Ireland Transmission System Performance Report 2025

April 2026

EirGrid

Revision History		
Revision	**Date**	**Description**
R0	30/04/26	Original issue

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1. Introduction

EirGrid, as Transmission System Operator (TSO) for Ireland, is pleased to present the annual Ireland Transmission System Performance Report for 2025. This report contains transmission system data and performance statistics for the transmission system in Ireland for the year 2025 (1 January 2025 – 31 December 2025). This report replaces the All-Island Transmission System Performance report for Ireland.

EirGrid is required to publish an annual report on the performance of the TSO business in accordance with Condition 18 of the Transmission System Operator Licence granted to EirGrid by the Commission for Regulation of Utilities (CRU).

Through comparison with previous reports, this report provides a useful resource through which trends can be identified.

This report is structured as follows:

- Section 3 outlines Ireland system data, generation availability and outages,
- Section 4 details the performance of the EirGrid TSO business during 2025 against the criteria approved by the CRU,

Appendices which provide further detail on the data, results and methodology of relevance are included at the end of this report.

2. Executive Summary

The annual Transmission System Performance Report for 2025 is a comprehensive review of the transmission system through which EirGrid makes available key system operating data from the previous year.

Key statistics detailed in this report include:

- Generation statistics
- Transmission system availability statistics
- Details on system events leading to system minutes lost
- Details of system frequency events

2.1. Key Data

- Ireland peak demand reached 6,024 MW on 8 January 2025 at 17:47. The minimum Ireland demand was 2,766 MW and occurred on 6 July 2025 at 05:54.
- The installed capacity of dispatchable generation (excluding batteries) on 31 December 2025 was 6,455 MW.
- In 2025 the system frequency was operated within 49.9 Hz and 50.1 Hz for 98.94% of the time.
- In 2025 the availability of the East West Interconnector was 92.3%.
- In 2025 the availability of the Greenlink Interconnector was 98.7%.
- The weighted-average availability of the Ireland transmission system in 2025 was 94.09%.
- The System Minutes Lost for 2025, attributable to EirGrid, was 2.207.

3. Ireland System Data

3.1. Overview of the Ireland Electricity System

The transmission system in Ireland provides the means to transport energy from generators to demand centres across the country. The transmission system is comprised of high-voltage overhead lines and cables that connect power stations, interconnectors and substations. Transformers link different voltage levels and provide a path for power to flow, typically, from higher to lower voltage networks. The transmission system in Ireland is operated at 400 kV, 275 kV, 220 kV and 110 kV.

The 400 kV and 220 kV networks form the backbone of the transmission system. They have higher power carrying capacity and lower losses than the 110 kV network.

The Ireland transmission system is electrically connected to the Northern Ireland transmission systems by means of a 275 kV double-circuit. This connection is from Louth station in Co. Louth, Ireland to Tandragee station in Co. Armagh, Northern Ireland.

There are also two 110 kV connections:

- Letterkenny station in Co. Donegal, Ireland to Strabane station in Co. Tyrone, Northern Ireland
- Corraclassy station in Co. Cavan, Ireland to Enniskillen station in Co. Fermanagh, Northern Ireland

This section contains basic Ireland transmission system data. Further information can be found on the EirGrid website: www.eirgrid.ie.

3.2. Total System Production

Total exported energy considers energy supplied by all generators In Ireland that have an export meter, including pumped hydro storage units and batteries. This does not consider interconnector imports and exports.

Table 1: Total Exported Energy 2024 & 2025

	2024	2025[1]
Ireland Total Exported Energy [GWh]	29,623	29,725

3.3. System Records

Peak demand is a measure of the maximum demand on the transmission system over a particular period (e.g., annual or seasonal) and is a key measurement for any power system. The transmission system in Ireland is a winter peaking system as a result of greater heating and lighting requirements during the winter months. The Ireland winter peak in 2025 was 6,024 MW and occurred at 17:47 on 8 January.

In summer, the reduced need for heating and lighting results in a lower demand for electricity. The minimum demand is known as the 'minimum summer night valley' and in 2025 a minimum Ireland demand of 2,766 MW was recorded at 05:54 on 6 July.

From the installed utility-scale wind capacity, a peak Ireland wind generation output of 3,884 MW was achieved at 22:15 on 13 February. From the installed utility-scale solar capacity, a peak Ireland solar generation output of 798 MW was achieved at 14:59 on 9 July. Table 2 provides a summary of the system records for 2025.

Table 2: System Records 2025

	2025
Winter Peak Demand [MW]	6,024
Minimum Summer Night Valley [MW]	2,766
Maximum Wind Generation [MW]	3,884
Maximum Solar Generation [MW]	798

[1] Provisional figures for 2025

3.4. Generation Capacity

Generating plant is connected to both the transmission and distribution systems. All generation contributes to meeting system demand. The total generation capacity is calculated as the sum of all fully operational generator capacities connected to both systems (excluding small-scale). Table 3 summarises the key categories of Ireland generation capacity. This does not include any import capacity from the East West Interconnector or Greenlink Interconnector.

Table 3: Ireland Generation Capacity as of 31 December 2025

	Capacity (MW)
Dispatchable Generation (MW)	6,455[2]
Batteries (MW)	834 (1,208 MWh)
Demand Side Units (MW)	718
Wind (MW)[3]	4,891
Solar (MW)[4]	975

Appendix 2 provides a list of the dispatchable generating units, including batteries and DSUs, connected to the power system.

[2] This figure includes 1,399 MW of out-of-market temporary emergency generation and retained existing units

[3] MEC of operational utility-scale wind farms

[4] MEC of operational utility-scale solar farms

3.5. Generation Availability

Generation Availability is a measure of the capability of a generator to deliver power in a given period to the transmission system. For EirGrid to operate a secure and reliable transmission system in an economic and efficient manner, it is necessary for generators to maintain a high rate of availability.

Generation system availability is calculated on a daily and 365-day rolling average basis[5]. Figure 1 shows the daily and 365-day rolling average availability for 2025.

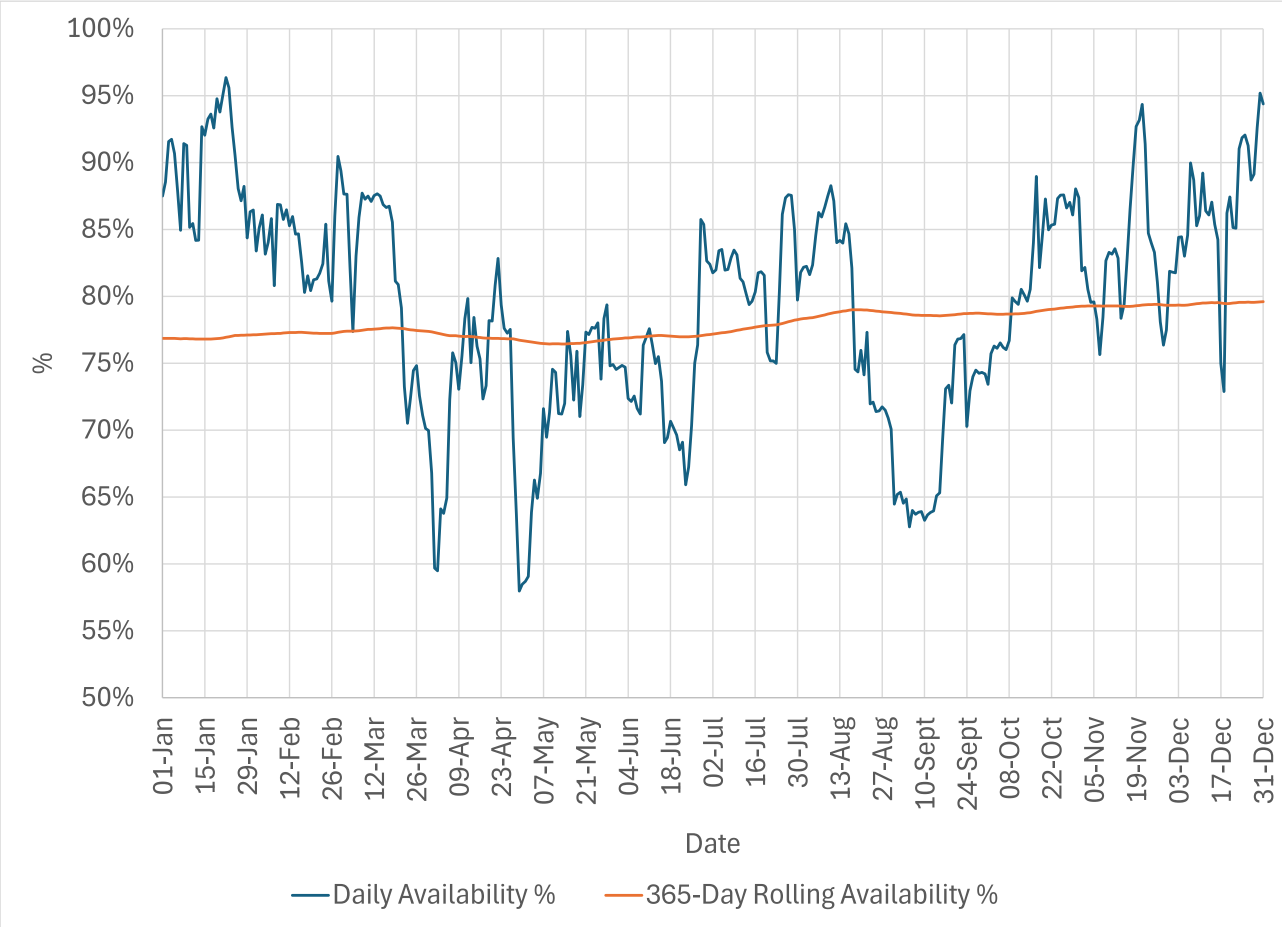

Figure 1: Ireland Dispatchable Conventional Generator Availability 2025

- The average daily generation availability in 2025 was 79.6%.
- The maximum daily generation availability in 2025 was 96.4%.
- The minimum daily generation availability in 2025 was 58.0%.

[5] 365-day rolling average is a capacity weighted average availability over the previous 365 days.

3.6 Generation Forced Outage %

The generation forced outage % is calculated on a daily and rolling 365-day average basis. The daily forced outage % is a capacity weighted percentage of the time during the day that generation units are unavailable due to unforeseen/unplanned outages. The 365-day rolling forced outage % is the average of the daily forced outage % over the previous 365 days. The daily forced outage % and 365-day rolling forced outage % are shown in Figure 2.

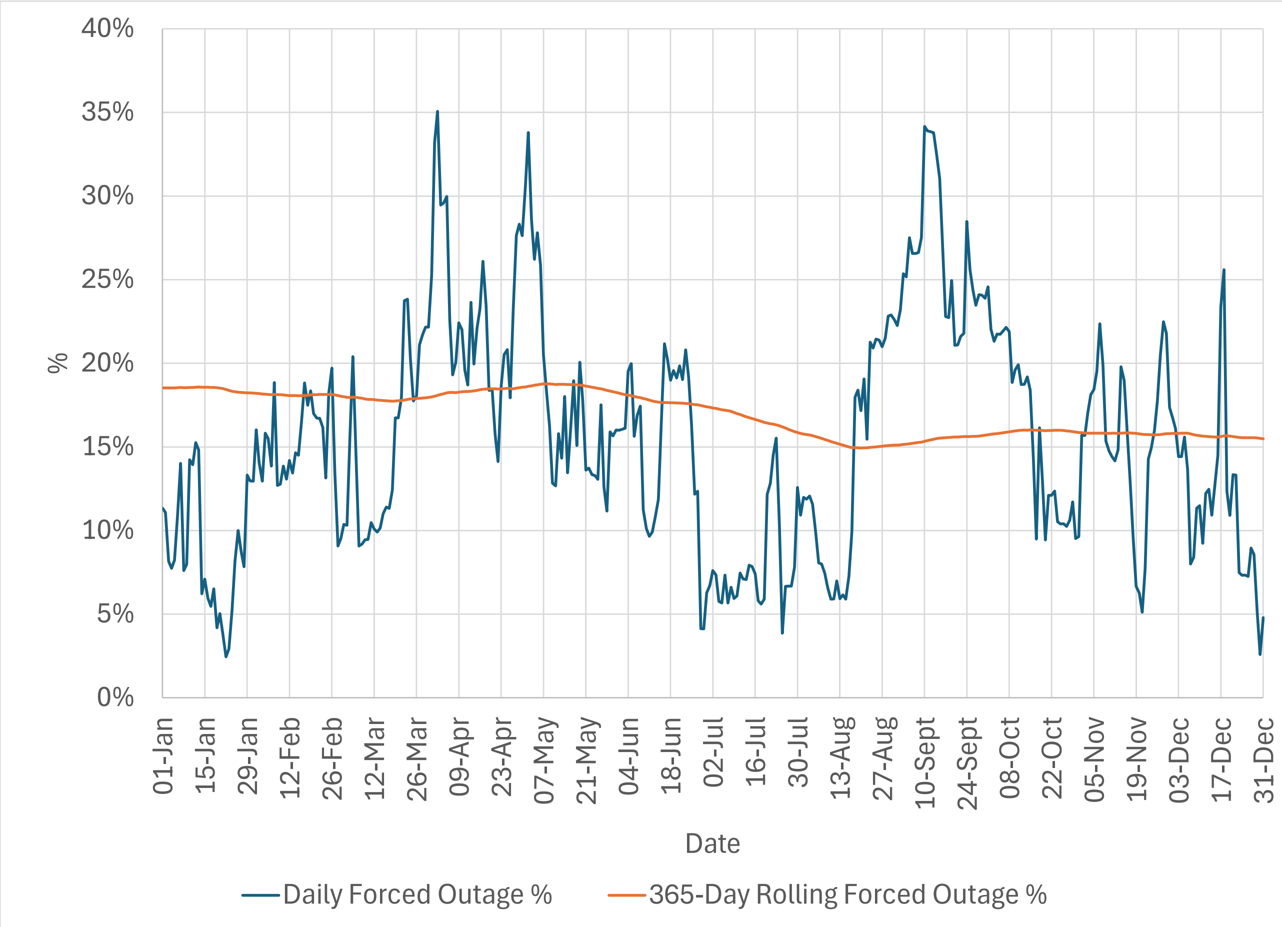

Figure 2: Ireland Dispatchable Conventional Generator Forced Outage % 2025

- The average daily generation forced outage rate in 2025 was 15.5%.
- The maximum daily generation forced outage rate in 2025 was 35.1%.
- The minimum daily generation forced outage rate in 2025 was 2.4%.

3.7 Generation Scheduled Outage %

The generation scheduled outage % can be calculated on a daily and rolling 365-day average basis. The daily scheduled outage % is a capacity weighted percentage of the time during the day that generation units are unavailable due to planned outages. The 365-day rolling scheduled outage % is the average of the daily scheduled outage % over the previous 365 days. The daily scheduled outage % and 365-day rolling scheduled outage % are shown in Figure 3.

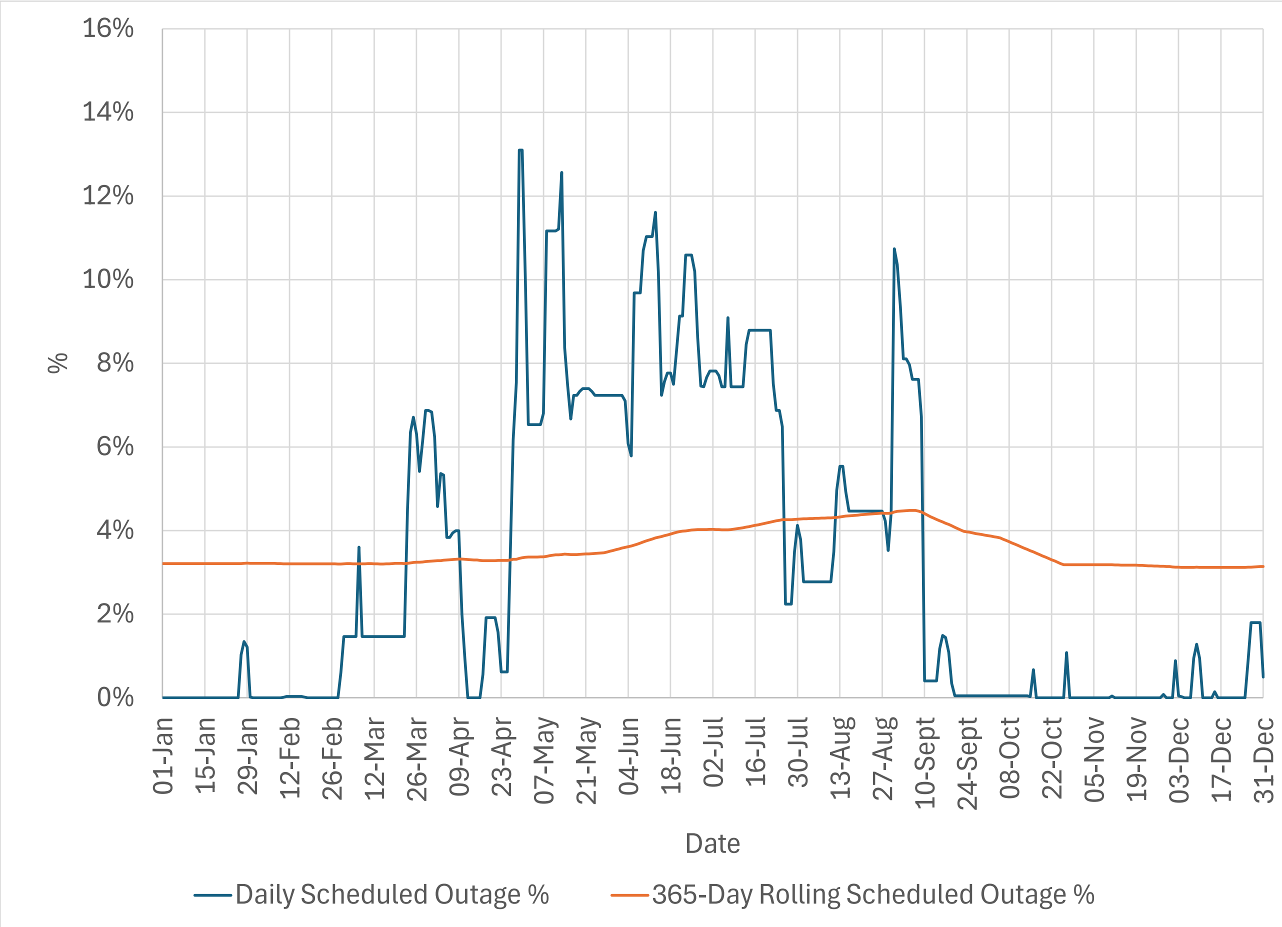

Figure 3: Ireland Dispatchable Conventional Generator Scheduled Outage Rate 2025

- The average daily generation scheduled outage rate in 2025 was 3.2%.
- The maximum daily generation scheduled outage rate in 2025 was 13.1%.
- The minimum daily generation scheduled outage rate in 2025 was 0.0%.

3.8 Battery Availability

Battery Availability is a measure of the capability of a battery to deliver power in a given period to the transmission system. For EirGrid to operate a secure and reliable transmission system in an economic and efficient manner, it is necessary for batteries to maintain a high rate of availability.

Battery availability is calculated on a daily and 365-day rolling average basis. Figure 4 shows the daily and 365-day rolling average availability for 2025.

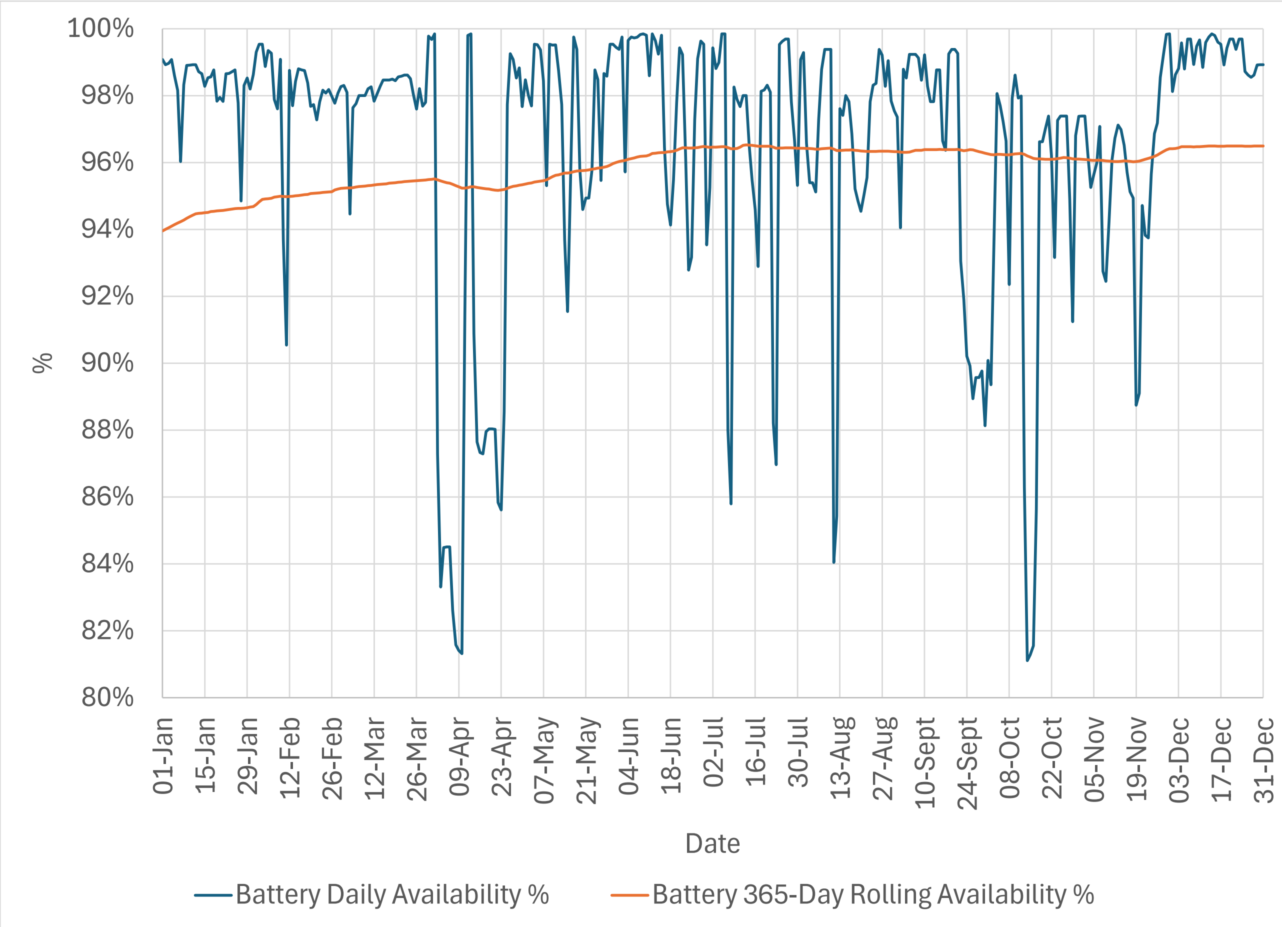

Figure 4: Ireland Battery Availability 2025

- The average daily battery availability in 2025 was 96.5%.
- The maximum daily battery availability in 2025 was 99.9%.
- The minimum daily battery availability in 2025 was 81.1%.

3.9 DSU Availability

DSU Availability is a measure of the capability of a Demand Side Unit to deliver demand reduction in a given period to the transmission system. For EirGrid to operate a secure and reliable transmission system in an economic and efficient manner, it is necessary for DSUs to maintain a high rate of availability.

DSU system availability is calculated on a daily and 365-day rolling average basis[6]. Figure 5 shows the daily and 365-day rolling average availability for 2025.

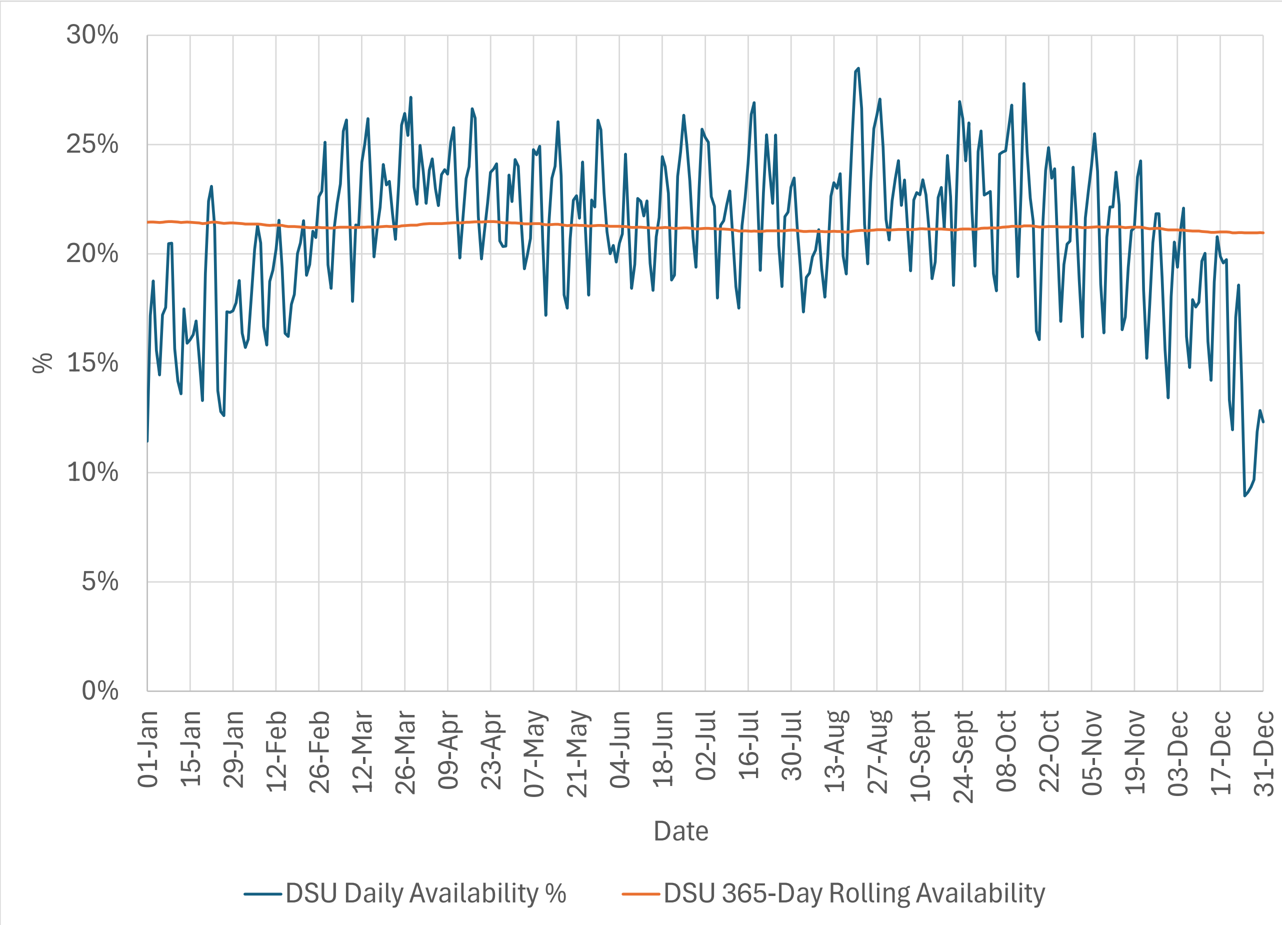

Figure 5: Ireland DSU Availability 2025

- The average daily DSU availability in 2025 was 21.0%.
- The maximum daily DSU availability in 2025 was 28.5%.
- The minimum daily DSU availability in 2025 was 8.9%.

[6] 365-day rolling average is a capacity weighted average availability over the previous 365 days.

4 Transmission System Performance

This section relates to the performance of EirGrid TSO and the transmission system in Ireland. This data has been prepared by EirGrid in accordance with the requirements of Part 5 of Condition 18 of its Transmission System Operator Licence.

4.1 Summary

There were no major incidents in 2025. A major incident is one which results in the loss of greater than or equal to one system minute as a result of a single system disturbance.

The system minutes lost as a result of faults on the main system was 2.207 in 2025. No system minutes were lost due to the disconnection of normal tariff load customers during Under Frequency Load Shedding (UFLS) disturbances.

EirGrid have a target to operate the system frequency within the range 49.9 Hz to 50.1 Hz for 98% of the time. In 2025, the system frequency was within the agreed limits 98.94% of the time.

4.2 Grid Development and Maintenance

This section provides an overview of grid development activities in 2025.

4.2.1 Completed Capital Projects

- CP1136 Deenes 110 kV station
- CP1132 New Cow Cross 110 kV transformer
- CP0622 Tarbert 220 kV station
- CP1287 Ringsend cable diversion
- CP1113 Corduff 220 kV station deep works
- CP0817 Flagford - Sliabh Bawn 110 kV circuit uprate
- CP1217 Philipstown 110 kV station
- CP0871 Galway 110 kV station redevelopment
- CP1059 Raghra 220 kV station
- CP1160 Coolroe, Inniscarra & connected stations protection upgrade
- CP1277 Ryebrook-Maynooth/ Dunfirth/ Kinnegad-Rinawade 110 kV line diversion
- CP1093 Barnageeragh 110 kV station
- CP1232 Derryiron 110 kV busbar uprate
- CP1041 Timahoe 110 kV station
- CP1155 Glenree - Moy 110 kV line uprates

- CP1167 Drybridge - Oldbridge - Platin 110 kV line uprate
- CP1231 Knockdrin 110 kV station
- CP1236 Timoney 110 kV station
- CP1294 Temporary Emergency Generation Shannonbridge Phase 2
- CP0905 Louth - Rathrussan 110 kV line uprate
- CP1234 Laurencetown 110 kV station
- CP0857 Paint towers nationwide and refurbish Kilbarry - Marina 110 kV double circuit
- CP1158 Rattin 110 kV station
- MC0356 Killoteran Waterford 110 kV circuit bay conductors uprate
- MC0379 Replacement of supports on Cashla T2104 transformer
- MC0390 Aghada - Knockraha 1 and 2 220 kV line droppers uprate at Aghada 220 kV station
- MC0381 Gorman-Maynooth 220 kV line tower replacement
- MC0393 Cunghill 110 kV station connectors

4.2.2 New Connection Offers

Parties seeking a new connection to the transmission system must apply to EirGrid for a connection offer. EirGrid operates within a regulatory approved process for providing connection offers to generators and demand customers seeking direct connection to the transmission system. The process for issuing generation offers was consulted on in 2017 resulting in the Enduring Connection Policy (ECP) which has led to a significant increase in the number of new generation capacity offers issuing between 2019 and 2025. Applications for ECP-GSS-1 opened in September 2025 and will begin to be processed in Q2 2026.

In order to connect to the transmission system, all demand and generation customers must execute a connection agreement with EirGrid. Table 4 summarises the total number of new capacity connection agreements executed in 2025 and their associated load or generation capacities. A connection offer which is accepted in one year is unlikely to impact on connected generation capacity in the same year given the lead times associated with construction.

Table 4: New Capacity Executed Demand & Generation Connection Agreements

	Demand	Generation	Autoproducer	Interconnector
Executed Connection Agreements in 2025 [No.]	3	53	0	0
Executed Connection Agreements in 2025 [Capacity]	22.0 MVA	3,023.3 MW	0.0 MW	0.0 MW

In addition to issuing connection offers for new generation and demand capacity, EirGrid facilitates existing contracted customers in modifying existing connection agreements.

4.2.3 Connections Energised

When a connection agreement is executed for a new connection, it typically takes several years before the demand or generation is connected to the transmission system. This period includes project development, time taken to obtain consents and to construct the connection.

When the transmission connection is energised, it then takes several months for the generator to reach commercial operation. This period is generally much shorter for demand customers.

Table 5: Demand & Generation Transmission Connections Energised in 2025 provides an overview of the number of new connections to the transmission system commissioned in 2025.

Table 5: Demand & Generation Transmission Connections Energised in 2025

	Demand	Conventional Generation	PPM[7]	Battery	Interconnector
Connections Energised in 2025 [No.]	0	0	6	1	0
Connections Energised in 2025 [Capacity]	0 MVA	0 MW	483.56 MW	63 MW	0 MW

4.2.4 Customers Certified Operational

Table 6 provides an overview of customers connected to the transmission system who have been deemed fully operational. It shows customer connections which have completed the testing phase and have received an operational certificate from EirGrid. This includes generators connected to the distribution network. Note that demand customers are not currently certified by EirGrid and are therefore not included in the table.

Following energisation, the unit is required to complete Grid Code Compliance testing, following which Operational Certificates[8] are issued.

[7] PPM: Power Park Modules.

[8] EirGrid issues Operational Certificate Justifications for distribution-connected generation. These are the included in the figures shown.

Table 6: Customers Certified Operational in 2025

	Total number of units certified operational in 2025	Total net new capacity certified operational in 2025 (MW)
PPM	8	247.4
Conventional	4	406.0
Battery	0	0.0
DSU (including existing DSUs with changes in capacity)	22	35.0
Synchronous Condenser	0	N/A
Interconnector	1	501.0 import / 517.0 export

4.3 General System Performance

4.3.1 Under-Frequency Load Shedding

There were no UFLS disturbances in 2025.

The relays to disconnect normal tariff customer load are only activated once the system frequency drops to 48.85 Hz. The lowest system frequency in 2025 was 49.722 Hz.

Figure 6 provides a trend of the number of disturbances since 2016 that involved operation of under-frequency relays to disconnect interruptible and normal tariff end-users. No normal tariff customers have been disconnected due to an under-frequency disturbance since 2014.

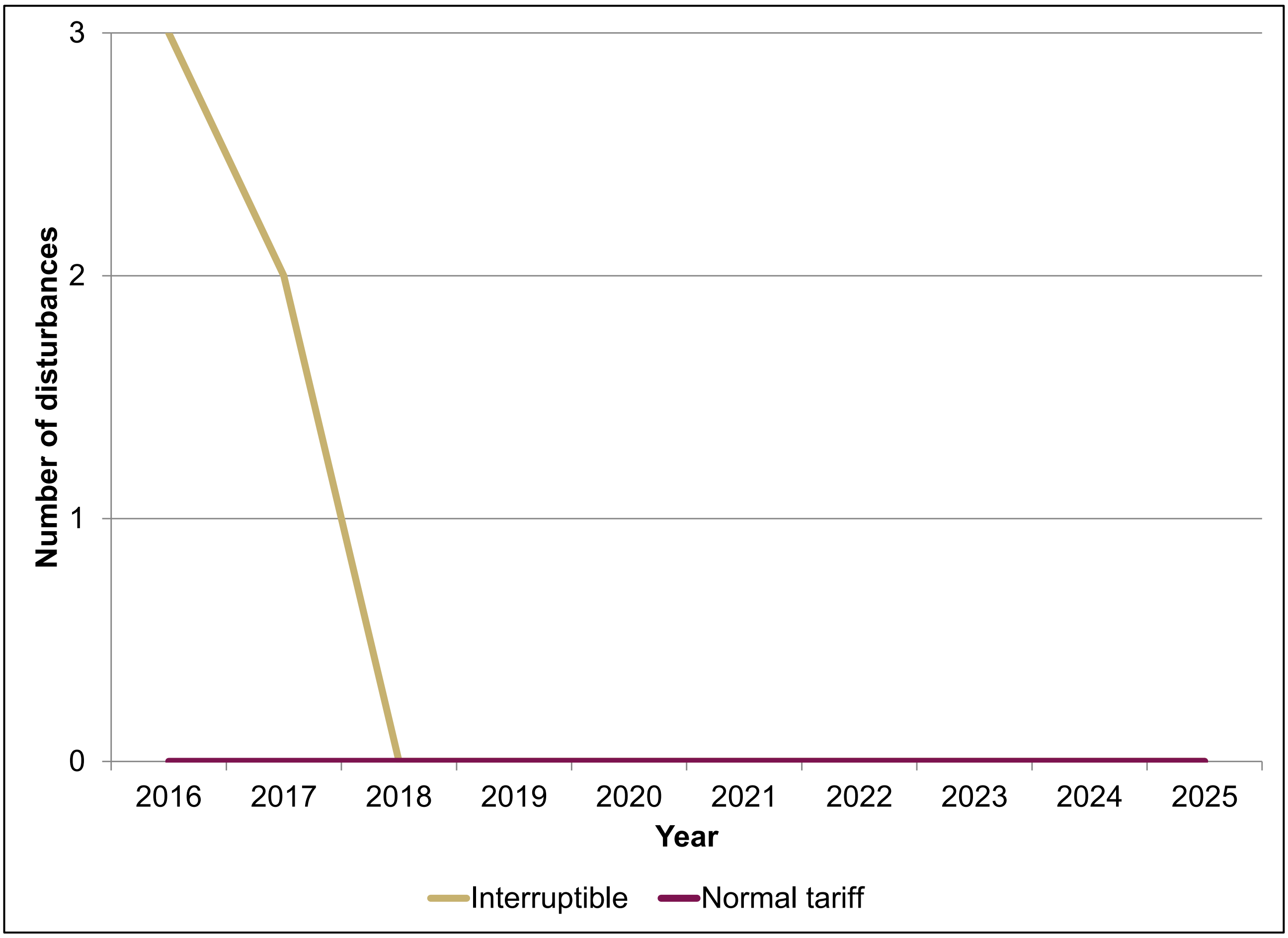

Figure 6: Under frequency disturbances 2016-2025

Figure 7 provides a trend of the lowest system frequency by year since 2016.

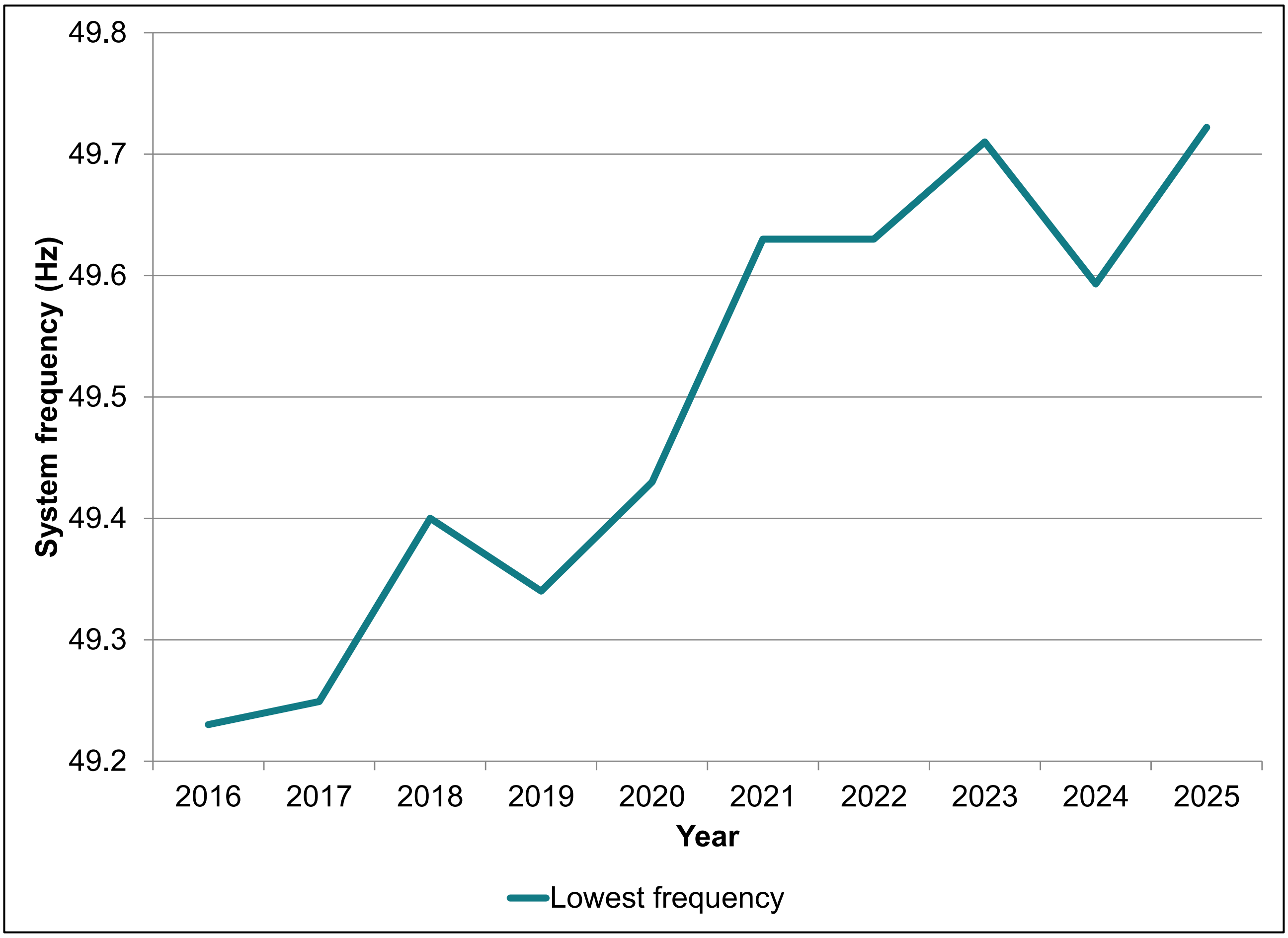

Figure 7: Lowest system frequency 2016-2025

4.3.2 Under-Voltage Load Shedding

There was no incident of Under-Voltage Load Shedding in 2025.

4.4 System Minutes Lost

This section provides information for system minutes lost (SML) attributable to the transmission system operator.

SML is a measure of the energy not supplied for a disturbance. The metric takes account of the load lost (MW), duration of disconnection (minutes) and peak system demand (MW), to allow for historical comparison. For example, if 300 MW were lost for 10 minutes and the system peak was 3000 MW, this would represent one system minute.

$$System\ minutes = \frac{(load\ \times\ duration)}{(system\ peak)} = \frac{(300\ \times\ 10)}{(3000\ )} = 1$$

The total SML due to faults on the main system for 2025, attributable to EirGrid, was 2.207. This was mainly due to Storm Éowyn. During the storm, one 400 kV, one 220 kV and thirty-nine 110 kV transmission circuits tripped on multiple occasions. Due to the tripping of 110 kV transmission circuits, a total of 55 MW of load was disconnected with an SML of 2.153 attributed to EirGrid. There were no under frequency load shedding disturbances which resulted in the disconnection of normal tariff load customers.

The trend of SML since 2016 is shown in Figure 8, with incentive / penalty limits and deadbands as provided by the Commission for Regulation of Utilities. The central target provided until 2020 was replaced in 2021 with a deadband between 0.75 and 2.5 SML, where there is neither penalty nor incentive. One fifth of the incentive amount is awarded for every 0.1 SML below 0.75, down to 0.25 SML. One fifth of the incentive amount is penalised for every 0.1 SML above 2.5, up to 3.0 SML.

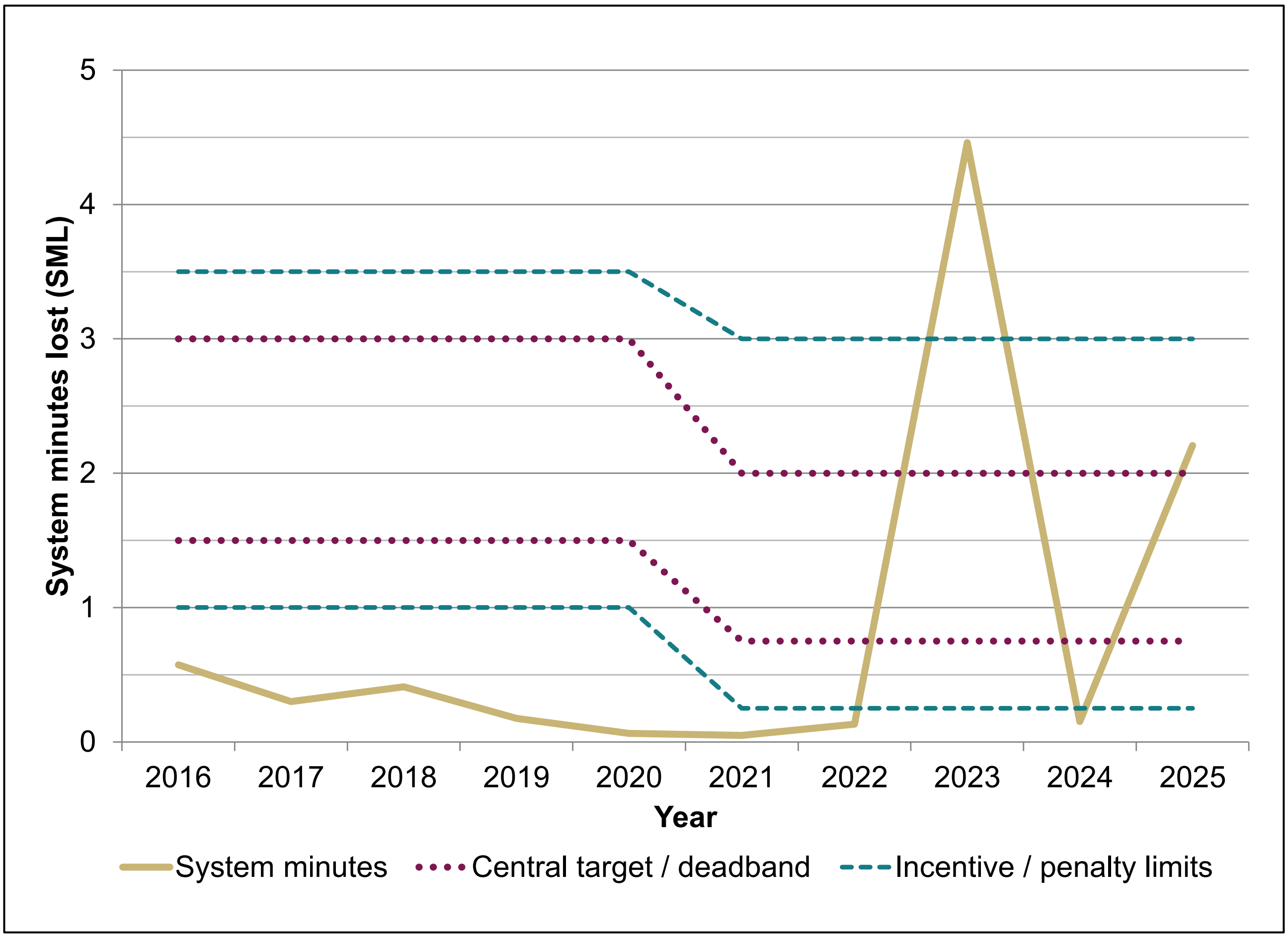

Figure 8: System minutes lost and associated targets: EirGrid 2016-2025

4.5 Zone Clearance Ratio

This section provides details of the short circuit faults on the main system and outside the main system for which main system protection is expected to operate without delay.

Zone clearance ratio (ZCR) is defined as the ratio of the number of short circuit faults, not cleared in zone 1 to the total number of short circuit faults per year cleared by main system protection. See Appendix 1 Glossary, for further definition of Zones and ZCR.

Of the 135 short circuit faults in 2025, the main system protection was expected to operate without delay for 132 of those short circuit faults on the main system. 129 of those faults had zone 1 clearances, giving a zone clearance ration of 0.022. The ZCR trend since 2016 is shown in Figure 9.

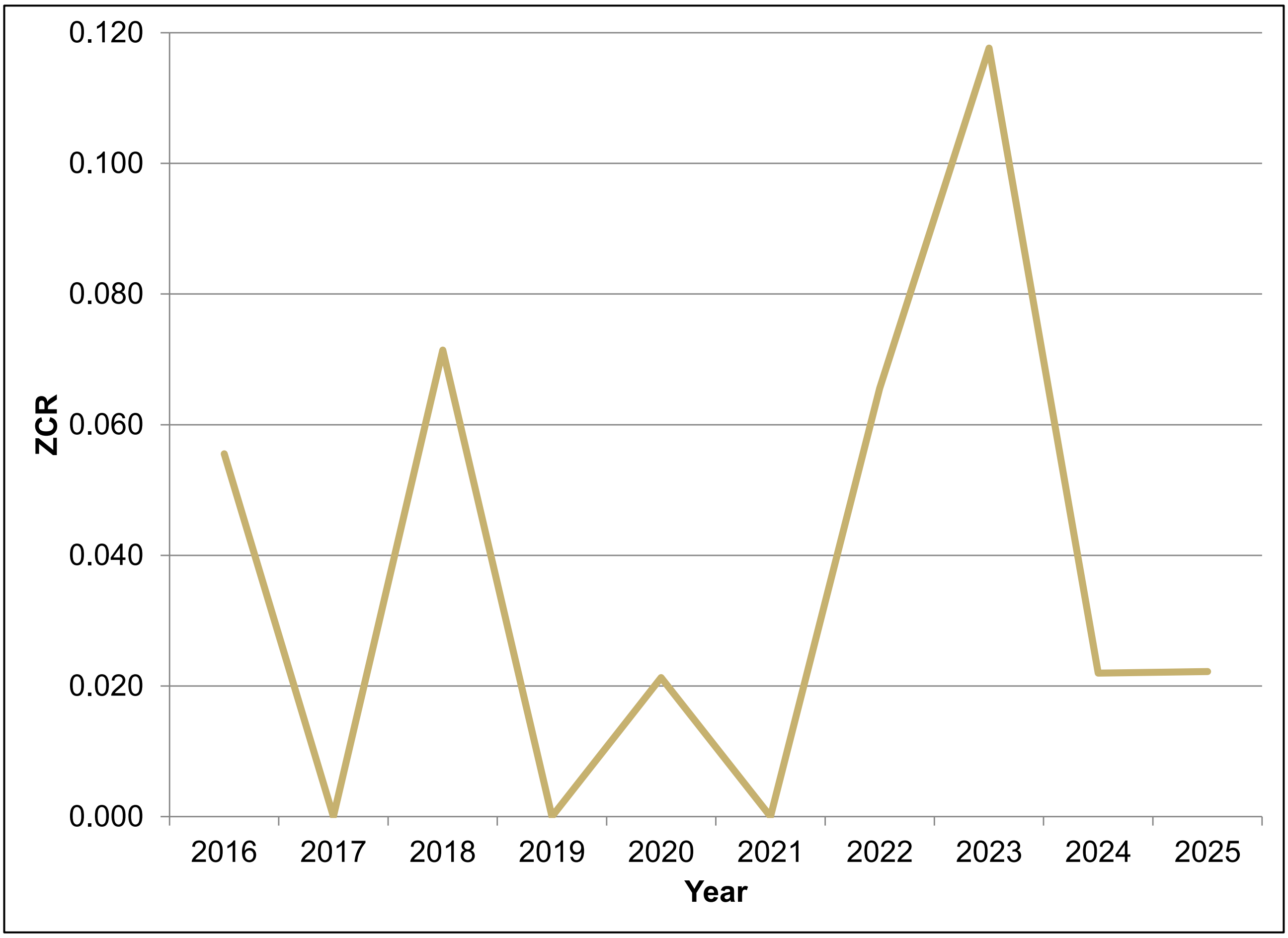

Figure 9: Zone clearance ratio: EirGrid 2016-2025

4.5.1 Frequency Control

In 2025 the system frequency was operated between 49.9 Hz to 50.1 Hz for 98.94% of the time.

4.6 Summary of key disturbances

4.6.1 Loss of load

Date/Time	Plant	Fault Type	Description	Cause	System Minutes Lost
24/01/2025 02:30	Dallow – Shannonbridge - Stonestown 110 kV circuit	Two-phase to earth (RSE)	At 10:15, the line was successfully returned to service.	Storm Éowyn	0.540339
24/01/2025 03:33	Cashla – Shannonbridge - Somerset 110 kV circuit	Phase to phase (RS)	At 10:26, the line was successfully returned to service.	Storm Éowyn	0.822709
24/01/2025 04:40	Booltaigh – Moneypoint - Tullabrack 110 kV circuit	Phase to phase (ST)	At 12:48, the line was successfully returned to service.	Storm Éowyn	0.243028
24/01/2025 05:07	Bellacorick - Castlebar 110 kV circuit	Single-phase to earth (SE)	At 06:36, the line was successfully returned to service.	Storm Éowyn	0.398904
24/01/2025 06:25	Bellacorick - Moy 110 kV circuit	Mal-operation	A mal-operation tripped the Bellacorick – Moy 110 kV circuit following a phase-to-phase fault on the Cunghill – Glenree 110 kV circuit. At 08:54, the line was successfully returned to service.	Storm Éowyn	0.148406

Date/Time	Plant	Fault Type	Description	Cause	System Minutes Lost
20/05/2025 21:13	Cathaleen's Fall - Corraclassy 110 kV circuit	Three-phase to earth (RSTE)	The Cathaleen's Fall - Corraclassy 110 kV circuit tripped and reclosed for a three-phase to earth fault (RSTE) due to lightning. Simultaneous to the fault on Cathaleen's Fall - Corraclassy 110 kV circuit, the impedance function in Sranangh 110 kV station on the Cathaleen's Fall 1 (ONE) cubicle mal-operated and tripped the circuit. This resulted in islanding of the Donegal region until the reclosing of Cathaleen's Fall - Corraclassy 110 kV circuit.	Lightning	0.045255
20/06/2025 03:23	Charleville – Mallow 110 kV circuit	Three-phase to earth (RSTE)	At 03:27, the line was successfully returned to service. As the Kilbarry - Mallow 110 kV circuit was on a scheduled outage, Mallow 110 kV station was disconnected from the system.	Lightning	0.008247

4.6.2 Storms Resulting in Trippings

A System Alert was issued between 00:00 and 16:10 on 24/01/2025 due to Storm Éowyn. Between 00:12 and 18:38, one 400 kV, one 220 kV and thirty-nine 110 kV transmission circuits tripped on multiple occasions resulting in 2.153 system minutes lost attributed to EirGrid. A Status Red weather warning was in operation nationwide.

Between 13:50 and 15:48 on 03/10/2025, there were 4 faults on the 110 kV transmission network during Storm Amy. No Interruptions to end-users occurred. Yellow weather warnings were in operation nationwide.

4.7 Transmission System Availability & Outages

4.7.1 Transmission System Availability

When considering transmission system availability, it is the convention to analyse it in terms of transmission system unavailability. The formula for calculating transmission system unavailability is given in Appendix 4 Formulae. Figure 10 shows the percentage Transmission System Unavailability in each month for 2025.

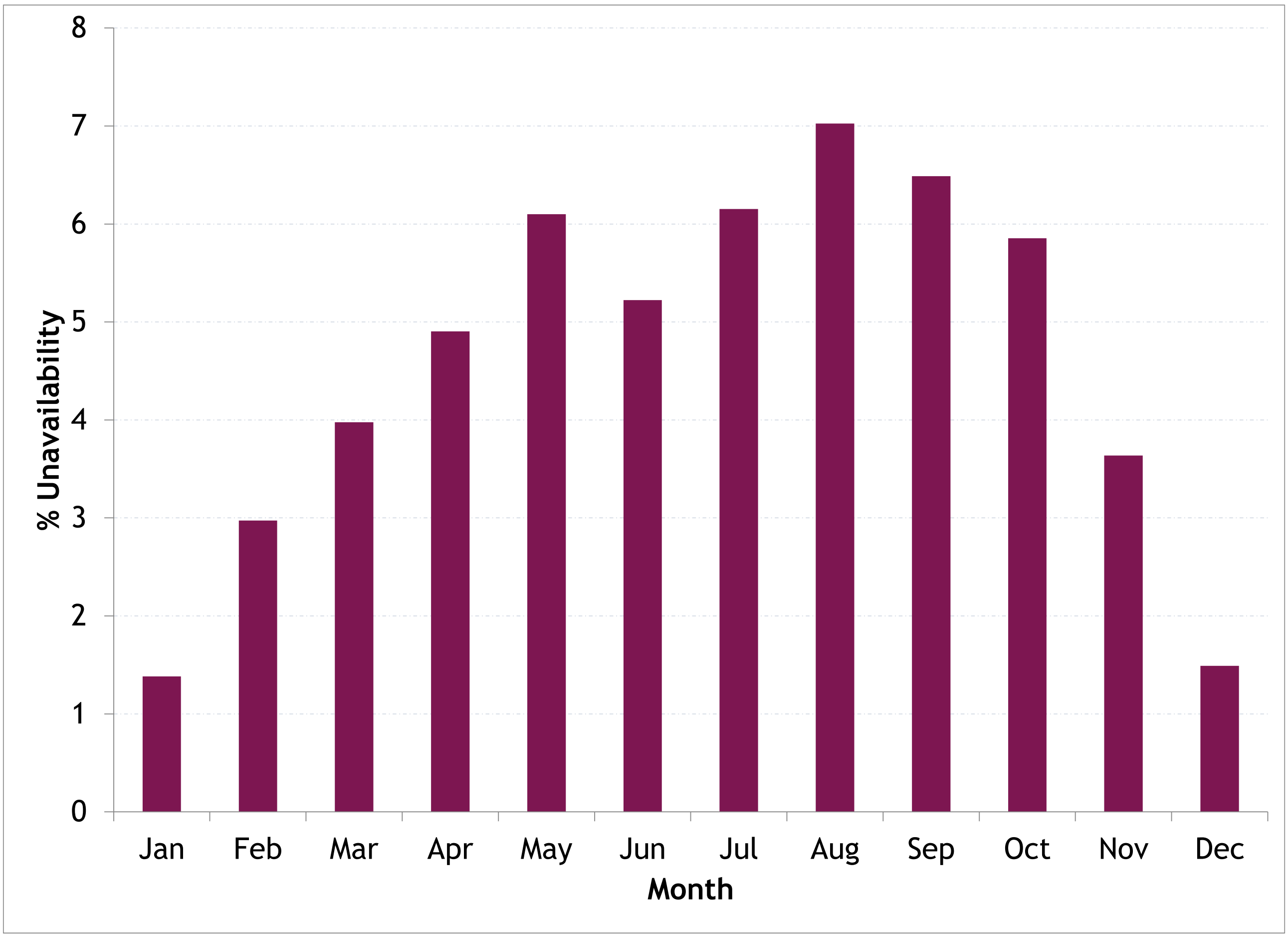

Figure 10: Monthly Variations of Transmission System Unavailability 2025

4.7.2 Transmission Plant Availability

The measure of plant availability is the kilometre-day for feeders and the MVA (megavolt ampere)-day for transformers. The availability figures vary between the different categories of plant. The formulae for calculating transmission plant availability are provided in Appendix 1 Glossary.

Table 7 provides a detailed breakdown of all plant availability figures for 2025.

Table 7: Transmission System Plant Availability 2025

Plant Type	Circuit Length [km]	Number of Outages	Availability (%) 2025
110 kV Circuits	4,697	331	93.56
220 kV Circuits	1,988	88	94.88
275 kV Circuits	97	2	99.40
400 kV Circuits	439	13	88.70
Plant Type	**Transformer Capacity [MVA]**	**Number of Outages**	**Availability (%) 2025**
220 / 110 kV Transformers	11,864	65	95.56
275 / 220 kV Transformers	1,200	6	91.88
400 / 220 kV Transformers	4,050	15	96.98
Total	7,221 km	520	**Weighted Average (%)**
	17,114 MVA		94.09

4.7.3 Cause of Transmission Plant Unavailability

Transmission plant unavailability is classified into the categories outlined in Table 8.

Table 8: Transmission System Plant Unavailability Categories

Category	Description
Forced & Fault	Refers to unplanned outages. An item of plant trips or is urgently removed from service. Usually caused by imminent plant failure. There are three types of forced outage: A) Fault & Reclose B) Fault & Forced C) Forced (No Tripping)
Safety & System Security	**Safety:** Refers to transmission plant outages which are necessary to allow for the safe operation of work to be carried out. **System Security:** Refers to outages which are necessary to avoid the possibility of cascade tripping or voltage collapse as a result of a single contingency. When a line is out for maintenance it may be necessary to take out additional lines for this reason.
New Works	An outage to install new equipment or uprate existing circuits.
Corrective & Preventative Maintenance	**Corrective Maintenance:** Is carried out to repair damaged plant. Repairs are not as urgent as in the case of a forced outage. **Preventative Maintenance:** Is carried out in order to prevent equipment degradation which could lead to plant being forced out over time. Includes line inspections, tests and routine replacements.
Other Reasons	Several other reasons may be attributed to plant unavailability, such as testing, protection testing and third-party work.

4.7.4 110 kV Circuit Unavailability

Figure 11 provides a breakdown of the causes of unavailability on the 110 kV network in 2025.

The largest contributor to unavailability (47%) on the 110 kV network was attributable to “Corrective and Preventative” maintenance. This type of maintenance includes, amongst others, ordinary services, condition assessments, wood-pole replacement/straightening and general line maintenance.

A further 34% of unavailability on the 110 kV network in 2025 were outages for the purpose of "New Works". This category is for outages to install new equipment or uprate existing circuits.

9% of unavailability was due to forced outages.

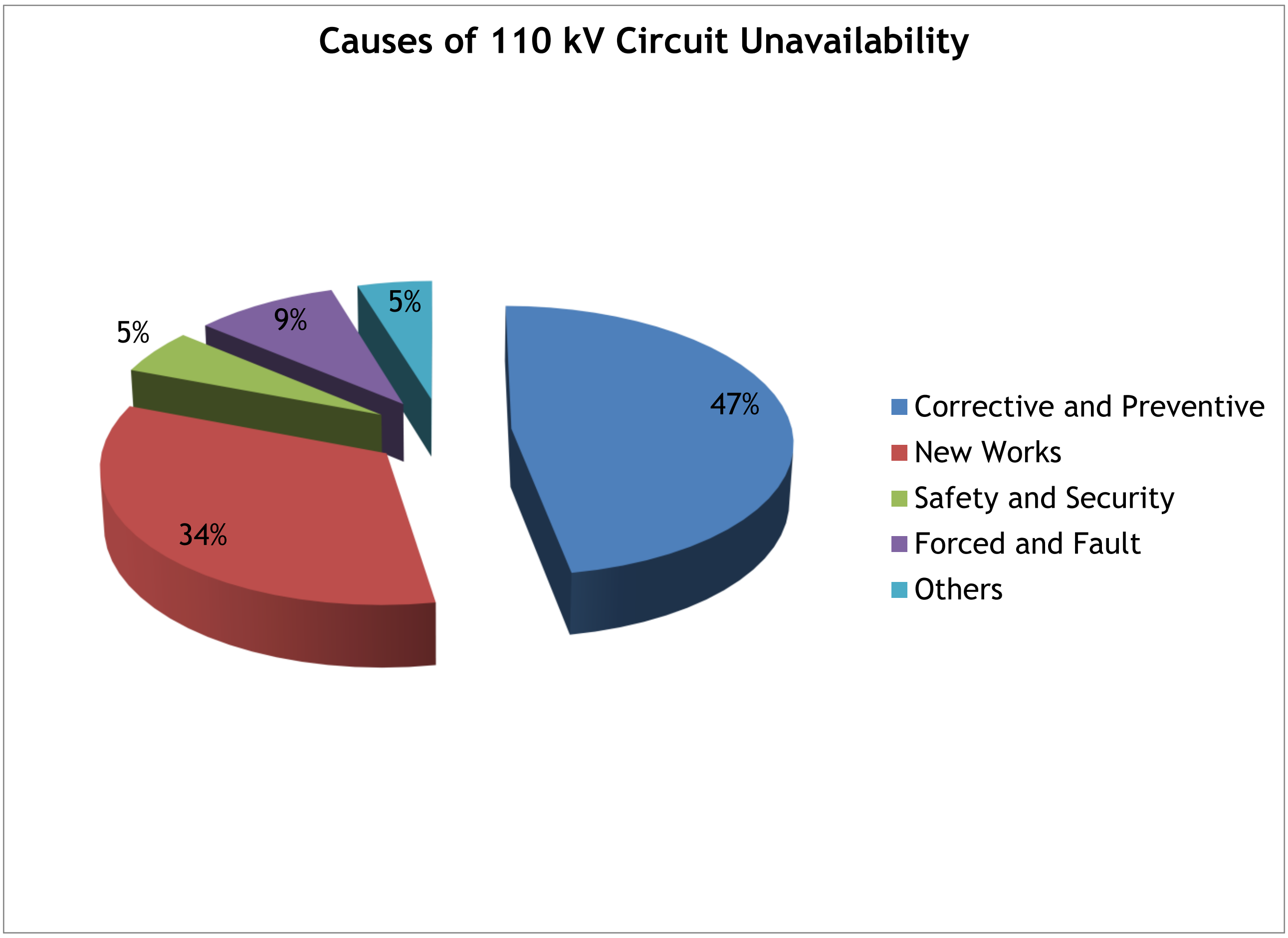

Figure 11: Causes of Unavailability on the 110 kV System in 2025

4.7.5 220 kV Circuit Unavailability

Figure 12 provides a breakdown of the causes of unavailability on the 220 kV network in 2025. The largest contributor to unavailability (52%) on the 220 kV network in 2025 were outages for "Corrective and Preventative" maintenance purposes. Approximately 31% of unavailability on the 220 kV network was attributable to “New Works”. A further 25% of unavailability on the 220 kV network was attributable to forced outages.

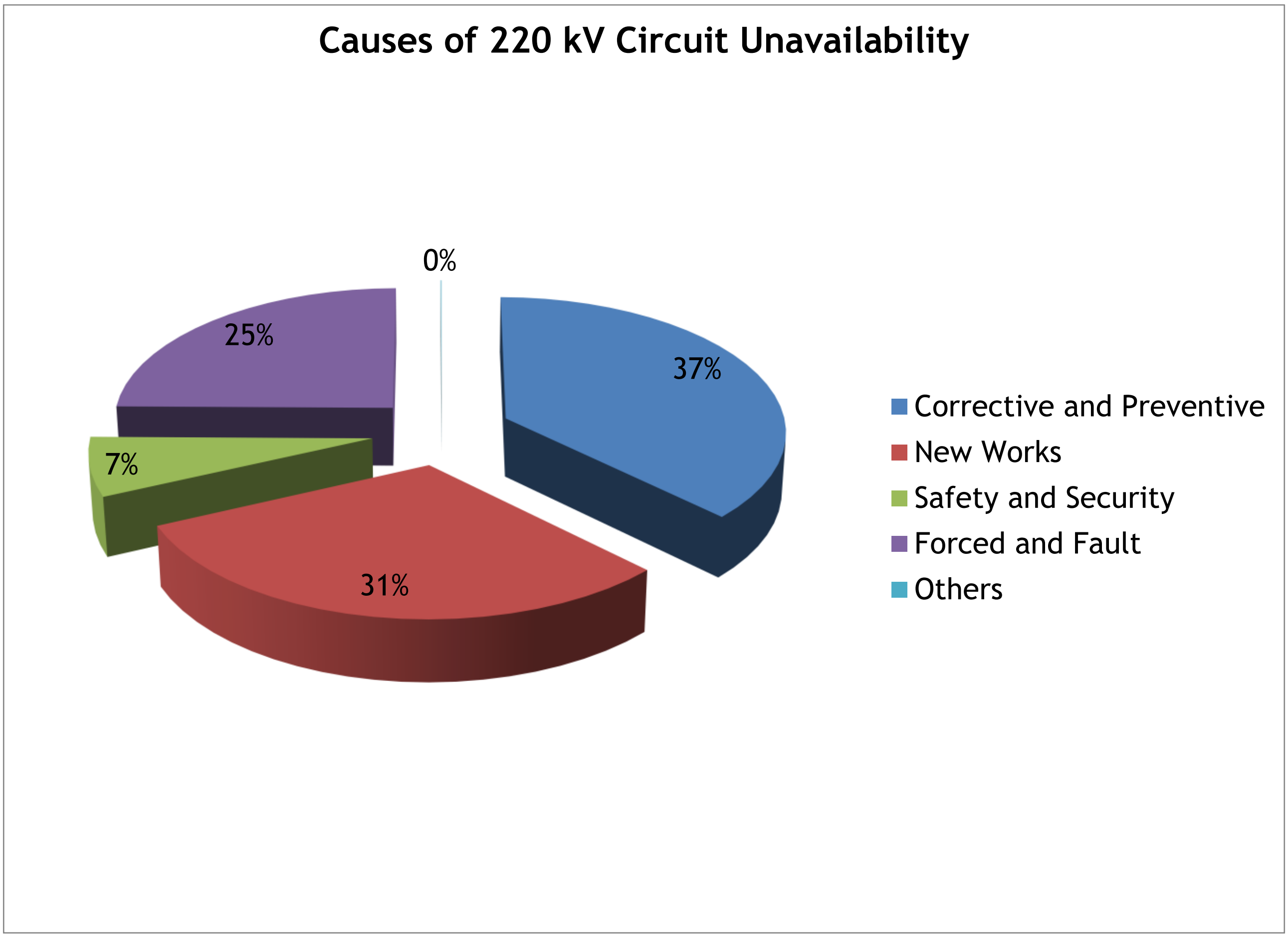

Figure 12: Causes of Unavailability on the 220 kV System in 2025

4.7.6 275 kV Circuit Unavailability

The 275 kV tie-line consists of 48.5 km of 275 kV double-circuit between Louth station and Tandragee station which is situated in County Armagh. Most of the unavailability (93%) on the 275 kV network in 2025 were outages for "New Works”.

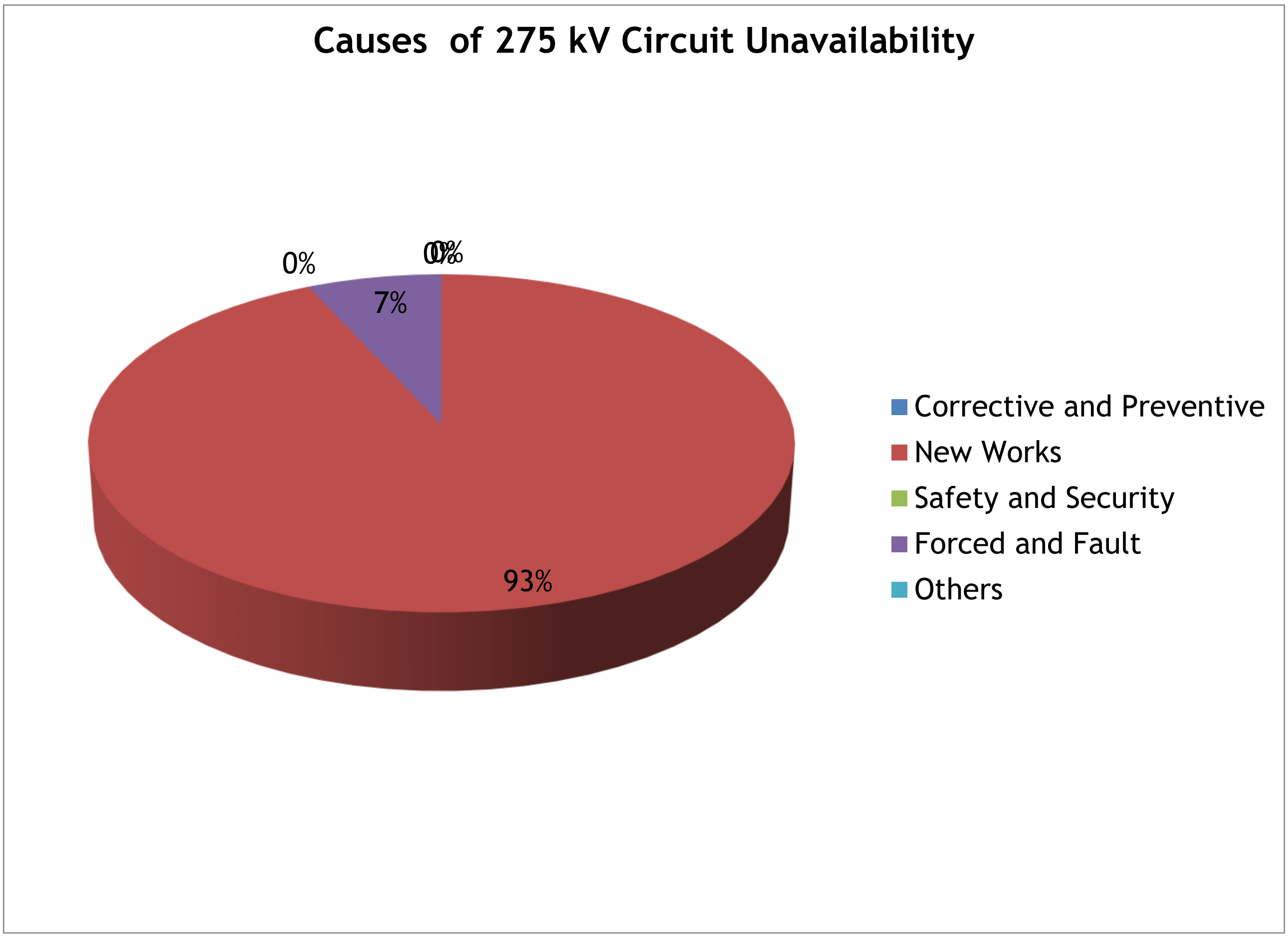

Figure 13: Causes of Unavailability on the 275 kV System in 2025

4.7.7 400 kV Circuit Unavailability

Figure 14 provides a breakdown of the causes of unavailability on the 400 kV network in 2025. The largest contributor on the 400 kV network in 2025 were outages for "Corrective and Preventative" maintenance purposes.

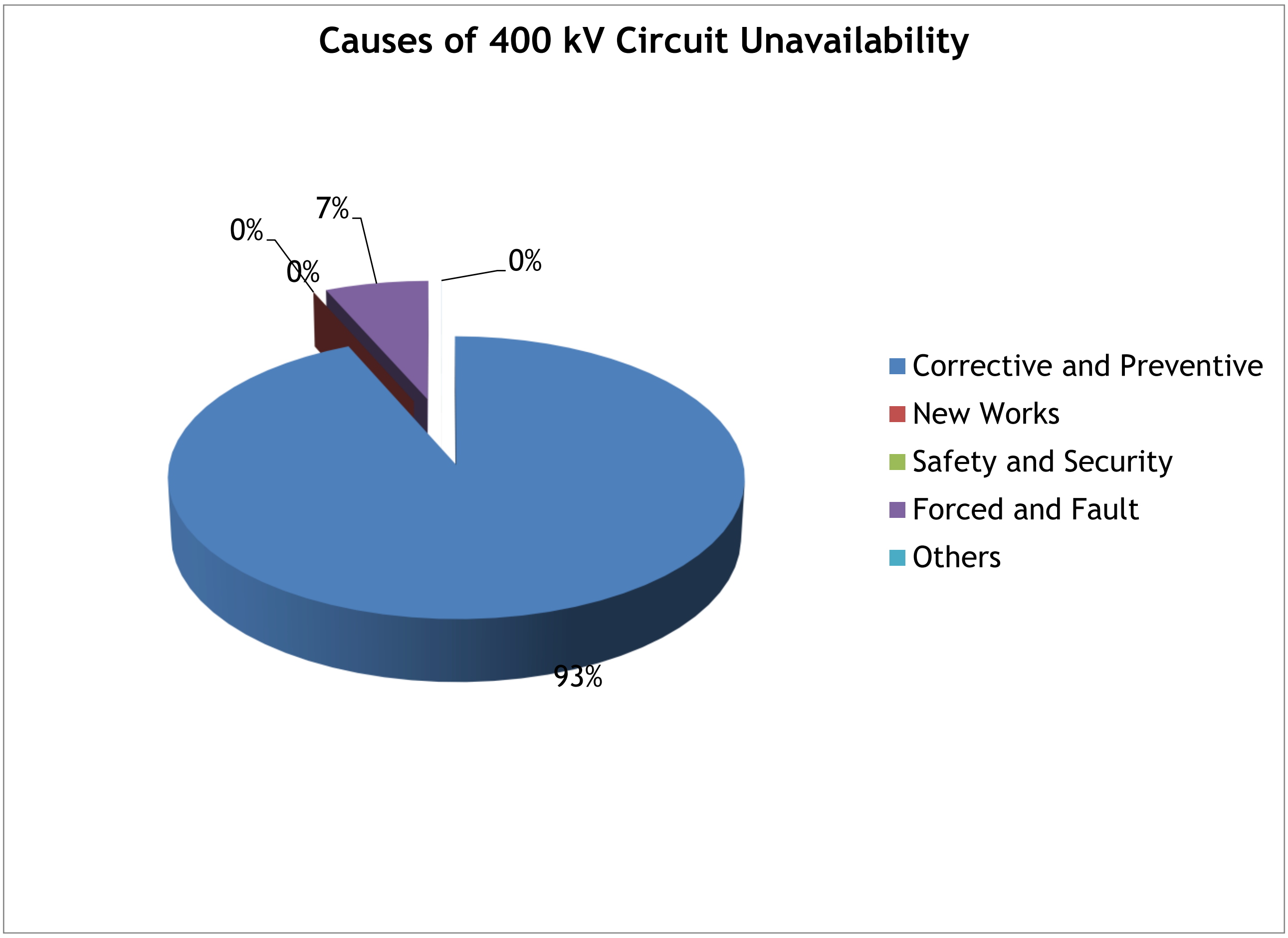

Figure 14: Causes of Unavailability on the 400kV System in 2025

Table 9 provides a breakdown of the transmission system outages that occurred in 2025 by plant type.

Table 9: Transmission System Plant Outage 2025

Plant Type	No. of Items	Circuit Length	Forced & Fault	Safety & System Security	New Works	Corrective & Preventive Maintenance	Other	Total No. of Outages
110 kV Circuits	278	4,697	56	14	61	182	18	331
220 kV Circuits	77	1,988	15	7	17	44	5	88
275 kV Circuits	2	97	1	0	1	0	0	2
400 kV Circuits	4	439	5	1	0	6	1	13
Total	361	7,221	77	22	79	232	24	434
Plant Type	**No. of Items**	**Transformer Capacity**	**Forced & Fault**	**Safety & System Security**	**New Works**	**Corrective & Preventive Maintenance**	**Other**	**Total No. of Outages**
220 / 110 kV Trafos	58	11,864	13	7	11	30	4	65
275 / 220 kV Trafos	3	1,200	3	1	1	1	0	6
400 / 220 kV Trafos	8	4,050	1	1	1	10	2	15
Total	69	17,114	17	9	13	41	6	86

4.7.8 East West Interconnector

The East West Interconnector (EWIC) is a high-voltage direct current (HVDC) scheme which links the power systems of Ireland and Great Britain. It has a nominal power rating of 500 MW. EWIC is a fully regulated interconnector which was developed and is owned by EirGrid Interconnector DAC (EIDAC) which is part of the EirGrid Group. The scheme consists of two converter stations located in Meath, Ireland and Deeside, Wales connected by 264 km of HV cable, 185 km of which is submarine.

4.7.9 East West Interconnector Availability

In 2025, the availability of the East West Interconnector (EWIC) was 92.3%.

4.7.10 Greenlink Interconnector

The Greenlink Interconnector is a high-voltage direct current (HVDC) scheme which links the power systems of Ireland and Great Britain. It has a nominal power rating of 500 MW. The scheme consists of two converter stations located in Wexford, Ireland and Pembrokeshire, Wales connected by 160 km of HV cable, 130 km of which is submarine. Greenlink began commercial operation on 29 January 2025.

4.7.11 Greenlink Interconnector Availability

The availability of the Greenlink Interconnector was 98.7% between beginning commercial operation on 29 January 2025 and year end.

4.7.12 Transmission Outage Duration

The duration of transmission outages is useful for assessing transmission system performance. Transmission outages are broken into eight-time classifications ranging from less than 10 minutes to greater than four weeks. The total number of outages in each time classification is shown in Figure 15.

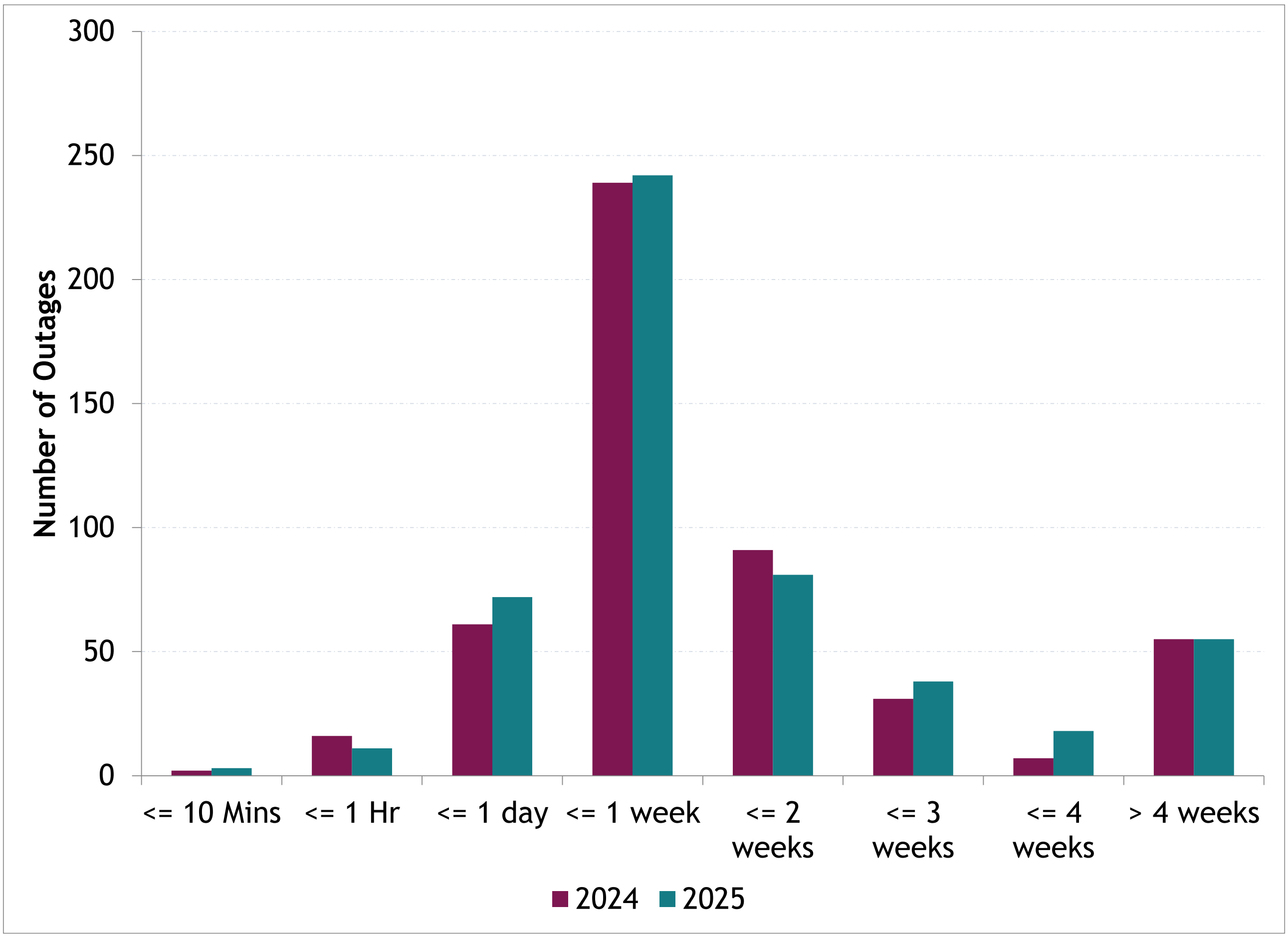

Figure 15: Duration of Outages in 2024 & 2025

Most of the outage durations are concentrated between one day and 2 weeks with the peak occurring between one day and 1 week. In the category of one hour to one day, outages can be arranged to avoid peak load times and thereby reduce the impact on the system, while one-week outages for annual maintenance are commonplace during the outage season.

4.7.13 Timing of Transmission Outages

Figure 16 shows the percentage unavailability of the transmission system in each month. The March-November period sees the highest rates of unavailability during the year, when decreased system load is taken advantage of. Figure 17 shows the average duration in days of the transmission outages in each month in 2025.

Figure 16: Percentage unavailability in each month of 2024 & 2025

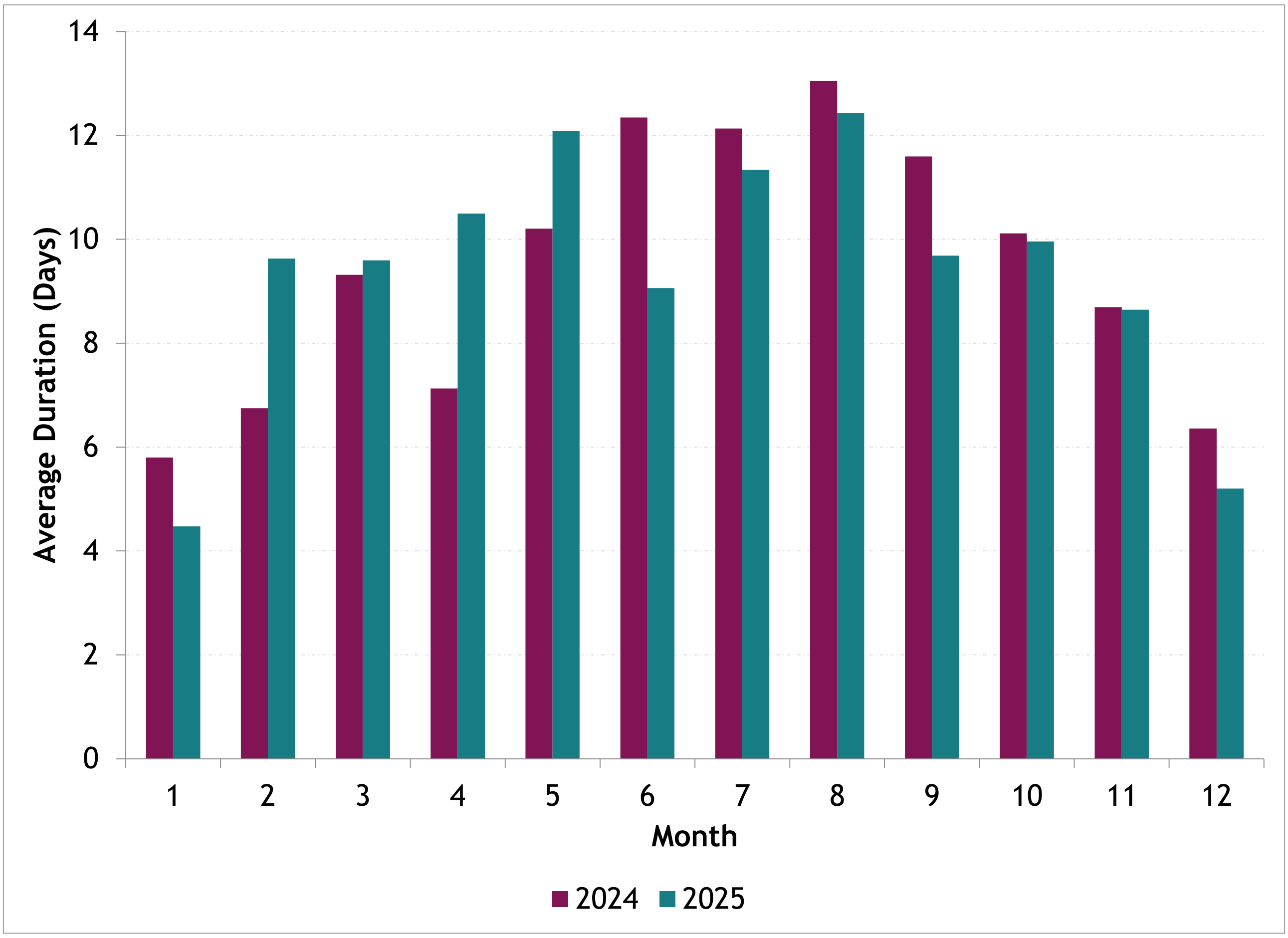

Figure 17: Average duration of outages 2024 & 2025

4.7.14 Forced Outages

There are two main outage classifications, voluntary outages and forced outages. Most outages are voluntary outages that are scheduled by EirGrid. Forced outages are not scheduled and cause the most disruption to the transmission system. Due to their disruptive nature, forced outages merit further analysis.

4.7.15 Forced Outages per km

The measure used for analysing the forced outages of lines and cables is the number of forced outages per kilometre of feeder and is shown in Figure 18.

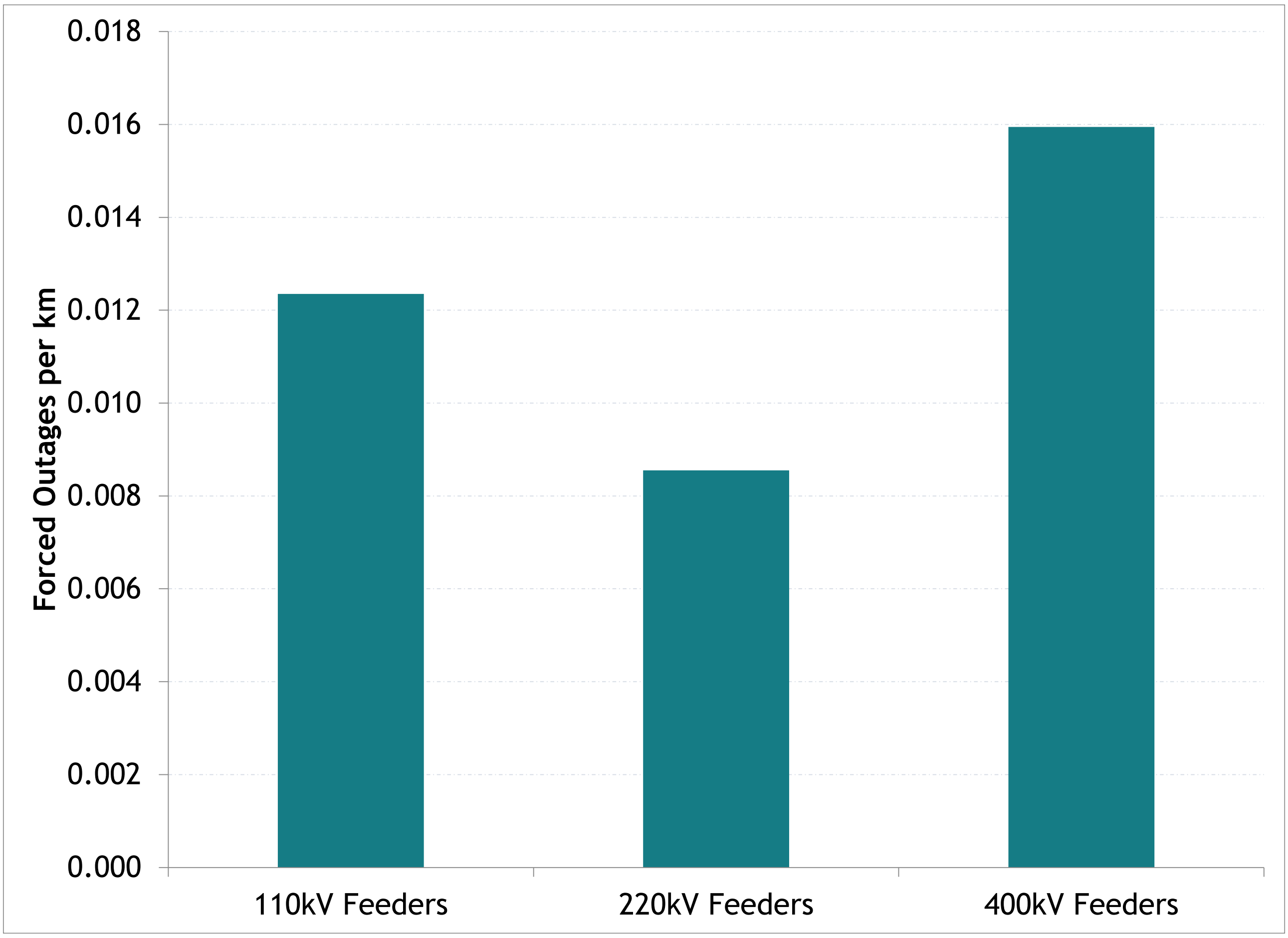

Figure 18: Forced Outages of lines and cables per km in 2025.

4.7.16 Forced Outages per MVA

The measure used for analysing the forced outages of transformers is the number of forced outages per MVA capacity, which can be seen in Figure 19.

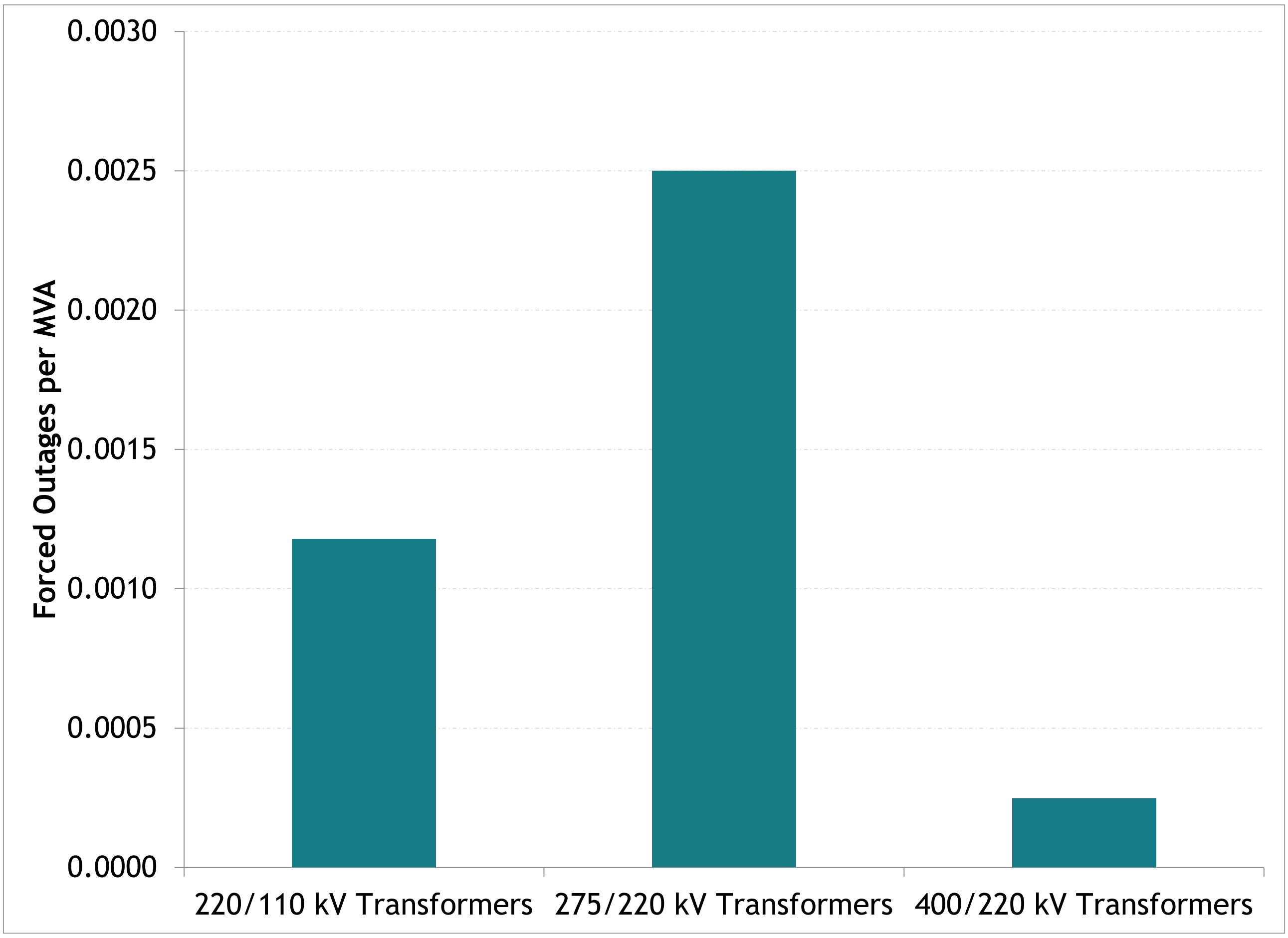

Figure 19: Forced Outage per MVA in 2025

5 Appendix 1 Glossary

5.1 Disturbance

A system disturbance is defined as one or more related faults and their consequences which occur either simultaneously or over a period of time. These incidents are grouped in a single system disturbance report under the highest voltage involved.

5.2 Fault

Any abnormal event causing or requiring the tripping of a Main System circuit breaker automatically within the Main System. Any abnormal event causing or requiring the closing of a Main System circuit breaker automatically within the Main System. Any abnormal event causing or requiring the tripping of an MV circuit breaker automatically by under frequency relay operation.

5.3 Main system

The main transmission system includes: the 400 kV, 220 kV and 110 kV overhead line (OHL) and underground cable (UGC) network, the 400 kV, 220 kV and 110 kV busbars and couplers, the 400/220 kV and 220/110 kV coupling transformers (except for those feeding the Dublin city 110 kV network). It also includes the 275 kV ESB/NIE Networks interconnector as far as the border with Northern Ireland, and the associated 275/220 kV transformers. The main transmission system does not include the Dublin city 110 kV network or the 220/110 kV coupling transformers at Carrickmines, Inchicore and Poolbeg. The HV circuit breakers of tail connected lines and directly connected transformers (DSO load, directly connected industrial customer load, generator and HVDC interconnector transformers) are part of the main transmission system thus faults on these lines and transformers, which cause transmission system circuit breakers to be tripped, are reported.

5.4 Major incident

A major incident is one which results in the loss of greater than or equal to one system minute as a result of a single system disturbance.

5.5 Non main system/outside the main system

All HV plant on the Irish electricity network that does not form part of the main system: the Dublin 110 kV network (controlled by the DSO at the northern distribution control centre (NDCC). The MV system in Ireland is controlled by the NDCC in Leopardstown), all DSO and industrial customer load transformers, all Independent Power Producer (IPP) generator transformers, and all plant on the NIE Networks owned, SONI controlled, HV system in Northern Ireland.

5.6 Non-System Fault

Any unplanned circuit breaker operation resulting from a cause other than a system fault or incorrect manual operation from a control point.

5.7 Permanent Fault

A fault is permanent if the component or unit is damaged and cannot be restored to service until repair or replacement is completed. An overhead line trips and stays out of service due to the absence or outage of reclosing facilities; the fault is permanent if maintenance staff must carry out equipment repairs or replacement before the line is returned to service. A protection setting change is required on the piece of plant before or after it is switched in following a fault.

5.8 POTT

Permissive Overreach Transfer Trip. A distance teleprotection scheme that allows accelerated tripping by exchanging permit and receive signals for faults in a relay’s zone 2.

5.9 Protection - Correct Operation

The operation is correct if a fault is cleared by the protection (in any time step) such that the correct circuit breakers open and no other circuit breaker opens.

5.10 Protection - Incorrect Operation

The operation is incorrect if, while a fault is being cleared, a circuit breaker is opened which should not have opened or a circuit breaker remains closed which should have opened.

5.11 PUTT

Permissive Underreach Transfer Trip. A distance teleprotection scheme that allows accelerated tripping by receiving a signal for a fault in a relay’s forward direction.

5.12 System Fault

Any fault or system abnormality which involves or is the result of failure of primary electrical apparatus and which requires the disconnection of the affected equipment from the system by the automatic tripping of the associated circuit breaker.

5.13 System Minute

A measure of the energy not supplied for a disturbance. The metric takes account of the load lost (MW), duration of disconnection (Minutes) and peak system demand (MW), to allow for historical comparison. For example, if 300 MW were lost for 10 minutes and the system peak was 3000 MW, this would represent one System Minute.

$$System\ Minutes = \frac{(Load\ MW \times Duration\ mins)}{(System\ Peak\ MW)} = \frac{(300 \times 10)}{3000} = 1$$

5.14 Transient Fault

A fault is transient if the unit or component is undamaged and is restored to service through manual switching operations, or rapid automatic reclosure on overhead lines, without repair being performed, but possibly with on-site inspection.

5.15 Zone Clearance Ratio

The Zone Clearance Ratio is defined as the ratio of the number of short circuit faults not cleared in Zone 1 to the total number of short circuit faults per year. The more faults cleared in Zone 1, the quicker they are taken off the power system which reduces the risk of system instability, plant damage and injury to personnel.

5.16 Zones of Protection

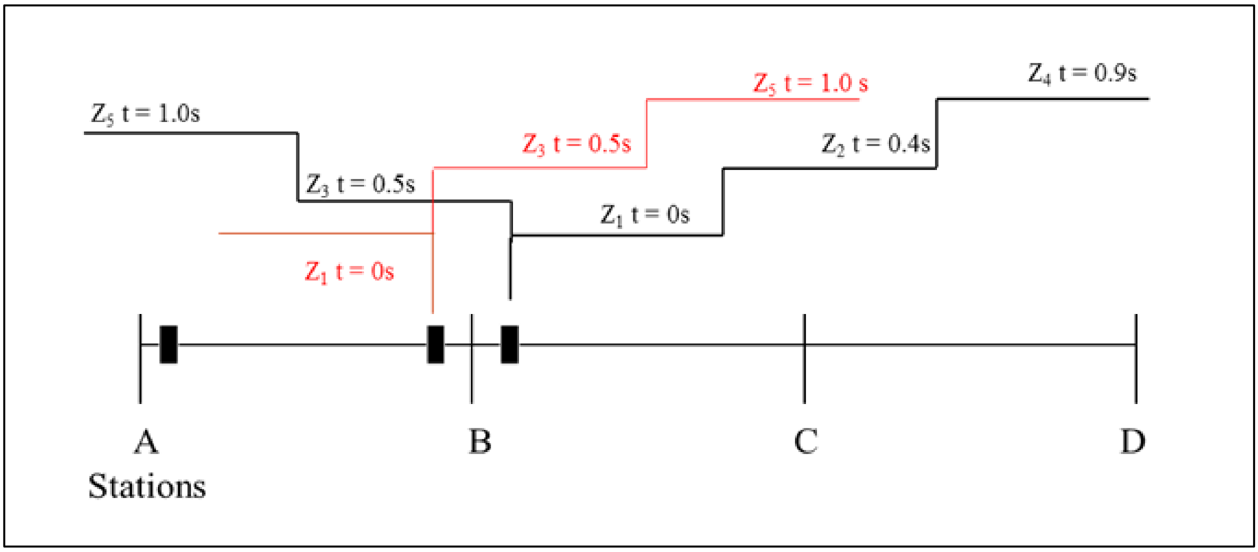

Figure 20: Zones of Protection

Zone 1 on an impedance (distance) relay is the primary protection zone and in the case of an overhead line is set to 70 - 85% of the circuit length depending on the location of the circuit in the transmission network. There is no time delay for the relay to pick up when a fault occurs within the Zone 1 reach, as shown in Figure 20. Typical Zone 1 clearance times are 50 to 150 ms.

Zone 2 on an impedance relay is used as a backup protection zone and is set to 100% of the circuit length plus 20 - 50% of the length of the shortest feeder at the remote end of the protected circuit. A delay of approximately 400 ms is applied in Zone 2 settings and so typical Zone 2 fault clearance times are 450 to 550 ms.

Zone 3 on an impedance relay is used as a backup protection zone and is set to 20 - 50% of the length of the shortest feeder in the reverse direction. A delay of approximately 500 ms is applied in Zone 3 settings and so typical Zone 3 fault clearance times are 550 to 650 ms.

Zone 4 is the third forward step of a distance scheme with a time delay of approximately 900 ms.

Zone 5 is the second reverse step of a distance protection scheme with a time delay of approximately 1.1 seconds.

6 Appendix 2 Ireland Dispatchable Generation Plant

Table 10: Ireland Dispatchable Generation Plant

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Hadwell - AD4	75.000 (150.000 MWh)	Battery	95.4
Hadwell - AD5	75.000 (150.000 MWh)	Battery	N/A
Poolbeg - PB8	75.000 (150.000 MWh)	Battery	99.5
Shannonbridge - RG1	63.200 (163.000 MWh)	Battery	N/A
Lisdrumdoagh - LF1	60.000 (26.280 MWh)	Battery	92.5
Gorman - GF1	50.000 (32.200 MWh)	Battery	98.2
Lumcloon - LU1	50.000 (30.000 MWh)	Battery	96.8
Lumcloon - LU2	50.000 (30.000 MWh)	Battery	96.6
Shannonbridge - SI1	50.000 (30.000 MWh)	Battery	99.3
Shannonbridge - SI2	50.000 (30.000 MWh)	Battery	99.2
Irishtown - IS2	30.000 (61.350 MWh)	Battery	98.2
Kylemore - IH1	30.000 (60.000 MWh)	Battery	96.8
Porterstown - PN1	30.000 (27.000 MWh)	Battery	98.7

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Kelwin – KZ4	26.600 (13.400 MWh)	Battery	94.7
Cloncreen - OE2	25.000 (79.230 MWh)	Battery	N/A
Ballykilleen - HB1	20.000 (98.355 MWh)	Battery	N/A
Aghada – AD3	19.000 (37.100 MWh)	Battery	96.9
Avonbeg – AV1	16.000 (9.220 MWh)	Battery	87.3
Beenanaspuck and Tobertoreen – XT2	11.000 (5.660 MWh)	Battery	88.8
Killala – KF2	10.800 (10.800 MWh)	Battery	85.7
Gorey – OD1	9.000 (4.500 MWh)	Battery	97.8
Gardnershill – GP1	8.500 (9.580 MWh)	Battery	93.0
Edenderry - ED1	118.000	Biomass	67.8
Kelwin - KZ3	2.000	Diesel / Ultra-Capacitor	96.8
Rhode - RP1	52.000	Distillate Oil	85.9
Rhode - RP2	52.000	Distillate Oil	87.4
Tawnaghmore - TP1	52.000	Distillate Oil	88.4
Tawnaghmore - TP3	52.000	Distillate Oil	80.2
Enel X - AE1	74.805	DSU	8.4
GridBeyond - EC1	57.461	DSU	18.8
VIOTAS - EE1	53.778	DSU	12.4
VIOTAS - VS2	45.977	DSU	21.8
Enel X - EN6	30.012	DSU	19.6

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Aughinish Alumina - EB1	25.000	DSU	2.8
VIOTAS - EE2	24.770	DSU	26.3
Enel X - EN8	23.350	DSU	29.8
Enel X - AE4	23.215	DSU	16.1
GridBeyond - EC5	21.627	DSU	14.4
Veolia - DP2	21.156	DSU	31.9
Enel X - EX1	20.200	DSU	0.0
VIOTAS - EE5	18.570	DSU	29.8
Enel X - EN2	16.980	DSU	0.0
Enel X - EN3	16.330	DSU	39.4
Enel X - EN9	15.918	DSU	24.6
Enel X - EN4	15.700	DSU	41.9
Enel X - EN1	15.451	DSU	0.0
VIOTAS - EE4	15.305	DSU	17.9
Enel X - AE5	15.300	DSU	0.0
Enel X - AE3	13.969	DSU	40.2
VIOTAS - EE6	13.718	DSU	41.4
PowerHouse - PG6	13.124	DSU	40.8
VIOTAS - EE3	12.958	DSU	13.6
GridBeyond - EC2	12.750	DSU	27.8
Enel X - AE2	12.407	DSU	26.0
VIOTAS - EE7	11.178	DSU	28.8
PowerHouse - PG1	10.499	DSU	16.7
VIOTAS - EE8	9.443	DSU	33.3

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Veolia - DP3	8.413	DSU	36.4
Veolia - DP1	8.067	DSU	63.6
iPOWER - IR1	6.277	DSU	21.5
VIOTAS - EE9	5.978	DSU	40.2
GridBeyond - EC3	5.365	DSU	29.8
Enel X - EN5	5.359	DSU	0.0
GridBeyond - EC4	5.001	DSU	42.7
VIOTAS - VS6	4.430	DSU	N/A
GridBeyond - EC6	4.105	DSU	0.0
PowerHouse - PG2	4.062	DSU	36.7
Corduff - FG2	64.000	Gas	97.1
Irishtown - IS3	64.000	Gas	96.5
Poolbeg - PB7	64.000	Gas	82.2
Great Island - GI4	464.000	Gas / Distillate Oil	80.2
Aghada - AD2	449.000	Gas / Distillate Oil	81.8
Whitegate - WG1	444.000	Gas / Distillate Oil	86.6
Dublin Bay - DB1	415.000	Gas / Distillate Oil	81.8
Tynagh - TYC	404.000	Gas / Distillate Oil	64.7
Huntstown - HN2	402.000	Gas / Distillate Oil	65.3
Huntstown - HNC	342.000	Gas / Distillate Oil	82.9
Poolbeg - PBA	240.000	Gas / Distillate Oil	91.7
Poolbeg - PBB	236.000	Gas / Distillate Oil	92.7
Aghada - AT11	90.000	Gas / Distillate Oil	81.3
Aghada - AT12	90.000	Gas / Distillate Oil	84.4

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Aghada - AT14	90.000	Gas / Distillate Oil	82.5
Seal Rock - SK3	83.000	Gas / Distillate Oil	83.2
Seal Rock - SK4	83.000	Gas / Distillate Oil	90.7
Edenderry - ED3	58.000	HVO	89.2
Edenderry - ED5	58.000	HVO	90.3
Ardnacrusha - AA4	24.000	Hydro	78.1
Erne - ER3	23.000	Hydro	94.4
Erne - ER4	23.000	Hydro	0.0
Ardnacrusha - AA2	22.000	Hydro	37.6
Ardnacrusha - AA1	21.000	Hydro	98.7
Ardnacrusha - AA3	19.000	Hydro	94.7
Lee - LE1	15.000	Hydro	96.7
Liffey - LI1	15.000	Hydro	32.3
Liffey - LI2	15.000	Hydro	32.1
Erne - ER1	10.000	Hydro	97.2
Erne - ER2	10.000	Hydro	97.6
Lee - LE3	8.000	Hydro	31.2
Lee - LE2	4.000	Hydro	96.5
Liffey - LI4	4.000	Hydro	8.1
Liffey - LI5	4.000	Hydro	95.6
Turlough Hill - TH1	73.000	Hydro - Pumped Storage	96.2
Turlough Hill - TH2	73.000	Hydro - Pumped Storage	95.9
Turlough Hill - TH3	73.000	Hydro - Pumped Storage	81.4
Turlough Hill - TH4	73.000	Hydro - Pumped Storage	96.6

Unit	Capacity (MW)	Fuel	365-day Rolling Availability %
Dublin Waste - DW1	62.000	Waste	82.7
Indaver - IW1	17.000	Waste	94.2
Moneypoint Retained Existing Unit - MP2	250.000	Heavy Fuel Oil	N/A
Moneypoint Retained Existing Unit - MP3	250.000	Heavy Fuel Oil	N/A
Moneypoint Retained Existing Unit- MP1	250.000	Heavy Fuel Oil	N/A
Northwall Temporary Emergency Generation - NW8	193.000	Gas	98.9
Huntstown Temporary Emergency Generation – DG1	50.000	Gas	98.8
Shannonbridge Temporary Emergency Generation – SQ1	256.000	Distillate	N/A
Tarbert Temporary Emergency Generation – TB5	150.000	Distillate	N/A

7 Appendix 3 EirGrid Maintenance Policy Terms

The following summarises the main terms and activities in the asset maintenance policy as operated by EirGrid. The overall objective of maintenance is to ensure that the assets continue to meet their service and performance requirements including safety, environmental and output parameters[9] . Maintenance activities help to realise expected lifetime of an asset.

There are four primary maintenance categories:

1. Preventative/Routine: Preventive/routine maintenance is planned at predetermined intervals to reduce the likelihood of equipment degradation which could lead to plant failure e.g., condition assessment. This type of maintenance is planned in advance, and the frequencies of these activities are pre-determined by the EirGrid Asset Maintenance Policy
2. Corrective: Corrective maintenance may consist of repair, restoration, or replacement of equipment before functional failure. Corrective maintenance requirements are identified through regular inspections. The aim of routine inspections is to identify the potential for failure in time for the solution to be planned and scheduled and then performed during the next available outage.
3. Fault: Fault maintenance includes activities arising from unexpected equipment failure in service.
4. Statutory Maintenance: Maintenance which is carried out to facilitate statutory requirements e.g., Pressure Vessel Inspections, bund inspections.

Please refer to the 'Guide to Transmission Equipment Maintenance' which is published on the EirGrid website for further information[10].

[9] An anatomy of Asset Management – Institute of Asset Management Version 2 (July 2014)

[10] Guide-to-Transmission-Equipment-Maintenance-March-2018.pdf

8 Appendix 4 Formulae

8.1 Availability & Unavailability Formula

Availability of 110kV, 220 kV, 275 kV and 400 kV lines:

$$\text{System Availability} = 1 - \frac{\sum_{i=1}^{i=n} \text{Duration of Outage (i)} * \text{Length of Line (i)}}{\sum_{j=1}^{j=m} \text{Length of Line (j)} * \text{Days in a Year}}$$

Where: n = The total number of lines (at that voltage level) for which outages occurred

m = The total number of lines at that voltage level

Availability of 220 kV/110 kV, 275 kV/220 kV and 400 kV/220 kV transformers:

$$\text{System Availability} = 1 - \frac{\sum_{i=1}^{i=n} \text{Duration of Outage (i)} * \text{MVA of Transformer (i)}}{\sum_{j=1}^{j=m} \text{MVA of Transformer (j)} * \text{Days in a Year}}$$

Where: n = The total number of transformers for which outages occurred

m = The total number of transformers at that voltage level

System Unavailability:

$$\text{System Unavailability} = 1 - \frac{\sum \text{Hours each Circuit is Available}}{\text{Number of Circuits} * \text{Hours in Period}}$$

8.2 System Minute Formula

System Minutes:

$$\text{System Minutes} = \frac{\text{Energy not supplied MW Minutes}}{\text{Power at System Peak}}$$