Winter Outlook
2025/26

Delivering a cleaner energy future

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Executive Summary

EXECUTIVE SUMMARY

SONI is Northern Ireland's Electricity Transmission System Operator.

SONI does not generate or sell electricity, rather we operate the electricity transmission system in real time to ensure power can flow from where it is generated to where it is needed. As such, we rely on those who secure contracts to generate electricity through the all-island markets for electricity to make that generation available to us when it is required.

Each year, SONI publishes the Winter Outlook which sets out our assessment of the expected consumer demand for electricity against the expected available generation over the winter period.

A key assumption underpinning the Winter Outlook analysis, based on best information available at the time of writing, is that there will be uninterrupted reserves of natural gas from both the Moffat terminal and the Corrib gas field, with no shortage issues.

For Winter 2025/26, the Loss of Load Expectation (LOLE) in Northern Ireland for the five months of the winter period being studied is 1.5 hours, this is higher than last winter (0.23 hours).

This means the system will operate inside the acceptable level of risk of 4.9 hours as set by the Department for the Economy. The results suggest that with the loss of just a single large unit in Northern Ireland, there is a risk of the system entering the Alert State, most likely at periods of low wind and interconnector imports. The risk of the system entering the Emergency State, due to insufficient generation being available to meet the demand, is low.

The Expected Unserved Energy (EUE) figure of 272MWh suggests that, on average, some electricity consumers could potentially be without supply for less than 11 minutes over the winter period. LOLE and EUE are metrics used to measure the risk or likelihood of such an event happening. This does not necessarily mean that electricity consumers will be without supply for any period. Based on information at the time of the data freeze, December 2025 is expected to be the most demanding period during winter from a capacity margin perspective.

There is no risk of a system-wide “blackout” (a loss of ≥ 50% of the electricity system) solely due to insufficient generation under any circumstances this winter. Other conditions would have to be present or multiple and significant failures occur to cause a system wide blackout.

2025 has been a challenging year operationally. From December, the Northern Ireland system experienced several prolonged forced generator outages and a forced extension to scheduled generator maintenance.

This has resulted in tight margins at times, System Alerts, increased operation of ARHL generation and has impacted the system’s ability to accommodate planned generator and transmission maintenance.

There have been eight system Alerts in Northern Ireland from December 2024 - September 2025 for the following issues:

- Storm Éowyn - Red weather alert
- Technical issues within the Control Room
- Breach of operational constraints

RELIANCE ON CONTINUED AVAILABILITY OF LARGE ANNUAL RUN HOUR LIMITED GENERATION

Northern Ireland has a limited portfolio of large generators, with some of this generation subject to Annual Run Hour Limitations (ARHL). Annual run hour limits are applied on an annual and 5-yearly basis, with maximum operating limits applicable from January to December.

The importance of the continued availability of ARHL generation to the end of December 2025 and throughout the winter period is highlighted through sensitivity analysis.

In a scenario where large ARHL generation is unavailable throughout November and December, the LOLE increases to 36.2 hours, outside the acceptable level of risk as set by the Department of the Economy. In such a scenario there is a high probability of the Northern Ireland system entering the Alert State and a reasonable probability of the system entering the Emergency State.

02

Introduction

INTRODUCTION

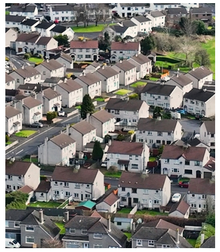
SONI is Northern Ireland's electricity Transmission System Operator.

We are responsible for the planning and operation of a safe, secure, reliable, economic, and efficient electricity transmission system to ensure power can flow from where it is generated to where it is needed.

SONI works in partnership with government, the Utility Regulator and industry to ensure Northern Ireland consumers receive a high quality and increasingly clean energy supply, while also managing an increasingly complex supply and demand dynamic.

There are inherent challenges and risks in all complex power systems. Electricity transmission system operators around the world face a wide range of demands and challenges, from geo-political pressures, the weather (including very cold spells and storms), delays in new generation development, to outages at power stations and on interconnectors. We utilise our deep technical expertise to assess the impact of these factors and develop mitigation plans, however a confluence of these pressures at any one point can create an imbalance on the system which could lead to the system operating outside of our security standards or, in rare cases, localised loss of supply. This risk can be heightened in winter when demand in Northern Ireland is at its peak.

SONI does not generate electricity, deliver demand response, or control market flows on interconnectors. As a transmission system operator, we plan and manage the electricity grid with the generation that is made available to us by the providers who secure contracts through the all-island capacity market for electricity. We rely on others to have this generation available to us when it is needed.



Our team of expert and experienced engineers manage risks to the electricity system every second of every day on behalf of local communities, businesses, and farms across the country.

The All-Island Resource Adequacy Assessment (AIRAA) presents information on generation adequacy studies that assess the balance between supply and demand over the subsequent ten years.

This Winter Outlook presents a more detailed view, focusing on the upcoming winter. This document helps inform the electricity industry and supports preparation for the coming months. We study the expected generation capacity and the forecast demand to determine if there is adequate generation capacity margin. We identify periods where the margin between generation capacity and forecast weekly peak demand is low, and the security of supply of the electricity system may be at risk.

The Winter Outlook for 2025/26 covers the period from 3 November 2025 to 5 April 2026. The data-freeze date for the outlook was 20 October 2025.

KEY TECHNICAL TERMS

Here we explain some of the key technical terms used in the report. A full glossary of other terms can be found in the following section.

Loss of Load Expectation (LOLE)

Is a mathematical formula, based on studies, of the number of hours in a period (typically a year)[1] during which the available generation plant will be inadequate to meet the instantaneous demand. The higher this number is, the greater the risk that there will be insufficient generation available to meet the demand at all times. The Department for the Economy sets the LOLE standard which acts as a maximum level of risk that it has judged the system should be operated at. The LOLE standard is 4.9 hours per year.

Expected Unserved Energy (EUE)

Is the expected amount of energy, based on the lame LOLE studies, not supplied during a period (typically a year) due to insufficient generation being available.

Alert State

Is when a single event on the electricity power system would give rise to a reasonable possibility of one or more operational security limits being violated, e.g., failure to meet the demand.

Emergency State

Is when one or more operational security limits on the electricity power system are violated, e.g., failure to meet the demand.

De-rated Generation Capacity

Is the capacity of generation that can be expected to contribute to capacity adequacy. It is typically based on the historical performance of each generator on the system. A generator that has performed poorly in the past, by being unavailable for extended periods (e.g., due to breakdowns), will have a lower de-rated capacity, as its contribution to capacity adequacy is deemed to be less.

De-rated Margin

Is the sum of the de-rated generation capacity from all available generating units and interconnectors, less the forecast demand and reserve requirement.

[1] For Winter Outlook 2025/26 LOLE is assessed over the period 3 November 2025 to 5 April 2026

GLOSSARY

Acronym/ Abbreviation	Term	Explanation
	Capacity	The rated continuous power output of a generator
	Capacity/ Generation Adequacy	When there is sufficient generation capacity to meet the demand and reserve requirements
	Capacity Market Auction	The Capacity Market is a mechanism designed to ensure that Ireland and Northern Ireland has enough electricity to power homes, businesses, and industry. The market takes the form of an auction, held every year, for capacity for the future
CCGT	**Combined Cycle Gas Turbine**	A type of thermal generator that typically uses natural gas as a fuel source. It is a collection of gas and steam turbines; where waste heat from the gas turbine(s) is passed through a heat recovery boiler to generate steam for the steam turbine(s)
	Conventional Generating Unit	The general term applied to generating units that produce electricity from coal, oil, or natural gas
	Demand	The amount of electrical power consumed by the power system
DSU	**Demand Side Unit**	A unit consisting of one or more individual demand sites that can be dispatched by the TSO to reduce demand
	De-Rating Factor	The percentage of a generating unit's capacity that reliably contributes to capacity adequacy. For the Winter Outlook, de-rating is typically based on forced outage rates
	Dispatchable Generating Unit/ Generation	Sources of electricity that can be used on demand and dispatched at the request of the TSOs. Does not include wind and solar generation which are non-dispatchable generation
Moyle	**Moyle Interconnector**	A 500 MW Interconnector that connects the electricity transmission systems of Northern Ireland and Great Britain
	Forced Outage	An event where a generator is unavailable for electricity production for a period due to unforeseen/ unplanned reasons
	Forced Outage Rate	The proportion of time that a generation unit is expected to be unavailable for electricity production due to unforeseen/ unplanned outages
	Forecast Demand	The amount of electrical power that is expected to be consumed by the power system in a time period
	Forecast Peak Demand	The maximum amount of electricity that is forecast to be consumed by the power system on a daily, weekly, or annual basis

Acronym/ Abbreviation	Term	Explanation
	Generating Unit	Any apparatus which produces electrical energy
	Interconnector	An electrical link that connects two electricity systems or markets
MW	**Megawatt**	Unit of power; 1 Megawatt = 1,000,000 Watts
AIRAA	**All-Island Resource Adequacy Assessment**	The All-Island Resource Adequacy Assessment, which replaces the All-Island Generation Capacity Statement, published by EirGrid and SONI presents information on generation adequacy studies that assess the balance between supply and demand over the next ten years.
	North-South Tie Line	The electrical link that connects the transmission system of Ireland to the transmission system of Northern Ireland
OCGT	**Open Cycle Gas Turbine**	A type of thermal generator that typically use kerosene or natural gas as a fuel source. It is similar to a CCGT but less efficient, as waste heat from the primary turbine(s) is not recovered.
	Outage	A partial or total reduction in the availability of a generating unit such that the generating unit is unavailable to achieve its maximum capacity
	Peaker Plant	A dispatchable generating unit that is typically used to meet evening peak demand
	Renewable	A natural resource or source of energy, such as wind, solar and hydro
	Reserve Requirement	The additional generation capacity that is required to be available to meet demand in the event that the forecasted supply of power is disrupted
	Scheduled Outage	Outage where a generator is unavailable for electricity production due to planned reasons, e.g., for maintenance
	Security of Supply	The electricity system's capability to ensure uninterrupted availability of electricity at a reasonable cost
	Security Standards Generation Margin	SONI aims to operate the transmission system in accordance with security standards which are important to ensure security of supply. It is important to maintain margins to allow these standards to be met, and to provide insurance against unexpected events.
	System Constraints	Congestion at one or more parts of the transmission network that prevent power being transmitted to the location of demand
	Thermal Generating Unit	Generating units that produce electricity from coal, oil, or natural gas, using steam to power a turbine(s)

03

Winter 2024/25 Review

WINTER 2024/25 REVIEW

Generation margin remained very tight in Northern Ireland across the 2024/25 winter period at times of low renewables and interconnection.

On 7 December 2024, Storm Darragh caused significant damage to Ballylumford power station, resulting in a loss of conventional generation capacity. From this date, system flexibility was extremely limited, and ARHL generation was required to operate on a continuous basis to meet demand and satisfy system stability and security constraints.

Daily engagement and reciprocal support arrangements with transmission system operators in Ireland, Great Britain and Europe were key to minimising the number of System Alerts during this time. As a result, there were only three System Alerts and no System Emergencies[2] in Northern Ireland during winter 2024/25.

During winter 2024/25, Northern Ireland experienced warmer than average conditions overall, with few notable cold spells. The winter peak demand of 1,498 MW[3] occurred on 8 January 2025 at 17:15 and was below our median forecast from last year's Winter Outlook.

On 21 January 2025, Storm Éowyn caused widespread and extensive damage to the Northern Ireland electricity system, leaving approximately 285,000 homes and businesses without power at its peak. Whilst the Northern Ireland distribution system was most impacted, there were significant challenges maintaining secure operation of the system, both throughout and following the storm.

Wind generation output over the winter period was consistent with recent winters, supplying 34% of the electricity demand. However, wind generation output varied from 0 MW to 902 MW[4] over the period.

Solar generation's contribution to the secure operation of the system during winter 2024/25 was low, as expected. Solar output is typically reduced throughout the winter period due to shorter, colder days, and with daily peak demand usually occurring after sunset during winter, solar generation is unavailable to provide support during peak demand periods. During the ten evening peaks with the tightest generation margin, the average import from Ireland was 60 MW on the North-South Tie-Line and 377 MW from Great Britain on the Moyle Interconnector.

[2]There were 108 days during the Winter period where Northern Ireland was reliant on interconnection and/ or wind generation and/or support from Ireland to keep the system out of the Alert (108 days) and Emergency (29 days) States. [3]Sent-out peak demand, not temperature corrected. [4]Dispatched to the system.

04

Winter 2025/26 Outlook

DEMAND

As can be seen in Figure 1, the Northern Ireland peak electricity demand over the winter period has been relatively static over the last number of years. In winter 2025/26 there is expected to be a slight increase in demand. The 2024/25 sent-out transmission peak demand (not temperature corrected) was 1,498 MW and occurred on 8 January 2025 at 17:15.

We anticipate a sent out peak demand of between 1,498 MW and 1,690 MW in Northern Ireland this winter. Figure 2 compares the historical weekly peak demand for the 2023/24 and 2024/25 winter periods, to the median forecast weekly peak demand of 1,570 MW for the 2025/26 winter period.

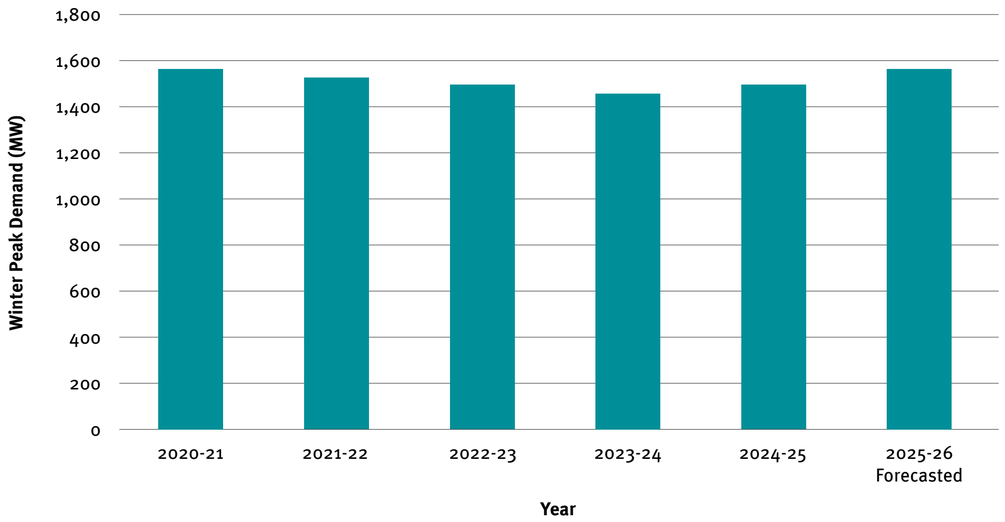


Figure 1: Historical annual peak demand

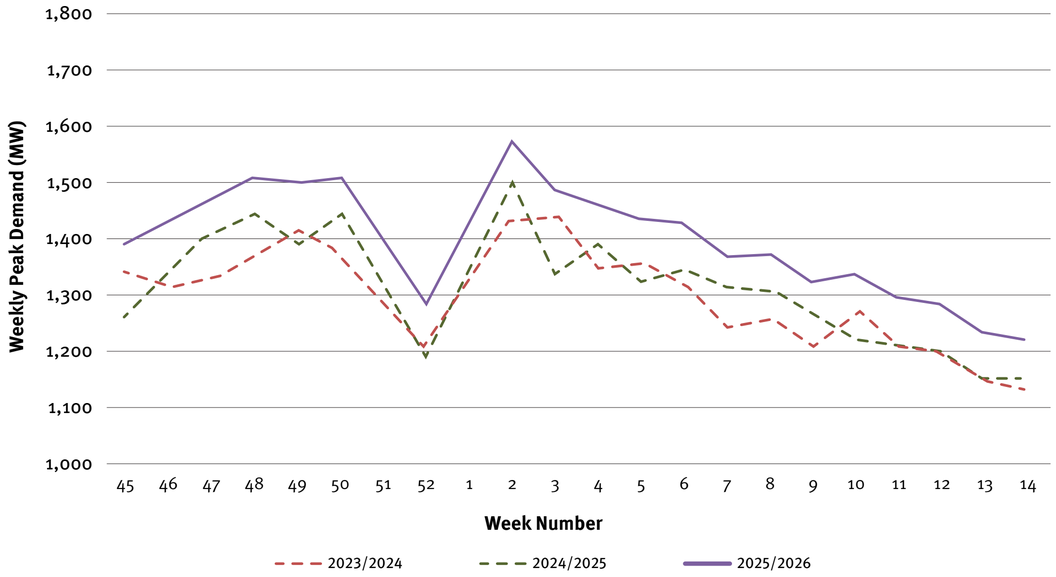


Figure 2: Weekly peak demand for 2023/24 and 2024/25 winter periods versus forecast median weekly peak demand for 2025/26 winter period

GENERATION CAPACITY VS FORECAST DEMAND

The total generation capacity in Northern Ireland is made up of a variety of different types of generating units; combined cycle gas turbines (CCGT) (gas), open cycle gas turbines (OCGT) (gas and distillate), other thermal generation plant (biomass, Hydrotreated Vegetable Oil (HVO), aggregated generating units (AGUs)), renewables (mostly wind and solar), demand side units (DSUs) and a small volume of other technologies including Batteries. There are two interconnectors; the 500 MW Moyle interconnector connecting Northern Ireland and Scotland, and the North-South Tie-Line which connects Northern Ireland and Ireland.

To calculate generation margin, we apply de-rating factors to the generation capacity to reflect its expected contribution throughout the winter period. For conventional dispatchable generating units, the de-rating factor is based on forced outage rates in a rolling three-year period. For OCGTs a de-rating factor of 10 % is used. For wind generation, the de-rating factor is derived using the All-Island Resource Adequacy Assessment model, whilst for solar generation a de-rating of 100% is applied, as daily peak demand typically occurs after sunset during winter. Support from Ireland across the North-South Tie-Line is assumed to be 100 MW. Support from Moyle is assumed to be 258 MW in the median scenario and is based on historical flows and discussions with the National Energy System Operator.

The de-rated margin is the sum of the de-rated generation capacity from all available generating units and interconnectors, less the forecast demand and the reserve requirement. The more positive the de-rated margin is, the greater the likelihood that we will have sufficient capacity to meet demand, whilst a negative de-rated margin indicates there may be a shortage of generation capacity.

Figure 3 shows the total generation capacity on the system, the de-rated generation capacity, and the forecast demand plus reserve for the day with the lowest capacity margin, across the upcoming winter period.

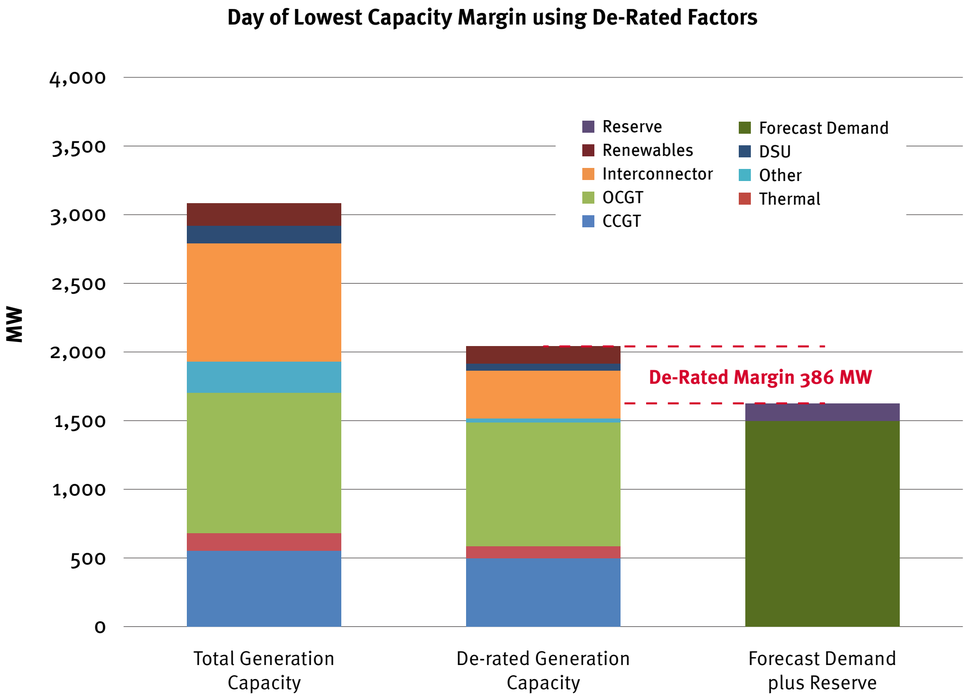


Figure 3: The day of the lowest de-rated capacity margin

LOLE AND DE-RATED MARGIN

The Loss of Load Expectation (LOLE) for Northern Ireland for the five months of the winter period being studied closely correlates to the availability of Northern Ireland conventional generation.

The LOLE for Northern Ireland for the five months of the winter period is 1.5 hours. For reference, the annual LOLE standard is 4.9 hours, as set by the Department for the Economy. The minimum de-rated margin over the winter period is expected to be in the range of 266 MW to 457 MW. The results suggest that with the loss of just a single large unit in Northern Ireland, there is a risk of the system entering the Alert State, most likely at periods of low wind and interconnector imports.

The risk of the system entering the Emergency State, due to insufficient generation being available to meet the demand, is low. Any risk is reduced with increased availability of wind and imports, or when demand is less than expected.

The Expected Unserved Energy (EUE) figure of 272MWh suggests that, on average, some electricity consumers could potentially be without supply for less than 11 minutes over the winter period. LOLE is a metric used to measure the risk or likelihood of such an event happening. This does not necessarily mean that electricity consumers will be without supply for any period.

Table 1:

Northern Ireland key metrics for median demand level

	2025/26
Loss of Load Expectation (LOLE)	1.5 hours
Expected Unserved Energy (EUE)	272 MWh
Minimum de-rated margin (MW) over Winter period	386 MW
Minimum de-rated margin (%) over Winter period	14.6%

Figure 4 shows the de-rated margin, as a percentage of demand plus reserve, for the day with the lowest capacity margin across the winter period for three demand scenarios. An approximate figure for the de-rated margin associated with a LOLE of 4.9 hours per year is shown below.

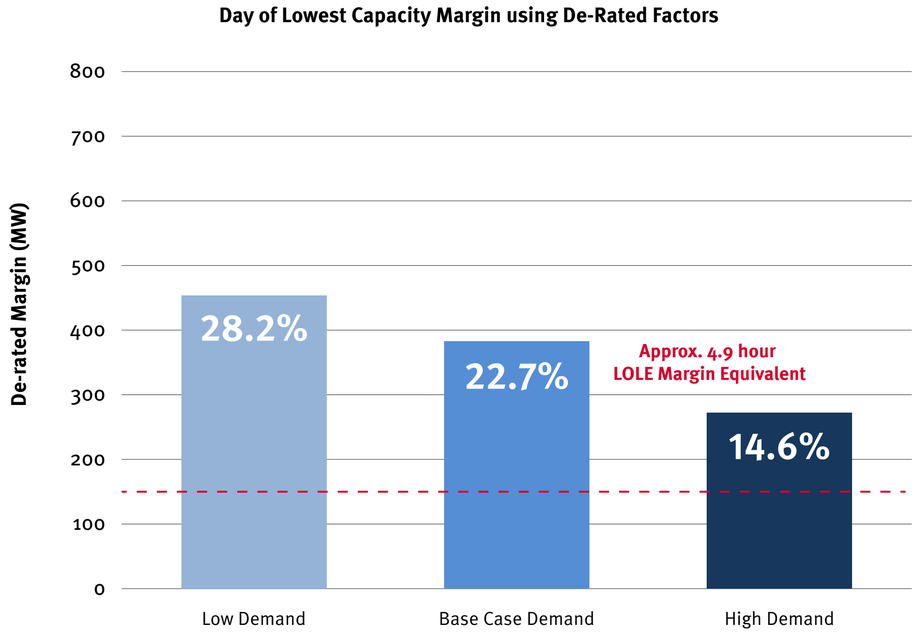


Figure 4: The day of the lowest de-rated capacity margin per demand scenario

GENERATION CAPACITY VERSUS FORECAST DEMAND - ARHL SENSITIVITY

Northern Ireland has a limited portfolio of large generators, with some of this generation subject to Annual Run Hour Limitations (ARHL). Annual run hour limits are applied on an annual and 5-yearly basis, with maximum operating limits applicable from January to December. The importance of the continued availability of ARHL generation to the end of December 2025 and throughout the winter period is highlighted through sensitivity analysis.

Figure 5 shows the total generation capacity on the system, the de-rated generation capacity, and the forecast demand plus reserve based on the day with the lowest capacity margin across the upcoming winter period in a scenario without large ARHL generation available.

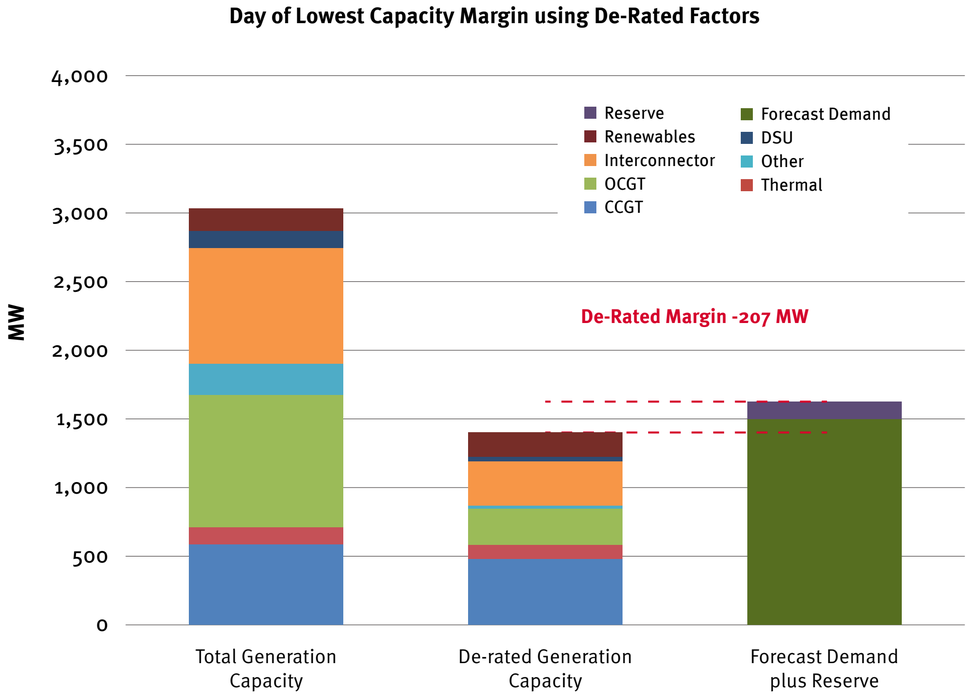


Figure 5: The day of the lowest de-rated capacity margin, without large ARHL generation

LOLE AND DE-RATED MARGIN - ARHL SENSITIVITY

Without availability of large ARHL generation during November and December of winter 2025, the Loss of Load Expectation (LOLE) for Northern Ireland increases to 36.2 hours, outside the standard set by the Department for the Economy. Applying this sensitivity, the minimum de-rated margin over the winter period is expected to be in the range of -327 MW to -135 MW. The results suggest there is high risk of the system entering the Alert State and there is a reasonable risk of the system entering the Emergency State.

Table 2:

Northern Ireland key metrics for median demand level if large ARHL generation is unavailable

	2025/26 Without Large ARHL Units
Loss of Load Expectation (LOLE)	36.2 hours
Expected Unserved Energy (EUE)	4643 MWh
Minimum de-rated margin (MW) over Winter period	-207 MW
Minimum de-rated margin (%) over Winter period	-18%

Figure 6 shows the de-rated margin, as a percentage of demand plus reserve, for the day with the lowest capacity margin across the winter period for three demand scenarios, where run hour limited generation is not available. An approximate figure for the de-rated margin associated with a LOLE of 4.9 hours per year is shown.

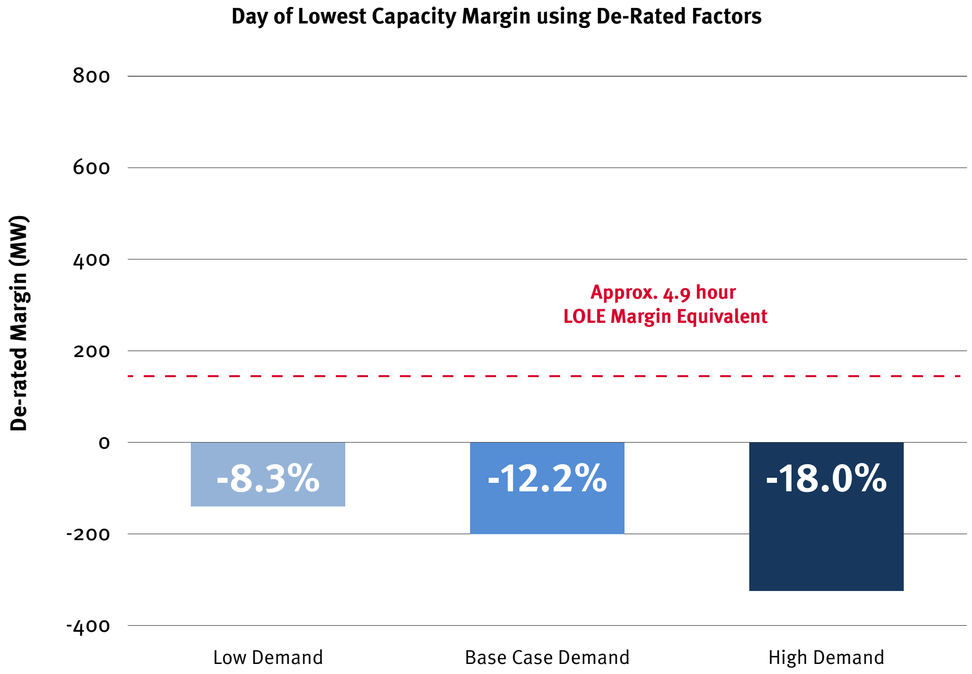


Figure 6: The day of the lowest de-rated capacity margin per demand scenario, without large ARHL generation

WEEKLY ANALYSIS

We study the expected de-rated generation capacity and the forecast demand for each week across the winter period. This allows us to identify weeks when the de-rated margin is low and when the system is at risk of entering the Alert and Emergency States.

We look at three interconnector (Moyle Interconnector and North-South Tie-Lines) import scenarios; low (0 MW), medium (358 MW) and high (850 MW) imports. It should be noted that our studies also include probabilistic analysis of forced outages, which can have a more significant impact than outlined in the bar chart.

Figure 7 shows the expected weekly de-rated generation capacity in the medium import scenario. The de-rated generation capacity fluctuates throughout the winter period due to scheduled outages of generating units.

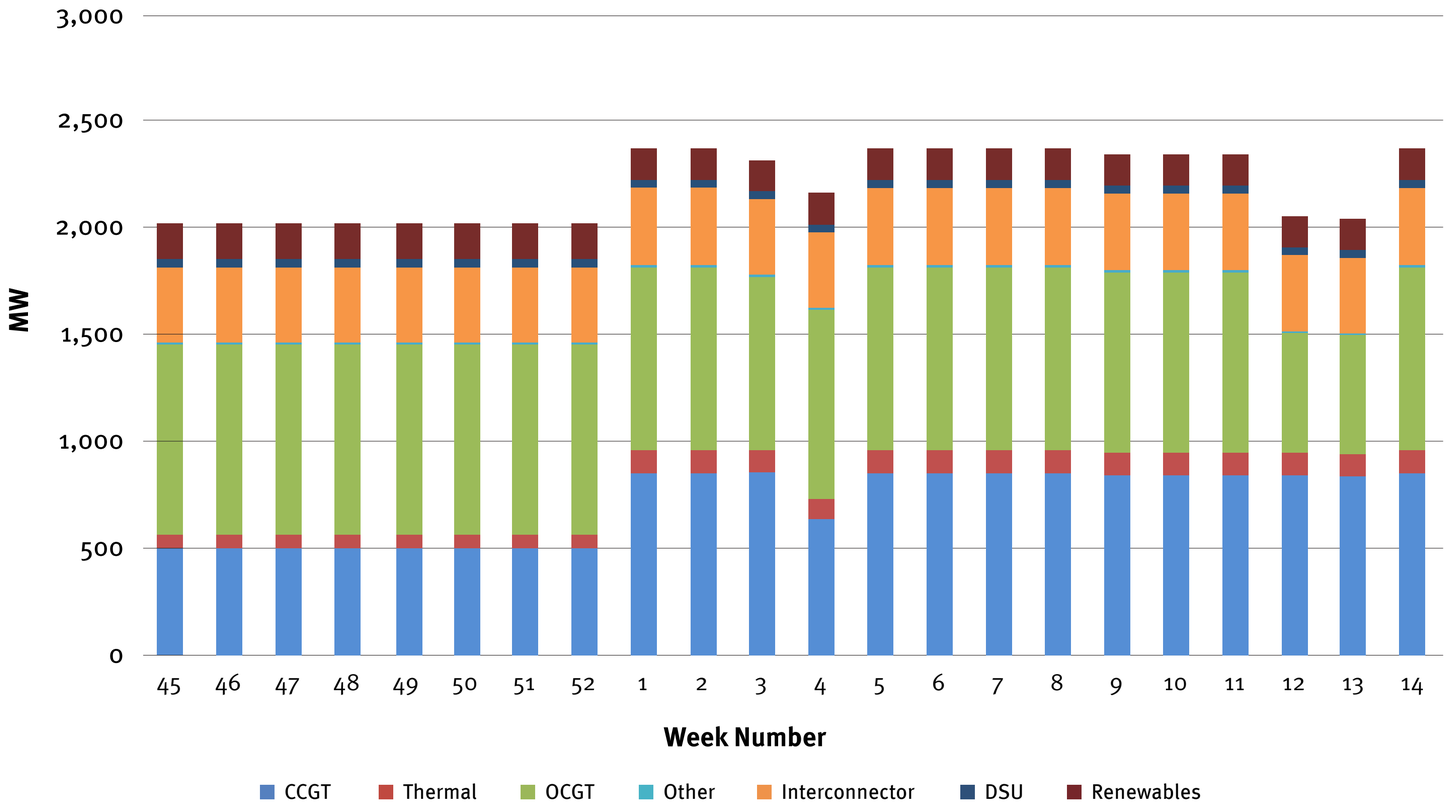


Figure 7: Northern Ireland expected weekly de-rated generation capacity per type of generating unit

Figure 8 shows the expected weekly de-rated generation capacity for each import scenario versus the forecast demand plus reserve. For all import scenarios, demand plus reserve is met by de-rated capacity.

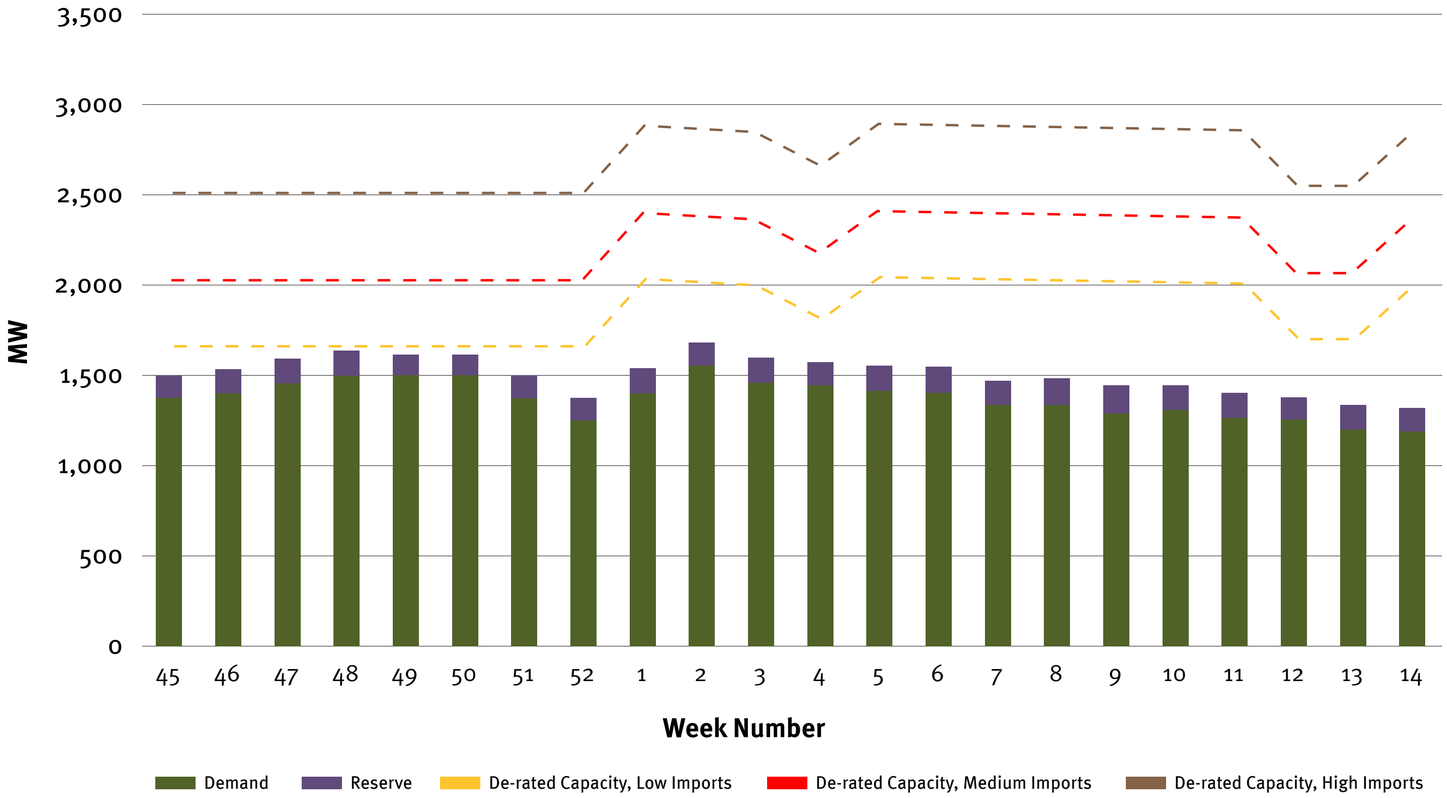


Figure 8: Northern Ireland weekly de-rated generation capacity (dashed lines) for each import scenario versus the forecast demand plus reserve (bars)

WEEKLY ANALYSIS - ARHL SENSITIVITY

Figure 9 shows the expected weekly de-rated generation capacity for each import scenario versus the forecast demand plus reserve in a scenario where large ARHL generation is unavailable in November and December. For the low import scenario, in all weeks in 2025 demand plus reserve requirement exceeds de-rated capacity, and in the medium import scenario, the demand plus reserve requirement exceeds the de-rated capacity in all weeks, bar one. The risk of the system entering the Alert and Emergency states is therefore higher in these weeks. Annual run hour limits are applied on an annual and 5-yearly basis, with maximum operating limits applicable from January to December. This is reflected in Figure 9 by ARHL generation returning to availability in week 1, representing a significant improvement in the de-rated capacity and the demand plus reserve requirement being subsequently met across all import scenarios.

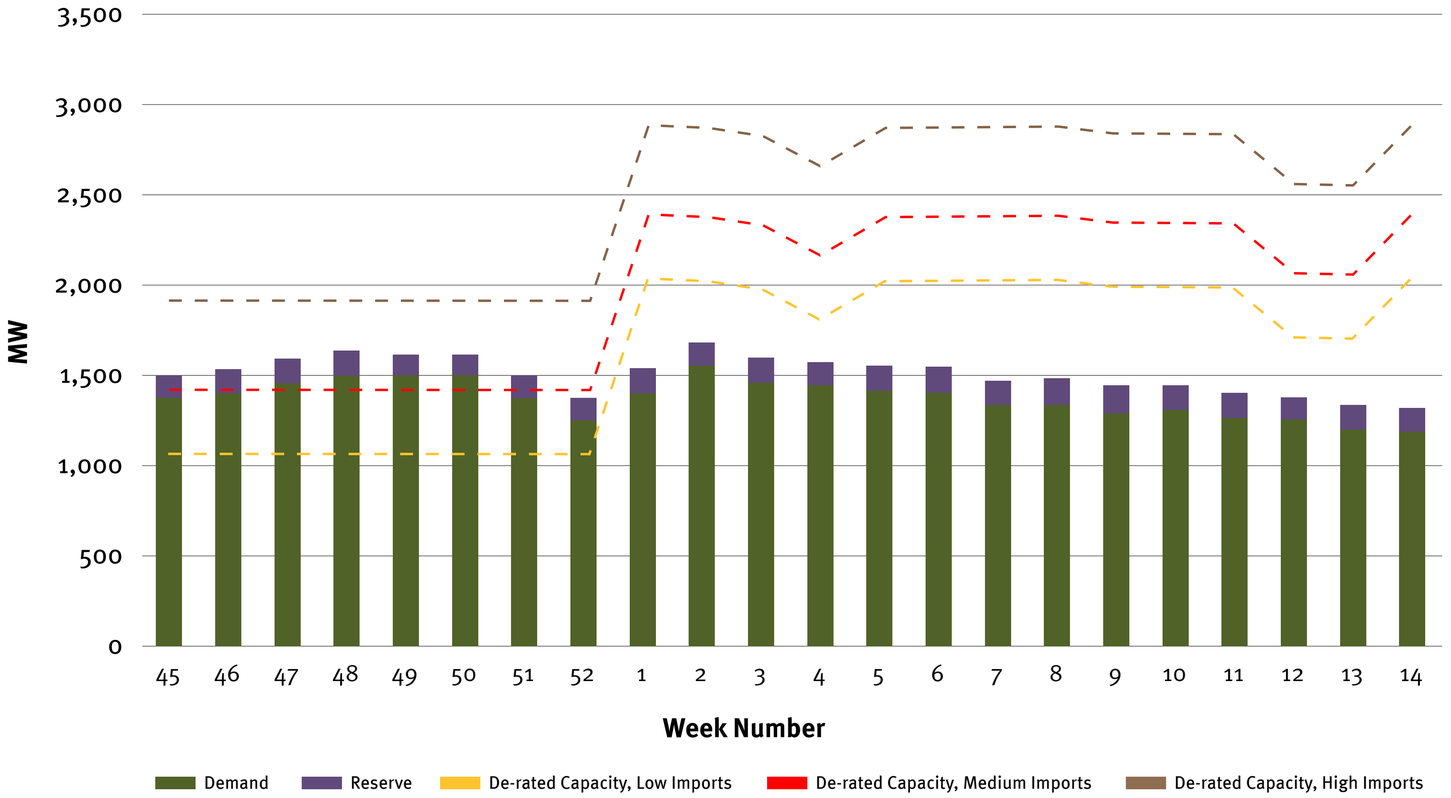


Figure 9: Northern Ireland weekly de-rated generation capacity (dashed lines) for each import scenario versus the forecast demand plus reserve (bars) without large ARHL generation

NORTHERN IRELAND FORCED OUTAGE RATES

The dispatchable generation forced outage rate, excluding DSUs, in Northern Ireland has increased significantly over the past five years. The combined average forced outage rate of dispatchable generation (excluding DSUs) over winter 2024/25 was high at 20.1%. This was double our assumption of 10.2% and largely due to the impact of Storm Darragh at Ballylumford Power Station.

From January 2025 to August 2025, the forced outage rate was 17.7%. Recent high forced outage rates have resulted in tight margins at times and impacted the system's ability to accommodate planned generator and transmission outages.

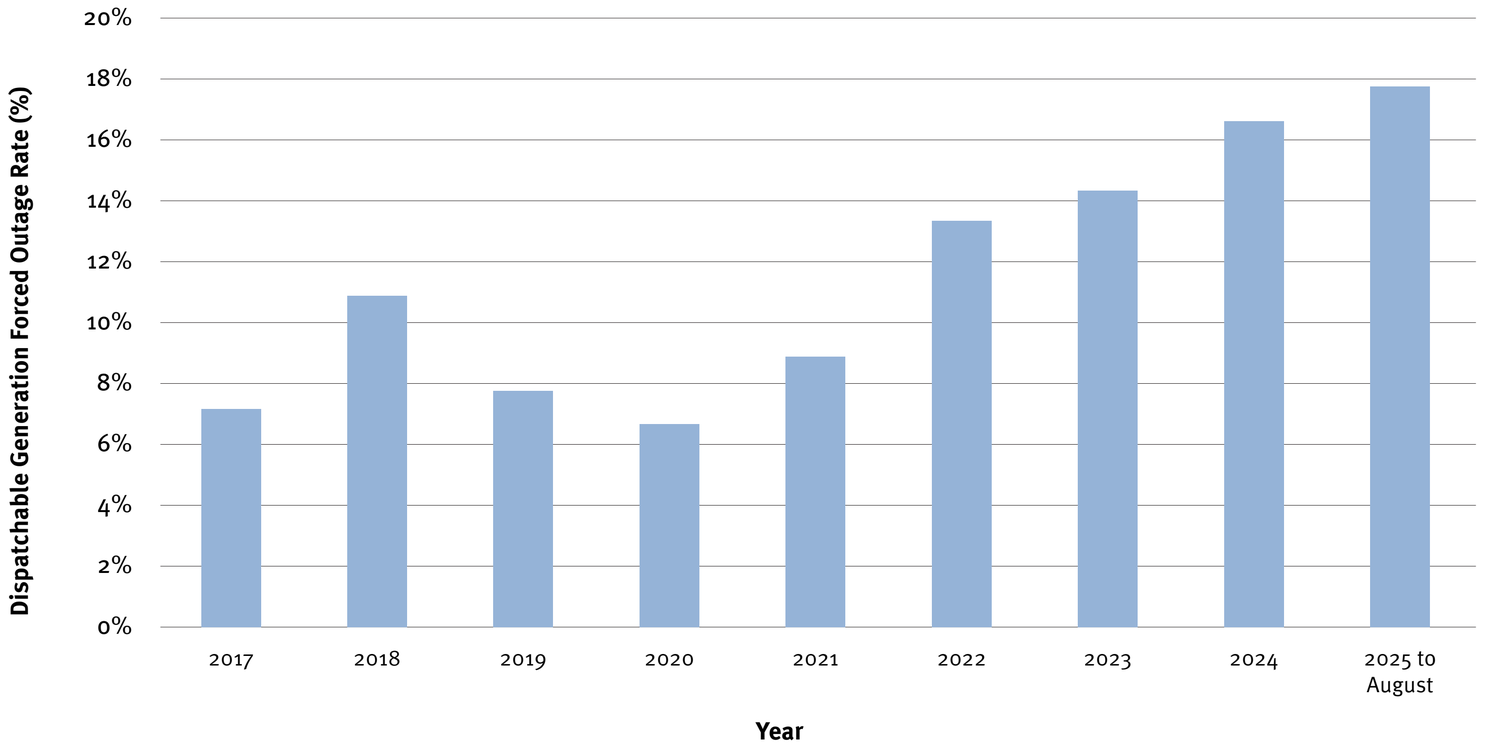


Figure 10: Northern Ireland historical dispatchable generation annual forced outage rates

05

Concluding Observations

CONCLUDING OBSERVATIONS

The assessment contained in this Winter Outlook points to a number of key observations:

- The assessment of the generation margin for this coming winter period indicates there is a risk of the system entering the Alert State, most likely at periods of low wind and interconnector imports. The risk of the system entering the Emergency State, due to insufficient generation being available to meet the demand, is low.
- The continued availability of large ARHL generation is essential to ensure the Northern Ireland system can operate within standards.
- The forced outage rate of conventional generation in Northern Ireland has doubled since 2021, resulting in tight system margins, System Alerts and impacting the system's ability to accommodate generator and transmission outages
- Throughout 2025, the Northern Ireland system experienced a number of prolonged forced generator outages and extensions to scheduled outages, which resulted in increased operation of run hour limited generation.
- Our team of expert engineers are always managing a degree of risk in operating the transmission system and we have tried and tested mitigation and contingency plans in place in the event that any challenges arise. These plans include:
  - Maximising all other available generation of the system,
  - Maximising imports from Great Britain and Ireland,
  - Reconfiguration of the planned outage schedule,
  - Acceleration of any new generation due to come onto the system; and,
  - Use of small, more responsive generation, such as Open Cycle Gas Turbines and other technologies such as batteries.

We continue to work closely with the Department for the Economy, the Utility Regulator and NIE Networks on security of supply and provide forecasts on expected consumer demand and the associated generation requirements for the coming years.

06

Assumptions

ASSUMPTIONS

- There will be uninterrupted reserves of natural gas from both the Moffat terminal and the Corrib gas field, with no shortage issues.
- The All-Island Resource Adequacy Assessment methodology[5] was used as a basis for the LOLE and EUE studies. 2016 has been selected as an average climate year for Winter Outlook studies.
- De-rating factors for capacity margin assessments:
  - CCGT and thermal units (high- and mid-merit units) de-rating factors are based on forced outage rates between September 2022 and August 2025 inclusive,
  - OCGTs de-rating factor: 10%,
  - DSU de-rating factors based on availability rates between September 2024 and August 2025 inclusive,
  - Battery de-rating factors as per 2024/25 Capacity Market auctions,
  - The wind de-rating factor was derived from the AIRAA Plexos model, whilst a de-rating factor of 100% was applied for solar.
- Generating units subject to ARHL remain available for dispatch throughout the winter period, with a sensitivity to indicate system risk should ARHL generation become unavailable due to exhaustion of available operating hours in November and December 2025.
- A fully intact network will be available.
- Demand scenarios: low, median (base case) and high as per the All-Island Resource Adequacy Assessment. Studies use median demand.

[5]The All-Island Resource Adequacy Assessment methodology can be found here:
National Resource Adequacy Assessment Methodology for Ireland and Northern Ireland | SONI Consultation Portal

Northern Ireland interconnector scenarios. Studies include model of Great Britain and France systems:

Table 3:

Import Scenario Breakdown

Import Scenario	Moyle Interconnector (Imports)	North-South Tie-Line (South to North)	Combined Total
Low	0 MW	0 MW	0 MW
Median	258 MW	100 MW	358 MW
High	450 MW	400 MW	850 MW

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