Meteorological forecasts have predicted periods of severe weather, and appropriate remedial actions have been taken. However, ice accretion has not been specifically forecasted.

The occurrence of this scenario is specific to a particular combination of weather conditions, wherein the temperature is approximately zero degrees Celsius, the humidity level is high, there is strong and constant wind, and heavy snowfall is experienced (i.e. wet snow conditions).

Initiating event and chain of events

Temperatures drop to around zero degrees Celsius, wet snow falls and freezes quickly due to strong winds that can last for several hours and, in an Irish context, may occur in the autumn, winter or early spring. Under extreme conditions, the snow could freeze around overhead power lines, resulting in an accumulation that increases their weight. Eventually, this additional weight could exceed the capacity of the pylons. This could lead to multiple pylons failing at the same time. In an Irish context, as reported by the TSO, there have been very few incidents of ice accretion on transmission power lines in the last 30 years.

Evolution of the scenario

The impact of ice accretion on the overhead lines has resulted in faults. While the impact is limited to a few stations, there is a risk of lost load due to generator trips and potential permanent damage. The duration of this scenario is expected to be no more than two days. However, the damage to multiple power lines could result in extended outages lasting for days or even weeks, leading to a prolonged recovery time until most affected power lines are repaired or reserve power plants become operational.

Scenario likelihood assessment

Scenario rated as unlikely.

According to Met Éireann Storm Emma[38] which impacted Ireland between 28 February and 4 March 2018 was one of the most significant snowfall events of recent years, where temperatures plummeted with widespread snowfall experienced across the country. Temperatures struggled to rise above freezing as bitterly cold easterly winds swept in over the country causing widespread disruptions to roads, rail and air travel and significant impacts on water, power and food supplies. ESBN reported that over 100,000 homes and businesses lost power. There was no damage to the transmission power system, and no reports of significant ice accretion on power lines. Therefore, this assessment is considered 'unlikely', as even in this significant winter storm, ice accretion did not damage power lines in Ireland.

[38] Met Éireann – Storm Emma

Scenario Impact assessment

EENS Impact: **Insignificant** impact, estimated at less than 0.002% of average annual consumption, or less than 0.6 GWh.

LOLE Impact: Considered to be **Minor**, likely resulting in loss of load over an aggregated period of between 3 and 12 hours.

Cross border dependency: Considered **Minor**. Similar extreme weather conditions likely to affect NI and GB simultaneously, also reducing their ability to support.

2.1 (e) Heavy Flooding [W.H.F]

Description of the Scenario

This scenario is based on an extreme precipitation event in a localised area of Ireland resulting in flooding of key transmission and distribution infrastructure

The Methodology scenario is based on the assumption that heavy flooding is a result of rapidly-melting snow and /or heavy rain. In Ireland, the most likely origin of a flood event would be from rainfall. River and / or tidal flooding may also be a factor in certain areas.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Heavy flooding	Unlikely	Major	Major	Minor	Medium

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian could be impacted, although flooding considered to be a local or regional scale, rather than a countrywide event.
Seasonal relevance	All
Likely advance warning	Hours, days via Meat Éireann alert.
Potential crisis duration	Hours to Days – depending on the infrastructure damaged
Considerations	The NRA 2024[39] states that "The increase in rainfall volumes and intensity of rainfall events will lead to more rivers, groundwater and pluvial flooding, increasing the number of communities at risk. The damage from flooding includes infrastructure, private and commercial property as well as damage to the local environment"

Preconditions and initiating event(s)

Initial conditions

The power system is operating within normal parameters, with no unexpected or excessive outages and sufficient power reserves.

Initiating event and chain of events

Met Éireann issues a weather warning several days in advance. This indicates that dangerous weather conditions related to heavy rainfall are expected.

[39] NRA 2024

Evolution of the scenario

Transmission and distribution infrastructure could be impacted by rapidly rising inflows in areas where floodwaters are likely to remain high.

The effects are not system-wide, the overall expected duration is seven days. However, the most severe flooding impacts are expected in specific infrastructure for a period of two to three days at particular sites, with the most significant effects occurring within this timeframe. Repairs cannot start until water levels drop sufficiently.

EirGrid has integrated climate adaptation into its infrastructure planning and asset management. A comprehensive climate risk assessment has been completed, identifying areas vulnerable to flooding under projected climate scenarios. This assessment is aligned with the National Adaptation Framework and sectoral adaptation plans for critical infrastructure. EirGrid conducted flood risk mapping using OPW data, climate models, and GIS tools to identify substations and assets at risk. EirGrid developed site-specific assessments which resulted in specific projects to mitigate against the flood risks at those sites. In total five existing stations were addressed and these projects are currently progressing towards the planning phase in 2025/2026.

Scenario likelihood assessment

Scenario rated as unlikely. Although the NRA rated their flooding risk scenario under their criteria as ‘likely’ (1 in 1 to10 years between occurrences), in relation to this RPP scenario, a flooding event on a nationwide scale that could lead to an electricity crisis in considered less likely than this. Therefore, a likelihood of ‘unlikely’ (1 in 10 to 100 years) has been assigned to this RPP scenario.

Scenario impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: Considered to be **Major**, likely resulting in loss of load over a period of between 12 and 48 hours.

Cross-border dependency: **Minor** impact as scenario is typically localised.

2.1 (f) Renewable Energy Source Shortage, including Dunkelflaute [W.DF]

Description of the Scenario

The regional scenario identified in the Methodology as 'Dunkelflaute' has been merged with Ireland's previous national scenario 'Renewable Energy Source Shortage'. Dunkelflaute type conditions are considered most significant during periods of low wind, solar PV and embedded solar PV production. Extended periods of low renewable generation are also possible in summer when low wind generation corresponds with cloud cover. While demand is significantly higher in winter, the available dispatchable generation tends to be lower in summer due to planned maintenance. This scenario specifically considers regional Dunkelflaute conditions (i.e. impacting also NI, GB, and parts of Central Europe), in line with the ENTSO-E scenario. As a reasonable worst-case scenario, it also considers simultaneous high levels of forced outages of dispatchable generation (unrelated to the Dunkelflaute conditions).

The regional nature of this scenario could have a considerable impact on Ireland's power system, particularly in the event of concurrent forced generation outages, given the country's substantial reliance on renewable energy sources and imports during such periods. In 2023, renewable energy sources (primarily wind) supplied 40.7% of Ireland's overall electricity supply[40].

Planning standards and adequacy studies should capture the needs of the system by ensuring sufficient dispatchable capacity is available when considering periods of low wind generation. As described in the TSO's Winter Outlook 2025/26[41], the electricity system remains at risk of entering an alert state during periods of low wind and low interconnector imports. The likelihood of the latter increases in the case of Dunkelflaute conditions across the region. The Loss of Load Expectation (LOLE) in Ireland for the five months of the winter period 2025/26 was reported in EirGrid's Winter Outlook as 1.1 hours, having taken the available TEG and REU capacity into consideration. This figure is inside the 3 hours per year standard, indicating that the system will operate within the level of risk set by the Department of Climate, Energy and the Environment guidelines. The system may enter the Alert State at times in winter 2025/26, most likely at periods of low wind and low interconnector imports. There remains a low probability of the system entering the Emergency State in winter 2025/26, due to insufficient generation being available to meet the demand even with the TEG and REU units available. If TEG and REU are excluded, the LOLE becomes 43.4 hours.

40 SEAI - First Look: renewable Energy in Ireland 2023

41 Winter Outlook 2025/26

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Renewable Energy Source Shortage, including Dunkelflaute	Possible	Major	Major	Major	High

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian could be impacted simultaneously.
Seasonal relevance	All seasons can be impacted
Likely advance warning	Days, weeks
Potential crisis duration	Days, weeks
Considerations	The Irish power system is increasingly reliant on wind power, which is non-dispatchable and variable in availability. When the capacity factor is low, alternative power sources can be required.

Preconditions and initiating event(s)

Initial conditions

The system is initially in normal, operational state. This particular scenario operates under the assumption that the additional infrastructure outlined below is available:

- Celtic Interconnector (700 MW), expected to be operational from spring 2028. The availability of Celtic would be a significant step, as it would provide direct access to a more diverse pool of generation in a different geographical location, thereby building additional resilience to risks such as regional weather patterns.
- All four Temporary Emergency Generation (TEG) units comprising circa 650 MW.
- Moneypoint back-up units (750 MW), which are operational from July 2025 to mid-2029 as out of market generators of last resort.
- The CRU led Programme of Actions which included establishment of the TEG and REU has lowered the risk of a crisis under this scenario.
- The market delivers the available generation capacity through the Capacity Market.

Initiating event and chain of events

The scenario assumes an extended period of low wind and limited solar energy over system peak (such as over winter evening peak demand) of (at times well below) 500 MW for a period of greater than 24 hours (several days). This corresponds with high levels of forced outages (up to 20%) of dispatchable generation.

Evolution of the scenario

Periods of very low renewable generation can occur in Ireland in the winter or summer. Historically, summer is the season during which most outages are planned in Ireland, and in the recent past Ireland has experienced alerts during this season. In the summer of 2022, six alerts due to generation shortfall were experienced from May to September 2022. The situation improved in 2023, 2024, and 2025 with just one alert experienced in the same period in 2023, and no alerts experienced in 2024 and 2025 since the introduction of the TEG units.

Winter may be characterised by periods of low wind and no solar PV generation over periods of high demand in the evening.

During such periods, dispatchable conventional generation units will be called on, and imports maximised over the interconnectors. Should this be insufficient, the TEG units may be called on. Where sufficient warning can be given in relation to the Moneypoint heat state and associated notice times, these units may be called on.

The improvement seen in the number of system alerts has been supported by the availability of TEG and REU units (11 Margin Warnings and 1 Margin Shortfall Risk notice have been issued by the end of 2025, since these units became available through the CRU SoS Programme). These market messages have all been related to periods of low renewable generation.

The risks of not being able to meet demand will increase where insufficient dispatchable generation is available (due to forced outages), or demand is higher than anticipated. The compounding risks associated with these factors are addressed in the scenarios "*Non-delivery of planned infrastructure projects accounted for in TSO system planning"* and "*Rapid above trend growth in electricity demand* scenarios".

Looking forward, diversifying RES capacity plays an important role in strengthening energy security and system resilience. The integration of solar PV capacity into a wind-dominated system (such as IE's) can decrease both the frequency and duration of seasonal low RES patterns, while also mitigating extreme events.

Scenario likelihood assessment

The likelihood of this scenario is rated as possible (1 in 5-to-10 years) on the basis of the Winter Outlook and the availability of non-market generation infrastructure (TEG and Moneypoint units).

Scenario impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: Considered to be **Major**, likely resulting in aggregated loss of load for between 12 and 48 hours.

Cross-border dependency: **Major** Cross-border impact of any low wind scenario would be major as both IE and NI likely to be similarly affected, and support from GB may be limited considering also some impact of these conditions in Central Europe.

2.1 (g) Unusually high demand/ RES forecast errors [W.FE]

Description of the scenario

Unusually high errors in demand and/or renewable generation forecast lead to difficulties in balancing power system supply and demand in in real-time.

In this scenario, high forecast errors (demand and RES) coincide with periods where the planned capacity available to the system is insufficient – considering the notice and ramp times required for available market generators. The long notice times of Moneypoint units (>48 hrs), are likely to result in these non-market units not being available to the system in real time when the forecast errors materialise. The potential shortfall in generation capacity may be aggravated by (unanticipated) forced generation or interconnector outages during the same period.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Unusually high demand / RES forecast errors	Possible	Major	Major	Major	High

Geographic relevance	Ireland, Northern Ireland and GB can be impacted simultaneously.
Seasonal relevance	Summer, Autumn, Winter, Spring
Likely advance warning	Hours
Potential crisis duration	Hours, days
Considerations	All market participants may be susceptible to the same (or similar errors).

Preconditions and initiating event(s)

Initial conditions

The power system is operational and performing within normal conditions, exhibiting no unexpected or excessive outages and with sufficient power reserves.

Initiating event and chain of events

Unusually big errors in demand and/or RES generation forecasts result in a shortfall of generation capacity in real time.

Significant demand and forecast errors may be the result of sudden and unanticipated weather changes, substantial fluctuations in demand, high uncertainty in anticipated market flows between

Ireland and GB, or errors in the data used for forecasting. Forecast errors may be unevenly distributed; large ramps, tend to carry the highest levels of forecast uncertainty.

Evolution of the scenario

The following operational impacts may occur:

- Actual power flows do not align with scheduled market flows,
- Intraday markets do not have the necessary volume to support the imbalance,
- Import capacity over the interconnectors may be exhausted
- Remedial actions (including non-market generation) available to the TSO in real time may be exhausted, should the situation worsen.

The scenario would be aggravated by loss of a large generator or interconnector due to a forced outage during this period.

While (non-market) TEG capacity can be dispatched at short notice (< 15 minutes) to address a shortfall in real-time, Moneypoint units may not be available to the system when the forecast errors materialise, as cold notice times exceed 48 hrs. The system would therefore be particularly vulnerable during periods where planned market generation and imports have been maximised, and TEG already included in the margin calculations.

Measures available to the System Operator during periods of high forecast uncertainty include pro-active dispatch of dispatchable market generation (for example, to address potential high-speed shut down of wind generation during storms), and the pro-active dispatch of Moneypoint units under a 'Margin Shortfall Risk", with the ability to cancel synchronisation if required.

Scenario likelihood assessment

The scenario is rated as possible. All market participants using the same forecasts may be susceptible to the same error.

Scenario impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: Considered to be **Major**, potentially resulting in loss of load for a period of between 12 and 48 hours.

Cross-border dependency: Considered to be **Major.** Cross-border impact would be major as both jurisdictions likely to be similarly affected as the same forecast vendors are used in NI.

2.2 Natural

Table 5 – Summary of natural scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Earthquake	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE
Volcanic eruption	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE	Not relevant to IE
Space weather	Very Unlikely	Major	Major	Major	Low

As per previous NRA[42], Ireland's geology is such that it is of low vulnerability to large scale natural disasters including earthquakes and volcanic eruption.

[42] NRA 2021/22

2.2 (a) Earthquake [N.EQ]

This regional scenario is not applicable to Ireland, given that Ireland is not situated within an active tectonic zone and is not susceptible to significant seismic activity, therefore such scenario does not present any risk to Ireland's power system.

2.2 (b) Volcanic eruption [N.VE]

This regional scenario is not applicable to Ireland, given that the island of Ireland is not situated in an area of volcanic activity. Furthermore, the NRA 2023 assessment classified volcanic ash as below the threshold for inclusion on the National Risk Matrix.

2.2 (c) Space weather [N.SW]

Description of the scenario

A solar storm event creates geomagnetically induced currents that circulate in the power grid through the grounded transformer neutrals. This has the potential to result in the tripping of circuit elements, the degradation of or permanent damage to grid infrastructure, particularly transformers.

The NRA 2024 states that "In *its more severe forms, space weather can cause significant disruption to the electricity grid and transportation networks. Satellites are vulnerable to its effects and can become disabled or damaged."*

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Space weather	Very unlikely	Major	Major	Major	Low

Geographic relevance	All regions of Ireland, Northern Ireland and Great Britian may be impacted.
Seasonal relevance	Summer, Autumn, Winter, Spring.
Likely advance warning	Days
Potential crisis duration	Hours, days
Considerations	In May 2024, Ireland was hit by a G5 geomagnetic storm. No impact on the power system was registered.

Preconditions and initiating event(s)

Initial conditions

The power system is in normal conditions with no unusual, excessive outages.

A geomagnetic storm alert has been issued, indicating that the storm is expected to impact the Earth within two days.

Initiating event and chain of events

A series of strong coronal mass ejections (CMEs) have been detected on the Sun. An alert is issued 3 days ahead of the impact.

Evolution of the scenario

Given advance warning of such an event, the TSO would be able to take preventive action to reduce the potential impact on the power system.

Should telecommunications be affected, this could have an impact on the gradual restoration of the system. The unavailability of telecommunications is also expected to lead to control failures, which could cause stability problems.

Voltage disturbances resulting in isolated failures due to induction on power lines and transformers are expected as the scenario unfolds.

Scenario likelihood assessment

The likelihood of such a scenario is considered to be 'very unlikely' based on the following information sources.

The NRA 2023 rated Space Weather as low probability with a high impact, and they recommended that this scenario is to be monitored and managed at the departmental/agency level. At the time of publication of the NRA 2024, the solar cycle was expected to peak in 2025[43]. The (US) National Oceanic and Atmospheric Administration (NOAA) and the (US) Space Weather Prediction Centre (SWPC) aim to provide monthly updates on Space Weather predictions for the (current) solar cycle 25[44]. According to the updated prediction, published in February 2025, the solar maximum had reached its maximum between July and November 2024 i.e. the solar maximum is considered to have now passed for this cycle. Given that the cycle is now declining, this is further evidence for a very low likelihood of occurrence for this scenario.

Scenario impact assessment

In this scenario, there is the possibility of lost load and long-term damage to system, although this is difficult to assess, due to the lack of data on previous events. Were an event to occur, it is considered that it would most likely result in local scale impacts. A G5 event occurred in Ireland in 2024, there was no impact to the power system.

In relation to possible impacts on the gas system, the gas TSO (GNI) have confirmed that a space weather event would not have any impact on the physical flow of gas. There may be a minor impact to electrical components of the network, which would be managed through existing monitoring systems and any affected components would be replaced, with no overall impact to the flow of gas expected.

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[43] NRA 2024 *" Space weather and its impact on global connectivity is a risk, in particular as we approach the Solar Maximum in 2025, the highest rate of solar activity during the sun's approximately 11-year solar cycle."*

[44] *Note that both the updated prediction and the 2019 NOAA/NASA/ISES Panel prediction apply only to Solar Cycle 25. Solar Cycle 26 is expected to begin sometime between January 2029 and December 2032.*

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: Considered to be **Major**, likely resulting in widespread loss of load for extended period of between 12 and 48 hours.

Cross-border dependency: **Major** impact. Cross-border dependency high as likely to affect NI/GB simultaneously, possibly Europe-wide

2.3 Malicious Actions

Table 6 – Summary of malicious actions scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario rating
Physical attack on critical assets	Unlikely	Critical	Critical	Major	Medium
Physical attack on control centres	Unlikely	Critical	Disastrous	Major	High
Attack on entities not connected directly to the grid	Possible	Minor	Major	Major	Medium
Loss of ICT systems to cyber-attack	Possible	Critical	Critical	Major	High
Unauthorised action by personnel	Unlikely	Critical	Major	Major	Medium
Targeted political malicious actions by entity/ adversarial states	Unlikely	Disastrous	Disastrous	Major	High

2.3 (a) Physical attack on critical assets [M.AA]

Description of the scenario

The scenario is based on a coordinated physical attack on Ireland's electricity infrastructure impacting the Single Electricity Market (SEM), including long term disruption to security of supply due to damage to power generation assets, transmission infrastructure, and cross-border capacity.

2.3 (b) Physical attack on control centres [M.AC]

Description of the scenario

This scenario is based on a successful physical attack on the TSO control centres.

2.3 (c) Cyber-attack on entities not connected directly to the grid [M.AE]

Description of the scenario

A successful cyber-attack against both primary and secondary ICT systems used by entities not directly connected to the transmission system, resulting in a possible impact on the operation of the power system. Such entities could include market participants not connected directly to the grid (including power exchange platforms, market makers, demand and renewable aggregators), and other entities identified through relevant regulations such as NIS2 and CER.

The systems used for control of the power system by TSOs and DSOs is not affected directly by the cyber attack.

2.3 (d) Loss of ICT systems to cyber-attack [M.CA]

Description of the scenario

In this scenario, a successful cyber-attack on TSO control room tools and ICT systems, results in the loss of real-time visibility and control of the transmission system, as per the Methodology.

A cyber-attack on generators or producers could have similar impacts, but it is noted that the likelihood, impact and scenario rating in this scenario are based on the reasonable worst-case scenario, which is considered to be a cyber-attack on the TSO control centre.

2.3 (e) Unauthorised actions by personnel [M.UA]

Description of the scenario

In this scenario, an unauthorised action by a TSO employee on the transmission system control centre destabilises the power system, potentially leading to a system-wide blackout.

2.3 (f) Targeted political malicious actions by adversarial entities / states [MAS]

Description of the scenario

This scenario considers adversarial entities or states as the main actor(s) of a 'hybrid' attack on multiple gas and electricity critical infrastructure, resulting in a significant loss of gas and electricity.

2.4 Technical

Table 7 – Summary of technical scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Large nuclear/ industrial accident	Extremely unlikely	Insignificant	Insignificant	None	Low
Serial technical defect	Unlikely	Minor	Minor	Minor	Low
Grid instability caused by unanticipated/uncontrolled interactions between new technologies	Possible	Critical	Major	Major	High

2.4 (a) Large nuclear/ industrial accident [T.IA]

Description of the scenario

This scenario considers a widespread contamination, causing disruptions in electricity supply and rendering large areas inaccessible for extended periods caused by a large industrial/ nuclear accident.

There are no nuclear facilities on the island of Ireland. Therefore, this scenario considers the possible impact caused by large nuclear accident(s) on energy infrastructure that is connected to Ireland but is located in the UK and France. The scenario considers Sellafield Nuclear facility in the UK and the Brennilis Nuclear facility in France, and their proximate Irish energy infrastructure.

It was considered that there would not be a scenario in which an industrial accident would impact the electricity system to a significant extent.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Large nuclear/ industrial accident	Extremely unlikely	Insignificant	Insignificant	None	Low

Geographic relevance	All regions of Ireland,
Seasonal relevance	Not linked to seasonal patterns
Likely advance warning	May be hours of advanced warning
Potential crisis duration	N/A
Considerations	There are no nuclear facilities on the island of Ireland. Therefore, this scenario considers the possible impact caused by large nuclear accident(s) on energy infrastructure that is connected to Ireland but is located in the UK and France.

Preconditions and initiating event(s)

Initial conditions

The power system is in normal conditions with no unusual, excessive outages.

Initiating event and chain of events

A significant incident could develop at the Sellafield Nuclear facility in the UK and/or the Brennilis Nuclear facility in France. The incident could result in major contamination affecting an area inside the standard nuclear exclusion zone of 16 km, potentially leading to immediate casualties and significant disruption to the area for an extended period.

Evolution of the scenario

In the event of such an incident, extensive areas inside the standard nuclear exclusion zone of 16 km may be rendered contaminated, potentially prohibiting entry for extended periods of time. This results in the suspension of repair work on damaged equipment and routine maintenance procedures.

The standard exclusion zone around a nuclear power plant in case of a release of radioactivity from the reactor in the US is 10 miles (16km)[45]. Sellafield plant in the UK has an exclusion zone of up to 8 km[46]. Therefore, should an incident occur at Sellafield, there would be no restriction of movement to energy system infrastructure in Ireland (distance approximately 190 km), or to GNI's onshore Scottish systems (distance approximately 55 km). Similarly in France, Brennilis Nuclear Power plant is approximately 25 km south of the town of Morlaix where the Celtic interconnector cable onshores. Therefore, Irish electricity and gas interconnector infrastructure in GB or FR are outside of the standard nuclear exclusion zones.

Scenario likelihood assessment

Ireland's NRA gives the likelihood of a Nuclear Incident Abroad as 'unlikely' (11-50 years between occurrences). It also states that "*An accident or terrorist attack at a nuclear installation abroad has the potential to cause widespread low level radioactive contamination of the environment in Ireland*". And *"... the likelihood of a nuclear incident in Sellafield triggering an emergency in Ireland is low..."*. In the case of impact to the electricity system, the likelihood does not only relate to the event itself, but also the likelihood of the incident resulting in a loss of EENS or LOLE. Therefore, even if such a nuclear accident event was to occur, the likelihood of an impact on the electricity system is considered to be 'extremely unlikely' i.e. an occurrence of 1 in 1,000 or more years. Low level contamination is not considered to present any difficulties operating the electricity or gas systems in Ireland (following expert discussion and feedback through workshops). The NRA looked at risk in a general sense, the RPP specifically assesses risk to the electricity grid, and on this basis a lower likelihood has been assigned.

Scenario impact assessment

The impact of this scenario is considered to be insignificant for both EENS and LOLE on this basis. Similarly, the cross border rating is none.

EENS Impact: **Insignificant** impact, estimated at less than 0.002% of average annual consumption, or less than 0.6 GWh..

LOLE Impact: **Insignificant**, likely resulting in widespread loss of load for extended period of less than 3 hours.

Cross-border dependency: None

[45] Nuclear Power Plant Emergency Preparedness
[46] What to do in an Emergency at Sellafield

2.4 (b) Serial technical defects [T.SD]

Description of the scenario

There is potentially a common failure risk of some gas fired power stations in Ireland associated with changes in gas quality. This could in turn impact electricity supply.

GB imports to IE supplied 82% of Ireland's gas demand in the 2022/23 gas year. This percentage is expected to increase going forward, as indigenous production declines.

Ireland's natural gas quality specification is aligned with GB's and has been since 2009. Following an assessment carried out by the UK safety regulator (the Health and Safety Executive), the UK has modified natural gas quality specification for injection into the UK's national gas network, with an implementation date of 6 April 2025. The most significant change is the lowering of the Wobbe Index (WI).

Wobbe Index is a key parameter, that ensures the safe combustion of gas in end-user appliances. GB intends to lower this index to facilitate further security of supply options for natural gas supply. While gas turbine operators in Ireland and the UK have prepared for operating within the new specifications, there remains a chance of excursions outside of these.

The probability of low WI gas arriving at Moffat is considered low by IE's gas TSO (GNI).

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Serial technical defects	Unlikely	Minor	Minor	Minor	Low

Geographic relevance	Ireland, Northern Ireland, Great Britian.
Seasonal relevance	This scenario is not subject to seasonal patterns
Likely advance warning	Days to weeks
Potential crisis duration	Days to weeks
Considerations	Scenario based on possible impact of low Wobbe Index gas on IE generation fleet as a result of gas quality changes from GB.

Preconditions and initiating event(s)

Initial conditions

The power system is in normal state with no excessive outage. Initial conditions which would increase the potential impact on the electricity sector would be at times during which all gas units have been called on (during periods of high demand and/or low RES).

Initiating event and chain of events

Ireland's gas fired generation fleet were originally specified to operate on a higher specification WI. Therefore, if a volume of low WI gas was to enter the IE gas network, there would be a potential risk that generators may not be suitably set up to operate on a lower WI gas, thereby potentially leading to generation failures. A reduction in generation availability which could cause a security of electricity supply issue across the gas fired generation fleet. This potential risk is considered to be a plausible crisis scenario for IE under the Methodology's regional crisis scenario 'serial technical defects'.

Evolution of the scenario

The gas TSO (GNI) considers that the IE gas entry point in GB (Moffat) is unlikely to see the full reduction to the lower WI limit (due to blending of supplies), and there is a low likelihood of low WI gas arriving at IE's entry point, estimated at probably lower than 18 days per year in total (potentially over several time periods).

Existing measures to mitigate the risk of this scenario include the following.

Should some generators experience difficulties during a low gas quality incident, these are all capable of operating on secondary fuel. Should the need arise, EirGrid is also able to seek increased imports on the interconnectors and redispatch generation – replacing these gas units with units on distillate or heavy fuel oil, including calling on non-market TEG and Moneypoint units in extreme cases.

A warning system for notification to generators of possible low WI gas being imported from the UK is currently under development by the gas TSO. Such a system will enable generators to make any required adjustments to equipment to manage the lower WI gas, in the low likelihood of such gas entering the Irish gas network. Therefore, depending on the time of year of the event occurring, generators would have of the order of one to several days to make any adjustments to their equipment to manage low WI gas.

Scenario likelihood assessment

The mitigation measure for this risk was undertaken through the Gas Code Mod Forum, a forum of stakeholders, which includes generation industry representatives. It was decided that each generator would seek an assessment from their OEM on their generation equipment's suitability for lower WI gas. These assessments were undertaken in 2024.

Feedback on the assessments in early 2025, is that all but one generator appears suitable for the lower WI gas. The one generator requiring upgrade have stated they are progressing with work to address the possible issue. It would be possible that IE's secondary fuel requirement could be used in the (low likelihood) event of low WI gas being supplied to this generator.

Therefore, considering this mitigation measure of OEM assessment, the likelihood of low WI gas leading to a serial technical defect is considered unlikely, and the impacts to EENS and LOLE are considered Minor, as is the cross-border rating. The Irish gas TSO (GNI) was consulted for this scenario and was in agreement with this assessment.

Scenario impact assessment

EENS Impact: **Minor** impact, estimated at between 0.002% and 0.01% of average annual consumption, in the range of 0.6 to 3 GWh.

LOLE Impact: **Minor**, likely resulting in widespread loss of load for extended period of between 3 and 12 hours.

Cross-border dependency: **Minor** Gas from the Moffat entry point is distributed to both IE and NI.

2.4 (c) Grid instability caused by unanticipated/uncontrolled interactions between new technologies. [IE.GI]

Description of the scenario

This scenario relates to a serious power system incident arising under dynamic conditions due to the introduction of new power system technologies and/or new/unique power system configurations, in the context of increased complexity in operating the power system.

A significant increase in Inverter-Based Resources (IBRs) associated with the integration of renewable energy integration (wind, solar, battery storage), HVDC Interconnectors, and large loads (or groups of large loads) with limited fault-ride through capability have the potential to introduce power system stability risks. These risks must be proactively addressed and effectively responded to in real time to ensure continued reliable grid operation. If not adequately managed, the interaction of these technologies could give rise to undamped power system oscillations and/or cascading trips of generation/demand.

Examples of such potential incidents include:

- A fault resulting in the simultaneous loss of demand, due to the limited fault ride-through characteristics of several Large Demand Facilities, or a combination of such demand and significant exports on an interconnector.
- A significant, undamped power system oscillation caused by the interaction of control systems of inverter-based facilities.

The impact of such an incident could give rise to system instability and, in the most severe cases, lead to a system-wide blackout.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Grid instability caused by unanticipated/uncontrolled interactions between new technologies	Possible	Critical	Major	Major	High

Geographic relevance	All regions of Ireland (and Northern Ireland) could be impacted
Seasonal relevance	This scenario is not subject to seasonal patterns
Likely advance warning	None, minutes, hours
Potential crisis duration	Hours, day
Considerations	This scenario is more likely to occur during periods when the system is operating at its outer limits (e.g. if a fault occurs in the vicinity of an interconnector on maximum export, or high RES conditions). It may also be related to human factors, such as unauthorised / inadvertent changes made to protection and control settings.

Preconditions and initiating event(s)

Initial conditions

The power system may be in normal state, or in alert, emergency, or restoration state due to unrelated prior conditions on the system.

It may or may not be operating at boundary conditions such as very low demand, full import/ export on the interconnectors, high non-synchronous penetration, and/or high ramping of renewables.

It may or may not be subject to the increased likelihood of system faults occurring (such as extreme weather conditions).

Initiating event and chain of events

A system fault or unanticipated interaction between two or more technology control systems and/or protection systems giving rise to:

- Significant oscillations on the all-Island power system that are not identified, diagnosed, and responded to in time.
- A loss of significant volumes of demand (and potentially interconnector exports) in a supply area such as Dublin where several large loads with low fault-ride through are connected. Such loads include large data centres that transfer their demand to backup supplies on detecting a drop in voltage on the power system.
- Other unanticipated incidents on the power system giving rise to a cascading loss of renewable and conventional generation connected at the transmission and distribution level (including rooftop solar)

Large Demand Facility Fault Ride Through

During transient faults on the transmission system, most data centres, even those remote from the fault, automatically reduce their consumption from the grid and switch to their own, temporary, back-up sources of supply. Data centres respond in this way to protect their IT systems and processes, ensuring that the key services they provide to their customers are maintained. This behaviour has been observed through multiple recorded events on the power system with the aggregated level of demand reduction in each event increasing as data centres continue to ramp up their consumption capacity in line with their connection contracts.

The impact of these large demand reductions is an imbalance of supply and demand which results in a frequency deviation that is experienced by the whole power system of Ireland and Northern Ireland. Based on the TSOs' analysis of credible fault scenarios under current data centre demand levels, such imbalances could be over 1,150 MW (a combination of data centre demand reduction and loss of HVDC interconnector export) if no mitigating actions are taken. Such an imbalance would be unprecedented, triggering the activation of defence measures which have the potential to further propagate the impact of the event.

To mitigate this, the TSOs (EirGrid and SONI) have implemented a number of operational measures to mitigate the risk by taking steps to reduce the potential imbalance. Further action is needed to address the growing challenge. The TSOs, working with industry, wish to ensure that enduring solutions are delivered to accommodate the expected growth in data centre and other new technology loads while maintaining the security of the power system for all consumers.

Power System Oscillations
Power system oscillations may arise on the power system for a variety of reasons, including the interaction of inverter-based technologies with new technologies such as battery storage systems.

Such incidents could give rise to significant voltage and frequency excursions, which if not controlled could give rise to cascading failures resulting in a system blackout.

<u>Existing measures to mitigate the risk of this scenario include the following.</u>

- Governance and oversight is in place to oversee the introduction of these new technologies, as wells as changes to operational policy.
- Advanced studies and pilots are undertaken before adopting new technologies or operational policy on an enduring basis.
- Advanced control centre tools, real-time visualisation, systems, and processes are developed and implemented to ensure power system security – including the wide deployment of phasor monitoring units (PMUs) on the Irish power system to allow the interactions of devices on the power system and the system's oscillation characteristics to be assessed in real time and post incident. It may be noted that Ireland has a particularly large number of PMUs for the size of its system.
- TSO control room staff have been trained on managing such incidents, and case studies are included in critical incident management workshops.
- Detailed technical investigations are conducted when significant events are observed on the power system. Recommendations from the investigation are implemented to address these – including operations measures, engagements with operators/demand customers, and changes to operational policy.
- A review of automatic system defence measures and manual procedures is undertaken to ensure that these are fit for purpose.
- Changes to the Grid Code may from time to time be proposed to address risks identified.
- Engagements with generators and/or operators of large demand facilities are undertaken to address concerns that may best be implemented within plant.

Evolution of the scenario

Simultaneous or cascading tripping of generators, demand, and/or interconnectors could give rise to loss of stability of the system, potentially resulting in a local or system-wide blackout.

Scenario likelihood assessment

The scenario rated is as possible, given the potentially unanticipated nature of interactions between technologies on the power system, as well as current concerns with fault ride-through characteristics of some large energy users.

Scenario impact assessment

EENS Impact: **Critical** impact, estimated at between 0.05% and 0.25% of average annual consumption, in the range of 16 to 84 GWh, assuming a blackout.

LOLE Impact: **Major**, likely resulting in widespread loss of load for extended period of up to 48 hours (including restoration of distribution load).

Cross-border dependency: **Major**, given the potential of an event initiated in Ireland impacting the power system in Northern Ireland.

2.5 Supply Chain

Table 8 – Summary of supply chain scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Fossil fuel shortage	Unlikely	Disastrous	Disastrous	Major	High
Nuclear fuel shortage	Extremely Unlikely	Insignificant	Insignificant	Minor	Low

2.5 (a) Fossil fuel shortage [S.FF]:

Description of the scenario

This scenario considers a shortage in the delivery of fossil fuels for an extended period of time, arising from supply chain disruptions caused by an accident, attack, and or/ geopolitical developments. In the Irish context, this scenario considers a rapid loss of all gas imports over both interconnectors to the UK due to a malicious act - based on the scenario developed in the NRA 2023.

From the perspective of the supply of electricity in Ireland, this scenario applies primarily to natural gas (methane). Coal ceased use in Ireland in mid-2025, as the Moneypoint units converted from coal to heavy fuel oil and are operating to mid-2029 as out-of-market generation. Distillate is primarily used by peaking stations and two of the four TEG sites (c.250 MW of the current TEG capacity is gas fed). In contrast to natural gas, Ireland has significant storage of liquid fuel, with stocks of 90 days held by the National Oil Reserves Agency (NORA).

According to GNI's Network Development Plan (NDP) 2023[47], 47% of Ireland's electricity is generated from natural gas. Gas-fired generators accounted for approximately 59.3% of the total gas demand in Ireland in 2023, making them the largest consumers in the gas market. As outlined in the NDP, the primary sources of gas in Ireland are the Corrib gas field, which met 17.6% of annual GNI's system demand (23% of Ireland's demand), and the Moffat Entry Point, providing the remaining 82.4% in 2023. By 2030, it is estimated that Ireland's reliance on natural gas imports, and the associated undersea infrastructure via Scotland, will increase to over 90%, given the ongoing decline in production from the Corrib Gas field. Despite the increased use of renewables and energy efficiencies expected over this time, Ireland is expected to continue to rely on gas as it transitions away from other fossil fuels.

Ireland is particularly vulnerable to a fossil fuel shortage as Ireland's gas supply is predominantly from two gas interconnectors from Scotland, and Ireland does not have any gas storage. This contrasts with other EU countries which have more diversified supplies including gas storage infrastructure. This reliance on gas from Scotland makes the country more vulnerable to a supply disruption on the gas interconnectors. There is an increasing awareness of potential threats to strategic infrastructure, including the risk of sabotage targeting telecommunications and energy transmission infrastructure.

In the context of the current risk environment, the Government approved the development of a strategic gas emergency reserve (SGER) in the form of a Floating Storage and Regasification Unit (FSRU) in Mach 2025. As a transitional measure, it reduces the risk of stranded fossil fuel assets, it is intended solely for emergency use and does not support increased gas demand.

[47] Network Development Plan 2023

In the NRA 2023[48], the reasonable worst-case scenario was determined to be a coordinated attack on both gas interconnectors to the UK. Under the Natural Gas Emergency Plan (NGEP), in the event of a gas shortage, the power generation sector is prioritised for gas load shedding. This scenario (i.e. the total loss of gas, simultaneously from both gas interconnectors for a period of 6 months) has therefore been considered as the applicable 'fossil fuel shortage' scenario. Under the scenario, the indigenous gas supply from the Corrib gas field and the supply of natural gas to Northern Ireland from the Moffat entry point in Scotland are considered to be unaffected.

This scenario and its impact to the power system, and to wider society was tested in 2024 under Exercises Méabh and Cathal. Details from these emergency tests have been used to inform this scenario description and assessment.

National electricity crisis scenario risk assessment:

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Fossil fuel shortage	Unlikely	Disastrous	Disastrous	Major	High

Geographic relevance	All regions of Ireland would be impacted. While the supply of gas from GB to NI is not considered as affected, the significant impact on the electricity sector in Ireland will impact the SEM.
Seasonal relevance	This scenario is not linked to seasonal patterns. However, the impact would be more severe during high demand seasons such as winter.
Likely advance warning	No warning is expected for this scenario.
Potential crisis duration	Months
Considerations	No impact on Corrib is expected and no geopolitical concerns impacting the oil supply chain are considered for this scenario. The supply of gas from GB to NI over the Scotland-Northern Ireland Pipeline (SNIP) is not considered affected, however the ability to supply power generation in IE with gas from NI is considered to be unlikely due to network pressure losses.

Preconditions and initiating event(s)

Initial conditions

The power system is in a normal state in the lead up to a high period of gas demand over the Winter. Operating conditions are normal with no major outages planned. The TEG and REU units are available.

[48] Section 4.4.2 *Damage to Undersea Infrastructure*

Initiating event and chain of events

A shortage of natural gas occurs due to the simultaneous loss of both subsea gas interconnectors between the UK and Ireland. As per the NRA 2023, the initiating event is considered to be a coordinated attack. There is no impact on the Scotland-Northern Ireland Pipeline (SNIP), or from the indigenous Corrib gas field.

The GNI/EirGrid Joint Procedure for Natural Gas Emergencies is implemented. EirGrid responds by initiating its fuel switching plan, including dispatching down gas-fired generation to reduce rapidly falling gas pressures and maintain the stability of the power system.

Evolution of the scenario

The use of gas in the electricity sector is rapidly terminated in order to prevent uncontrolled tripping of generators and to arrest a rapid reduction in gas pressure and line pack in the gas interconnectors. The gas network would be isolated at the two landfall sites in order to maintain the integrity of the system and maintain safe network pressures. Reduced gas availability would lead to fuel switching of gas-fired power plants, causing immediate power shortages and a substantial reduction in electricity supply.

In the first hours of such an event, the TSO's focus would be to secure the power system. The TSO's primary objectives would be to secure the power system (mitigate the increased risk of a system blackout), terminate gas use, and ensure blackstart readiness. Of lesser priority in this initial phase would be the minimisation of load shedding (if required to secure the system), and managing secondary fuel stocks levels at specific power stations.

After the power system has been secured and all gas units either dispatched down or switched to secondary fuel, the TSO's focus would be to optimise operations. The TSO's primary objectives thereafter would be to maintain operational security and minimise load shedding. This would include securing and maximise electricity imports, manage generator availability, as well as optimising secondary fuel consumption and fuel stocks on site.

The following sequence of events is anticipated during the initial response:

- On a day with high levels of renewable generation, peaking units can be rapidly dispatched to manage a reduction in gas-fired generation. Gas units can be dispatched on secondary fuel.
- On a day with low levels of renewable generation, many units may already be dispatched to meet electricity demand. Demand Control (Mandatory Demand Curtailment of large energy users and emergency Demand Disconnection by ESB Networks may be required to allow gas units to be dispatched to minimum load and switched to secondary fuel. This may be necessary as the number of units switching simultaneously to secondary fuel will typically not exceed two units, given the increased risk of trip during the fuel switch.
- In both cases, electricity imports over the N-S Tie Line from GB (and in future France) will be maximised. Non-market generation units on distillate (c. 400 MW of TEG capacity) can be dispatched.
- The Moneypoint non-market (heavy fuel oil) units will be dispatched, though the notification times may be in excess of 20hrs.

- The supply of gas will be maximised via Twynholm to ensure power generation continues in Northern Ireland (maximum capacity is 89 GWh/d)

The damage to the gas subsea interconnectors is assumed to take up to 6 months to repair, based on international experience.

Given the potentially reduced generation availability on secondary fuel, load shedding may be required particularly at times when renewable generation is low. Providing predictability to users when load shedding is required will be a key priority for the TSO and DSO.

The following supply management measures are available to the gas system operator to manage the gas network:

- Identifying and responding to protected customer supply shortages
- Determining the appropriate order of demand reduction
- Mobilising resources to isolate protected customer

Mitigation measures

The following existing mitigation measures apply.

- Secondary fuel operation is a Grid Code requirement for gas-fired generators (i.e. at 90% of rated output on gas).
- On-site storage of secondary fuel is a requirement on the Grid Code (the volumes required are based on the nature of the generator – i.e. 1 to 5 days).
- Secondary fuel testing is undertaken by operators and the TSO.
- A secondary fuel replenishment plan has been developed by DCEE and NORA, providing for access to NORA reserves and logistics through the industry body.
- The relevant legislation is in place to support the State's management of fuel reserves, including supply to power generation.
- A Joint Procedure for the Control of Gas Emergencies is in place between EirGrid and GNI.
- This scenario has been exercised at an energy sector and national level in 2023 and 2024.

The following additional mitigation measures are underway.

- In March 2025, the Government approved the development of a strategic gas emergency reserve in the form of a Floating Storage and Regasification Unit (FSRU). This unit would provide additional security of supply resilience to the gas system, by providing an additional gas entry point, which would be available to supply gas to Ireland in the event of a supply disruption to the subsea gas interconnectors.
- Additional interventions to address the resilience of extended operation and refuelling of the generation fleet are being addressed by the CRU, DCEE, and EirGrid.

Scenario likelihood assessment

Scenario likelihood has been rated as 'unlikely' (1 in 10 to 100 years), which is based on the NRA 2023 rating of the likelihood of a coordinated attack on both gas interconnectors to the UK under the *Damage to Undersea Infrastructure* (Section 4.4.2 of NRA) as 'unlikely'.

Scenario impact assessment

Ireland relies heavily on natural gas for electricity generation. As outlined in the scenario description, 50% of Ireland's electricity is generated from natural gas, with 74% of the country's gas supply imported through two interconnectors from the UK.

Recent emergency exercises (Exercises Méabh and Cathal), demonstrated that simultaneous loss of both gas subsea interconnectors would have severe impacts – particularly if coinciding with periods of low wind, high demand, and/or low temperatures. This scenario would result in widespread load shedding and an increased risk of a blackout.

There would also be a significant impact on gas customers. Domestic supplies of gas would be prioritised for smaller gas users, the Daily Metered (DM) and Non-Daily Metered (NDM) customers. The gas supply of Large Daily Metered (LDM) gas customers (which includes the power generation sector), would be curtailed to protect NDM and DM customers, in line with the gas load shedding plan in the Natural Gas Emergency Plan (NGEP)

<u>EENS Impact</u>: **Disastrous** impact, estimated at more than 0.25% of average annual consumption, equivalent to approximately greater than 84 GWh.

<u>LOLE Impact</u>: **Disastrous**, likely to result in significant loss of load at times over a prolonged period - in excess of 168 hours.

<u>Cross-border dependency</u>: **Major** – given the impact on the SEM and cross-border support for the power system in Northern Ireland.

2.5 (b) Nuclear fuel shortage [S.NF]:

Description of the scenario

This scenario is based on the premise that due to geopolitical developments/government actions, nuclear power plants in Europe and GB are unable to purchase nuclear fuel from non-European countries for a prolonged period of time and/or the transport of nuclear fuel is interrupted.

The island of Ireland does not have any nuclear generation capacity. IE is connected via electricity interconnectors to GB and from 2026, France, both of which have nuclear generation fleets. Therefore, IE could be supplied with nuclear energy from these countries, depending on circumstances.

In 2024, nuclear power accounted for approximately 14%[49] of the total electricity generated in the UK according to the National Energy System Operator (NESO). France has a significantly higher proportion of its electricity generation from nuclear. According to the International Energy Agency (IEA), in the year 2023, nuclear power constituted over 64%[50] of the total energy generated in France. A shortage of nuclear fuel would be expected to have a higher impact on electricity generation therefore in France, given its higher dependence on this fuel type.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Nuclear fuel shortage	Extremely unlikely	Insignificant	Insignificant	Minor	Low

Geographic relevance	Great Britan and France could be impacted.
Seasonal relevance	Any
Likely advance warning	Months, years
Potential crisis duration	Months, years
Considerations	There are no nuclear facilities on the island of Ireland. Therefore, the impacts of this scenario would be experienced via Great Britain and France.

49 NESO – National Energy System Operator UK
50 IEA – Sources of electricity generation

Preconditions and initiating event(s)

Initial conditions

The power system is in normal state and operational conditions are normal.

Initiating event and chain of events

The scenario considered that there has been an interruption to the supply of nuclear fuel for an extended period. As a result, existing nuclear power plants are unable to obtain the necessary fuel resources in time for the next operation cycle, which may result in them having to cease or limit their electricity production without prior notice

Evolution of the scenario

A sustained supply shortage could result in the partial or complete cessation of power generation from affected nuclear power plants.

It should be noted that there is a possibility of limited or unavailable energy imports via interconnectors from GB and from 2026 France, since the same nuclear fuel supply problem may have a simultaneous impact both on GB and FR.

Scenario likelihood assessment

The scenario is considered to be ‘extremely unlikely’, which is based on France's assessment of such an incident occurring.

Scenario impact assessment

The AIRAA 2025 – 2034 assessed[51] the impact of removing two or four medium sized nuclear units in France. The sensitivity of removing two French Nuclear Units showed an average impact of 170 MW, increasing to 340 MW with removing four French Nuclear Units in the supply of electricity to Ireland via the Celtic interconnector. A similar sensitivity analysis of GB nuclear units was not undertaken in the AIRAA, however, given that nuclear power in GB comprises a much lower percentage of overall electricity supply compared to France, the impact of a nuclear fuel shortage in GB on IE would likely be lower.

Overall, it is considered that Ireland would not have a high reliance on electricity supplied by nuclear generation from GB and France. As simulated in the AIRAA, the loss of up to 340 MW from France would not be significant. In addition, Ireland would be expected to have sufficiently diverse supplies of electricity overall. Therefore, in the event of a nuclear fuel shortage, the impact to Ireland is considered to be minor overall.

[51] All-Island Resource Adequacy Assessment 2025-2034

EENS Impact: **Insignificant** impact, estimated at less than 0.002% of average annual consumption, equivalent to approximately less than 0.6 GWh.

LOLE Impact**: Insignificant**, likely resulting in widespread loss of load for extended period of less than 3hours.

Cross-border dependency: **Minor** Given the impact to Ireland, minor cross border dependency has been identified.

2.6 Human

Table 9 – Summary of Human scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Pandemic	Possible	Major	Minor	Minor	Medium
Industrial action, strikes, riots	Unlikely	Major	Major	Minor	Medium
Unforeseen interaction of energy markets	Possible	Minor	Minor	Major	Medium

2.6 (a) Pandemic [H.PA]:

Description of the scenario

This scenario considers the occurrence of an outbreak of a highly contagious disease in Ireland which results in prolonged staff shortages in the energy sector, which leads to problems with energy supply and the safe operation of the electricity system. Other sectors are also affected, affecting system demand and services provided to the sector. Energy markets may also be adversely affected.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Pandemic	Possible	Major	Minor	Minor	Medium

Geographic relevance	All regions of Ireland and Northen Ireland and GB could be impacted
Seasonal relevance	No seasonal relevance
Likely advance warning	Weeks to months
Potential crisis duration	Months to years
Considerations	In line with the Methodology, this scenario considers the experience of the energy sector with COVID-19.

Preconditions and initiating event(s)

Initial conditions

The power system is in Normal state and operational conditions are normal.

Initiating event and chain of events

An infectious disease spreads internationally, with cases in Ireland. The speed of transmission, infectiousness, modes of transmission and severity of symptoms are unclear at this stage, and it is assumed that there is no known diagnostic method or treatment for the disease.

Evolution of the scenario

Based on the Methodology's considerations, the following assumptions have been applied:

- The pandemic causes increased rates of sickness of employees in the electricity sector of up to 30%. with infected staff unavailable for work for an average of 6 weeks. Lower staffing levels do not impact the ability to run the markets.
- The total energy demand will remain consistent with normal conditions.
- The technical ability to generate wind and solar power is assumed to be unaffected.

- A total decrease in thermal generation should be assumed to be lower by at least 20%.
- Supply chain problems could cause impacts to maintenance schedules.

Mitigation measures include the availability of non-market generation, should the availability of market-based resources place system margins at risk.

Scenario likelihood assessment

The likelihood rating of this scenario is aligned with the NRA, which ranked their Pandemic scenario as 1 in 1 to 10 years between occurrences. According to the Methodology for Identifying Regional Electricity Crisis Scenarios, this time frame is equivalent under the RPP framework to 'Possible'.

Scenario impact assessment

The impact is primarily related to the maintenance of generators, the associated constraints on the supply chain, and the need for expertise from overseas. This could lead to a delayed loss of load due to forced outages during a later period of high demand. The main impact is likely to be the inability to maintain generators as planned, which will affect system operations in the aftermath or even in a second wave. It is possible that many months after the pandemic there will be load losses due to lack of maintenance. The cross-border impact is likely to be similarly detrimental to Northern Ireland and Great Britain.

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: **Minor**, likely resulting in widespread loss of load for extended period of between 3 and 12 hours.

Cross-border dependency: **Minor**

2.6 (b) Industrial action, strikes, riots [H.IA]:

Description of the scenario

This scenario considers a situation where people working in the energy sector stop working, go-slow, or take insecure actions against the system.

In Ireland, the electricity and gas system operators and asset owners are semi-state organisations (i.e. they are ultimately owned by the State), therefore, it is considered that the Government has a greater influence to resolve an industrial dispute before it develops significantly to an extent whereby the power system would be impacted.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Industrial actions, strikes, riots	Unlikely	Major	Major	Minor	Medium

Geographic relevance	All regions of Ireland could be impacted.
Seasonal relevance	Not linked to seasonal patterns
Likely advance warning	Hours to weeks
Potential crisis duration	Hours to weeks
Considerations	Ireland's approach is in line with that of the Methodology for this scenario. It has been assessed independently of a pandemic scenario as the mitigation measures implemented, including the ability to end a strike by decision, are substantially different.

Preconditions and initiating event(s)

Initial conditions

The power system and operational conditions are in a normal state.

Initiating event and chain of events

Workers in the energy sector, for example, those at system operators, power plants, and energy markets, may halt their work, slow down their activities, take unauthorized actions, or engage in similar behaviours to protest in response to national or local issues.

Evolution of the scenario

In Ireland, the system operators are semi state organisations, therefore the Government is assumed to have greater influence to resolve a dispute before it develops significantly.

The electricity system is considered to be sufficiently diverse such that work stoppages in one, or a small number of organisations would not impact on the wider system.

Scenario likelihood assessment

Given the above considerations, the likelihood of the scenario is rated as '**unlikely**'

In addition, historical events of this type have not been frequent or regular in Ireland.

Scenario impact assessment

If the scenario did occur, the impact could be major and customers may not be supplied with energy for periods.

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: **Major**, likely resulting in widespread loss of load for extended period of between 12 and 48 hours.

Cross-border dependency: **Minor.** Such an event is unlikely to occur in other states simultaneously so cross-border impacts would be minimal.

2.6 (c) Unforeseen interaction of energy markets [H.IM]:

Description of the scenario

This scenario is based on an unusual or unexpected event impacting the electricity market, which can result in situations with which market participants are not familiar. This results in markets producing results that cause an unexpected adequacy problem.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Unforeseen interaction of energy markets	Possible	Minor	Minor	Major	Medium

Geographic relevance	All regions of Ireland and Northen Ireland can be impacted.
Seasonal relevance	No seasonal influence
Likely advance warning	None to days (and possibly longer)
Potential crisis duration	Hours to months
Considerations	This aligns with the Methodology's regional scenario, and includes events where anticipated imports do not materialise when market flows are anticipated to be in the direction of Ireland.

Preconditions and initiating event(s)

Initial conditions

The power system, operational conditions is in a normal state.

Initiating event and chain of events

A highly unusual situation or combination of situations that has the potential to have serious consequences. These situations may coincide with significant changes in: weather conditions; demand; regional power system conditions; political decisions; industrial or technical accidents. These unusual situations are unfamiliar to many energy market participants and cause highly unusual behaviour by market participants.

Evolution of the scenario

The net effect of market transactions can result in unconventional volumes and patterns of trade flows, which can include high levels of variability. In such circumstances, the methods employed by TSOs to plan grid operations may produce inaccurate results due to the high error rate associated with trade flow forecasting.

Mitigation measures

The Irish power system is centrally dispatched, allowing the TSO to make the adjustments required, subject to notification times of units that may still be cold when called on. Batteries and peaking units (OCGTs) may be called on rapidly (< 15 min), while bringing on an OCGT from a cold heat state may take a few hours.

The non-market TEG units also have rapid response timed (< 15 min).

Scenario likelihood assessment

This scenario is rated as possible.

Scenario impact assessment

EENS Impact: **Minor** impact, estimated in the range of 0.6 to 3 GWh. This would represent a shortfall of c.200 to 1000 MW for 3 hrs.

LOLE Impact: **Minor**, likely resulting in loss of load for between 3 and 12 hours.

Cross-border dependency: **Major**, given the all-island nature of the SEM.

2.7 Adequacy

Table 10 – Summary of adequacy scenarios risk assessment

Scenario Name	Likelihood	EENS	LOLE	Cross-border	Scenario Rating
Simultaneous forced outage of 2 or more power plant/ interconnector	Likely	Major	Major	Major	High
Non-delivery of planned infrastructure projects accounted for in TSO system planning	Likely	Major	Major	Major	High
Rapid above-trend growth in electricity demand	Likely	Minor	Major	Major	High

2.7 (a) Simultaneous forced outage of 2 or more power plant/interconnector: [IE.FO]

Description of the scenario

This scenario is based on an actual occurrence in 2021 when two unrelated equipment failures occurred at two large generators that resulted in simultaneous prolonged outages of several months. The failures, representing capacity equal to c.15% of winter peak demand, significantly impacted system adequacy and may have resulted in load shedding had these units not returned for Winter 2021/22. The scenario has been generalised and broadened to consider that prolonged forced outages could occur to two or more generation units and/or interconnectors.

This is a locally relevant scenario to Ireland, it was not developed under the regional scenario assessment in the Methodology.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Simultaneous forced outage of 2 or more power plant/ interconnector	Likely	Major	Major	Major	High

Geographic relevance	All regions of Ireland and Northern Ireland could be impacted.
Seasonal relevance	This scenario is not subject to seasonal patterns but would have the most significant impact during period of high demand and low RES (winter).
Likely advance warning	None
Potential crisis duration	Days to months (over which periods of load shedding may be required)
Considerations	This is a scenario locally relevant to Ireland, based on a past occurrence of two unrelated equipment failures at two large generators that resulted in prolonged outages with duration of several months.

Preconditions and initiating event(s)

<u>Initial conditions</u>

System is in normal state and operational conditions are normal with no unusual/ excessive outages.

<u>Initiating event and chain of events</u>

A significant failure in a large generator (or interconnector) leads to a forced outage for several months. This is followed by an unrelated failure in a second similarly important generator (or interconnector) within a short period of time also resulting in a forced outage for several months. This results in reduced system margins for an extended period (up to a year).

Evolution of the scenario

The underlying generator forced outage rate (applicable to other generators) may give rise to a further reduction of generation availability at times. The evolution of this scenario could lead to extremely tight margins, particularly if associated with periods of high demand and low RES.

Scenario likelihood assessment

Scenario rated as likely (1 in 2 to 5 years), based on recent outage events, trends in recent forced outage rates, and the age of the generation fleet.

Ireland runs large generators in comparison to the size of the overall system. For example, a large generator could represent around 10% of the overall system demand on a given day. Therefore, failure of two or more units could lead to a material shortfall in generation and a risk to electricity security of supply.

For example, in 2018, an outage occurred at the Moneypoint power station, which resulted in a loss of 915 MW. This incident highlighted the possibility of simultaneous multiple unit outages. The reliability of approximately one-third of the current Combined Cycle Gas Turbines (CCGTs) are expected to decline by 2030 unless they are replaced or upgraded[52]. The SEM Committee introduced Intermediate Length Contracts[53] to, inter alia, promote investment in existing units and extend the life of existing CCGTs. Forced outages of two large CCGTs for several month could have an impact comparable to the Moneypoint outage, presenting a significant risk to security of supply, particularly during periods of low wind output.

A similar scenario occurred in 2021, when unrelated equipment failures occurred at two power stations that resulted in prolonged outages of several months. The underlying issue was driven by tight system margins between available generation capacity and demand, aggravated by multiple power plants undergoing maintenance outages and low wind generation. A confluence of factors, including system demand, wind generation, interconnector flows, generator failures, and maintenance outages, necessitated the deployment of demand response measures. It ultimately led to the issuance of several System (Amber) Alerts.

As described in EirGrid's Winter Outlook 2025/26, the dispatchable generation (excluding DSUs) forced outage rate in Ireland has increased significantly over the last number of years. For January to June 2025, it was 18%.

Mitigation measures relevant to his scenario developed under the Electricity Security of Supply programme include deployment of TEG and Retention of Existing Units, as well as a range of demand measures deployed since 2021, including Flex Demand, Voluntary Demand Reduction, and Mandatory Demand Reduction.

[52] Technical Analysis of the Security of Energy Supply of Ireland's Electricity and Natural Gas Systems

[53] SEM-24-035 Intermediate Length Contract Decision Paper | The Single Electricity Market Committee

Scenario impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh.

LOLE Impact: **Major**, likely resulting in loss of load of between 12 and 48 hours.

Cross-border dependency: Considered to be **Major** such an occurrence could trigger an incident in Northern Ireland due to tightened capacity availability.

2.7 (b) Non-delivery of planned infrastructure projects accounted for in TSO system planning: [IE.ND]

Description of the scenario

Scenario describes situation where delays to, or non-delivery of projects results in future supply deficits that cannot be addressed in a timely manner by standard market processes. TSO system planning takes into account planned and contracted infrastructure, such as interconnectors and new generation plant, to forecast system supply/demand margins and inform future capacity requirements. Delays to, or non-delivery of projects can result in future supply deficits that cannot be addressed in a timely manner by standard market processes. For example, an indicative construction timeline for new generation plant is estimated at 3.5 to 5.5 years. Successful candidates terminating their contracts within 3 years of their scheduled energisation date can result in a future capacity shortfall.

To ensure system adequacy in the future, new generation and transmission capacity will be required. This is in response to the expected increase in demand and the decommissioning of older plants.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Non-delivery of planned infrastructure projects accounted for in TSO system planning	Likely	Major	Major	Major	High

Geographic relevance	All regions of Ireland and Northen Ireland could be impacted.
Seasonal relevance	This scenario is not subject to seasonal patterns.
Likely advance warning	Months, years
Potential crisis duration	Months, years
Considerations	Delays to, or non-delivery of projects can result in future supply deficits that cannot be addressed in a timely manner by standard market processes, e.g., Construction timeline for new generation plant is estimated at 3.5 to 5.5 years.

Preconditions and initiating event(s)

In contrast to other scenarios, this scenario does not have a single, defined initiating event. This scenario could materialise in the event that a series of capacity projects were not delivered. This could include the infrastructure projects outlined in the Electricity Security of Supply Programme, including the development of interconnectors (Celtic and North – South interconnectors) and the capacity market auctions to provide an additional 2,000 MW of flexible gas-fired generation capacity. Should these projects experience delays, then this scenario could be realised. Delays may be due to a multitude of factors, which could include financing, issues with approvals and/or permits, or insufficient interest in the auctions.

Capacity shortfalls may occur as a result of increasing demand and plant retirements. To address this, the Capacity Remuneration Mechanism (CRM) seeks to ensure sufficient capacity through competitive auctions, contracting new generators to meet targets at the lowest cost. However, there is a market risk that new capacity will not be delivered on time, potentially leading to generation shortfalls. Examples include terminated contracts from recent capacity auctions. The North-South Interconnector is considered to be a critical component of the internal transmission network. The introduction of a second North-South Interconnector has been proposed as a solution to the limitations currently experienced with regard to electricity transfer between Ireland and Northern Ireland. It is anticipated that this would result in a reduction in dependence on a single infrastructure element. Several impacts could arise in a scenario of non-delivery of this project, including: ongoing electricity flow limitations between IE and NI; challenges integrating new renewable energy generation; challenges to ensure a reliable and stable electricity supply affecting energy security

Evolution of the scenario

A shortfall in generation adequacy could lead to lost load, particularly at times of peak demand and low wind generation. The All-Island Resource Adequacy Assessment published in 2025 (AIRAA 2025-2034) indicates that a total of 1,468 MW of previously awarded capacity has been terminated to date, resulting in developers facing termination charges. This is an additional 383 MW compared to the previous update in the 2023 Generation Capacity Statement (2023-2032). However, the core scenario of the AIRAA 2025-2032, which includes a risk-assessed view of new capacity delivery, indicates that, at the time of the data freeze, there is an improvement in the delivery of new capacity. The latest project information helps to improve Ireland's adequacy position across the horizon compared to the risk-adjusted view assumed in the Generation Capacity Statement (GCS) 2023-2032. It is noted that delivering new capacity remains a complex technical and logistical challenge, particularly in terms of timely commissioning.

Scenario likelihood assessment

Scenario rated as likely, (1 in 2 to 5 years). The assessment is based on the AIRAA 2025-2034, which demonstrates that the secure scenario remains significantly outside of the 3 hour LOLE standard for the period of this RPP cycle. The base scenario is outside of the standard for the first half of this RPP cycle, significantly so in 2026. The measures (including TEG and REU) provided by the Electricity Security of Supply Programme are in place and are available, if required, to provide additional capacity should an adequacy gap arise, as described in Section 4 of this document.

Mitigation options undertaken in response to previously identified capacity shortfalls, under the Electricity Security of Supply programme include running additional capacity auctions, and the establishment of TEG and Retention of Existing Units.

Scenario impact assessment

EENS Impact: **Major** impact, estimated at between 0.01% and 0.05% of average annual consumption, in the range of 3 to 16 GWh

LOLE Impact: **Major**, likely resulting in loss of load for between 12 and 48 hours.

Cross-border dependency: **Major**. Adequacy issues in Ireland could trigger a capacity issue in Northern Ireland, given the SEM, and the mutual support provided by the North-South tie-line..

2.7 (c) Rapid above-trend growth in electricity demand: [IE.RG]

Description of the scenario

Ireland’s electricity demand growth has significantly exceeded the EU average in recent years and is predicted to grow rapidly and beyond normal expected economic patterns in the coming years, primarily due to increasing data centre loads. In this scenario, this level of demand is anticipated to give rise to an adequacy gap with inadequate capacity available to supply this demand.

Electricity demand in Ireland is projected to increase by 45% over the next decade, primarily due to the expansion of Large Energy Users (LEUs), such as data centres, and the electrification of heat and transport, as outlined in the AIRAA 2025-2034[54]. The AIRAA forecasts that the most significant growth will come from data centres and new technology loads (NTLs), which are expected to account for 31% of all electricity demand in Ireland by 2030. It is important to note that the current RPP covers the period from 2026 to 2029. Consequently, projections beyond 2029 fall outside the scope of this RPP and should be evaluated in the next RPP. Historical data indicates that electricity demand is less seasonally volatile compared to gas demand. However, the electrification of heat may introduce greater seasonal variability, particularly in winter. It is expected that demand from data centres and other LEUs will be less seasonal compared to residential demand. Therefore, the demand from data centres and large LEUs is anticipated to remain relatively consistent throughout the year, leading to a sustained high level of demand.

The Security of Supply Programme was developed as a strategic initiative aimed at ensuring Ireland's energy security and was designed to address growing demand, replace retiring generators, and support the increased penetration of renewables. By 2030, the programme is expected to deliver over 2,000 MW of long-term flexible generation capacity through all-island capacity auctions.

National electricity crisis scenario risk assessment:

Scenario	Likelihood	EENS Impact	LOLE Impact	Cross border	Scenario Rating
Rapid above trend growth in electricity demand	Likely	Minor	Major	Major	High

54 All-Island Resource Adequacy Assessment 2025-2034

Geographic relevance	All regions of Ireland could be impacted
Seasonal relevance	This scenario is not subject to seasonal patterns
Likely advance warning	Days, Weeks
Potential crisis duration	Months, years
Considerations	This is a scenario locally relevant to Ireland, with high demand primarily due to the expansion of Large Energy Users (LEUs), such as data centres, and the electrification of heat and transport. A shortfall in generation adequacy could lead to lost load, particularly at times of peak demand and low wind generation.

Preconditions and initiating event(s)

This scenario would not be initiated by a single event, rather it could manifest over a period of years if significant demand was to result in an adequacy gap. The AIRAA forecasts that there is expected to be significant growth in the data centres and new technology loads (NTLs) sectors.

Evolution of the scenario

It is important to note that the evolution of this scenario is driven by a number of factors, including the predicted increase in Ireland's electricity demand, which is largely attributed to the growth in data centre loads. The result of this scenario would be an adequacy gap, with concerns that the capacity to supply demand may be inadequate.

If demand continues to rise, the discrepancy between supply and demand would become more apparent, resulting in a capacity shortfall, particularly during peak periods. Additionally, the electrification of heat will introduce greater seasonal variability, with increased demand in winter due to heat pump demand. This is expected to be significant, particularly in very low temperatures, where more electricity will be required to maintain the desired heating level. This seasonal spike could exacerbate the adequacy gap.

Should such a scenario coincide with periods of extreme weather, such as cold snaps, and / or low wind generation, this could further escalate the risk to electricity security of supply.

Scenario likelihood assessment

The following points were considered in the development of the scenario likelihood assessment.

The scenario is rated as 'likely' (1 in 2 to 5 years), given the trajectory of demand described in the AIRAA 2025, where demand is forecasted to grow considerably, and the potential adequacy gaps, as highlighted in the previous scenario *Non-delivery of planned infrastructure projects accounted for in TSO system planning*,

The CRU's proposed decision paper on the Large Energy Users connection policy[55] (published in February 2025) sets out a potential pathway for connection applications for new data centre customers to the electricity grid with due regard to security of supply and network constraints while

[55] Large Energy Users Connection Policy

minimising, where possible, potential impacts on national renewable energy targets and carbon emissions. This 'new' demand would be in addition to that currently accounted for in the AIRAA. One of the objectives of this policy is to manage the impact of future LEU demand around the peak demand periods and reduce the impact on security of supply.

Further, demand trends are relatively accurately forecast through the AIRAA process, which allows capacity to be planned to meet demand, and this factor was also considered for the likelihood rating of this scenario.

Scenario impact assessment

EENS Impact: **Minor** impact, estimated at between 0.002% and 0.01% of average annual consumption, in the range of 0.6 GWh to 3 GWh.

LOLE Impact: **Major**, likely resulting in widespread loss of load for extended period of between 12 and 48 hours.

Cross-border dependency: **Major** - Adequacy issues in Ireland could trigger a capacity issue in Northern Ireland, given the SEM, and the mutual support provided by the North-South tie-line.

3. Roles and Responsibilities

3.1 Role of the Competent Authority

The **Commission for Regulation of Utilities (CRU)** is the Regulatory Authority for electricity, gas and water in Ireland, with statutory responsibility for monitoring and ensuring security of gas and electricity supplies. The CRU has been designated by the Department of Climate, Energy and the Environment (DCEE) as the Competent Authority under Article 3 of the RPR[8] to facilitate the implementation of the regulation, and along with DCEE, attends the Electricity Coordination Group (ECG) meetings. The role of CRU under the RPR is:

- Article 7: To identify the most relevant national electricity crisis scenarios and consult with the relevant stakeholders.
- Article 10, 11, 12: To establish a risk-preparedness plan, after consulting with the relevant stakeholders, and publish this on the CRU website.
- Article 14: To issue an early warning to the Commission and other Member States that a possible electricity crisis may occur, its causes, measures planned or taken to prevent a crisis and the possible need for assistance; after consulting with the TSO, to declare an electricity crisis and inform other Member States and the Commission, along with the causes, measures planned or taken to mitigate it, and the need for assistance from other Member States.
- Article 17: To provide the ECG and the Commission with an *ex-post* evaluation report on the crisis within 3 months of the end of an electricity crisis.

The CRU has not formally delegated any section of its role as Competent Authority under the RPR.

3.2 Roles and Responsibilities of relevant other bodies

Department of Climate, Energy and the Environment (DCEE)

The **Department of Climate, Energy and the Environment (DCEE)** is the Government Department responsible for the formulation of energy policy, including security of supply.

The role of DCEE under the RPR is to designate the CRU as Competent Authority under Article 3; to inform the ECG and the Commission of their assessment of the risks in relation to the ownership of infrastructure relevant for security of electricity supply under Article 7; to cooperate with other Member States and provide assistance in a crisis, where possible, having agreed on the necessary technical, legal and financial arrangements beforehand as per Article 12.

Transmission System Operator (EirGrid)

EirGrid is the designated Transmission System Operator (TSO) in the Republic of Ireland, with responsibility for maintaining security of supply. As TSO, EirGrid is also responsible for system defence, emergency management and system restoration.

The role of EirGrid under the RPR is to contribute to the development of the regional electricity crisis scenarios as part of ENTSO-E under Article 6; to work with the CRU to develop the set of complimentary national electricity crisis scenarios under Article 7; and to contribute expertise to the relevant sections in the preparation of the Risk Preparedness Plan under Article 10.

Distribution System Operator and Transmission Asset Owner (ESB Networks)

ESB Networks (ESBN) is the Distribution System Operator and Transmission Asset Owner in Ireland. ESBN manages the operation of the electricity distribution network in Ireland and provides the interface with the distribution network operator in Northern Ireland, Northern Ireland Electricity (NIE). In particular, ESBN work closely with the TSO on the load-shedding aspects of the System Defence Plan. Within the System Restoration Plan, ESBN will work with the National Control Centre (NCC) to restore the electricity system to normal configuration. Further information is provided on these plans in section 4.1(a).

The role of ESBN under the RPR is to contribute expertise to the relevant sections in the preparation of the Risk Preparedness Plan under Article 10.

4. Procedures and measures in an electricity crisis

4.1 Regional and bilateral procedures and measures

A 'region' is defined in the RPR as '*a group of Member States whose transmission system operators share the same regional coordination centre as referred to in Article 36 of Regulation (EU) 2019/943*'. EirGrid is a member of the Coreso Regional Coordination Centre (RCC).

A synchronous system and single electricity market (SEM[56]) are in operation over two jurisdictions within the island of Ireland – Ireland and Northern Ireland (NI). The transmission system in Ireland is operated by EirGrid, whilst SONI is the TSO for Northern Ireland. Following Brexit, Article 9 and Annexe 4 of the Northern Ireland Protocol ensure the continued operation of the SEM and the continuing application of EU energy market rules in NI concerning generation, transmission, distribution and supply of electricity, trading in wholesale electricity or cross-border exchanges in electricity.

ACER Decision No 05/2022 assigns SONI and EirGrid to the Central System Operation Region and confirms that SONI's and EirGrid's obligations pertaining to the Regional Coordination Centres' tasks under Regulation (EU) 2019/943 shall become effective only upon the start of operation of the Celtic Interconnector[57], expected in spring 2028[58].

Three interconnectors are currently in operation between the island of Ireland and Great Britain (GB). The EU-UK Trade and Cooperation Agreement provides for the development of electricity trading arrangements across the interconnectors. The island of Ireland will be connected to Central Europe via France when the Celtic interconnector comes into commercial operation.

4.1 (a) Mechanisms for cooperation and coordination within the region

This section considers those mechanisms relevant to cooperation/coordination between NI and Ireland, and between the SEM and GB.

Regulation (EU) 2017/2196, Network Code on Electricity Emergency and Restoration (NCER)

The System Defence Plan (SDP) and the Power System Restoration Plan (PSRP) described in Section 3.1 were developed by EirGrid in accordance with the NCER. In accordance with the principles of the NCER Article 5 (Consultation and Coordination) and Article 6 (Regional Coordination), the measures set out in the SDP and PSRP have been developed such that they are consistent with those contained within the SDP and PSRP for NI, as developed by SONI. The

[56] SEM
[57] Position Paper of the Central Europe System Operation Region's Regulatory Authorities
[58] Celtic Interconnector

measures included in the SDP shall not lead the TSO's transmission system or the interconnected transmission systems into Emergency or Blackout states. NCER Article 14 (Inter-TSO assistance and coordination in emergency state) obliges the TSOs to provide assistance to interconnected TSOs, including specific actions in the case of DC-connected systems, provided this would not cause an emergency or blackout state to occur on their own system.

EirGrid and SONI participated in the consistency check of system defence and restoration plans undertaken by Coreso in 2024, as required every 5 years under Article 6 of the NCER.

Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (System Operation Guideline or SOGL)

Part IV of the SOGL, entitled Load Frequency Control (LFC) & Reserves, recognises that relatively small synchronous areas such as in IE/NI require operational flexibility when compared with larger synchronous areas such as continental Europe as well as specific time varying influence of network connectivity and technology in the energy mix in determining how system operators' processes and reserve services meet the system quality criteria. This flexibility is achieved through the development of agreements and methodologies.

In accordance with Articles 118, 119 and 120 of SOGL, EirGrid and SONI jointly developed a Synchronous Area operational agreement (SAOA) [59], an LFC Block operational agreement (LFCBOA)[60], and an LFC Area operational agreement[61], allocating responsibilities for operating the frequency restoration process. The methodologies contained in the LFC Area operational agreement for Ireland and Northern Ireland ensure application of the principles of proportionality and non-discrimination; transparency; optimisation between the highest overall efficiency and lowest total costs for all industry stakeholders and consumers; and use of market-based mechanisms as far as possible, to promote frequency quality and operational security.

Regulation (EU) 2016/1388 Network Code on Demand Connection

Regulation (EU) 2016/1447 Network Code on High voltage direct current connections.

Both the above regulations specifically refer to a requirement for harmonising frequency-related requirements across a synchronous system, and the latter particularly with regard to the connection of cross-border HVDC links.

TSO Licence conditions

The TSO Licence under which EirGrid operates contains multiple provisions for cooperation and coordination with its NI counterpart, SONI. These include terms relevant to an emergency situation, *inter alia*:

- the two transmission systems shall operate in a coordinated manner,
- the interests of consumers in both jurisdictions will be protected,

[59] Synchronous Area Operational Agreement for Synchronous Area IE/NI
[60] LFC Block Operational Agreement
[61] Operational Agreements for Ireland and Northern Ireland Synchronous Area

- planning and development will be consulted upon and carried out in a coordinated fashion,
- there will be cooperation in contracting of ancillary services,
- provision of information to interconnected system operators.

Interconnector Operating Protocols

There are interconnector operating protocols in place for the HVDC links connecting the island of Ireland to Great Britain. The purpose of the protocols is to provide a common point of reference to cover issues associated with the operation of the links. They describe processes to be followed where there is an interface between the relevant system operators in the areas of outage planning, day ahead and intraday user data and transfer programme agreement, real-time operation including crisis scenarios/system warnings, and post-event review and general management. The protocols contain specific provisions relating to requests for emergency assistance and the responses to be provided.

4.1 (b) Regional and bilateral technical, legal and financial arrangements

There are a number of arrangements in place under the SEM that cover the technical, legal and financial arrangements related to cooperation and coordination between the two jurisdictions, and with GB via the interconnectors.

System Operator Agreement

The System Operator Agreement (SOA) between EirGrid, SONI and the Single Electricity Market Operator (SEM-O) contains the technical, legal, financial and governance arrangements that are in place between the three entities.

Internal System Alerts Procedure Ireland and Northern Ireland

BP SO_9.2- Declaration of System Alerts is the SEM business process that contains the criteria for the establishment of an alert state in each jurisdiction and determines the processes and responsibilities for communicating the changes in alert state to relevant parties.

Demand Disconnection Procedure

BP_SO_9.1 Demand Control Process sets out the processes, responsibilities and information flows associated with a requirement for load-shedding under emergency conditions in either of the jurisdictions.

Trading and settlement code

The SEM Trading and Settlement Code (TSC) contains rules and procedures governing the sale and purchase of wholesale electricity in the SEM and includes specific procedures for the continuation of market activities during system restoration.

Interconnector operations and trading

A number of business processes cover operational and trading arrangements on the HVDC interconnectors with GB (National Grid Electricity Transmission, NGET). These include:

- BP_SO 11.2 Cross-border Trading between EirGrid/SONI and NGET[62] which relates to the exchange of energy across the Moyle and EWIC interconnectors in close to real-time
- BP_SO 11.4 Coordinated third party trading[63] details a mechanism available to alter the physical flows on the interconnectors in advance of the Cross Border Balancing timeframes
- BP_SO_11.3 Interconnector Emergency Actions identifies two interconnector actions that can be taken by the TSOS in a crisis, or potential crisis, situation:
    - **Emergency Assistance** is an increase or decrease in active energy into the requesting TSO transmission system. It is required in extreme cases when one of the parties foresees a difficulty in meeting the expected demand on its system or foresees a difficulty in maintaining security on its transmission system. Emergency Assistance will be assumed available for each TSO to instruct unless specifically withdrawn or a system warning has been issued.
    - **Emergency Instruction** is used for either safety, system security or demand control. If EirGrid have a shortfall in generation and EWIC and/or Greenlink are exporting to GB, then EirGrid may reduce transfer to zero to maintain security of supply.

Solidarity with and support for Northern Ireland electricity consumers during an electricity crisis

Article 14 of the NCER obliges the TSOs to provide assistance to interconnected TSOs, provided this would not cause an emergency or blackout state to occur on their own system.

In line also with the provisions on cooperation and assistance under Article 15 of the Risk Preparedness Regulation, EirGrid may dispatch non-market units if required to prevent load shedding, or to reduce the volumes of load shedding in Northern Ireland.

Where the North-South Tie-Line allows additional MW to flow when the power system in Northern Ireland approaches Emergency State, and where Ireland would otherwise be in Alert State (if non-market capacity was not considered in the margin calculation for Ireland), the following procedure will apply:

- SONI will issue an Alert State and EirGrid will issue a Margin Warning.
- SONI will invoke Emergency Assistance on Moyle.
- EirGrid will, on request for assistance from SONI, dispatch non-market units to prevent or minimise demand control in Northern Ireland, as a last resort, after
    - SONI has issued an Emergency Instruction to terminate exports on Moyle
    - SONI has invoked its Power System Emergency Communications Plan (PSECP).
    - SONI has issued a public appeal for voluntary demand reduction in Northern Ireland.

[62] BP_SO_11.2 Cross Border Balancing Trading between EirGrid / Soni and NGESO
[63] BP_SO 11.4 Coordinated third party trading

- Where time does not permit all or some of the actions in (1) and (3) to be undertaken, EirGrid may, on request from SONI, support Northern Ireland by dispatching the non-market units, following which all the actions in (1) and (3) will be implemented without delay to reduce (or negate) the need for such support.

- SONI will not issue Margin Warnings; only Alert and Emergency states will be issued in Northern Ireland.

- SONI will not include non-market capacity in its Net Transfer Capacity (NTC) margin calculations for the Moyle interconnector – i.e. non-market capacity available in Ireland will not avoid NTC reductions where needed to avoid a System Alert or Emergency state in Northern Ireland.

- The dispatch of non-market units to support Northern Ireland will be subject to EirGrid's assessment of available annual run-hours of these units.

Financial solidarity arrangements between IE and NI for the dispatch of non-market units

DCEE and DfE-NI are currently working together to finalise a formal agreement on the financial arrangements that would apply should IE support NI through the dispatch of non-market units described above, in line with Article 15 of the RPR.

Solidarity with and support for electricity consumers in Great Britian and France during an electricity crisis

In line with the provisions on cooperation and assistance under Article 15 of the Risk Preparedness Regulation, EirGrid may dispatch non-market units if requested by NESO or RTE.

Reporting and transparency

Article 16(2) of Regulation (EU) 2019/941 requires the Competent Authority (CRU) to inform relevant stakeholders in its Member State of the application of any non-market-based measures. EirGrid will support the provision of this information by:

- Issuing a "Margin Warning" notice to the market when TEG units have been taken into consideration in system margins and issuing a "Margin Shortfall Risk" notice to the market when Moneypoint units have been called on to synchronise to the power system.

- Publishing a list of the dates and times when TEG units have been dispatched and Moneypoint units have been synchronised to the grid, including the reasons.

4.1 (c) Mechanisms for cooperation with 3rd countries within the relevant synchronous area

There are no 3rd countries within the same synchronous area.

4.2 National procedures and measures

The procedures and measures in place to address electricity crises relate to three categories of measures, namely:

- **Emergency response measures**: Measures that are in place, or that are planned, to mitigate the consequences of an electricity crisis;
- **Preventive measures**: Measures that are in place, or that are planned, to prevent the occurrence of the identified electricity crisis scenarios;
- **Preparedness measures**: Measures that are in place, or that are planned, to prepare a response to an imminent crisis (e.g., preparedness measures taken as part of the Procedure in the case of an Electricity Shortfall).

The following sections will briefly describe these procedures and measures and how these address the identified national electricity crisis scenarios.

4.2 (a) Procedures to be followed in the case of an electricity crisis

This section address procedures to be followed in the case of an electricity crisis and to prevent electricity crisis events from materialising.

There are a number of plans, protocols, processes and procedures that determine the actions of the TSO, the DSO, and Market Participants in response conditions on the power system in the event of an emergency, or in response to identified threats to security of supply. Regulation (EU) 2017/2196 establishing a network code on electricity emergency and restoration (NCER) sets out procedures and systems that determine actions to be taken in response to an emergency situation. The TSO has an internal set of business processes in place that ensure the necessary steps are taken to maintain the system in its normal operational state, or return to this as quickly as possible in the event of an emergency. The Grid Code[64] governs the use of the Irish transmission system by all users, and as such, contains rules for actions to be taken in emergency situations.

It is important to note that due to the integrated nature of market and system operation on the island of Ireland, there is seamless engagement between the TSOs of Ireland (EirGrid) and Northern Ireland (SONI) at an operational level. There is also close cooperation between the islands of Ireland and Great Britain with respect to interactions between the two markets (SEM and BETTA respectively), response to weather conditions, and operation of the three interconnecting HVDC links. A set of SEM business processes contain procedures to be followed throughout the synchronous system during an emergency situation (further detailed in 4.2 (b)).

(i) **Declaration of early warning and crisis and activation of measures**

As set out in Article 2(9) of the RPR,

[64] The Grid Code

> "*an electricity crisis means a present or imminent situation in which there is a significant electricity shortage, as determined by the Member States and described in their risk-preparedness plans, or in which it is impossible to supply electricity to customers*".

A crisis may be called on the electricity system in Ireland when a scenario arises (or is considered very likely to arise) where the expected impact rating based on the LOLE or EENS will be 'major', 'critical' or 'disastrous', according to the ratings procedure set out in Appendix I of the Methodology for Identifying Regional Electricity Crisis Scenarios, approved by the Agency for the Cooperation of Energy Regulators (ACER) on 8 March 2024 (Decision No. 02/2024). Events with less significant expected ratings may also be designated as crises, depending on the circumstances, i.e., expected duration, cross-border impact, and / or potential for spill-over into other sectors.

In accordance with Article 14(2) of the RPR, the CRU will, after consulting with EirGrid as the transmission system operator (TSO), determine whether a threat or incident on the power system is classified as an electricity crisis and, in the event of such a crisis being identified, will communicate this to the appropriate stakeholders.

Classification as an electricity crisis is separate from - but may be informed by - the system states issued by the TSO in accordance with Regulation (EU) 2017/1485 on establishing a guideline on electricity transmission system operation.

As set out in Article 14(1) of the RPR,

> "*where an adequacy assessment or other qualified source provides concrete, serious and reliable information that an electricity crisis may occur*",

the CRU shall notify an Early Warning to the Commission.

In line with Article 16(2) of the RPR,

> *"non-market-based measures shall be activated in an electricity crisis only as a last resort if all options provided by the market have been exhausted or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation."*

In the event that the TSO considers that Article 16(2) applies, the processes set out below will apply, including notification of the CRU of the dispatch of these units as soon as practically possible.

(ii) **System States**

The actions taken by the TSO will be determined by the severity of the situation. The system states set out in the SOGL and NCER include Normal State, Alert State, Emergency State, Blackout, and Restoration State[65] - each with an associated set of defining criteria. OC9.4 of the TSO Grid Code outlines the criteria for the issuing of System Alerts in the event of a System Emergency Condition or imminent shortfall in capacity. The published SEM business process detailing the details and

[65] The Alert, Emergency, and Blackout states are locally referred to as Amber, Red and Blue Alerts, respectively.

criteria is BP_SO_9.2 Declaration of System Alerts[66]. There is a complementary internal procedure, the "System Alerts Procedure Ireland and Northern Ireland" that is used by the control centres in the event of a change in system state. This procedure, summarised in Table 11, details the steps the control centres and managers would take depending on the severity of the situation. It covers aspects such as the initial determination of change in system state, the communication of the Alert or Emergency State to relevant stakeholders, and the options available to restore the system to Normal State. The Grid Code specifies that procedures are activated for both the TSO and Generators in response to a change of system state.

The table below summarises key measures that may be deployed to avoid or manage an electricity crisis and the corresponding system states. Further detail on the priority of these measures relative to other measures available to the TSO are provided in Table 12. The procedures for activation of non-market measures (TEG units and Moneypoint units) are provided at the end of this section. While the TEG units can be dispatched in real-time, the Moneypoint units may require over 48 hrs notice when cold at the time the System Operator identifies a margin shortfall risk.

Table 11 - System state criteria and a summary of key actions and measures to be deployed

State	Criteria for establishing this state	Key actions / measures
Normal	The transmission system shall be considered to be in the 'Normal State' when all of the following conditions are fulfilled: • voltage and power flows are within the operational security limits; • frequency meets the following criteria: i) the steady state system frequency deviation from nominal is within ± 200 mHz; or ii) the absolute value of the steady state system frequency deviation from nominal is not larger than 500 mHz and the system frequency limits established for the Alert state are not fulfilled; • active and reactive power reserves are sufficient to withstand contingencies from the contingency list without violating operational security limits; • operation of the All-island transmission system is and will remain within operational security limits after the activation of remedial actions following the occurrence of a contingency from the contingency list.	Available market resources are deployed to meet demand and provide for the required operating margin. Net Transfer Capacity reductions may be applied to the interconnectors to limit exports day-ahead or on the day, for periods at which the system would otherwise enter Alert state. Non-market generation (available TEG and Moneypoint units) will be included in the system margin calculation when the system would otherwise enter Alert or Emergency State. Where this capacity is sufficient to avoid Alert and Emergency State, the system will remain in Normal State. A market notice ('Margin Shortfall Risk') will be issued for the period ahead when a heightened security of supply risk is identified, and for which one or more Moneypoint units have been instructed to synchronise. A market notice ('Margin Warning') will be issued in real time when TEG units are included in the margin calculation. Once a Margin Warning has been issued, TEG units may be dispatched. Where time does not permit, these units may be dispatched and a Margin Warning issued as soon as is practicable.

[66] BP_SO_9.2 Declaration of System Alerts

		In exceptional conditions, where a safety or local security of supply risk arises (unrelated to system margins), non-market units may be dispatched without a Margin Warning issued. In this case, a market notice will be issued as soon as is practicable, indicating the period for which the units have been dispatched.
Alert	The Alert state should be initiated when voltage and power flows are within operational security limits (base case secure) and one or more of the following conditions are fulfilled: • Frequency meets the following criteria and the absolute value of the steady state system frequency deviation from nominal is within ± 500 mHz but has continuously exceeded: i) ± 200 mHz for a time period longer than 15 minutes; or ii) ± 250 mHz for a time period longer than 10 minutes; or • At least one contingency from the contingency list leads to a violation of operational security limits, even after the activation of remedial actions; or • Multiple contingencies are probable because of adverse weather; or • The jurisdictional margin is such as the tripping of the largest set, would give rise to a reasonable possibility of failure to meet the System Demand or • The All-Island reserve capacity is reduced by more than 20% for longer than 30 minutes and there are no means to compensate for that reduction in real-time system operation.	Generators, Market, NG-ESO and NDCC are notified. If the Alert State is due to insufficient margin, the steps below are taken: • Additional trades and Emergency Assistance (EA) is considered on interconnectors. • LEUs will be asked to prepare for Mandatory Demand Curtailment. • The DSO will prepare for the possible need for Demand Control. If there is a high possibility that a System Emergency state may be issued, the Power System Emergency Communications Plan (PSECP) will be invoked. Where time allows, a Public Appeal may be issued (including voluntary demand reduction from LEUs[67].)
Emergency	The Emergency state should be initiated when the System enters an “Emergency state” i.e., when any of the following criteria are satisfied: • There is at least one violation (base case) of voltage limits, short-circuit current limits, or current limits in terms of thermal rating; or	All actions for Alert state are implemented. The Power System Emergency Communications Plan (PSECP) will be invoked if a System Emergency state is declared. If Emergency state is due to insufficient margins:

[67] Including sites with backup generation available that has sufficient run hours.

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Frequency does not meet the criteria for the Normal state or Alert state definitions; or
Any of the following system defence plan measures are activated:
i) activation of UF load shedding where frequency does not recover within +/- 500mHz less than 1 minute; or
ii) widespread (multiple station) UV load shedding; or
iii) activation of manual demand disconnection; or
iv) activation of system separation protection.
There is a failure in the functioning of:
○ EMS / SCADA or
○ Phones (Corporate and Optel / Tetra) resulting in the unavailability of those tools, means and facilities for longer than 30 minutes.

The “RED ALERT” signal should also be initiated by NCC or CHCC when:

it is likely/ imminent that in the period immediately ahead (i.e., in the next four (4) hours) there is a high risk of failing to meet System Demand
Dynamic reserves (excl. batteries) have been reduced to 70MW (50MW IE and 20MW NI).
The steady state system frequency is outside a range of ± 500 mHz for more than 1 min.
LSAT (real time) continually forecasts a freq Nadir of below 49 Hz for a period of 30 min and there are no means are available to address this

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Emergency Instruction is implemented on EWIC and Greenlink to terminate any remaining exports.
Operating Reserves are eroded.
Demand Control is implemented by the TSO and DSO.

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<td>Blackout</td>
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The Blackout state (Blue alert) should be initiated by the NCC to inform relevant parties that all or part of the transmission system must be started from black that is:

Loss of more than 50% of demand load
Loss of voltage across the transmission system for 3 min

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A ‘Blue Alert’ is issued to stakeholders and operational staff to implement the relevant procedures to initiate restoration.

The Power System Emergency Communications Plan (PSECP) is activated.
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Restoration	The transmission system shall be in the restoration state when any measure of the restoration plan has been activated, following an emergency or blackout state, that is the Power System Restoration Plan has been activated.	Restoration of the power system is initiated, guided by the procedures in the Power System Restoration Plan (PSRP).

Further detail on the indicative priority order (dependent on time, context, and annual run hours available) of specific actions to be taken is shown in Table 12.

Table 12- Indicative priority of System Operation actions in response to anticipated and real-time system security concerns.

System state *Approximate Margin*	**System Operator actions (time and context dependent)** *The priority shown is indicative. Decisions will be based on conditions on the day, including available run hours, EPA ambient air quality limits, primary/secondary fuel constraints etc.*	**Comment**	**Notice**	**Volumes (approximate)**	**Day(s) ahead**	**On the day (>1hr)**	**On the day (<1hr)**
>LSI	Continuous scheduling & dispatch of market units	Optimise juristictional margins	Continuous	Declared (EDIL)	●	●	●
	Reduction in interconnector Net Transfer Capacity (NTC) - exports	For the periods system is expected to enter Alert state	D, D-1	Max export capacity	●	●	
	Demand side units (DSU's)	Schedule twice on the day if needed	1.5 hrs			●	
	Peaking units	Dispatch as required (manage annual run hours)	< 15 min			●	●
	Batteries	Manage charging when possible (e.g. mid-day solar)	< 15 min			●	●
<LSI risk	**Issue 'Margin Shortfall Risk' - up to 3 days ahead (if TEG insufficient)**	*Include available non-market generation in margin*					
	Instruct Moneypoint Unit(s) to synchronise to mingen	Notice times are dependent on heat state of the units	20 - 56 hrs	750 MW	●		
	Cancel synchronisation instruction (if TEG sufficient)	Updated RES, imports, generation availability			●		
<LSI *NMG not included in margin*	**Issue TEG 'Margin Warning' - real time**	*TEG and available Moneypoint MW included in margin*					
	Request ESBN Beat the Peak Demand Reduction	Issued by ESB Networks (request Director SO)	1 to 4 hrs			●	
	Cross-border trades on interconnectors	To avoid / minimise TEG dispatch	1 to 2 hrs			●	
	Flexible Demand (Large Energy User demand reduction)	The unfirm component of contracted import capacity	< 15 min				●
	Dispatch Non-Market Generation (TEG / available Moneypoint units)	Dispatch to consider availability of short-run batteries	< 15 min	650 MW			●
<LSI *with NMG included*	**Issue System Alert State**						
	Emergency Assistance (EA) - interconnectors	Available for up to 2 hrs	< 15 min	2x150 MW for 2hrs		●	●
	ESB Networks prepares for possible Demand Control					●	●
	Large Energy Users (LEUs) prepare / staff up for possible MDC					●	●
	Maximise Jurisdictional Margin (margin support from Northern Ireland)	NI may enter Alert State to avoid Emergency in IE				●	●
<150 MW *with NMG included*	Invoke Power System Emergency Communication Plan (PSECP)	Decision by Director SO (day-ahead for rota shedding)			(●)	●	●
	Voluntary Demand Reduction (VDR) request	Issued to LEUs / Distribution Customers >= 38 KV	> 1hr	c.150 MW	(●)	●	
	Public Appeal for demand reduction	Issued by EirGrid/ESBN comms (Crisis Comms Plan)	> 1hr	not available	(●)	●	
<50 MW *with NMG included*	**Issue System Emergency State**						
	Emergency Instruction (EI) - issued for interconnectors (EWIC/Greenlink)	Interconnector to 0 MW if exporting.	< 15 min	Up to export capacity		●	●
	Mandatory Demand Curtailement (MDC) - instruct	NCC & NDCC: LEUs (50%/75% reduction instructed)	> 1hr	c.400 MW		●	
	EBSN VDR Requested (Customers 38kV and above)	If not already issued	> 1hr	not available		●	
	Emergency Demand Disconnection (Rapid) Instruct	NDCC Protocol	<15 min	c.500 MW		●	●
	Emergency Demand Disconnection (Slow) Instruct	NDCC Protocol	<30 min	c.1000 MW		●	●
	Rota Demand Disconnection (up to 3 x 1000 MW)	Additional 150 MW available rapidly	> 12hrs	c.1000 MW	●		

Note: Real-time margins are based on loss of the Largest Single Infeed (LSI).
Note: Flexible Demand, VDR, and MDC may in some locations be limited by aggregated ambient air quality limits as well as annual generator run-hour limits.
Note: Public Appeal and VDR are called on only just before a System Emergency given: (i) potentially reduced public response after multiple calls to reduce, and (ii) run-hour limitations of customers using backup generators to provide voluntary demand reduction (this will also be called on during a System Emergency State), and (iii) EPA ambient air quality limits

System Defence

Regulation (EU) 2017/2196, establishing a Network Code on Electricity Emergency and Restoration (NCER) details the requirements for each TSO to develop a System Defence Plan (SDP)[68]. The System Defence Plan contains (manual) procedures and automatic schemes available to the TSO to prevent the further deterioration towards an Emergency state when one is forecast, or to manage the system when it is in an Emergency state. There are a number of automatic actions also defined in the System Defence Plan which should prevent the system going into an Alert or Emergency state such as automatic under frequency and under voltage load shedding relays.

EirGrid's System Defence Plan[69] (SDP) contains the following provisions:

- The conditions under which SDP is activated;
- The SDP instructions to be issued by the TSO;
- The measures subject to real time consultation or coordination with the identified parties.

The SDP is currently under review, and an updated version is anticipated to be published in 2026, as required every 5 years by the NC ER.

The automatic schemes include:

Automatic under-frequency control scheme

This scheme is designed and implemented in collaboration between TSO and the DSO to ensure sufficient demand can be disconnected in the event of an exceptional low frequency event on the power system in Ireland. Under-frequency load shedding relays are installed at designated substations around Ireland with the capability of disconnecting up to 60% of system demand, triggered at an initial frequency of 48.85 Hz, which is within the Emergency state.

Automatic Over-frequency control scheme

This scheme is implemented by the TSO on the protection relays at designated transmission substations and is to help manage the frequency in the event of a sudden significant loss of demand and/or exports on interconnectors. If fully exporting, EIDAC would be the largest single loss on the system and this is currently only likely when wind farms in Ireland are near full capability. A significant loss of demand may also arise simultaneously where multiple Large Demand Facilities have limited fault ride-through capability. The disconnection of wind farms due to a major over-frequency event is central to the scheme. Note this scheme is from 50.50Hz to 50.75Hz and is an action within the Emergency state if the frequency deviation remains above 50.5Hz for more than one minute.

Automatic Scheme against Voltage Collapse

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[68] System Defence Plan for Ireland

There is one main automatic scheme installed to prevent voltage collapse, a scheme for low voltage demand disconnection known as Automatic Under Voltage Load Shedding (UVLS).

The manual procedures include:

Frequency Deviation Management Procedure

Frequency regulation is managed through the provision of different types of reserve products described in Regulation (EU) 2017/1485 establishing a guideline on electricity transmission system operation (System Operation Guideline or SOGL). For all reserve providers, the reserve capability is mandated by the Grid Code and contracted via System Services agreements. These measures to control frequency are available for the TSO to select the most economic service providers.

Voltage Deviation Management Procedure

The TSO is obliged to operate the transmission system with the operational security limits defined in SOGL, see Table 11. However, EirGrid has a more stringent set of voltage limits in operational timescales. The voltage management of the system is achieved in a number of ways designed to ensure the system remains within the Normal System voltage range with sufficient voltage support (reactive power) reserves to limit the voltage step change post contingency within the post-contingency limits and hence avoid an Emergency state. These include,

- Switching reactive compensation equipment
- Capacitors
- Reactors
- Instructing reactive power on synchronous generation
- Changing target voltage set points
- Static Variable Compensators (SVCs)
- Power Park Modules (PPM)
- Switching out high reactive gain circuits
- Simultaneous tap changing of NCC controlled grid transformers
- Tap staggering of parallel NCC controlled system transformers

Power Flow Management Procedure

Power flows across the synchronous area of Ireland are managed by the TSOs with the objective of ensuring that the system is operated within the thermal limits of the transmission equipment. Standard remedial actions to maintain the system in Normal State include:

- Re-switching circuits to restrict flows
- Return of outage plant to remove system overload
- Re-dispatch active power set points for generators online
- Schedule additional generation
- Tap change of transformers
- Adjust active power flows through HVDC systems with other TSOs

Assistance for Active Power Procedure

Dispatch instructions are available to the TSO to ensure the security standards in accordance with SOGL are maintained. The TSO may also issue an Emergency Instruction (either pre- or post-fault) to a User in respect of any of its Plant. These will generally involve a dispatch instruction for an active (or reactive) power change (increase or decrease), or a change in required Notice to Synchronise (or, in the case of a demand unit or pump storage unit or energy storage unit, a change in the relevant effective time) in a specific timescale on an individual unit or groups of units. To ensure the security standards in accordance with SOGL are maintained, the TSO may also select a Special Protection Scheme for stability or thermal reasons.

Manual Demand Disconnection Procedure

Manual Demand Disconnection procedures may be required where there is insufficient generation or transfers to meet demand in all or any part of another TSO's system where the TSO is able to assist the other TSOs.

In the EirGrid Policy on Demand Control and the ESBN Distribution System Operator Load Shedding Plan there are three types of manual demand control available to the TSO, under an system Emergency State:

- Mandatory Demand Curtailment (Large Demand Facilities)
- Emergency Load Shedding (urgent)
- Emergency Load Shedding (planned)
- Rota Load Shedding

EirGrid also includes the disconnection of demand under its Flexible Demand Agreements as part of its manual procedures. These are implemented to avoid or remediate a System Alert state.

These are further explained in Section 4.2 (d).

(iii) **Power System Restoration**

The EirGrid Power System Restoration Plan (PSRP) is a procedure that will be used in the event of a partial or total shutdown (blackout) of the power system. The objectives of the plan are to ensure secure restoration of the transmission system, and that customers are re-connected safely and as quickly as possible.

Restoration of the All-Island power system could be supported over the interconnectors with Great Britain, and in future, by France via the Celtic Interconnector. The majority of generators on the Irish power system require external power supply to start-up and supply energy to the power system. The TSO has contracts in place with a number of Black Start Units that have the ability to start up without an external power supply. The providers of black start services would include a diversity of fuel types, including hydro generators, pumped storage, and gas turbines. These are located strategically, to restore supply to generation stations and customers in up to 5 different areas (subsystems) at the same time. Each subsystem has at least one Black Start Unit. One or more Black Start Units in each Black Start Station is tested annually.

Once each subsystem has supply restored to enough customers to allow multiple generators to operate stably, those subsystems are synchronised to form a single system and restoration continues. Synchronising facilities are available at various locations on the transmission system for this purpose. The NCER distinguishes between top-down and bottom-up re-energisation strategies. Top-down refers to re-energisation with assistance from a neighbouring TSO, and in the case of Ireland, this would mean using HVDC interconnector blackstart capabilities or getting supply from NI if those systems are not also in a Blackout state. Bottom-up re-energisation involves the use of Black Start Units. A combination of top-down and bottom-up re-energisation strategies would be used in the event of a blackout in Ireland.

Restoration of a power system after a blackout is a complex process, undertaken by expert engineers and operators trained and exercised on the relevant procedures. The restoration process would be led by EirGrid as TSO, working closely with ESB Networks as both the Distribution System Operator (DSO) and Transmission Asset Owner (TAO). The restoration of supply to homes and businesses across the country would be undertaken by ESB Networks.

EirGrid and ESB Networks participate in regular control room and field training exercises.

The PRSP, updated in 2025, currently targets restoration of the transmission system in 12-hours. Depending on the cause of the blackout, and post-blackout conditions, the restoration process could be quicker or take longer. Longer restoration times might be associated with some of the national electricity crisis scenarios identified – including those associated with malicious attacks (physical and/or cyber), weather-related damage to assets, and complex scenarios such as a severe disruptions in gas supply to power stations (while stations are required to operate on secondary fuel, the overall availability of these on secondary fuel at any particular time may be lower than on primary fuel).

Restoration of all customers connected to the distribution system would take longer than restoration of the transmission system, given the depletion of substation batteries which are vital to maintaining communication with the substations and the need in many cases to dispatch staff to site to check for damage, turn off specified protection setting, and undertake switching.

The PSRP is updated from time to time. The stages of power system restoration outlined in Version 11 of the plan are summarised in Figure 4.

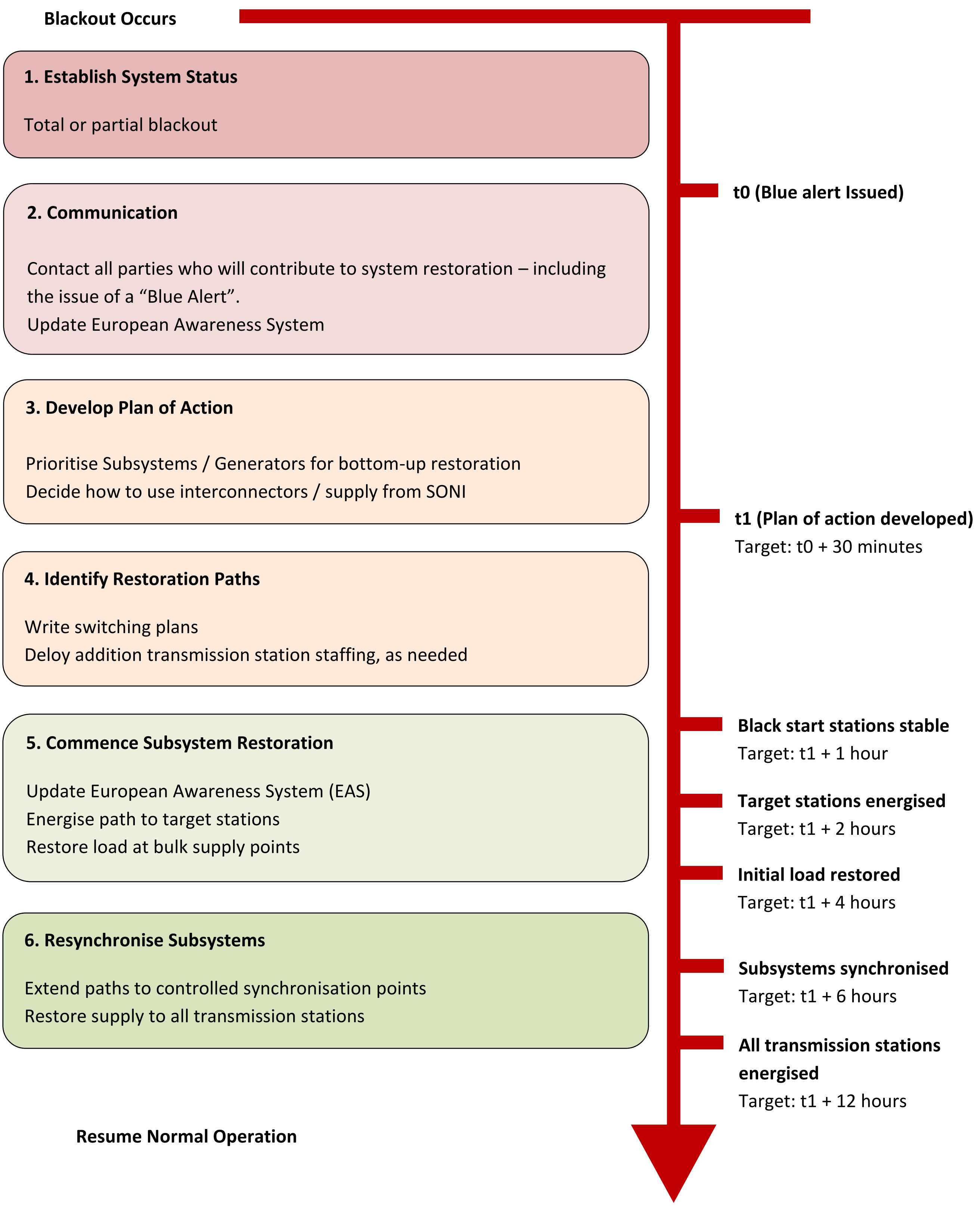
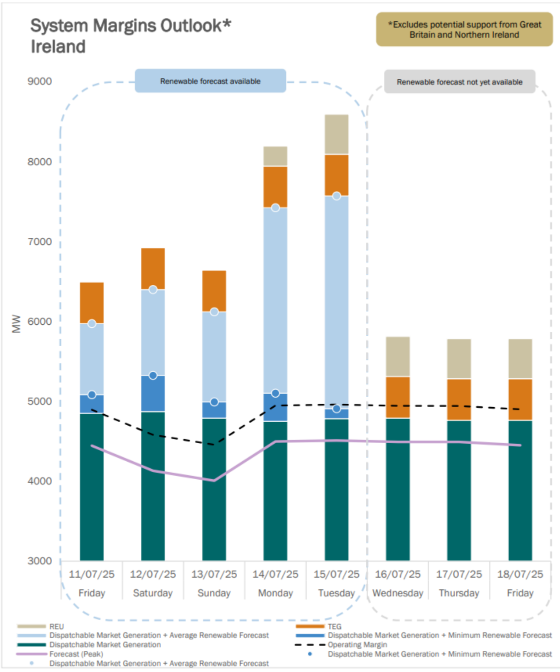


Figure 4 Overview of the stages of the power system restoration plan

(iv) Communication and information flows before and during system alerts

System Margin Outlook reports are issued by EirGrid twice weekly during normal system operations (these may be issued more regularly if system conditions require)[70]. These reports provide anticipated system margins for the coming days, allowing market participants and large energy users to prepare for potential Alert/Emergency states during periods when margins are anticipated to be tight.

The reports show margins with and without available non-market measures, as well as an indication of the potential variability of renewable generation (the average and minimum forecast).



TEG Availability

The outlook for the maximum generation capacity for TEGs is shown below.

TEG Availability (MW)	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri
North Wall (NW8)	193	193	193	193	193	193	193	193
Huntstown (DG1)	50	50	50	50	50	50	50	50
Shannonbridge (SQ1)	128	128	128	128	128	128	128	128
Tarbert (TB5)	150	150	150	150	150	150	150	150

Non-Market (REU) Availability

The outlook for the maximum generation capacity for REUs is shown below, taking into consideration the respective notification and ramp times associated with the heat state of these units.

REU Availability (MW)	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri
Moneypoint (MP1)	0	0	0	0	0	0	0	0
Moneypoint (MP2)	0	0	0	250	250	250	250	250
Moneypoint (MP3)	0	0	0	0	250	250	250	250

Interconnector Availability

Imports via interconnector will be subject to trades on the day. The outlook for the maximum import capacity from Great Britain to Ireland is shown below. In real-time, interconnector trades will be included in the system margin calculation before considering Temporary Emergency Generation.

Interconnector Availability (MW)	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri
East-West Interconnector	500	500	500	500	500	500	500	500
Greenlink Interconnector	500	500	500	500	500	500	500	500

Figure 5 - Example of System Margin Outlook reports including non-market generation.

An alert communication system is employed to notify relevant parties including generators, distribution system operators, internal staff, regulators and the market operator that the system is in a state other than Normal state. In the event of the power system entering an Alert state, the System Operator will issue a power system alert and notify the relevant stakeholders. The team will also cancel the alert when the system has been stabilised. Each system user is responsible for internal procedures in receipt of this alert.

System alerts are notified to all European TSOs via the control centre ENTSO-E Awareness System ('EAS'). Market participants are informed through market messages and for relevant

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70 System Margins Outlook Reports

entities via the control centre tools. Market participants include demand side units which provide a market-based approach to demand response prior to demand disconnection.

During an Alert state, large customers may be requested to voluntarily reduce their demand (Voluntary Demand Reduction, VDR), including potential use of their on-site backup generators. Commercial customers engaged with the DSO 'Beat the Peak Business' campaign[71] will be notified of an anticipated Alert, and when the system enters Alert state.

Table 13 indicates the communications issued to customers at various levels during business as usual, pre-alert, Alert State and Emergency State. The Power System Emergency Communication Plan is invoked when the margin drops below 150 MW.

Table 13 Communication and information flows before and during a system alert.

Outlook	Issued by	Communication	Recipients	Notice
Outlook messaging				
	EirGrid	System Margin Outlook (Mondays / Fridays)	Large Energy Users Market Participants	4-8 days
Pre-Alert messaging				
High risk	EirGrid	Margin Shortfall Risk	Market Participants	1-3 days
Tight Margins on the day	ESBN	"Is This a Good Time"	Customers signed up	6-9 hrs
	ESBN	Beat-the-Peak Business	Customers signed up	6-9 hrs
	EirGrid	Margin Warning	Market Participants	0-6 hrs
System Alert State communication issued				
<LSI	NCC	Generation / DSU / Batteries	Market Participants	15 min
	ESBN	"Is This a Good Time"	Customers signed up	4-8 hrs
	ESBN	Beat-the-Peak Business	Customers signed up	1-8 hrs
<150 MW	NCC/ NDCC	Voluntary Demand Reduction	110kV/38kV and above	> 1 hr
	EirGrid/ ESBN	Public Appeal (Alert Issued)	General public	> 1 hr
System Emergency State communication issued				
<50 MW	NCC / NDCC	Voluntary Demand Reduction	38kV and above	> 1 hr
	NCC / NDCC	Mandatory Demand Curtailment	110kV and above	> 1 hr
	NDCC	Emergency Demand Disconnection	Homes and businesses	c.15 min
	NDCC	Rota Demand Disconnection	Homes and businesses	c.12 hrs

(v) **Specific communications during a Blackout state**

Accompanying the Power System Restoration Plan is the Power System Emergency Communication Plan (PSECP). It sets out arrangements for the TSO to manage communications during a power system blackout and share information with key stakeholders. The focus of the plan is to alleviate concerns of the public/stakeholders and maintain confidence that the TSO is addressing the situation. It involves activating the communications response via structured

[71] Beat the peak - Business

stakeholder meetings and working closely with the DCEE, CRU, ESBN and Gas Networks Ireland (GNI). It ensures that messaging is co-ordinated, consistent and timely.

As soon as the system is confirmed to be in a Blackout state, the following communications are initiated:

- Notifying System Manager (or Operations Charge Engineer if System Manager unavailable) who will oversee the restoration of the power system.
- A Blue Alert is issued notifying ESBN, all centrally dispatched units, priority transmission stations, GNI, NESO, key EirGrid personnel and external stakeholders.
- The ENTSO-E Awareness System is updated to notify other Transmission System Operators of the Blackout state.

The System Manager will inform all the relevant parties as directed in the PSECP and EirGrid may choose to invoke its Crisis Communications Plan if appropriate.

As far as possible, all communications should be directed through the operational telephony system, OPTEL, which is independent of the public telephone system. It is expected that the mobile network will survive the initial immediate onset of a blackout and for this reason when the alert is issued a text message (SMS) is also sent to key personnel who have standing instructions to attend their place of work on receipt of such a text. A complete failure of all communication systems including OPTEL is highly unlikely but is still a potential risk. If these phones are the only method of communication available, the restoration time may be significantly slower.

4.2 (b) Preventative and Preparatory Measures

In order to test the response of the electricity system and its actors to a crisis event and ensure that the communications proceed as planned, the Emergency Communications Plans are tested annually, involving all key stakeholders in the exercise. Additionally, one or more Black Start Units in each Black Start Station is tested annually.

Some general measures are in place that are designed to protect and prepare the system for future changes. These measures are set out by both European and domestic legislation, and the Transmission System Operator's licence.

Section 38 of the Electricity Regulation Act 1999[72] and Part 10 of S.I. No. 60 of European Communities (Internal Market in Electricity) Regulations 2005[73] require EirGrid to publish forecast information about the power system. This includes information on the forecast flows and loadings on the transmission system along with other information useful for prospective system users such as forecast generation capacity and demand for electricity.

In line with this, EirGrid previously produced an annual 10-year Generation Capacity Statement (GCS)[74] in conjunction with SONI, depicting the projected future demand and generation for the coming decade for both jurisdictions within the all-island synchronous area. The report included an adequacy assessment, including projections of peak demand to aids in identifying potential adequacy gaps ahead of time that may threaten security of supply.

As noted previously, the GCS has been replaced by the AIRAA, most recently for the years 2025-2034, published in March 2025. While the GCS provided a specific analysis of the generation capacity of power plants and other sources, the AIRAA aims to provide enhanced capabilities to model the reliability of the power system for an increasingly diverse technology mix. It also ensures better alignment with European modelling frameworks and regulatory requirements. Furthermore, the AIRAA's objective is to ensure that IE has sufficient resources to meet energy needs in a reliable and sustainable manner.

The transition to the AIRAA will bring several benefits, including improved forecasting accuracy and better integration of renewable energy sources. This change will positively impact stakeholders by providing more reliable data and supporting sustainable energy practices.

In accordance with S.I No. 227/2022[75] which amends S.I 454/2000[76]and with condition 8 of the TSO licence[77] EirGrid also prepares a Transmission Development Plan (TDP[78]) every two years. This plan outlines the intentions for the development of the Irish electricity transmission network and interconnection over a ten-year period. It presents projects that EirGrid has considered are

[72] Electricity Regulation Act 1999
[73] S.I. No. 60 of European Communities (Internal Market in Electricity)
[74] Ten Year Generation Capacity Statement 2023-2032
[75] S.I. No. 227/2022 - European Union (Internal Market in Electricity)
[76] S.I. No. 445/2000 - European Communities (Internal Market in Electricity)
[77] EirGrid Market Operator Licence
[78] Transmission Development Plan 2024-2033Transmission Development Plan (TDP)
[78] Transmission Development Plan 2024-2033Transmission Development Plan (TDP)

needed to reinforce the transmission network and which will help to achieve the strategic objectives laid out by national and EU policies. In relation to specific electricity crisis scenarios, the development projects set out in the TDP focus on:

- Ensuring the security of electricity supply by facilitating new generation – including renewables – and interconnection to address risk scenarios relating to supply chain and national scenarios.
- Monitoring and deploying upgrades to manage changes in asset condition over time to address risk scenarios relating to weather, technical or natural scenarios.

Additionally, EirGrid also prepares an annual All-Island Ten-Year Transmission Forecast Statement (TYTFS) containing forecasts of capacity, flows and loading on the transmission network. This allows prospective users of the transmission system to understand opportunities for new connections.

(i) Scenario-specific measures

Alongside the general measures, there are preventive and preparatory plans related to each category of risk scenario which are employed to ensure the system does not enter a change in system state should such a crisis scenario occur. The remainder of this section details these measures.

Weather

The Transmission and Distribution networks are designed for continuity of service and safety within economic constraints. The design is in accordance with EN 50341 (Overhead electrical lines exceeding AC 1 kV), including requirements relating to weather conditions such as wind and ice loading. The distribution network is generally exposed to less severe wind loading than the transmission network because it is closer to the ground (generally less than 10 m).

Different plans and documents are prepared by the TSO to address particular features of weather-related scenarios:

- The EirGrid Winter Outlook [79] is an annual summary providing information on expected electricity demand and capacity margin for Ireland over the winter months from November to April. It is normally published in the preceding months. This published outlook informs stakeholders and the public of the available capacity margins during the winter months.
- The Winter Readiness Risk Assessment is an EirGrid internal document which captures the state of preparedness of the power system for the following winter.
- A severe weather plan is created internally to EirGrid when the national forecaster establishes a risk of a storm. Within this plan, a number of different elements of the power system are considered including transmission, generation and scheduling, resourcing and communications. The communication flow is from EirGrid to DCEE and CRU, as well as ESBN in their role as both the Transmission Asset Owner and Distribution System

[79] EirGrid Winter Outlook 2024/25

Operator. This plan allows the early intervention in the power system to ensure it is as secure as possible before the arrival of a storm.

- In the event of Geomagnetic Induced Currents there is an internal policy document which details steps that the control centre must take to secure the transmission system.
- The training programme for certification for Control Centre Staff includes responding to complex and exceptional circumstances in system operation, including scenarios caused by large forecast errors. Shifts are regularly scheduled to take place in the Emergency Control Centre to ensure staff familiarity, and unplanned, mid-shift moves are also rehearsed regularly.

In relation to the DSO, ESBN's measures include the following.

- Risks from forest fires or fallen timbers are mitigated by an ESBN Company Standard – Vegetation Management and Timber Cutting near transmission and DSO 110kV overhead lines. This ensures minimum distances are maintained between vegetation and electricity infrastructure.
    - For the transmission network, all trees within falling distance are removed. The height of vegetation is restricted to 3 m underneath the conductors and for a 15 m corridor on both sides.
    - For the distribution network, all diseased and unstable trees within falling distance are removed. Vegetation is managed to achieve a clearance of at least 4 m below the conductors and for a 4 m corridor on both sides.

Following a Government decision in the aftermath of Storm Éowyn, ESB Networks was tasked with developing an Enhanced Winter 2025 Grid Resilience Plan[80] The plan's implementation period is between March and October of 2025. The objective of the plan is to enhance the resilience of the grid in the most vulnerable locations for Winter 2025/26, to take some immediate short-term measures to reduce the impact of potential storm in Winter 2025, whilst progressing plans and initiatives for longer term. ESB Networks subsequently published its Review of Storm Éowyn[81] report in October 2025. The review made recommendations for how ESB Networks can continue to support customers in future weather events. The key recommendations are outlined below:

- ***Storm preparedness:*** Refine emergency procedures and ensure personnel are ready before the storm. Develop a digital Storm Response Toolkit to improve coordination and decision-making.
- ***Asset performance:*** Engage with stakeholders to support legislation for vegetation management. Review network design standards and benchmark international utility responses. Improve the capture of fault data for resilience planning.
- ***Resource mobilisation:*** Strengthen partnerships with European utilities and harmonise material standards. Update storm plans to reflect recent learnings, and enhance the usage of smart meter data for outage management.

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[80] ESB Networks WINTER 2025 RESILIENCE PLAN
[81] ESBN – Storm Éowyn Review

- ***Customer and Communications:*** Expand support for vulnerable customers and improve the accuracy of estimated restoration times. Formalise coordination with critical infrastructure owners and improve media engagement and volunteer training.
- ***Safety enhancements:*** Introduce dedicated safety assurance roles and standardised protocols for visiting crews. Ensure staff wellbeing through structured rest periods and welfare support.

The National Directorate of Fire and Emergency Management (NDFEM), a unit within the Department of Housing, Local Government and Heritage, in October 2025, published a review of the coordinated response to Storm Éowyn[82]. The report outlines the NECG's necessary response actions and details the recommendations considered necessary to consolidate and build on the strengths of the existing coordination structures. It acknowledges the need for continuous improvement, emphasising community support measures and the strengthening of critical infrastructure resilience.

The key recommendations are outlined below:

- ***Immediate Actions:*** Operators of electricity, gas, water, wastewater, and communications must address vulnerabilities before the next storm season and report preparations to the Government Task Force (GTF) on Emergency Planning.
- ***Regulatory Measures:*** The EU Critical Entities Resilience (CER) Regulations require risk assessments and mitigation plans. Oversight is provided by designated competent authorities. Digital infrastructure will be covered under the forthcoming National Cyber Security Bill.
- ***Oversight***: The Minister for Defence leads the development of a national strategy, with cross-government coordination via the GTF.
- ***Sectoral Groups:*** The Department of Defence has initiated sectoral groups for energy, water, and communications to mature resilience planning.
- ***Local Critical Entities Groups:*** Local authorities are encouraged to establish inter-agency groups to coordinate with essential service providers and maintain emergency contact lists.
- ***Backup Power:*** All critical infrastructure must have sufficient backup power to endure extended outages. Guidance will be developed through sectoral groups.
- ***NECG Coordination:*** During any crises with potential impact on the operators of essential services the NECG must consider the establishment of a critical infrastructure subgroup to manage disruptions, restoration timelines and cross-cutting issues.
- ***Vegetation and Forestry Management:*** Legislative changes are recommended to enable proactive vegetation clearance and establish Forestry Corridors to protect infrastructure.
  Infrastructure Resilience: The CER Directive is central to improving resilience. Implementation will be overseen by the Office of Emergency Planning and relevant regulators.

[82] Department of Housing, Local Government and Heritage – Review of Storm Éowyn

Malicious Actions

Cyber security

Addressing cyber security threats is an increasing concern within the energy sector as the numbers of reported attacks against utilities has increased in recent years. Regulators and legislators are attempting to address the threat through increased guidance for operators and the introduction of legislation mandating a minimum set of cyber security controls. Within Europe, the Network and Information Systems Directive 2 (NIS2), which replaces the NIS1 Directive, establishes a unified legal framework to enhance security across 18 critical sectors in the EU such as energy, public administration and water. The NIS2 was built upon the original NIS Directive, requiring measures to strengthen, manage and harmonise cyber security across the EU. An update from the National Cyber Security Centre (NCSC) in June 2025[83] indicated that the NIS2 transposition was ongoing and that NIS1 (NIS-D) continues to apply to already designated Operators of Essential Services within the State.

The NCSC was established to assist government, associated agencies, and critical infrastructure providers in defending against cyber-attacks. They aim to protect government systems and information, plan for and respond to cyber incidents and work with providers of critical national infrastructure to improve the protection and computer security of such infrastructure against cyber-borne threats.[84] Cybersecurity policies are kept under regular review by stakeholders in the electricity sector, and it is expected that the risk scenarios and responses are updated frequently.

In Ireland the TSO, DSO and large generators are designated Operators of Essential Services under the NIS-D directive. They are required to complete an annual Cyber Resilience Self-Assessment and submit it to the NIS-D Competent authority (NCSC). This self-assessment covers,

- The organisational structures, policies and processes in place to manage cybersecurity risk to the network and information systems of the OES e.g.
  - Governance and cyber risk assessment & management
  - Inventory and asset management
  - Supply chain risk management
- The security measures in place to protect their network and information systems e.g.
  - Logical and physical access controls
  - Data security
  - Service protection policies, processes and procedures
  - Maintenance and protective technologies
- The capabilities in place to identify, detect and defend against the occurrence of an cybersecurity event e.g.
  - Anomalies & event detection
  - Security monitoring and detection processes
- Measures to respond to and recover from a cybersecurity incident e.g.
  - Business continuity planning, disaster recovery and incident response

[83] NIS 2
[84] National Cyber Security Centre

Issues identified as part of the self-assessment process are required to be assessed, risk rated and addressed in a corrective action plan.

ESBN has incorporated the requirements set out in the NIST CSF to its critical systems that fall within the scope of NIS-D, specifically power system SCADA and Utility Telecommunications system.

In March 2024, the European Commission adopted the first-ever Network Code on Cybersecurity (EU) 2024/1366 [85] (NCCS) for the electricity sector. As outlined in Article 59 of the EU 2019/943 [86] on the internal market for electricity and the EU's 2022 EU Action Plan to digitalise the energy system [87], this delegated act plays a crucial role in enhancing the cybersecurity resilience of critical energy infrastructure and services within the EU. It is designed and aims to ensure a strong, unified level of cybersecurity for cross-border electricity flows within Europe.

The network code aims to establish and implement a recurring process for conducting cybersecurity risk assessments within the electricity sector. These assessments are designed to systematically identify entities that carry out digitalised operations with a critical or high impact in cross-border electricity flows, evaluate their cybersecurity vulnerabilities, and determine the necessary measures to mitigate these risks effectively. To achieve this, the network code develops a governance framework that leverages and aligns with the mechanisms outlined in horizontal EU legislation, specifically the updated and revised NIS2 [88].

The CRU is carrying out the tasks of the competent authority in accordance with the NCCS as per Article 4(1) of the NCCS Regulation (EU) 2024/1366 based on the CRU's role as the regulatory authority under Directive (EU) 2019/944 [89]. Article 24(6) of the NCCS Regulation requires competent authorities to notify entities that they have been identified as entities no later than 13 June 2028.

Specific response to cyber security incidents affecting the electricity sector

As is the case with any initiating event that may impact the electricity system, the response to an event caused by a cyber-attack will follow the procedures set out in section 3.1(a) of this document, as appropriate. A cyber-attack will also lead to the activation of the National Cyber Emergency Plan (NCEP)[90]. The NCEP has been developed in alignment with the Strategic Emergency Management National Structure and Framework[91], and ensures that all stakeholders (including

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[85] Commission Delegated Regulation (EU) 2024/1366 of 11 March 2024 supplementing Regulation (EU) 2019/943 of the European Parliament and of the Council by establishing a network code on sector-specific rules for cybersecurity aspects of cross-border electricity flows.
[86] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast) (Text with EEA relevance.)
[87] 2022 EU Action Plan to digitalise the energy system
[88] Network and Information Security Directive (NIS2)
[89] Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast) (Text with EEA relevance.)
[90] National Cyber Emergency Plan (NCEP)
[91] Strategic Emergency Management National Structures and Framework

Government Departments and Operators of Critical National Infrastructure) understand their roles and responsibilities; that the public understands the government's approach; and that the response to a national cyber emergency is coordinated and effective.

The National Cyber Emergency Plan (NCEP) sets out the national approach for responding to serious cyber security incidents that affect the confidentiality, integrity, and availability of nationally important information technology and operational technology systems and networks. It defines a cyber emergency as any cyber incident which causes or threatens to cause: death or serious injury or damage to property, the environment or the economy or significant incidents impacting two or more critical sectors, and which requires the activation of the National Emergency Coordination Group (NECG Cyber) to ensure an effective coordinated response for containment, mitigation and/or recovery

In the case of a cyber incident involving electricity supply, as per the Strategic Emergency Management National Structure and Framework, this group will likely involve DCEE as the relevant lead government department for the energy sector and CRU, NCSC, EirGrid, ESBN and possibly GNI as relevant agencies. The NCEG will also oversee the communications relating to the incident and engagement with external agencies.

In 2022, a national exercise was conducted with the objective of simulating a cyber attack on the energy sector[92]. The aim of this exercise was to test the NCEP. Additionally, the NCSC conducted exercises to test the NCEP in 2023 and subsequently published an updated version of the plan in May 2024. The NCSC also participate in the following cyber exercises:

- Locked Shield[93] - this week long exercise took part in April 2024, the aim of the exercise is to enable cyber security experts to enhance their skills in defending national IT systems and critical infrastructure under real-time attacks.
- Cyber Europe[94] - is a cyber incident and crisis management exercise organised by the European Union Agency for Cybersecurity (ENISA). In 2024, the focus of the exercise was on the energy sector, with the aim of simulating the escalation of a large-scale cybersecurity incident into a cybersecurity crisis.

Physical security

The CRU has been designated by the Minister for Defence[95] under the *European Union (Resilience of Critical Entities) Regulations 2024*[96] as the Competent Authority for the implementation of the Critical Entities Resilience Directive[97] in the energy sector, to include the subsectors of electricity,

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[92] National Cyber Security Centre conducts successful emergency exercise simulating cyberattack on the energy sector
[93] Locked Shield Exercise
[94] Cyber Europe 2024
[95] Tánaiste signs new regulations to enhance the resilience of the operators of essential services in the State
[96] S.I. No. 559/2024 - European Union (Resilience of Critical Entities) Regulations 2024 (irishstatutebook.ie)
[97] Directive - 2022/2557 - EN - CER - EUR-Lex (europa.eu)

gas, oil, hydrogen and district heating and cooling. The role of the Competent Authority includes: participation in the National Risk Assessment process; identification of sectoral critical entities; notifying critical entities of their identification; assisting critical entities in meeting their obligations under the Directive; compliance of critical entities with the Directive. The Department of Defence will act as a strategic office with oversight of the delegated operationalisation of the competent authority function for each sector covered in the Directive. Successful implementation of the Directive is expected to lead to the improvement of critical entities' resilience, thereby protecting our society and our security.

Access to all Control Rooms on the system and associated critical infrastructure is tightly controlled with sophisticated access control systems in place. Physical building security and monitoring measures are used at the sites to ensure only legitimate entry is permitted.

Ireland is an active participant in the Permanent Structured Cooperation (PESCO)[98] project on Critical Seabed Infrastructure Protection. This initiative aims to improve the effectiveness of maritime infrastructure protection, thereby enhancing IE's capability to protect subsea assets thereby increasing their security and resilience[99]. The European Commission recently published a Recommendation on the security and resilience of submarine cable infrastructures[100] in the light of the disruption of the Estlink2 cable between Finland and Estonia. This Recommendation emphasises the need to enhance the security and resilience of submarine cables against physical and cyber threats.

Technical

As TSO, EirGrid operates and ensures the maintenance[101] and development of a safe, secure, reliable, economical and efficient transmission system, in accordance with its obligations under Regulation 8(1) of S.I. 445/2000. EirGrid maintains and develops technical standards[102], including functional specifications and standard drawings that are available to assist Customers proposing to connect to the Irish transmission system. These technical standards govern the design and construction of new transmission assets namely transmission substations, cables and overhead lines as well as providing guidance when developments are proposed in proximity to existing transmission infrastructure.

It should be noted that physical maintenance works are carried out by ESBN, as Transmission Asset Owner (TAO), in accordance with its obligations under Regulation 19(a) of S.I. 445/2000. The arrangements governing the interactions and respective roles of the TSO and TAO in respect to the maintenance of the transmission system are further detailed under Section 8 of the Infrastructure Agreement[103].

Transmission System Operator - Outage Planning

98 Permanent Structured Cooperation

99 Maritime Jurisdiction Dáil Éireann Debate

100 Recommendation on the security and resilience of submarine cable infrastructures

101 Maintenance Policy including operational testing

102 Design technical standards

103 ESBN and EirGrid Infrastructure Agreement

As TSO, EirGrid develops and implements a Generation Outage Plan. This ensures co-ordination of "planned outages" when power stations will not be available due to maintenance or other reasons. The Generation Outage Plan takes into account security of supply in Ireland, as well as economic operation of the power systems, and the maintenance/resource needs of generators. EirGrid also develops a Transmission Outage Programme and manages transmission outages. This involves planned times when transmission infrastructure (lines, cables and substations etc.) will be out of service for maintenance. It also involves times when testing, connection of new plant and decommissioning of old plant is carried out.

A high-level description of the transmission outage planning process is available on the EirGrid website.[104]

Transmission Asset Maintenance Policy

Transmission maintenance is undertaken to ensure that the transmission system can operate in a safe, secure and reliable manner. The Transmission Asset Maintenance Policy comprises preventive, corrective, fault and statutory maintenance tasks as well as continuous and cyclical condition monitoring (on-line and off-line). The Transmission Asset Maintenance policy is kept under review to ensure that it continues to meet the requirements of the system and best international practice.

Transmission Protection Maintenance Policy

Transmission Protection Maintenance Policy details the preventive and corrective maintenance tasks, as well as the frequency at which the protection maintenance should be carried out. The Protection Maintenance Policy is kept under review to ensure that it continues to meet the requirements of the system and best international practice.

Distribution System Maintenance

ESBN have 'Business as Usual' controls that mitigate risk for all asset classes across the distribution network, i.e., substations, lines, cables, meters, protection. These include:

- Maintenance Policy & Standards
- Security Policies
- Maintenance & Inspection Procedures (that support frontline delivery)
- Risk Register that looks to capture key asset risks occurring across the portfolio and set out controls to mitigate risk
- Capital & Maintenance work programmes that support ongoing replacement/upgrading of at-risk plant

As the ICT behind the operation of the power system becomes more complex, it may provide more opportunities for failures. To protect against the loss of ICT or Telecoms, there is a back-up telephony system (OPTEL) in place, and procedures for IT systems to fail over to alternative servers. There is a backup software system that can be used in the event of a failure of the EMS.

[104] Transmission Outage

In the case of a physical failure in the NCC, EirGrid can move operations to a designated Emergency Control Centre.

Gas Quality

The implementation of a measure to address risk from low Wobbe Index (WI) gas entering the IE network from Moffat involves the notification of generators by GNI of any low WI gas detected at Moffat. The GNI control room monitors gas quality entering the network on a continuous basis and would be alerted to deviations from the approved gas quality specification. If low WI gas (but within the range of the gas quality specification) is monitored at Moffat, gas-fired generators would be notified by email of the expected low WI gas, which could take a number of days to reach the IE network, depending on the time of year and the volume of gas being transported at the time. This alert would then give generators notice to implement any actions they deem necessary to equipment (e.g. turbine settings) in order to manage lower WI gas. This measure is considered to be sufficient to reduce any risk from low WI gas.

Supply chain

Natural Gas

In March 2025, the Minster for the Environment, Climate and Communications received government approval to proceed with the development of a State-led Strategic Gas Emergency Reserve (SGER), in line with Article 5(1) of 2017/1938. The purpose of this project is to enhance Ireland's resilience in the event of a gas disruption.

In 2022/23, 82% of gas demand was supplied through the Moffat Entry Point in Scotland[105]. Should there be an interruption to this gas supply through Ireland's largest gas infrastructure (IC2) on a peak gas day, there is potential for up to 35% of gas demand being unmet[106]. Considering this, Ireland's energy security would be significantly improved and risks greatly reduced if Ireland were to implement a measure to meet this gap and gain compliance with the EU N-1 Infrastructure Standard, under Regulation 2017/1938.

This project will enable the implementation of a Strategic Gas Emergency Reserve on a transitional basis, for use in the event of a disruption to gas supplies. The emergency reserve will be in the form of a Floating Storage and Regassification Unit (FSRU) and will be owned on behalf of the state by Gas Networks Ireland (GNI).

In the government's 'National Risk Assessment 2023' a disruption to Ireland's electricity and gas supplies represents a low likelihood but very high impact event. Recent events of apparent sabotage to sub-sea infrastructure have emphasised this heightened security of supply risk. The SGER may be in operation for the latter period of this RPP cycle. This measure would provide a significant risk reduction measure for the *fossil fuel shortage* scenario.

In order to prepare for any potential shortage of supply, Ireland's gas TSO (GNI) undertakes annual gas emergency exercises to test the effectiveness of industry response to a gas supply emergency,

[105] Network Development Plan 2023
[106] Energy Security in Ireland to 2030 - Energy Security Package

including for electricity generation. Section 6 below describes recent emergency exercises conducted.

CRU Decision CER/09/001[107] '*Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland*' aims to mitigate against potential loss of generation due to a shortage of gas. The obligation requires that gas generators be able to run at 90% of their rated capacity on a secondary fuel and must hold a predetermined level of stock of that secondary fuel as set out in Table 14. Generators are regularly tested by EirGrid running on secondary fuel and are obliged to provide monthly reports to EirGrid on their secondary fuel stock levels. The report must show the available amount of secondary fuel of the unit running continuously at rated capacity on its primary fuel.

The CRU receives regular updates on the availability of generators on secondary fuel; it has recently been the case that at any given time, one or more generators may not be available to run on secondary fuel, typically due to technical failures. Additional work by CRU and EirGrid on monitoring and engaging with generators on maintenance and upgrades has resulted in a significant improvement in availability in recent years.

In the event of a gas shortage, it would be expected that the State would prioritise oil supply to the power sector.

Table 14 Secondary fuel requirements for each generator type

Primary Fuel Type of the Generating Unit	Requirement to be capable of running on a secondary fuel	Requirement to hold stocks of that fuel
Gas units and CHP units of more than 10MW	Yes	Requirement to hold secondary fuel
Non-gas units such as oil and coal (excluding renewable and peat units)	No requirement	Requirement to hold primary fuel
Renewable units	No requirement	No requirement
CHP units of 10MW and less	No requirement	No requirement
Peat units	No requirement	No requirement

Wind power

In 2023, renewable energy sources represented 40.7% of IE's electricity supply, up from 38.6 in 2022. Wind energy accounted for 33.7% of the total electricity supply, while solar PV accounted

[107] Secondary Fuel Obligations on Licensed Generation Capacity in the Republic of Ireland

for 1.9% [108]. The current record for the maximum wind output for Ireland is 3,866MW reached on 6th December 2023[109]. The record for the maximum system demand is 6,024MW[110].

Two forecast vendors are used to provide daily 5-day forecasts, and wind is not currently included in generation outage planning, which minimises the potential impact of forecast errors.

The increasing addition to the system of batteries and interconnections such as Greenlink IC, which became operational in January 2025, provides opportunities to mitigate shortfalls associated with the coincidence of short-term calm conditions with a peak in demand.

Progress is currently being made on enhancing the representation of renewables and other aspects of the system in capacity adequacy studies – for example, the model previously used by EirGrid to conduct the GCS, Aala, has been replaced in 2024 by the AIRAA based on a more sophisticated unit commitment model, Plexos.

Human

Accidental errors

There is a certification and re-certification program for all roles in the EirGrid control room. This program assesses and tests the grid controllers every two years in their competence to do remote switching on the power system. In 2023/4 a review of safety documentation was completed by EirGrid working closely with ESB Networks, covering a number of aspects of the existing safety systems.

It is ESBN policy that only competent persons shall carry out electrical operations on the system. The process of issuing a competency approval for operations on the system includes successful completion of the appropriate training course, followed by mentoring with a competent person for a number of switching programmes as detailed in the procedure. Following completion of these two stages, an assessment process (technical & practical) is in place to confirm that the required competency is in place prior to the authorisation of an approval.

Pandemic and Industrial action, strikes, riot

ESBN has business continuity plans in place which cover a range of potential scenarios including pandemics, cyber-attacks and industrial disputes. EirGrid has a Group Crisis Management Plan in place which will be invoked in the event of major incidents. This plan supported by Major Incident Response Plans which are revised from time to time.

[108] SEAI – First look: Renewable Energy in Ireland 2023
[109] Wind Energy Records
[110] New electricity demand records set during cold snap

Adequacy

Regional adequacy type scenarios

Included here are *Non-delivery of planned infrastructure projects accounted for in TSO system planning* and *Rapid above-trend growth in electricity demand*

To be included in TSO system planning, and by extension inform future supply/demand margins, non-generation infrastructure projects such as interconnectors must be sufficiently advanced in their development process; for example, have reached financial close and are in a position to start construction. For new generation plants, projects must have been successful in a Capacity Auction and risk adjusted to an expected delivery date aligned with best available information.

The Capacity Remuneration Mechanism supports delivery of new capacity in Ireland. Capacity Auctions are normally held by the TSO four years (T-4 Auctions) before a Capacity Year with additional Auctions for incremental capacity held closer to the Capacity Year, e.g. in the year prior to the Capacity Year start (T-1 Auctions). T-4 Auctions provide for the delivery of new capacity, which is capacity that is yet to be commissioned, as well as providing revenue to facilitate existing capacity to remain in the market. New capacity is required to meet a series of milestones after achieving success in a Capacity Auction. This includes a requirement to achieve Substantial Financial Completion (SFC) within a certain timeframe of the Capacity Auction Results Date, which is 18 months in T-4 auctions. To achieve SFC the project must hold, amongst other items, all necessary consents, licences, authorisations and permits in respect of the construction, commissioning, repowering or refurbishment works for the planned capacity. The final date for delivery of the planned capacity (Long Stop Date) is 18 months beyond the start of the Capacity Year (in the case of new capacity delivering from a T-4 auction).

The achievability of proposed new capacity projects is evaluated as part of the Qualification process by the System Operators. Where projects are deemed unlikely to meet the Auction requirements, including timely delivery, their qualification application can be rejected.

Where Awarded Capacity by a successful bidder is terminated, a termination penalty is applied, which increases proportionally as the Capacity Year in question approaches.

Grid instability scenario

<u>Existing measures to mitigate the risk of this scenario include the following.</u>

- Governance: oversight of the introduction of new technologies, changes to operational policy, studies, pilots and lessons learned.
- Change management: Advanced studies and pilots are undertaken before adopting new technologies or operational policy on an enduring basis.
- Operations: Advanced control centre tools, systems, and processes are developed and implemented to ensure power system security – including the wide deployment of phasor monitoring units (PMUs) on the Irish power system to allow the interactions of devices on the power system and the system's oscillation characteristics to be assessed in real time and post incident.
- Lessons learned: Detailed technical investigations are conducted on unanticipated events on that system and actions implemented.

Summary Table of Preventative and Preparatory Measures

Table 15 below summarises the preventative and preparatory measures in place for each scenario type.

Table 15 Summary of preventative and preparatory measures per scenario category

Owner (▼) Participants						Measure	Type				Scenarios																										Existing /Planned
DECC / Govt	CRU	EirGrid	ESB Networks	GNI	NORA		Preventive	Preparatory	Emergency	Non-Market	W.SS	W.SW	W.ST	W.IL	W.FL	W.DF	W.FE	N.SW	N.SW	M.AA	M.AC	M.AE	M.CA	M.UA	M.AS	T. IA	T.SD	S.FF	S.NF	H.PA	H.IA	H.IM	IE.FO	IE.ND	IE.RG	IE.GI	
						Policy & Regulation																															
▼						National Energy Security Framework	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
▼						CER Directive (transposed as S.I. No. 559/2024)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	planned
▼						NIS-D regulation	✓														✓	✓	✓	✓													planned
▼						NIS-2 regulation															✓	✓	✓	✓													planned
		▼				Operational Security Standards (**OSS**)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						System status / outlook																															
		▼				All-Island Resource Adequacy Assessment (**AIRAA report**)	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Winter Outlook report (annual)		✓				✓	✓	✓	✓	✓	✓																				✓
		▼				System Margin Outlook (twice weekly - Monday/Friday)		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Renewable energy forecasts (primary & secondary)		✓			✓	✓	✓	✓	✓	✓																					✓
		▼				System Margin Risk (market message)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				System Margin Warning (market message)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				System State notifications (market message)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Supply side measures																															
		▼				CRM assessment of viability of timely delivery – proposed new capacity	✓				✓	✓				✓	✓											✓					✓	✓	✓		✓
		▼				Capacity Auctions (T-1, T-2, T-3, T-4)	✓				✓	✓				✓	✓											✓					✓	✓	✓		✓
		▼				Binding Capacity Auction contracts with termination clauses	✓				✓	✓				✓	✓											✓					✓	✓	✓		✓
		▼				Generation / interconnector outage plan	✓	✓			✓	✓	✓			✓	✓											✓					✓	✓	✓		✓
		▼				Reserves	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				System Alert Procedure - Generators		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Short-run batteries		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Temporary Emergency Generation (TEG)			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Retained Existing Units (REU) - Moneypoint			✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Primary Fuel																															
		▼		▼		Joint Procedure for Gas Emergencies		✓																				✓									✓
					▼	National Oil Reserves		✓	✓																			✓									✓
	▼					Secondary Fuel Obligations		✓	✓																			✓									✓
▼					▼	Secondary Fuel Replenishment Plan		✓	✓																			✓									✓
		▼				Secondary Fuel Testing		✓																				✓									✓
▼				▼		Strategic Gas Emergency Reserve (SGER) (Planned)		✓	✓	✓																		✓									planned
				▼		Enhanced leak detection (Planned)		✓	✓																			✓									planned

Owner (▼) Participants						Measure	Type				Scenarios																										Existing / Planned
DECC / Govt	CRU	EirGrid	ESB Networks	GNI	NORA		Preventive	Preparatory	Emergency	Non-Market	W.SS	W.SW	W.ST	W.IL	W.FL	W.DF	W.FE	N.SW	N.SW	M.AA	M.AC	M.AE	M.CA	M.UA	M.AS	T.IA	T.SD	S.FF	S.NF	H.PA	H.IA	H.IM	IE.FO	IE.ND	IE.RG	IE.GI	
						Demand side measures																															
	▼					Market design - price signals	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	▼					Time of Use electricity metering / pricing	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	▼	▼				Capacity Market - Demand Side Units (**DSU**)	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Flexible Demand contracts with Large Energy Users	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				System Alert Procedure - Demand Side Unit actions		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			▼			Beat-the-Peak Commenrcial & Domestic		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼			Voluntary Demand Reduction (**VDR**)		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
▼		▼	▼			Public Appeal for electricity demand reduction		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼			Mandatory Demand Curtailment (**MDC**) of Large Energy Users			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼			Emergency Demand Control - fast and slow			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼			Rotal Load Shedding			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				TSO load shedding			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Cross-border measures																															
		▼				Cross-border capacity (Interconnectors and N/S tie line)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Market-based imports - based on price signals	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				TSO coordination meetings (Ireland / UK / Europe)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Interconnector Net Transfer Capacity (NTC) Reduction - Great Britain	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Allocation Constraints - Europe (from 2028 when Celtic goes live)	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	planned
		▼				Cross-border Trades		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Northern-Ireland erosion of system margins		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Interconnector Emergency Assistance (**EA**)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Interconnector Emergency Instruction (**EI**)			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Grid measures																															
		▼	▼			Climate Adaptation Plans	✓				✓	✓	✓	✓	✓																						✓
		▼	▼			TSO/TAO system planning input requirements	✓				✓	✓	✓	✓	✓																						✓
		▼	▼			TSO and DSO technical standards and specifications	✓				✓	✓	✓	✓	✓											✓	✓										✓
		▼	▼			Transmission Asset Maintenance Policy	✓				✓	✓	✓	✓	✓																						✓
		▼	▼			TSO/TAO infrastructure delivery incentivisation under price reveiws	✓				✓	✓	✓	✓	✓																						✓
			▼			DSO/TAO Standard - Vegetation Management and Timber Cutting	✓				✓	✓	✓	✓	✓																						✓
			▼			DSO/TAO Maintenance & Inspection Procedures	✓				✓	✓	✓	✓	✓											✓	✓										✓
			▼			TSO/DSO/TAO Capital & Maintenance work programmes	✓				✓	✓	✓	✓	✓											✓	✓										✓
		▼	▼			TSO/DSO/TAO outage planning - quantitative risk assessments	✓	✓			✓	✓	✓	✓	✓																						✓
						Telecommunications measures																															
		▼	▼			Optel back-up telephony system		✓	✓				✓							✓	✓																✓
		▼	▼			Substation backup supplies / back feeds		✓	✓				✓							✓	✓																✓
▼		▼	▼			Tetra network		✓	✓				✓							✓	✓																✓

Owner (▼) Participants						Measure	Type				Scenarios																										Existing /Planned
DECC / Govt	CRU	EirGrid	ESB Networks	GNI	NORA		Preventive	Preparatory	Emergency	Non-Market	W.SS	W.SW	W.ST	W.IL	W.FL	W.DF	W.FE	N.SW	N.SW	M.AA	M.AC	M.AE	M.CA	M.UA	M.AS	T. IA	T.SD	S.FF	S.NF	H.PA	H.IA	H.IM	IE.FO	IE.ND	IE.RG	IE.GI	
						Control Centre measures																															
		▼	▼	▼		Emergency Control Room infrastructure		✓	✓				✓								✓									✓	✓						✓
		▼	▼	▼		Business continuity plans		✓	✓				✓							✓	✓	✓	✓	✓	✓					✓	✓						✓
		▼	▼	▼		IT fail-over servers		✓													✓																✓
		▼	▼	▼		EMS software backup system		✓													✓																✓
		▼	▼	▼		Emergency Control Centres and infrastructure		✓													✓																✓
		▼	▼	▼		Training and Certification programme for Control Centre Staff	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Critical Incident Management training workshops		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Security measures																															
		▼	▼	▼		Control Centre and critial infrastructure security measures	✓																														✓
						Incident Plans																															
		▼				System Defence Plan		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			▼			DSO Load Shedding Plan		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				TSO Severe Weather Protocol		✓	✓			✓	✓	✓	✓	✓	✓																				✓
		▼				TSO solar storm policy		✓											✓																		✓
		▼	▼			TSO and DSO cybersecurity policies	✓	✓															✓														✓
						National and regional coordination structures																															
▼						Energy Security Group (**ESG**)	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	▼					Gas and Electricity Emergency Planning Forum (**GEEP**)	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
▼						UK & Ireland Security of Supply Forum	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Emergency coordination structures																															
	▼					Joint Energy Emergency Response Team (**JEERT**)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
▼						National Emergency Coordination Group (**NECG**)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
▼						National Cyber Security Centre (**NCSC**)	✓	✓	✓												✓	✓	✓	✓													
						Crisis communications structures and plans																															
		▼	▼	▼		Joint Crisis Messaging Plan	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼	▼		Energy Press Officers' Network (**EPON**)		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
▼						Energy Sector Crisis Communications Subgroup		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼	▼	▼		Website stakeholder information		✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
			▼			DSO Power Check website (interruption status)			✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
						Emergency preparedness exercises																															
▼						Exercise programme - Cross-Border (NI&GB)		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
▼						Exercise programme - National (NECG)		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
		▼				Exercise programme - Energy Sector (PSECP Electricity Emergencies)		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
				▼		Exercise programme - Energy Sector (NGEP Natural Gas Emergencies)		✓												✓								✓									✓

4.2 (c) Measures to Mitigate Electricity Crises, Including Non-Market Measures

(i) Criteria and process for demand control

Demand control (load shedding) involves liaison with the Distribution System Operator to reduce demand (see Section 3.1(d)), and may be utilised if the system is in an Emergency State. Options to disconnect demand or instruct demand curtailment would be deployed only after market-based solutions have been exhausted or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. Where time permits, large customers may be requested to reduce demand voluntarily (VDR) during a system Alert, potentially avoiding the need for load shedding. This is true for system-wide issues, as well as for localised issues whereby there may be fewer market-based solutions or options available.

As part of the actions taken under the Security of Supply Programme, System Operators have since 2021 put in place a Mandatory Demand Curtailment process which includes an instruction to large energy users to reduce demand (through a reduction in base demand or using their significant quantities of back-up generation) under a system Emergency State.

(ii) Security of Supply Programme of Actions 2021 – 2025

Ireland's electricity system is currently transitioning to a low carbon system with a high penetration of renewable generation. This includes generating an increasing proportion of electricity from wind and solar power, increasing battery storage capacity and delivering more interconnection with other countries, all of which help to reduce the reliance of the system on fossil fuels. Investments are also being made in technical devices to ensure grid stability without large traditional generators, such as synchronous compensators.

A set of factors were identified by EirGrid in the GCS 2021-30[111] and subsequent additional security of supply analyses in 2021 as contributing to a potential security of supply issue in Ireland. These included,

- a significant growth in electricity demand driven primarily by data centres and to a lesser extent by electrification of heat and transport;
- the closure of older fossil fuel generating stations in line with carbon and emissions reduction goals, and a reduction in availability of existing generators due to increasing forced outages and maintenance requirements;
- the termination of some capacity procured under the existing Capacity Remuneration Mechanism.

The analysis indicated an inability of supply to meet demand at peak times, particularly when coincident with low wind events or a forced outage of a conventional generator. In line with its statutory duties, based on the recommendations of EirGrid and working with the Department of

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[112] Security of Electricity Supply – Programme of Actions

Climate, Energy and the Environment, the CRU developed a programme of actions to be executed to address the potential adequacy gap in September 2021[112]. In June 2022, the CRU published an update[113] on the Programme of Actions reflecting the reorganisation of the work into 'Pillars' to increase efficiency and speed of delivery, and further updates were published in 2023, 2024 and 2025 [114].

Programme Key Actions

Under the published Programme of Work in September 2021, the CRU, in conjunction with EirGrid and the Department of Climate, Energy and the Environment (DCEE), developed several key actions to be delivered by this group.

These included:

- The delivery, through the all-island capacity auctions, of over 2,000 MW of enduring flexible gas fired generation capacity by 2030, to provide for growing demand, replace retiring generators and support additional penetration of renewables in order to meet our 2030 policy goals, and the development of a policy statement to underpin this capacity.
- Procurement of temporary emergency generation capacity to remain available until the necessary enduring capacity has been secured. This capacity is a non-market-based measure and will only be called upon in the event of a shortfall in market-based capacity and where alerts on the system are likely. -Extending the operation of older generation units, on a temporary basis, to be called upon only when necessary, until the arrival of new enduring capacity. -Actions to enhance the responsiveness of existing Demand Side Units in the SEM and develop additional demand side capacity, including accelerated deployment and optimised usage of batteries, and greater demand side response more generally. -Advance work on the regulatory frameworks to support delivery of new electricity interconnectors.

As the programme has evolved, the required workstreams to deliver these actions were further developed across the three key organisations charged with delivery of the programme.

The workstreams were reorganised into the following programme areas of activity.

- A - System Operations
- B - Demand Initiatives
- C - Delivery

A. System Operations

- Operational deployment of the Temporary Emergency Generation (TEG) units and Retained Units has been included in the latest Balancing Market Principles Statement (Ver 9.0), which was published on 12th August 2025[115].

[112] Security of Electricity Supply – Programme of Actions
[113] CRU Electricity Security of Supply Programme of Work Update
[114] Electricity Security of Supply Programme of Work Update February 2023
[115] Balancing Market Principles Statement Ver 9.0

- The Winter Outlook 2025/26[116], published in October 2025, included new market capacity and available TEG and REU units. It demonstrated a significant improvement in the outlook over previous winter, with an LOLE of 1.1 hours compared to an LOLE of 21 hours in the 2023/24 outlook. The system may enter the Alert State at times in winter 2025/26, most likely at periods of low wind and low interconnector imports. There is a low probability of the system entering the Emergency State in winter 2025/26, due to insufficient generation being available to meet the demand. If TEG and REU are excluded, the LOLE becomes 43.4 hours.
- Mandatory Demand Curtailment protocols have been strengthened through the assessment and approval of Industrial Emissions Directive (IED) licenses by the Environmental Protection Agency (EPA). This further enables customers with significant backup generation to deploy generators during a System Emergency, whilst ensuring compliance with air quality requirements. Pre-winter 2024/25 engagements took place with Large Energy Users on their continued preparedness to provide demand reduction using their on-site generators. The Power System Emergency Communications Plan (PSECP) was further tested as part of Exercise Méabh in September 2024, the outcomes of which informed Exercise Cathal in December 2024 (which included all energy sector agencies and the wider government departments that participate in the National Emergency Co-ordination Group). These exercises included coordinated crisis communications messaging across the Energy Sector and Government. System Margin Reports continue to be issued by EirGrid twice per week to provide an indication of system margins for the week ahead.

B. Demand Initiatives

- The focus of Demand Initiatives was demand management and reduction and its contribution to maintaining security of supply. The Proposed Decision on Large Energy Users connection policy[117] published by CRU on 18 February 2025 includes a requirement for data centres connecting to the electricity network to provide dispatchable onsite or proximate generation and/or storage capacity which matches their Maximum Import Capacity (subject to derating requirements), with this generation required to participate in the wholesale electricity market. The final decision on this policy will be published following consultation.
- The National Energy Demand Strategy (NEDS) has been developed to meet both the specific ambition set out in the Government's Climate Action Plan 2023 (CAP23) to "*complete and publish an electricity demand side strategy and implementation plan*" (EL/23/24), and to support wider decarbonisation and security of supply objectives. This action was completed with the publication of the NEDS Decision Paper[118] in July 2024, which included the identification of actions (approximately 53) across a number of stakeholders, with the overarching aim to enhance Ireland's energy demand flexibility. The NEDS has since entered the implementation phase. Overall support for the progression of these actions, and the Government recommendations, are contained within the Government's Climate Action Plan 2024 (CAP24), which calls for the implementation of

[116] Winter Outlook 2025/26 | EirGrid
[117] Review of Large Energy Users Connection Policy | CRU.ie
[118] National Energy Demand Strategy Decision | CRU.ie

the NEDS (EL/24/20) by all relevant bodies in order to realise the demand side strategy. In July 2025, the CRU published the second update on the progress of the NEDS actions[119]. It showed that the majority of actions, 35 out of 53, are on track, or have been completed

C. Delivery

- Under TEG 1, the North Wall (193 MW) and Huntstown (50 MW) are fully available to support the grid should the need arise for their use.
- Under TEG 2, Shannonbridge (256 MW) and Tarbert (150 MW) are fully available to support the grid should the need arise for their use.
- The Retention of Existing Units (REU) also falls under the Delivery workstream, targeting extension of the availability for operation of a number of older generation units, on a temporary basis, until new enduring capacity has been delivered to replace them through the Capacity Remuneration Mechanism (CRM). In August 2023, following Direction from the CRU, EirGrid entered into a Services Agreement with ESB for the continued availability of the three (3) units at Moneypoint after their planned closure date for the provision of Security of Supply services on an out of market and temporary basis. The units will operate on Heavy Fuel Oil (HFO) as a generator of last resort from June 2025 to end March 2029, with break clauses in place, and will provide a temporary conventionally powered back-up generator to the national electricity grid, making the most sustainable use of existing infrastructure and equipment.
- The Delivery workstream also focused on the delivery of projects successful in recent capacity market auctions under the CRM. A number of capacity auctions have been held since the CRU Security of Electricity Supply Programme of Actions was published in September 2021. The first of the capacity procured under these auctions has now come into operation, including significant volumes of battery storage, with further capacity expected to become available over the next few years.

Non-Market Generation and Alignment of TEG with Article 16(2)

Article 16(2) stipulates that non-market-based measures shall be activated only as a last resort if all market-based measures have been exhausted, or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. Article 16(2) also requires that non-market-based measures shall not unduly distort competition and the effective functioning of the internal electricity market. They shall be necessary, proportionate, non-discriminatory, and temporary.

EirGrid have presented guidelines to the Market Operator User Group[120] as to how they will operate the temporary emergency generation. An outline of this is included in the annually-updated Balancing Market Principles Statement (BMPS)[121]. EirGrid also published an *Information Note on Temporary Emergency Generation*[122] in March 2025. The compatibility of the non-market

[119] National Energy Demand Strategy Biannual Update | CRU.ie
[120] Market Operator User Group
[121] The latest versions will be available here: Balancing Market Principles Statement (BMPS)
[122] EirGrid Information Note on Temporary Emergency Generation

measures to be used in an emergency with the requirements of Article 16(2) is detailed in the paragraphs below. The outcomes of these actions in relation to mitigating actions to be taken before or during an emergency are included in Section 4.2 (c).

No undue distortion of competition or the effective functioning of the market

The temporary emergency generation (TEG) and the Retained Existing Units (REU) will exist outside of the market and will only be dispatched once market-based measures have been exhausted, or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. They are excluded from the ex-ante markets to avoid market distortions and are dispatched through TSO actions when necessary to maintain system security.

A number of CRM auctions have taken place since the use of temporary emergency generation was proposed, which have succeeded in procuring new generation capacity, indicating no impact on the functioning of the CRM.

Necessary

A capacity adequacy issue was identified, with ensuing risk of electricity crises, and in the time available, it was not possible to obtain the additional generation capacity required via a market-based mechanism.

Proportionate

The TEG and REU cannot operate in the market, and will only be dispatched where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. A value-for-money assessment indicates that maintaining specific units beyond their current life and procuring the first tranche of temporary emergency generation (TEG1) represents a net positive benefit in all scenarios. The second tranche of temporary emergency generation (TEG2) represents value for money in a number of credible scenarios. The contingency measures will be continuously under review to ensure they only remain in place, and incur costs for consumers, for as short a period as possible.

Non-discriminatory

All units identified in the Generation Capacity Statement 2021-2030 as assumed plant closures were considered for retention under Pillar 3 of the Security of Electricity Supply Programme of Actions and therefore the measure is non-discriminatory., the process follows the procedure set out by the CRU (CRU/17/346) and as provided for in the European Commission's CRM State Aid decision, see paragraph 164 of European Commission State Aid No. SA.44464 (2017/N) – Ireland Irish Capacity Mechanism[123].

[123] Available at: Ireland Irish Capacity Mechanism

The first tranche of temporary emergency generation (TEG1) was procured via an Open Competitive Dialogue Competition as set out in Council Directive 2014/25/EU and transposed into Irish law by the European Union (Award of Contracts by Utility Undertakings) Regulations 2016. The competition was advertised in the EU's Official Journal. The procurement process for TEG1 was non-discriminatory as to technology type and no geographic restriction was applied.

The second tranche of temporary emergency generation (TEG2) was undertaken under procurement in accordance with the "negotiated procedure" as set out in Article 61 of Directive 2014/25/EU, as transposed into Irish law by Regulation 49 of the European Union (Award of Contracts by Utility Undertakings) Regulations 2016. The generation was located at two separate sites at Shannonbridge and Tarbert generating stations, as set out in the Development (Emergency Electricity Generation) Act 2022[124]. No restrictions were placed on the OEMs or Suppliers eligible for consideration or the extent of the market engagement. The procurement process required that technology must be suitably mature and capable of evidenced operational application in a temporary generation situation. A range of technologies was considered. Second-hand equipment was offered by some OEMs/Suppliers and was considered in particular in the context of guarantees and warranties and potential for delays in transfer of the units to site owners.

Any measures undertaken in relation to the TEG and REU will be time limited and therefore be temporary in nature, as per the service periods outlined below. When new enduring capacity has removed the need, temporary units will cease operation and will be decommissioned. The service periods for these units are as follows:

- The TEG 1 units have an initial service period of 36 months from service commencement, with an option for EirGrid to extend the arrangement by up to two additional periods of 12 months each (3+1+1 years). The first of these units became operational and commenced service at the end of 2023.
- The TEG 2 units fall under the EirGrid, Electricity and Turf (Amendment) Act 2022 which allows for an initial services period up to 31 March 2027 with the option, to extend to no later than 31 March 2028, subject to order by the Minister for Climate, Energy and the Environment.
- REU Moneypoint three units (750 MW) will operate as a generator of last resort from June 2025 to end March 2029, with break clauses in place.

Temporary Emergency Generation (TEG units)

Background

TEG capacity has been procured under two tranches (TEG 1 and TEG 2), totalling c.650 MW of capacity that can be dispatched in under 15 minutes.

[124] Development (Emergency Electricity Generation) Act 2022

	Location	Capacity
TEG 1	North Wall	193 MW
	Huntstown	50 MW
TEG 2	Shannonbridge	256 MW
	Tarbert	150 MW

Objectives

The market and operational treatment of non-market generation is informed by the following objectives:

- Securing the power system in Ireland
- Minimising the impact on the wholesale markets.
- Utilising existing market and control room tools, systems, and processes to the maximum extent possible.
- Matching the scale and complexity required without needing to make wholesale changes to the Market Management System ('MMS') for generators that would be dispatched on a very infrequent basis (including practical measures - such as treatment of individual generators as one TEG unit).
- Adopting a single approach to the dispatch of all TEG units.
- Minimising as far as possible the need to dispatch these units.
- Integrating with existing power system emergency processes and procedures.

Market treatment

The treatment of TEG in the Single Electricity Market ('SEM') is based on the following principles:

- Ex-ante markets: TEG units are not permitted to participate in Ex-Ante Markets. Ex-ante market prices and volumes, as well as ex-ante market imports/exports schedules should therefore be unaffected.
- Capacity market: TEG units do not participate in Capacity Market auctions. They do not hold reliability options or receive capacity market payments and will not be subject to difference charges.
- Ancillary services market: Operators of TEG units are not contracted to provide or receive revenue for ancillary services. The scheduling and dispatch of TEG units should in so far as possible not impact other ancillary service providers.
- Balancing market: The TEG units have a presence within the Balancing Market ('BM') and participate in the Balancing Market (BM) but do so differently from other market units. They

are normally unavailable for balancing actions but will only be made available for dispatch when security of supply risk has been identified and where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. They are made unavailable to the BM when security of supply risk has abated.

- The TEG units are required to submit complex offers subject to Bidding Code of Practice (not simple offers). Commitment and dispatch are based on a pre-determined relatively high incremental prices which overwrites the submitted complex offer prices to minimise utilisation. All actions are flagged as non-energy. The operators of these units receive payments and charges from the BM. Any Infra Marginal Rent received by a TEG through the BM is in turn paid to EirGrid to the benefit of use of system customers.
- Dispatch of the TEG units by the System Operator will appear in BM reports.

Operational treatment

The capacity provided by TEG units is treated as follows ahead of real-time operations:

- Outages: TEG capacity is not included in margin calculations for the purpose of scheduling planned outages. TEG capacity may be considered as a risk measure in the event of local system outages with critical safety / system conditions. The units may be dispatched should a forced outage with critical safety / system concerns occur. If dispatched under these conditions, the System Operator will issue a market notice that the units have been dispatched (a Margin Warning will not be issued).
- Net Transfer Capacity (NTC) calculations: TEG capacity may be included in day-ahead NTC calculations, so as to avoid unduly restricting market exports.
- Outlook: The System Margin Outlook[125], issued twice a week, provides margin calculations with and without TEG capacity.

The criteria for including TEG capacity in margin calculation and for dispatching TEG units under tight margin conditions are as follows:

- System state: When system margin calculations for Ireland indicate that the system would enter Alert State or Emergency State in the absence of TEG capacity, this capacity is included in the margin calculation. The system will then remain in Normal State if available TEG capacity is adequate to address the shortfall (see Figure 6 below). This applies whether the TEG units have or have not been dispatched, given their rapid ramping capability (i.e. in under 15 minutes). A system Alert State or Emergency State is issued by the System Operator when the relevant criteria for these states are met after TEG has been included in margin calculations.
- Market transparency: A Market Notice (system Margin Warning) is issued in real time when the power system in Ireland would otherwise be in Alert or Emergency State (in the absence of TEG).

[125] System Margin Outlook Reports | Grid Information | EirGrid

- TEG dispatch: The TEG units are dispatched once a Margin Warning has been issued (where time permits), and where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation – having factored in the periods at which energy-limited resources will be dispatched (e.g. hydro, batteries, DSUs). Where time does not permit, a Margin Warning will be issued as soon as is practicable after the units have been dispatched.

- Prioritisation of TEG units: The dispatch priority of individual TEG units will be guided by operational considerations and nature of the scenario and related system threats at the time, including available run-hours of each of the TEG units, operating cost (gas vs. distillate), logistics (replenishment of fuel stocks), ramp times, and any known risks to reliable operation of the units.

- As described above, the TSO is required to issue a "Margin Warning" when the TEG units are considered in the margins and the system would otherwise have entered an Alert or Emergency State. This is a clear signal that the adequacy requirement has not been met by market capacity. Once the TEG units have been included in the margin calculations (even if not dispatched), the system is technically not in Alert or Emergency state as long as the additional non-market capacity covers the shortfall (i.e. loss of a single largest infeed will not give rise to load shedding). Issuing an Alert State requires the DSO and Large Demand Facilities to prepare for load shedding (Demand Disconnection by the DSO and Mandatory Demand Curtailment by the Large Demand Facilities). This is not necessary if the system is N-1 secure. A Margin Warning clarifies that the system would not have been secure had the non-market units not been considered in the Margin Warning (even if the TEG units have not been dispatched).

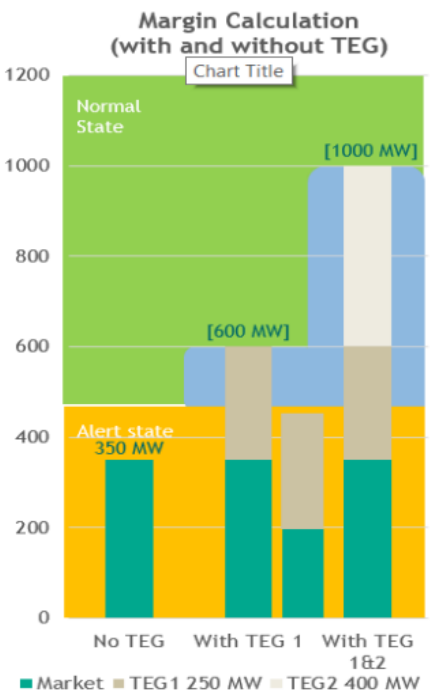

Figure 6 – TEG units dispatch, showing Margin Warnings.

Local security of supply and safety risks

In exceptional cases, where a safety risk or local security of supply risk arises (unrelated to system margins), non-market units may be dispatched without a Margin Warning being issued, after available market measures and available flexible demand has been considered. A market notice should be issued as soon as is practicable, indicating the period for which the units have been dispatched.

Testing

The TEG units may be tested from time to time. These units may be dispatched without issuing a Margin Warning in the following cases:

- Testing by the System Operator: To confirm the availability and response times under operational testing. This is in line with the process for other thermal units that are not regularly dispatched via the balancing market.
- Testing by TEG operators: For the purpose of ensuring the operational readiness of the units. The TEG units are required to have a Physical Notification (PN) communicating expected generation levels during testing on the day. The TEG units are required to have a PN for testing on the day.

A Margin Warning is not issued during these tests by the TSO as it is a communication to the market that system conditions are particularly tight, and, similar to a system Alert State, market participants are required to maximise their availability, which would not be the case during testing by the TSO. The TSO will issue a market notice immediately after the test has been initiated (issuing a notice before the test would defeat the objective of the test).

Section 4.2(a) of the RPP sets out the priority of measures to be applied as system margins become tighter. The capacity provided by TEG units may be included in system margin calculations when the system would otherwise be in Alert or Emergency State, as summarised in Table 12.

Transparency and reporting

Article 16(2) of Regulation (EU) 2019/941 requires the Competent Authority (CRU) to inform relevant stakeholders in its Member State of the application of any non-market-based measures. In addition to the information included in the Risk Preparedness Plan, EirGrid supports the CRU in the provision of this information by:

- Publishing System Margin Outlook reports twice a week showing the outlook with and without the capacity provided by TEG units.
- Issuing a “System Margin Warning” notice to the market when TEG units have been taken into consideration in system margins to avoid Alert or Emergency State in Ireland, or to support the power system in Northern Ireland.
- Issuing a market message when the TEG units have been dispatched.

- Publishing on EirGrid's website a list of the dates and times when the TEG units have been dispatched.

A total of eleven Margin Warnings have been issued as of December 2025 – i.e. on all these days the system would otherwise have entered Alert State. One Margin Shortfall Warning has also been issued to date. On none of these occasions were the TEG (or REU) units dispatched, underlining the intent to avoid dispatching these unless absolutely necessary.

The TEG units in Dublin were dispatched on the night of 8 May 2025. This is the only time that the units have been dispatched. The details of this incident, and reason for the dispatch, were presented in detail by the TSO to market participants on 20 May 2025[126]. The TSO have reported that this dispatch was necessitated by a significant unplanned transmission network outage (cable fault) in Dublin, giving rise to a critical condition on the system. This instance of TEG dispatch will be included by the TSO in the list published along with future dispatches of the TEG units. As described in the subsection above, and in the TSO's Information Note on Temporary Emergency Generation, the TEG units may be dispatched on an exceptional basis to address risks to safety / security of the system.

Retained Existing Units (Moneypoint units)

Background

Action 3 of the CRU Security of Electricity Supply Programme of Actions sought to explore the possibility of extending the operational life of a number of older units, on a temporary basis until new capacity has been delivered to replace them through the Capacity Remuneration Mechanism. As part of this action, EirGrid commenced discussions with a number of parties in regard to their respective units, including with ESB in respect to the potential to retain the three Moneypoint Units (MP1, MP2 and MP3) (the Moneypoint Units) on a temporary basis. The CRU issued a Direction to EirGrid on the 18 July 2023 to enter into an agreement with ESB for the provision of Security of Supply Services by Moneypoint under the Targeted Contracting Mechanism and, having regard to Article 16 of Regulation (EU) 2019/941 – the Risk Preparedness Regulation. The Services Agreement was entered into effect on 14 August 2023. The framework for reaching this Agreement is set out in the CRU's Information Paper - Regulatory Approach to Maintaining Local Security of Supply in Electricity (CRU17346[127]).

The Agreement with ESB is temporary in nature, and while extending to March 2029 includes break options for EirGrid to terminate the agreement in whole or in part (that is at a unit level) on 30 September 2027 or 30 September 2028, if the prevailing security of supply conditions allow. Following their closure (30 June 2025), the Moneypoint Units will only run when required for security of supply reasons and will not operate in the ex-ante markets. The details of this are outlined in the paper Security of Electricity Supply – Retention of Moneypoint Units (MP1, MP2 & MP3), issued by the CRU on 17th March 2023[128]. The Agreement negotiated with ESB is based on the use of Heavy Fuel Oil (HFO) rather than coal. Operating on HFO will increase the availability

[126] Market Operator User Group May 2025

[127] Information Paper - Regulatory Approach to Maintaining Local Security of Supply in Electricity

[128] Security of Electricity Supply – Retention of Moneypoint Units (MP1, MP2 & MP3)

of the Moneypoint Units and reduce their carbon intensity compared to coal operation while also retaining fuel diversity on the Island of Ireland.

All three units exited the capacity market at the end of June 2025 and became available as non-market units from 1 July 2025.

Market treatment

The Agreement only allows the Moneypoint Units to run for security of supply reasons and includes the following provisions to ensure that market distortion is minimised:

- The Units will only be run where required by the TSO for security of supply reasons.
- The Units are prohibited from participating in the Capacity Market, ex-ante market, intraday market and system services markets.
- The Units will participate as segregated units in the Balancing Market and will have restricted participation. This restriction is intended to limit any potential impact on competition. The units will be required to submit cost reflective bids only and will be paid the better of the bid price or the Balancing Market clearing price.
- Any market revenues received by ESB through the Balancing Market, where a unit(s) is dispatched for provision of security of supply services, will be paid to EirGrid to the benefit of use of system customers.
- System operator flagging of these units will be implemented with the intent of avoiding these units setting the imbalance price.

The costs of the Agreement will be funded through Transmission Use of System (TUoS) charges. These charges will be charged by EirGrid to suppliers, who in turn may pass them on to consumers.

System Operations Treatment

Article 16(2) of Regulation (EU) 2019/941 requires non-market-based measures to be activated only as a last resort if all options provided by the market have been exhausted, or where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. It further requires that non-market-based measures do not unduly distort competition and the effective functioning of the internal electricity market (including the SEM). They are required to be necessary, proportionate, non-discriminatory and temporary.

Such situations could arise during periods of insufficient market-based capacity to meet the TSO's security requirements, as well as during (or in anticipation of) electricity crisis scenarios such as those listed in this plan.

From an operational perspective, unlike TEG units which can be dispatched in real time (under 15 minutes), the Moneypoint units have significantly longer notice times (dependent on the heat state as defined by their Technical Offer Data), longer ramp times, and longer minimum on-times once synchronised. A decision to dispatch these units will therefore need to be made well before real time in the context of increased uncertainty related to the demand, RES forecasts, and imports.

Principles for decision making

The System Operator may instruct one or more of the Moneypoint units to prepare for synchronisation or to synchronise to the power system, where expected system conditions indicate a heightened risk of the system entering Alert or Emergency state, having considered:

- The outlook for the period ahead associated with the notification and ramp times and minimum on times of the Moneypoint units, given the heat state of the units, including the demand forecast, the RES (forecast and associated uncertainties), dispatchable generation availability (including operational risks declared by operators), generation constraints (energy limits, run hour restrictions, and any potential fuel constraints), and anticipated interconnector flows.
- The capacity available from the TEG units to respond in the event that a potential capacity shortfall materialises, as well as the available run hours and any known risks (such as potential fuel constraints).
- Scenarios and associated system conditions outlined in Section 2.

Dispatch priority

The following dispatch priority and related considerations guide the decision process.

Table 16: Dispatch priority and related considerations of REU, taking notice time of units into consideration.

Dispatch Priority	Considerations
Market-based resources	Available conventional generation including the uncertainty and potential impact associated with any significant known risks
	Run-hour limited plant: peakers, DSUs - including fuel supply.
	Energy limited plant: hydro, pumped-storage, Long-run batteries
Imports	Anticipated imports and support/trades from GB
	Net Transfer Capacity (NTC) reductions
Flex demand	Flexible (non-firm) demand available from Large Energy Users
TEG	Declared availability, annual and daily run hour restrictions, primary fuel (gas or distillate) availability.
REU (Moneypoint)	Declared availability, heat state, available run-hours, primary fuel (HFO) availability, as well as minimising the impact on the market position of Moneypoint Unit 5 (MP5) in the dispatch of MP2.

Where relevant it may be prudent in advance of tight margins to dispatch a Moneypoint unit, thereby also reducing the notice required for other cold units. Once synchronised, the system operator will regularly review the system margin outlook. Should system conditions indicate margins to have improved, reducing the risk of a margin shortfall, the unit may be instructed off, having considered the minimum on-time for these units. The synchronisation of a unit may also be cancelled if conditions have improved since a unit was called on to prepared for synchronisation.

Dispatch in response to specific risks to security of supply

Some scenarios or system conditions present a heightened risk to security of supply, considering the underlying uncertainty of an identified threat materialising, as well as the magnitude of the potential impact on the system. Given the long notice times, such scenarios or system conditions may warrant pre-emptive preparation, synchronisation, and/or ramping of the Moneypoint units to reduce the risk of an electricity crisis arising.

Relevant scenarios and system conditions may include, but are not limited to, the electricity crisis scenarios outlined in the RPP. The list below provides some specific examples.

- Storm weather alerts: potential high speed shut down of wind generation, potential loss of transmission circuits, and potential loss of conventional units.
- Extreme winter cold snaps: high demand, low RES often across GB as well, increased forced generation and/or transmission outages, and/or reduced generator availability.
- Ice loading / snow: a risk of significant transmission outages impacting generation plant.
- Natural gas emergency: reduced or interrupted gas supplies resulting in an instruction by GNI to reduce gas, with potentially reduced availability of gas units on secondary fuel, and risks to secondary fuel stock availability.
- Significant forced outages: significant volumes of generation plant or interconnector capacity forced off – particularly for longer durations
- Dunkelflaute: extended periods of limited RES – particularly where this is regional (i.e.. also impacting NI, GB and parts of Central Europe), thereby limiting potential cross-border support. This is likely to coincide with periods of high demand and/or high forced outage rates these also impact NI, GB and Central Europe.

Testing

The units may be tested from time to time to ensure that these are available for dispatch when required.

Reporting and transparency

Article 16(2) of Regulation (EU) 2019/941 requires the Competent Authority (CRU) to inform relevant stakeholders in its Member State of the application of any non-market-based measures. EirGrid will support the provision of this information by:

- Publishing System Margin Outlook reports (typically twice a week) showing the outlook with and without the capacity provided by Moneypoint units.
- Issuing a “Margin Shortfall Risk” notice to the market either indicating the period ahead for which there is a heightened risk of a system Alert or Emergency state being issued (in the

absence of non-market units), and for which one or more Moneypoint units have been instructed to prepare for synchronisation.

- Issuing a notice to the market for the periods when the Moneypoint units have been synchronised.
- Publishing a list of the dates and times when Margin Shortfall Risk notices have been issued and when the Moneypoint units have been dispatched, and the reasons for this.

The "Margin Shortfall Risk" notice issued to the SEM when the REU units are called on is a strong message to the Market regarding a potential capacity shortfall (with available TEG capacity already considered). If the Market responds to this, and/or demand and RES forecasts improve, synchronisation of the REU units(s) will be cancelled by the TSO.

For example, a "Margin Shortfall Risk" was issued by the TSO at 23:06 on 22/11/2025. In line with the aforementioned approach, synchronisation of the units was subsequently cancelled by the TSO on 25/11/2025, given an improvement in system conditions and inclusion of TEG capacity in the system margin calculations (a Margin Warning was issued on 25/11/2025 from 09:00 to 20:00).

Summary of Moneypoint and TEG activation

The operational characteristics of the TEG and the REU (Moneypoint units) differ significantly in their required notification and dispatch times. The treatment of these units, detailed individually in this section, is substantially different, given that:

- TEG units can be called on in real time, when the system might otherwise have entered Alert or Emergency state.
- A decision to call on the Moneypoint units may need to be made a few days ahead, in anticipation of significant margin risks to the system.

Table 17 Summary of Moneypoint and TEG activation

	Moneypoint units	**TEG Units**
Dispatch time	Heat state dependent. From cold to full output could exceed 48 hrs.	15 min to full output.
Market Messages	"*Margin Shortfall Risk*" issued before or when the MP units are instructed to prepare for synchronisation. *MP dispatch notice* when MP unit(s) synchronised.	"*Margin Warning*" when TEG capacity is included in real-time margin calculations *TEG dispatch notice* when units are dispatched in real time.
Dispatch	Units will be instructed to synchronise when the system outlook indicates a heightened risk that available TEG capacity is inadequate to avoid a System Alert/Emergency state. The synchronisation instruction may be cancelled, should the outlook improve.	TEG units are dispatched in real time where it is evident that market-based measures alone are not sufficient to prevent a further deterioration of the electricity supply situation. Note: TEG units may also be dispatched in response to local transmission system risks (in this case only a dispatch notice will be issued).
Prioritisation	TEG units will be prioritised over MP units to minimise the impact on the market. MP units may however be prioritised to manage TEG annual run hours limits, where TEG units have been regularly called on.	The dispatch priority of individual TEG sites is based on operational considerations at the time, including available run-hours, operating cost (gas vs distillate), logistics (replenishment of fuel stocks), and ramp time.
Reporting	Reported in System Margin Outlook: impact of available MP capacity on margins (based on heat state). Margin Shortfall Risk periods. Dispatch periods and reasons.	System Margin Outlook: impact of available TEG capacity on margins. Margin Warning periods. Dispatch periods and reasons.

4.2 (d) Framework for Demand Control (load-shedding)

Demand control is concerned with the reduction of demand (load-shedding) in the event of insufficient generation to meet demand, or in the event of breakdown or operating problems relating to frequency, voltage or thermal limits.

The all-island approach to demand control is set out in a SEM Business Process[129]. The technical detail on demand control is contained in the EirGrid Grid Code, the EirGrid Demand Control Policy (internal document), and the ESB Distribution System Operator Load Shedding Plan approved by the CRU[130].

The Grid Code states that demand control or load shedding may occur in the following ways:

- Automatic Load Shedding / Low Frequency Demand Disconnection
- Manual (Planned or Emergency) Disconnection

Grid Code section OC5 is concerned with the actions of the DSO and TSO in any case where available supply cannot meet demand, through insufficient generation, breakdown or operational issues. Manual Demand Control is specifically covered by Grid Code OC5.4, 'Procedure for the implementation of Demand Control on the Instructions of the TSO', and a description is also included in the SDP.

In the EirGrid Demand Control Policy, Operational Procedures, and DSO Load Shedding Plan there are three types of manual Demand Control available to the TSO and DSO:

- Mandatory Demand Curtailment (MDC). This type of Demand Control is implemented when there is time to instruct Large Demand Facilities to reduce demand (with at least 1 hour notice). Facilities connected at 110kV or above with full backup protection provided by emergency generators, would be required to reduce demand by 50% within one hour, failing which they may be disconnected by the TSO or DSO. The TSO may call on these facilities to reduce demand by up to 75% (the additional 25% reduction could take up to 2 hours).
- Emergency Load Shedding (Urgent). This type of Demand Control is implemented where demand reduction is required at short notice (less than 1 hour). The DSO will disconnect DSO customers as instructed by the TSO and outlined in its Load Shedding Plan. Large Energy Users connected at 110 kV and above may thereafter be instructed to reduce demand should the emergency be sustained for several hours (as outlined above for MDC).
- Emergency Load Shedding (Planned) (including Mandatory Demand Curtailment). This type of Demand Control is implemented where notice of at least 1 hour can be provided to affected customers. The TSO and DSO will instruct Large Energy Users connected at 110 kV and above to curtail demand. Should a further demand reduction be required, the DSO will disconnect DSO customers as outlined in its Load Shedding Plan. Currently Demand

[129] SEM Business Process

[130] Distribution System Operator Load Shedding Plan

Curtailment is expected to provide c.400 MW of demand reduction (this will depend on what voluntary reduction has been provided by the same customers under a System Alert).

- Rota Load Shedding. This type of Demand Control is implemented where notice of at least 12 hours can be provided. The DSO will disconnect DSO customers on a rota basis as outlined in its Load Shedding Plan. The TSO and DSO may also instruct Large Energy Users connected at 110 kV and above to curtail demand on a rota basis.

Emergency Load Shedding procedures are designed to be deployed rapidly when the system enters a System Emergency state. The Rota Load Shedding procedure is to be followed where at least 12 hours' notice is available of a protracted generation deficit. The procedures are reviewed and updated periodically. Figure 7 shows the different load shedding procedures and their timings. A TSO Contingency Plan is also in place to prioritise demand disconnection at the TSO level, should a particular scenario or sequence of events require this to secure the system.

As described in the DSO Load Shedding Plan, it may be necessary for ESBN to engage electricity customers and stakeholders directly in relation to load shedding, for example, operators of essential services, public representatives and / or vulnerable customers. To meet these needs: (i) specific contact arrangements may be put in place by ESBN for stakeholders and priority customers, and; (ii) vulnerable customers will receive proactive information from ESBN via their customer contact centre daily, where they are or are planned to be without supply due to load shedding.

ESBN hold a vulnerable customer register based on information from all electricity suppliers to ensure they can look after these customers if a power outage occurs in their area[131]. ESBN requests customers to contact their electricity supplier to have their name placed on the register. Suppliers will then notify ESBN who will add details to their vulnerable customer register.

[131] Vulnerable customers | ESB Networks

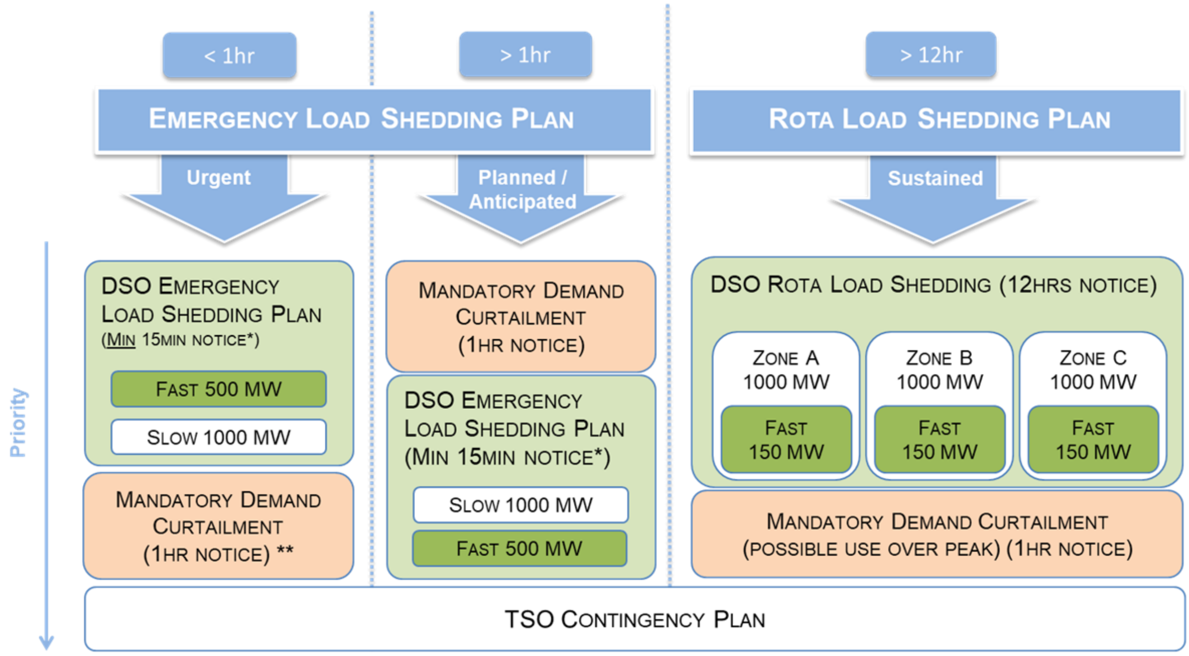

Figure 7 Diagram showing the different load shedding procedures and timings (notice may be shorter where a System Alert has been issued, and the DSO has had time to prepare for load shedding).*

Special protection against disconnection

As set out in the Distribution Code section OC5.1.4[132], the process of demand control, "*in so far as reasonably practicable does not discriminate against any Customer or Supplier and shall use reasonable endeavours to ensure that the burden is shared fairly among Customers*". There are two categories of customers, at the time of writing, which are exempted from demand disconnection in the load-shedding plan:

- Customers who are not shed because of the risk either to life or to national security, i.e., hospitals, prisons, airports etc., and
- Larger industrial customers where there is risk of severe consequential loss to production or plant, or where the standard rota shedding system could have severe consequences for employment and the economy.

The protected customers listed in the load-shedding plan have been classified as such with reference to the Strategic Emergency Guideline 3[133] and, as stated in the plan,

> *"…having regard to the specific nature of the emergency and balancing this with the requirement that the policy must be capable of implementation and effective to reduce demand in an emergency situation."*

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[132] Distribution Code

[133] Strategic Emergency Management

Some aspects of these criteria and processes for selection of exempt customers are the subject of on-going review by ESBN and may be subject to change following future engagements with CRU. In all of these situations, it will be made clear to customers that exemptions are determined by available resources and the need to prevent a total system collapse. Exemption cannot be guaranteed in all cases.

4.2 (e) Mechanisms to inform the public

Article 16(2) of Regulation (EU) 2019/941 requires the Competent Authority (CRU) to inform relevant stakeholders in its Member State of the application of any non-market-based measures. In addition to the information included in the Risk Preparedness Plan, EirGrid supports the CRU in the provision of this information by:

- Publishing System Margin Outlook reports twice a week showing the outlook with and without the capacity provided by TEG units.
- Issuing a "System Margin Warning" notice to the market when TEG units have been taken into consideration in system margins to avoid Alert or Emergency State in Ireland, or to support the power system in Northern Ireland.
- Issuing a "Margin Shortfall Risk" notice to the market when REU units have been requested to initiate synchronisation to the grid.
- Issuing a market message when the TEG units have been dispatched.
- Publishing on its website a list of the dates and times when the TEG units have been dispatched, and Retained units have been synchronised to the grid, along with the reasons for this.

The Power System Emergency Communications Plan provides for the requirements to inform key stakeholders in the event of a system emergency or blackout state arising on the system. The protocol requires that EirGrid inform the **Energy Press Officers Network (EPON)**, and that meetings are held at a set frequency with this group until the crisis has been resolved.

The EPON consists of communication experts from DCEE, CRU, EirGrid, GNI and ESBN, as required, and, in the event of an electricity emergency, is chaired by EirGrid's Head of Public Relations. The purpose of the EPON is to ensure the delivery of a consistent national media response in the event of an energy emergency. This is supported by a joint media crisis messaging plan.

Additionally, in the case of any outages resulting in loss of customer electricity supply (including minor network faults and maintenance), ESBN provide a service to the public via their PowerCheck website[134], which offers real-time information on the cause for the outage and expected reconnection times. ESBN also provide social media updates.

[134] ESBN - PowerCheck

4.2 (f) Electricity crises and climate change

Climate change impacts on scenarios

The incidence of some of the electricity crisis scenarios described in this document and their severity may change as a result of climate change. The EPA provides a useful summary of the likely changes expected to be felt in Ireland in the coming decades[135], with heatwaves likely to become more commonplace and heavy precipitation events increasing in the autumn and winter months. It is anticipated that winter temperatures will be higher on average and that there may be an increased incidence of intense storms affecting Ireland. Impacts are primarily likely to be on infrastructure, with some potential impacts on renewable generation, cooling for conventional generation, and electricity demand patterns as space cooling becomes more commonplace. Adaptation to and mitigation of the changing risks will be required, building in additional resilience to the electricity system where necessary[136] and this plan will be updated frequently in accordance with the regulation to reflect the new reality and measures required.

The European Resource Adequacy Assessment 2024[137] (ERAA) now includes enhanced climate change considerations. A new pan-European climate database has been used, developed within the EU Copernicus Climate Change Service (C3S)[138] in close cooperation with ENTSO-E. This initiative aims to support an efficient interconnected energy system by measuring its ability to maintain security of supply, taking into account climate change and the rapid increase in installed renewable capacity.

Moreover, the National Risk Assessment (NRA) 2024 identifies climate change as a risk multiplier. As this phenomenon occurs, it will interact with a range of other potential risks faced by Ireland. Consequently, scenarios of electricity crises, as outlined in this document, and the severity of these scenarios may change as a result of climate change. The NRA 2024 also indicates that climate change is leading to a rise in extreme weather conditions. A significant risk remains as disruptions continue to occur to critical infrastructure, including energy and telecommunications networks.

The Sectoral Planning Guidelines for Climate Change Adaptation 2024[139] present recent events of extreme weather such as flooding, heatwaves and windstorms experienced in the State to highlight the wide range of potential impacts of Ireland's changing climate. Met Éireann has stated that 2024 was the warmest year on record globally, and the first year where global temperatures were 1.5 ºC above pre-industrial levels[140]. It is expected that this trend will continue and intensify, resulting in an increased frequency of severe weather conditions in the coming decades.

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[135] EPA - What impact will climate change have on Ireland?
[136] The electricity system is witnessing increasing pressure from climate change
[137] ERAA Downloads | ENTSO-E – ERAA 2024
[138] ERAA 2024 Adequacy Assessment Methodology
[139] Sectorial Planning Guidelines for Climate Change Adaptation 2024
[140] Climate Change - Met Éireann - The Irish Meteorological Service

The UK Research and Innovation (UKRI) published a report entitled "A climate change report card for infrastructure – Power Systems, Transmission & Distribution[141]", which indicates that in the UK the winter peak loads are up to 50% higher than summer peaks. However, in certain urban areas, this difference has already disappeared, and there is a possibility that a summer peak may arise due to the rise in demand for air conditioning. Should this scenario arise, it has the potential to impact the capacity of the UK's support to IE in summer months, and IE's electricity system may need to adapt to this potential change.

Climate Change *Adaptation*

Ireland's second National Adaptation Framework (NAF)[142] was published in June 2024. The plan sets out the national strategy to reduce Ireland's vulnerability to the negative effects of climate change, and avail of potential benefits from expected impacts of climate change. The NAF provides a structured approach for local authorities, regions and key sectors to assess climate change risks and implement resilience actions. The framework emphasises the importance of integrating adaptation considerations into policymaking at all levels, with specific adaptation measures to be developed by sectors and local governments. The NAF requires the development of Sectoral Adaptation Plans (SAP) for 13 key sectors. As a crucial sector for the economy and society, the energy sector must adapt to both gradual climate changes and extreme weather events.

DCEE has published the second Electricity and Gas Networks Climate Change Sectoral Adaptation Plan in November 2025 (EGN SAP)[143]. The EGN SAP 2025 has been developed in accordance with the 2024 Sectoral Planning Guidelines for Climate Change Adaptation[144] which provide a framework for key national sectors, including energy, to plan for climate resilience. Building on the EGN SAP 2019, the plan seeks to enhance the resilience of the energy sector infrastructure against climate-related impacts through proactive and integrated adaptation measures.

The plan sets out climate adaptation measures and the governance structures responsible for their assessment and implementation within the Electricity Transmission and Distribution system and Gas Networks. These measures are designed to ensure effective climate resilience across critical energy infrastructure:

Electricity Transmission

The evaluation and implementation of electricity transmission system climate adaptation measures is the responsibility of the TSO. The SAP 2025 describes EirGrid 's targeted plans to enhance resilience and mitigate potential risks to the transmission system have been developed based on the assets most vulnerable to climate change, as identified by EirGrid.

141 A Climate Change Report Card for Infrastructure – Power Systems, Transmission & Distribution
142 National Adaptation Framework (NAF)
143 Electricity and Gas Networks Sector Climate Change Adaptation Plan 2025
144 Sectoral Planning Guidelines for Climate Change Adaptation

In 2023, several strategic projects received capital approval to strengthen climate resilience across critical infrastructure. These initiatives are now in progress, with completion scheduled for October 2028. Key works include the construction of drainage systems, embankment reinforcement, road elevation changes , and installation of water-level sensors within drainage channels at substations.

The SAP 2025 outlines the climate adaptation measures that EirGrid has integrated into project planning and development. Furthermore a formal Climate Adaptation Policy is currently being developed by EirGird which will outline EirGrid's approach to identifying, assessing and managing climate risks for the Irish Transmission System, which will be implemented over the coming years.

Electricity Distribution

ESBN are responsible for evaluating, reporting and implementing climate adaptation measures across the distribution system, ensuring its resilience to the impacts of climate change.

The SAP 2025 describes the climate adaptation measures carried out by the DSO to improve the distribution network’s resilience to extreme weather and long-term climate risks. Key initiatives include enhanced vegetation management using LiDAR technology and a new timber-cutting framework to reduce storm-related outages; improved lightning protection through wildlife guards, surge arrestors, and anti-lightning devices; and the deployment of automation and smart grid solutions, including automated substations, smart switches, and remote monitoring systems for rapid fault isolation.

Proactive inspection and monitoring are being strengthened through the use of drone-based LiDAR technology, while flood risk management incorporates detailed substation assessments and collaboration with the Office of Public Works on mapping and mitigation strategies. The emergency preparedness measures have been reinforced with upgraded response protocols and cross-sector coordination to address cascading impacts.

Furthermore, under PR6 ESB Networks applies ISO 55001 principles to guide strategic asset management and condition-based upgrades, reducing climate-related risks to ageing infrastructure. Collaboration is central to this approach, with ESB Networks engaging with industry leaders and expert groups to develop evidence-based climate risk mitigation solutions. ESBN’s adaption strategy also introduces a climate adaptability framework that incorporates measures such as automation, advanced control systems and improved vegetation management.

Contribution of emergency measures to greenhouse gas emissions

It is an undeniable fact that Ireland’s electricity system is dependent on fossil fuels at the current time. These contribute greenhouse gases to the atmosphere, causing climate change. The potential use of distillate or diesel as a backup fuel in an emergency where there is a shortage of gas would be expected to contribute proportionately more emissions than gas and as such, the dispatch of these options is reserved for scenarios only in line with procedures detailed in this plan to maintain supply in a crisis. The Fit-for-55 programme in tandem with the national climate action plan aims to accelerate the deployment of renewable generation and focus efforts on developing longer duration battery capacity and interconnection.

5. Crisis co-ordination

5.1 Crisis Coordinator

The joint energy sector response to an electricity crisis would be coordinated by the Chief Operating and Asset Management Officer (COAMO) from the TSO, EirGrid, as chair of the Joint Energy Emergency Response Team (JEERT).

The national response to an electricity crisis would be coordinated by the National Emergency Coordination Group (NECG), chaired by the Department of Climate, Energy and the Environment (DCEE) in its role under the Strategic Emergency Management Framework for Ireland[145].

The need to escalate the response from an energy sector response to a national response would be determined by the Department (DCEE).

The structures, procedures, and escalation processes are outlined below.

5.2 Power System Emergency Communications Plan

The energy sector response to electricity crisis is detailed in the **Power System Emergency Communications Plan (PSECP)**, updated annually by the TSO (EirGrid).

The purpose of the PSECP is to facilitate multi-agency crisis coordination and stakeholder communications in response to real-time emergencies that affect, or have the potential to affect, the transmission system in Ireland. It provides for an adaptable "all hazard" approach to responding to major power system emergencies – including a national blackout, power system adequacy concerns, and other crisis scenarios outlined in this Plan that might affect or threaten to affect the national power system.

The PSECP is activated by the TSO (EirGrid) in response to tight system conditions and power system emergencies. It may also be activated pro-actively in response to any significant threat to the power system.

Objectives

The objectives of the PSECP are:

- To provide for structured real-time information sharing between the operations team, crisis management teams, and communications teams of each of the participating organisations, thereby facilitating 'one voice' across key organisations in the energy sector.

[145] Office of Emergency Planning, Department of Defence, **Strategic Emergency Management, National Structures and Framework**, Version 1.0, October 2017, Strategic Emergency Management, National Structures and Framework.

- To ensure that the necessary information is available to Government sector departments and agencies, responders, the media, and the public to facilitate timely and informed decision making.
- To issue information that is relevant, timely, concise, complete and accurate regarding imminent and ongoing emergencies – based on a preprepared messaging plan.
- To build and maintain public confidence in the face of emerging threats, during an emergency, and during the process of restoring the power system to its pre-incident state - in accordance with approved and well-practiced procedures and guidelines.

The PSECP includes the emergency response structures required for coordinating the emergency response, as well as crisis communications procedures.

If an incident occurs and should DCEE determine that it requires the activation of the NECG, the objectives of the whole of government response include preservation of life and property, maintenance of essential services, continuity of government and government services (e.g. managing social protection, humanitarian needs, public safety and security), and early recovery.

Activation for cross-border emergencies

In some scenarios it may be necessary to invoke the PSECP in the event of a power system emergency or blackout in Northern Ireland, given:

- the impact on the Single Electricity Markey (SEM),
- potential impacts on the power system in Ireland,
- the need to assure public in Ireland.

The decision to invoke the PSECP in both Ireland and Northern Ireland will be taken by the EirGrid Director System Operations.

5.3 Emergency Response Structures

The emergency response structures, designed to meet the objectives of the PSECP, are outlined in the figure below.

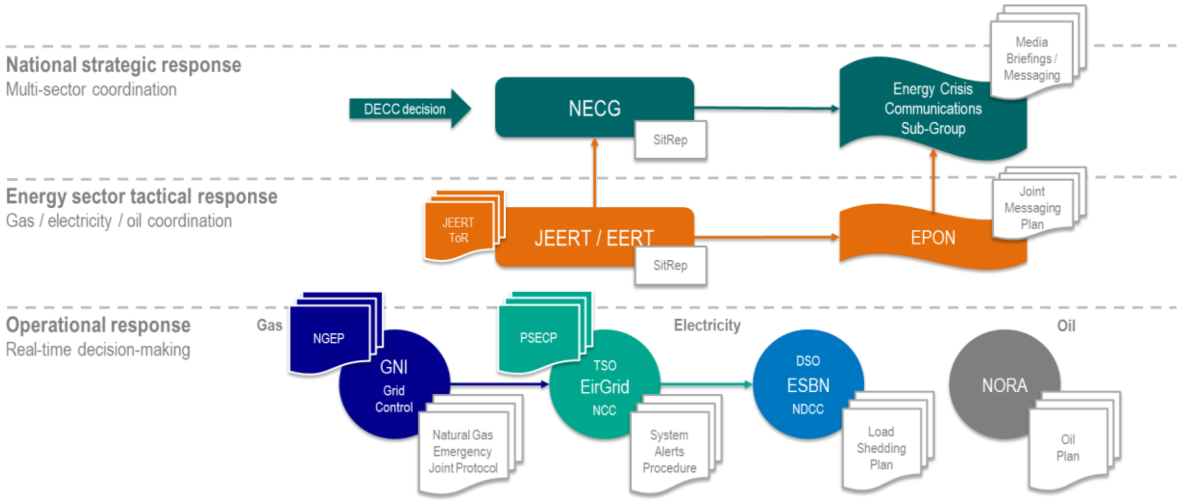

Figure 8 – Emergency response structures, showing the escalation of an incident affecting the electricity sector.

Electricity Emergency Response Team (EERT)

In the event of an electricity crisis, on activation of the PSECP, the EirGrid Chief Operating and Asset Management Officer will chair a multi-stakeholder response forum known as the **Electricity Emergency Response Team (EERT)**.

The EERT is comprised of key personnel from the DCEE, CRU, GNI, EirGrid, ESB Networks, and the National Oil Reserves Authority (NORA). The forum is activated to coordinate the joint response to an electricity emergency situation nationally or in individual regions.

Joint Energy Emergency Response Team (JEERT)

This combined response team is comprised of the key personnel from the DCEE, CRU, GNI, EirGrid and ESB Networks, and the National Oil Reserves Authority (NORA), who normally comprise the Gas Emergency Response Team (GERT) and Electricity Emergency Response Team (EERT).

The **Joint Energy Emergency Response Team Procedure** is issued and updated from time to time by the CRU. The **Joint Energy Emergency Response Team (JEERT)** may be activated by the Natural Gas Emergency Manager (NGEM) (GNI) and Director of System Operations (EirGrid) in the event of:

- A Stage 2 gas emergency and an expectation of an Emergency State in the electricity system.

- A Power System Blackout with expected gas impact and therefore expectation of Natural Gas Emergency Plan (NGEP) activation.
- Other scenarios, including simultaneous attacks on the energy network.

The JEERT Procedure requires a precautionary approach to be taken to activation of the JEERT where there is uncertainty in relation to the risk potential. Where a potential energy emergency is subsequently not realised, the JEERT can be stood down. The JEERT may be chaired by EirGrid or GNI, depending on the nature of the emergency.

National Emergency Co-ordination Group (NECG)

The **National Emergency Coordination Group (NECG)** chaired by the relevant Lead Government Department (LGD), acts as the central government's platform for coordinating a "whole-of-government" response to threatened or ongoing national-level emergencies. Its purpose is to ensure that decisions and actions are made effectively, promptly and cohesively by all relevant departments, agencies and stakeholders during emergencies that exceed local or regional capabilities. The NECG can be triggered by emergencies that may require national coordination/intervention including[146]:

- An emergency that poses a threat to public safety or health, social and economic functioning, damage to infrastructure, property or the environment, and which is on a scale that requires a co-ordinated multi-Agency national level response.
- Where an emergency is expected or anticipated, and where a LGD is of the view that the matter is of such gravity as to require national coordination.
- Where the public interest demands national-level co-ordination of a response effort.
- Where the Government considers that there is an imperative to raise the response to the national level.
- An emergency arising from an event outside the country may result in initial response at national level, with a possible requirement for a subsequent cascading of responsibility for response downwards to the principal response agencies.
- Other such circumstances as may be identified by the LGD.

In the context of an energy supply emergency that meets one of the criteria above, DCEE will assume the role of Lead Government Department and will convene and chair the NECG, which consists of all Government Departments and the relevant agencies. During an electricity crisis, DCEE will facilitate linkage and communications between the EERT / JEERT and the NECG.

The role of the NECG is to coordinate and manage the national-level response to an emergency situation, on a "whole of government", cross-sector basis. Its functions will include the following: -

- Gathering reports and information, evaluating the emergency situation from a national perspective and identifying key issues.
- Coordinating the national level response, and linking with the Primary Response Agencies and other frontline support services at a regional or local level, as appropriate.

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[146] Strategic Emergency Management - Guide 1 - National Emergency Coordination Group

- Ensuring the dissemination / sharing of information (inter-department and agency).
- Setting objectives and identifying priorities in support of the objectives.
- Deciding the efficient allocation of available resources, and seeking additional resources (including international assistance) if required.
- Making decisions in relation to operational cross-cutting issues arising, where appropriate.
- Developing and making recommendations in relation to any longer-term policy issues arising.
- Developing a public information strategy (in consultation with the GIS), particularly on public safety.
- Agreeing post-emergency review and reporting of the response arrangements.
- Other such functions as deemed necessary by the NECG or the LGD

5.4 Crisis Communications

Crisis communications procedures are included in the PSECP. These are supported by joint messaging plans and pre-prepared media assets that are aligned across the energy agencies.

Energy Press Officers' Network

Once the PSECP has been invoked and the EERT / JEERT activated, the Energy Press Officers' Network (EPON) will be activated to coordinate messaging across the relevant stakeholder and public communications platforms. EPON meetings, attended by communications experts from the energy sector agencies (including the CRU and DCEE.), are held after each JEERT / EERT meeting.

Energy Crisis Communications Subgroup

Once the NECG is activated for an electricity crisis, an NECG Energy Crisis Communications Subgroup is activated to coordinate national communications.

The EERT / JEERT Situation Report will be tabled in the NECG by the parties (EirGrid, GNI, ESBN, DCEE/NORA). The DCEE representative on EPON and the EPON Chair will coordinate communications with the NECG Crisis Communications Subgroup. In terms of their 'first responder' roles, each organisation will continue to issue real-time system status messaging.

Media Briefing sessions will be coordinated by the NECG Crisis Communications Group and the Government Information Service (GIS) at the National Emergency Coordination Centre (NECC). The Government Information Service (GIS) will work closely with the Office of Emergency Planning (OEP) and DCEE in dealing with the media, press conferences and interviews.

Early warning and declaration of an electricity crisis

The CRU will inform the European Commission and relevant Member States of an early warning or an electricity crisis in accordance with Article 14(1) and 14(2) of the RPR.

Direct Customer and Stakeholder Contact (ESBN)

As described in Section 4.2(d) and in the DSO Load Shedding Plan, it may be necessary for ESBN to contact electricity customers and stakeholders directly in relation to load shedding, for example, operators of essential services, public representatives and / or vulnerable customers.

5.5 Structures for coordinating risk preparedness

In addition to the coordination of emergencies outlined above, the broader framework for coordinating energy security initiatives, risk preparedness and emergency preparedness is outlined in below. The CRU are the designated Competent Authority in Ireland under the RPR and the CER Directive. and have an overseeing role in risk preparedness and emergency planning in the energy sector.

The membership of the Gas & Electricity Emergency Planning Forum (GEEP) consists of the system operators (EirGrid, ESBN and GNI), DCEE, NORA and CRU. It is chaired by the CRU and meets biannually to discuss emergency planning topics, such as risk preparedness, seasonal outlooks, past and planned emergency exercises and recent events or incidents.

The Government Task Force (GTF) on Emergency Planning co-ordinates and oversees the emergency planning activities of all government departments and public authorities. It examines policy issues, any current risks and ensures that information is shared across government. The Government Task Force is chaired by the Minister for Defence. The Office of Emergency Planning (OEP) in the Department of Defence provides a key support role to the Government Task Force. The Office of Emergency Planning is responsible to the Minister for Defence for the co-ordination and oversight of emergency planning.

OEP are the lead Department for the implementation of the CER Directive. As part of their role, the OEP chairs the CER Energy Sector Group. The aim of the Group will be to facilitate the engagement, collaboration and cooperation of energy sector as designated under the CER Directive. The OEP also attends the Critical Entities Resilience Group (CER G) at EU level.

Table 18 – Structures for coordinating risk preparedness and emergency planning.

	Energy Sector (CRU)	**Government (DCEE & DJHAM)**	**Regional (DCEE)**	**European Union (DCEE, CRU, DoD)**
Energy Security	Security of Supply Programme / Electricity Adequacy Reporting Group CER Energy Sector Group	Energy Security Group (ESG) National Cyber Security Centre (NCSC)	IE-NI-GB Security of Supply Forum	Electricity Coordination Group (ECG)
Risk & Emergency Preparedness	Gas & Electricity Emergency Planning Forum (GEEP)	Government Task Force (GTF) on Emergency Planning		Critical Entities Resilience Group (CER G)
Emergency Response Coordination	Joint Energy Emergency Response Team (JEERT)	National Emergency Coordination Group (NECG) NECG Infrastructure Subgroup		
Crisis Communications	Energy Press Officers' Network (EPON)	NECG Energy Crisis Communications Subgroup		** The EC is Informed by the CRU of an Early Warning / Electricity Crisis*

6. Emergency exercises and tests

6.1 Overview

This section addresses:

- The programme of regional and national (real time) simulations of electricity crises.
- Exercise procedures agreed and the actors involved.
- Simulation exercises and tests carried out since the last plan was adopted and the main results, including measures that have been adopted as a result of these.

6.2 Exercise programme

A range of electricity crisis simulation exercises are undertaken on a scheduled basis to ensure that participants are well versed with the relevant plans, procedures, and communications protocols. This programme of exercises is outlined in Table 19, indicating the stakeholders involved, the frequency of these exercises, and the exercise requirements.

As indicated in the table, multiple response plans may at times be tested in the same exercise (e.g. operational engagements between the National Control Centre and large energy users to simulate Mandatory Demand Curtailment may be tested at the same time that the JEERT is tested to test the tactical decision-making and crisis communications that would flow from decisions in the JEERT meeting).

6.3 Exercise procedures

The planning and execution of simulations, exercises and tests is managed as follows:

- **Exercises involving national emergency structures** (i.e. the NECG, OEP, Government Departments, GIS, and the Energy Crisis Communications Subgroup) are planned and executed by the Department (DCEE). The energy sector operators and relevant agencies (EirGrid, GNI, ESB Networks and NORA) support DCEE in the development of the scenarios for these exercises. The objectives of these exercises are to test the national structures and cross-sector coordination for energy-related crises, including crisis communications.
- **Exercises involving DCEE, the CRU and energy sector agencies** (EirGrid, GNI, ESB Networks, and NORA) are planned and executed by the electricity and gas TSOs (EirGrid and GNI). The objectives of these exercises are to test the PSECP for a range of major incident plans (e.g. Gas Emergency[147], Demand Control, Power System Restoration, and Cyber Incident responses). These exercises involve the simulated activation of the JEERT/EERT and EPON structures. These exercises could include cross-border

[147] The Natural Gas Emergency Plan (NGEP) would also be tested during a gas emergency exercise

engagements with neighbouring TSOs (SONI in particular). These exercises test activation of inter-agency protocols (EirGrid-GNI, EirGrid-ESBN, and engagements with NORA on fuel replenishment), as well as inter-control room engagements (NCC-CHCC, NCC-NDCC).

Exercises involving multiple stakeholders will generally include pre-exercise briefings to ensure that participants are familiar with any updates to the major incident plans and procedures since the last exercise. The operators (EirGrid, GNI, ESB Networks) support DCEE in these briefings with individual sector departments.

The exercises may be planned to be executed across multiple days to address different aspects of the response (e.g. control room responses using the digital simulator and/or related tools), real-time simulation of the energy sector (JEERT/EPON) structures across multiple points in time in the scenario, and staged table-top responses involving government sector departments, based on the outcomes of the energy sector responses.

6.4 Exercises conducted

The national and energy sector preparedness for electricity crises has undergone significant enhancement over the last three years through implementation of simulation exercises. The severity and complexity of the scenarios has increased, as well as the range of stakeholders involved. A range of exercises have been conducted, including exercises Dara (2022), Gráinne (2023), Brigid (2023), Morrigan (2024), Méabh (2024), Cathal (2024). These are summarised below, and in Table 19, including the measures adopted as a result of these exercises.

Exercise Dara (September 2022) - national (energy sector)

Exercise Dara tested the joint industry and government response to a reduction in gas supply to Ireland following the declaration of a gas supply emergency in Great Britian. The scenario simulated the interruption of gas supply to a number of gas-fired generators in IE leading to a reduction in electricity supply. This in turn required rota load shedding over peak electricity demand periods. The exercise covered the operational response as well as communications and was held over two days. The first day (9th September 2022) involved industry (GNI, EirGrid and ESBN) and CRU and DCEE. The second day (16th September 2022) involved the cross-government response through meetings of the National Emergency Coordination Group (NECG) in the National Emergency Coordination Centre (NECC) in Dublin.

Subsequent to this exercise, the decision was taken to include NORA to the membership of the Joint Energy Emergency Response Team (JEERT). The exercise also highlighted the need for the establishment of an Energy Crisis Communications Subgroup, which was subsequently established by DCEE and exercised in Exercise Brigid.

Exercise Gráinne (June 2023) – national (energy sector)

Exercise Gráinne tested the energy sector response to a national blackout. The objectives of the exercise were to test the updated PSECP and identify improvements, particularly in relation to its integration with other processes such as the NECG and the JEERT. It was also aimed at familiarising new members of the EERT and EPON structures with the response process in preparation for a more expansive real-time exercise (Exercise Brigid) in September.

Exercise Brigid (September 2023) – national (government sector departments)

Exercise Brigid tested the energy sector and government response to a natural gas emergency, based on the new Power System Emergency Communications Plan. It tested the simultaneous activation of emergency response structures at a company level, energy sector level and national level. It also exercised coordination between real time operations, multi stakeholder coordination, and crisis communications and demonstrated the range of measures to protect the power system in the build up to and during an electricity crisis (based on the Risk Preparedness Plan approved in May 2023).

Exercise Brigid highlighted that the NECG would be activated early by DCEE if there is a material risk to electricity supply in the context of a sequence of escalating events. The role of the JEERT was highlighted as being potentially established in response to most types of energy sector emergency scenarios, given also the interdependencies within the sector (gas, electricity, oil, and heating).

Exercise Everest (October 2023) – regional with UK and NI

Exercise Everest was the annual gas emergency exercise developed and led by the UK's Network Emergency Coordinator (NEC). GNI participated as the gas transporter for the Moffat gas interconnection point, and led the response to the exercise element in Ireland as the NGEM. The GERT was called up for the exercise and all relevant organisations participated in the exercise.

Exercise Morrigan (June 2024) – national (energy sector)

Exercise Morrigan simulated the energy sector response to a complex, escalating security/energy cyber incident affecting EirGrid/SONI/SEMO systems. It had a dual objective to review the activation and role of the JEERT/EPON structures for more complex incidents involving the energy sector. It also specifically reviewed coordination between the JEERT, National Cyber Security Centre (NCSC) and the NECG.

The exercise outcomes identified improvements needed to the coordination of inter-agency decision-making protocols as well as crisis communication (where the approach to messaging may differ significantly).

Exercise Méabh (September 2024) – national (energy sector)

Exercise Méabh took place on the 24th September 2024 and simulated a prolonged gas emergency due to the complete loss of gas supply from both subsea interconnectors to GB for a period of 6 months. The Gas Emergency Response Team (GERT) consisting of representatives from GNI, CRU, DCEE, EirGrid, ESBN and NORA was convened as part of the exercise. The focus of the exercise included both the impact of an immediate reduction in gas supply and the associated need to switch gas-fired generation units to secondary fuel, as well as the impact of a prolonged gas supply shortage on electricity generation – in particular, secondary fuelling of gas-fired power generators and the role of NORA in replenishing secondary fuel stocks.

Exercise Cathal (December 2024) – national (government sector departments)

Exercise Cathal, which was organised by DCEE took place on the 3rd December 2024 at the National Emergency Coordination Centre (NECC) in Dublin. This exercise used the same scenario as the energy sector Exercise Méabh. It tested the response of government departments and agencies, via the National Emergency Coordination Group (NECG), to a prolonged gas supply shortage. The exercise focussed on the impact on electricity generation, the impact on large gas-users (industry) was a particular focus of the exercise. Subsequent to this exercise, the decision was taken by Government to approve the development of a State-led strategic gas emergency reserve.

Exercise Fahrenheit (October 2024) – regional gas exercise with UK and NI.

Exercise Fahrenheit was a regional exercise undertaken with Great Britain and Northern Ireland and led by the UK's Network Emergency Coordinator (NEC). It simulated the national and regional responses to a gas emergency scenario. GNI participated as the gas transporter at the Moffat gas interconnection point and led the response to the exercise element in Ireland as the NGEM. The GERT was called up for the exercise and all relevant organisations participated in the exercise, including the electricity sector.

Exercise Atlantic (September 2025) – regional blackout exercise involving NI.

Exercise Atlantic took place on 18th September 2025 and simulated an All-Island blackout due to a two-phase fault on the north-south tie line during high south-to-north flows, along with protection failure, triggering a high-frequency event that caused a cascading blackout. The exercise focussed on the energy sector responses in Ireland and Northern Ireland, including full activation of the JEERT and EPON in Ireland. This exercise included the actual deployment of operators in the field, in response to a "Blue Alert" test communication issued without prior warning to these operators. This exercise is planned to be followed by a government sector (NECG exercise) including regional crisis coordination.

Table 19 – Programme of emergency exercises

Exercise programme		Status & Organisations Involved								Minimum Frequency	Requirements		Exercises
		EirGrid	ESBN	GNI	DECC	CRU	NECG	NORA	LEUs		Participants	What is to be tested	Date
Multi-Sector Energy Emergency: Gas/Electricity/Oil	Joint Energy Emergency Response Team (JEERT) & NECG Processes	●	●	●	●	●	●	(●)		2 yr *	NECG, (JEERT, EPON inputs) * DCEE Coordination	Structures, Communciation Protocols, Crisis Messaging, Sector Plans	**Cathal** 3-Dec-24 **Brigid** 14-Sep-23 **Dara** 9 &16-Sep-22
Power System Emergency	Power System Emergency Communications Plan (PSECP)	●	●	●	●	●		(●)		1 yr	Ops Panel (SitRep), JEERT/EERT, EPON	Structures, Communciation Protocols, PECP check lists, Crisis Messaging Plan	**Atlantic** 18-Sep-24 **Méabh** 24-Sep-24 **Morrigan** 13-Jun-24 **Brigid** 14-Sep-23 **Grainne** 11-May-23 **Dara** 9 &16-Sep-22
Blackstart	Power System Restoration Plan (PSRP)	●	(●)							2 yr	NCC Control Room staff (ESBN NDCC)	PSRP procedures	**Atlantic** 18-Sep-24 **EirGrid/ESBN** Mar-May 24
	Blue Alert Test	●	●							2 yr	EirGrid, ESBN staff, Generators	Blackstart initial communications	**Atlantic** 18-Sep-24 17-Oct-2023
Demand Control	Alerts Procedure, Demand Control Procedure - DSO Load shedding Plan	●	●							2 yr	Control Rooms (NCC, NDCC)	Alerts & Demand Control Procedure, Demand Disconnection Procedure	**Méabh** 24-Sep-24 **Brigid** 14-Sep-23 25-Oct-22, 25-Jun-22
	Mandatory Demand Curtailment Procedure (MDC)	●	●						●	2 yr	Control Rooms (NCC, NDCC), Large Energy Users (LEUs) on MDC	Alerts & Demand Control Procedure, Demand Disconnection Procedure, Customer MDC Procedure	**Méabh** 24-Sep-24 **Brigid** 14-Sep-23 25-Oct-22, 25-Jun-22
Gas Emergency	Gas Emergency Procedure (NCC)	●		●						2 yr	Control Room	Gas Emergency Procedure, Spreadsheets, Secondary Fuel Replenishment Plan (new)	**Méabh** 24-Sep-24 **Brigid** 14-Sep-23 **Dara** 9 &16-Sep-22
	Natural Gas Emergency Plan (NGEP)	●	●	●	●	●	●			2 yr *	* GNI Coordination	NEGP Process	**Méabh** 24-Sep-24 **Brigid** 14-Sep-23 **Dara** 9 &16-Sep-22
Control Room Continuity	Planned Transfers	●	(●)							2-monthly	Control Room staff (shift on duty)	Planned Transfer Procedure	monthly
	Emergency Transfer	●	(●)							1 yr	Control Room staff (shift on duty)	Oval Evacuation Procedure, Emergency Transfer Procedure	13-May-2025 25-Apr-2024
Critical Tools	Critical Tools Procedure	●	(●)							2 yr	SO / Control Room staff	Critical Tools Procedure	**Morrigan**: 13/06/2024
	Backup communications (TETRA)	●	●	●	●	●				monthly	PSECP participants	TETRA communications	monthly
Cyber	Cyber Emergency Plan	●	●	(●)						2 yr	Cyber Security, SO, EirGrid, ESBN	Critical Tools Procedure - Cyber Response	**NECG** 23-Nov-22 **Morrigan:** 13 Jun-24
Physical Security	CER Directive	●	(●)	(●)	(●)					n/a	EirGrid Security (ESBN)	Critical Site security response	**CER Stress Test** Mar 24

NOTE 1: Plans may be tested in combined exercise scenarios

7. Stakeholder consultations

7.1 Overview

In accordance with the RPR, this section describes the stakeholder engagement mechanisms used for and the results of the consultations carried out for the development of this plan.

7.2 National Electricity Crisis Scenarios

In collaboration with the TSO, the CRU developed a set of proposed electricity crisis scenarios for Ireland and the TSO and CRU conducted a risk assessment for each of the scenarios.

In accordance with Article 7(2) of the RPR, the CRU conducted a series of consultations on the national electricity crisis scenarios, as described below.

In line with the RPR, the CRU conducted workshops between October and November 2024 with the objective of consulting ESB Networks, the Distribution System Operator (DSO), Gas Network Ireland (GNI), the gas Transmission and Distribution System Operator (TSO), and the Department of Climate, Energy and the Environment (DCEE). The CRU also undertook an industry workshop, with invitations extended to industry through industry associations (the Electricity Association Ireland (EAI) and the Irish Energy Storage Association (IESA)) and working groups (Market Operator Users Group (MOUNG) and the Trading and Settlement Code (TSC) Modifications Committee). Eight attendees from industry attended the workshop.

Additionally, representatives from organisations in Northern Ireland (including DfE-NI, URNI and SONI) were also engaged through workshops. This approach enabled the collection of comprehensive feedback on the full range of the national electricity crisis scenarios and their risk assessments, and plan alignment.

Overall, the outcome of the consultations was that there was strong alignment from participants with the proposed scenarios. No changes were suggested to the risk assessment, and no new scenarios were proposed. Positive feedback was received on the new scenario on grid instability [IE.GI]. Industry context was provided on the serial technical defects scenario, with generators expressing residual concern about the notification process for potential changes in gas quality, which has been addressed through a notification process overseen by GNI, as noted in the scenario. Additionally, it was suggested broadening the reference to include "Adversarial entity/state" to the Scenario M.AS, which was accepted.

7.3 Draft Risk Preparedness Plan

The draft RPP was issued to the electricity and gas system operators (EirGrid, ESB Networks, and GNI) for review, and their feedback was integrated into the document before the submission of the draft Plan for consultation. The draft RPP was also shared with DCEE and DoD for their comments.

The CRU submitted the draft RPP for consultation to the competent authorities of all Member States via the Electricity Coordination Group. The draft RPP was also shared with DfE-NI, URNI and Ofgem (UK).

To address the requirements of Article 10(1) of the RPR, the CRU held a public consultation on the draft RPP[148]. A consultation period of eight-weeks took place between July and September 2025 subsequent to the publication of a consultation paper. Stakeholders were invited to provide feedback on the draft plan.

In response to the consultation paper, the CRU received seven submissions. The following organisations responded: *Aggreko Ireland, Energia, EP UK Investments, Irish Science Forum (ICSF), NexSys – Nex Generation Energy System, Uisce Éireann (Irish Water),* and one confidential submission. The submission responses are published on the CRU's consultation portal.

As outlined in the consultation paper, the CRU has considered the comments received in relation to the public consultation for the preparation of the final RPP, and relevant contributions from the consultation are described this section. It is noted that this RPP covers the period 2026 to 2029, in line with the four-year revision period of the RPR.

The results of the consultation carried out and relevant updates made to the draft RPP are described below.

In response to points raised by *EPUKI, a*dditional clarity on the context of the AIRAA was added to Section 1.2(c) and in Section 1.4(e), minor changes to wording were made to aid clarity on the potential for concurrent scenarios.

Section 1.3 (f). *Critical Entities Resilience Directive* was included as a new section to the plan, following discussions with the TSO and consultee responses [*Uisce Éireann and Energia]*. The updates include, inter alia, (i) future engagements with critical entities identified through the CER, and (ii) references cross sectoral response.

Scenario 2.1 (c) *Severe Storm,* cross sectoral impacts on water and telecom systems were updated based on the recent Review of Storm Éowyn Report published by the Department of Housing, Local Government and Heritage (DHLGH), and to include reference to RES ramps, based on public consultation feedback [*Uisce Éireann and NexSys – Nex Generation Energy System]*.

The scenario description for Scenario *2.3(c) Cyber-attack on entities not connected directly to the grid* was expanded to describe the relevant entities, based on public consultation feedback [*Energia]*. Scenario 2.3 (d) *Loss of ICT systems to cyber-attack* has been updated based on feedback from the public consultation [*Energia]* to reference a cyber-attack on generators or producers, noting that the likelihood, impact and scenario rating are based on the reasonable worst-case scenario, which is considered to be a cyber-attack on the TSO control centre. Based on discussions with the TSO, the risk assessment for scenario 2.3 (d) *Loss of ICT system to cyber-attack impact* was updated, resulting in an overall assessment change to 'High' from 'Very High'.

The scenario description for 2.4 (c) *Grid Instability caused by unanticipated/uncontrolled interactions between new technologies* was updated in relation to description, impact and mitigation, based on discussions with the TSO, and comment in the public consultation *[Energia]*.

[148] Draft RPP – Public consultation

In the scenario 2.5 (b) *Nuclear fuel shortage*, following discussions with the TSO, the impact rating has been updated to align with the considerations of a comparable event in the AIRAA, but the overall rating remains unchanged.

In relation to Scenario 2.1 (f) *Renewable Energy Source Shortage, including Dunkelflaute*, additional context has been included, based on public consultation feedback [*NexSys – Nex Generation Energy System]*, to the scenario evolution section in relation to the diversification of RES capacity and its role in strengthening energy security and system resilience.

In relation to measures, section 4.2 (f) (ii) *Electricity crisis and climate change* was updated by CRU in relation to climate adaptation measures for transmission and distribution systems, in the context of the recent publication by DCEE of the Electricity and Gas Sectoral Adaptation Plan.

The public consultation feedback [*Energia and ICSF - Irish Climate Science Forum]* included a point that there is an over-reliance on interconnectors as mitigation and energy security measures. Whilst not necessarily relevant to the RPP, we note that DCEE's National Policy Statement on Electricity Interconnection 2023[149] considers that *"The primary drivers of Ireland's interconnectivity needs are…. Ensuring electricity security and resilience through diversified energy supply and market access."* The AIRAA, which is referenced in the RPP, incorporates the impact of interconnection in its adequacy assessment, it "…*accounts for the introduction of other non-conventional resources that can also supply electricity demand, including interconnection with Great Britain and France…".*

A consultee [*EPUKI*] raised point in relation to continued engagement around gas quality changes. CRU and GNI will continue to maintain ongoing engagement in relation to security of supply, including gas quality changes.

In relation to non-market generation, in discussions with DCEE, CRU included an update to the financial solidarity arrangements with IE and NI was included in Section 4.1(b).

Section 4.2 (b) (ii) *Scenario specific measures Weather* was also updated by CRU based on recent publications from DHLGH and ESBN relating to Storm Éowyn.

In relation to consultee feedback [*EPUKI*] regarding dispatch of non-market generation, additional clarity was included in Section 4.2 (c) (ii) *'Temporary Emergency Generation' 'Operational Treatment'* in relation to conditions and notices for the issuing of a Margin Warning. Additional information was added to Section 4.2 (c) (ii) *'Temporary Emergency Generation' Transparency and reporting* section summarising the number of issuances of margin warnings and margin shortfalls, and a summary of the TEG dispatch in May 2025.To Section 4.2(c)(ii) *Retained Existing Units Reporting and transparency* further clarity was added on the Margin Shortfall Risk issuance.

Section 5 *Crisis Coordination* was updated based on feedback from DoD and DCEE in relation to emergency response structures, and structures for coordinating risk preparedness, aligned with Strategic Emergency Management Guidelines.

Under the area of crisis coordination, a comment from the public consultation [*Uisce Éireann]* sought the expansion of notification processes beyond what is required in the RPP – the

[149] National Policy Statement on Electricity Interconnection 2023

notification of entities when early warning or crisis declarations are issued, and not just the EC. This is not currently a requirement of the regulation. CRU carries out the early warning and declaration of an electricity crisis in accordance with Article 14(1) and (2) of the RPR. Public notification of early warnings and / or alerts would be assessed through the EPON, this reflects the importance of coordinated national communications in such circumstances. Agency social media channels would be available for such notifications.

We note that there are a number of publicly available notification channels in relation to system states, including the following. The SEMO website includes a dedicated section for Market Messages[150], through which system states (including system margin warnings) are issued to inform stakeholders of emerging supply concerns. TSO social media would also notify followers of changes to system states. A further comment from the public consultation [*Uisce Éireann]* sought to expand emergency exercises to simulate cascading impacts on national critical infrastructure operators. This is outside the scope of the RPR, which is focused on electricity. The CER Directive has a focus on cross sectoral impacts.

A comment in the public consultation [*Aggreko Ireland*] referenced the review cycle of the RPP and its alignment with the NRA. The CRU, in collaboration with EirGrid, will undertake annual desktop reviews of the RPP and publish an updated version where an update is warranted. The public consultation highlighted some possible emerging scenarios [*NexSys – Nex Generation Energy System and Confidential response]*, these and other emerging scenarios will continue to be assessed as part of the regular RPP review process.

[150] Market Messages | SEMO

Appendix I: Methodology to Identify Regional Electricity Crisis Scenarios

Scenario rating scale

Crisis likelihood scale

Classification	Events per year	1 x in … years	Description/example of initiating event
Very likely	≥ 0.5	2 or less	event expected practically every year, e.g. winds/storms causing multiple failures of overhead lines may be expected nearly every year in some areas
Likely	0.2-0.5	2-5	event expected once in a couple of years, e.g. heat wave causing limits on output of open-loop water-cooled power plants, low water levels at hydro plants, higher load, etc.
Possible	0.1-0.2	5-10	event expected or taken into consideration as a potential threat, e.g. cyber or malicious attack
Unlikely	0.01-0.1	10-100	rare event, e.g. simultaneous floods causingunavailabilityofgeneration, distribution and transmission infrastructure
Very unlikely	0.001-0.01	100 - 1000	very rare event, e.g. earthquake causing a huge destruction of transmission, distribution and generation infrastructure
Extremely unlikely	≤ 0.001	1000 or more	Not applicable, impossible, or extremely rare event, expected beyond 1 in 1000 years

Crisis impact scales

Classification	$EENS_S\%$ (of average annual consumption)	$LOLE_S$ [hours]
Disastrous	≥0,25%	≥168
Critical	≥0,05% and <0,25%	≥48 and <168
Major	≥0,01% and <0,05%	≥12 and <48
Minor	≥0,002% and <0,01%	≥3 and <12
Insignificant	<0,002%	<3

Crisis scenario rating at the Member State level

Crisis scenario rating is performed by combining the operational impact rating (resulting from EENS% and LOLE evaluation) and likelihood rating, as illustrated in the Likelihood – Impact Matrix below

For example, if a certain crisis is Likely and has Critical EENS impact and Minor LOLE impact, it would be defined as Major.

Impact $EENS_S\%$	$LOLE_S$	Extremely Unlikely	Very Unlikely	Unlikely	Possible	Likely	Very likely
Disastrous	Disastrous	Medium	Medium	High	Very high	Extremely high	Extremely high
Disastrous	Critical	Medium	Medium	High	Very high	Very high	Extremely high
Critical	Disastrous	Medium	Medium	High	Very high	Very high	Extremely high
Disastrous	Major	Medium	Medium	High	High	Very high	Extremely high
Major	Disastrous	Medium	Medium	High	High	Very high	Extremely high
Disastrous	Minor	Medium	Medium	High	High	Very high	Extremely high
Minor	Disastrous	Medium	Medium	High	High	Very high	Extremely high
Disastrous	Insignificant	Medium	Medium	High	High	Very high	Extremely high
Insignificant	Disastrous	Medium	Medium	High	High	Very high	Extremely high
Critical	Critical	Low	Medium	Medium	High	Very high	Extremely high
Critical	Major	Low	Medium	Medium	High	Very high	Very high
Major	Critical	Low	Medium	Medium	High	Very high	Very high
Critical	Minor	Low	Medium	Medium	High	High	Very high
Minor	Critical	Low	Medium	Medium	High	High	Very high
Critical	Insignificant	Low	Medium	Medium	High	High	Very high
Insignificant	Critical	Low	Medium	Medium	High	High	Very high
Major	Major	Low	Low	Medium	High	High	Very high
Major	Minor	Low	Low	Medium	Medium	High	High
Minor	Major	Low	Low	Medium	Medium	High	High
Major	Insignificant	Low	Low	Medium	Medium	High	High
Insignificant	Major	Low	Low	Medium	Medium	High	High
Minor	Minor	Low	Low	Low	Medium	Medium	High
Minor	Insignificant	Low	Low	Low	Medium	Medium	High
Insignificant	Minor	Low	Low	Low	Medium	Medium	High
Insignificant	Insignificant	Low	Low	Low	Low	Medium	Medium

Cross-border dependency rating

For each scenario, the level of cross-border dependency is assessed according to the following scale:

Cross-border dependency rating	Value	Description
None	1	The crisis has no impact on neighbouring countries, even if they are facing simultaneous or coincident crisis.
Minor	1.2	The crisis is susceptible to aggravate a simultaneous or coincident crisis in at least one of the neighbouring countries, either through direct or indirect causes (cf. Article 3).
Major	2	The crisis is susceptible to generate a cross-border crisis in at least one of the neighbouring countries, either through direct or indirect causes (cf. Article 3).