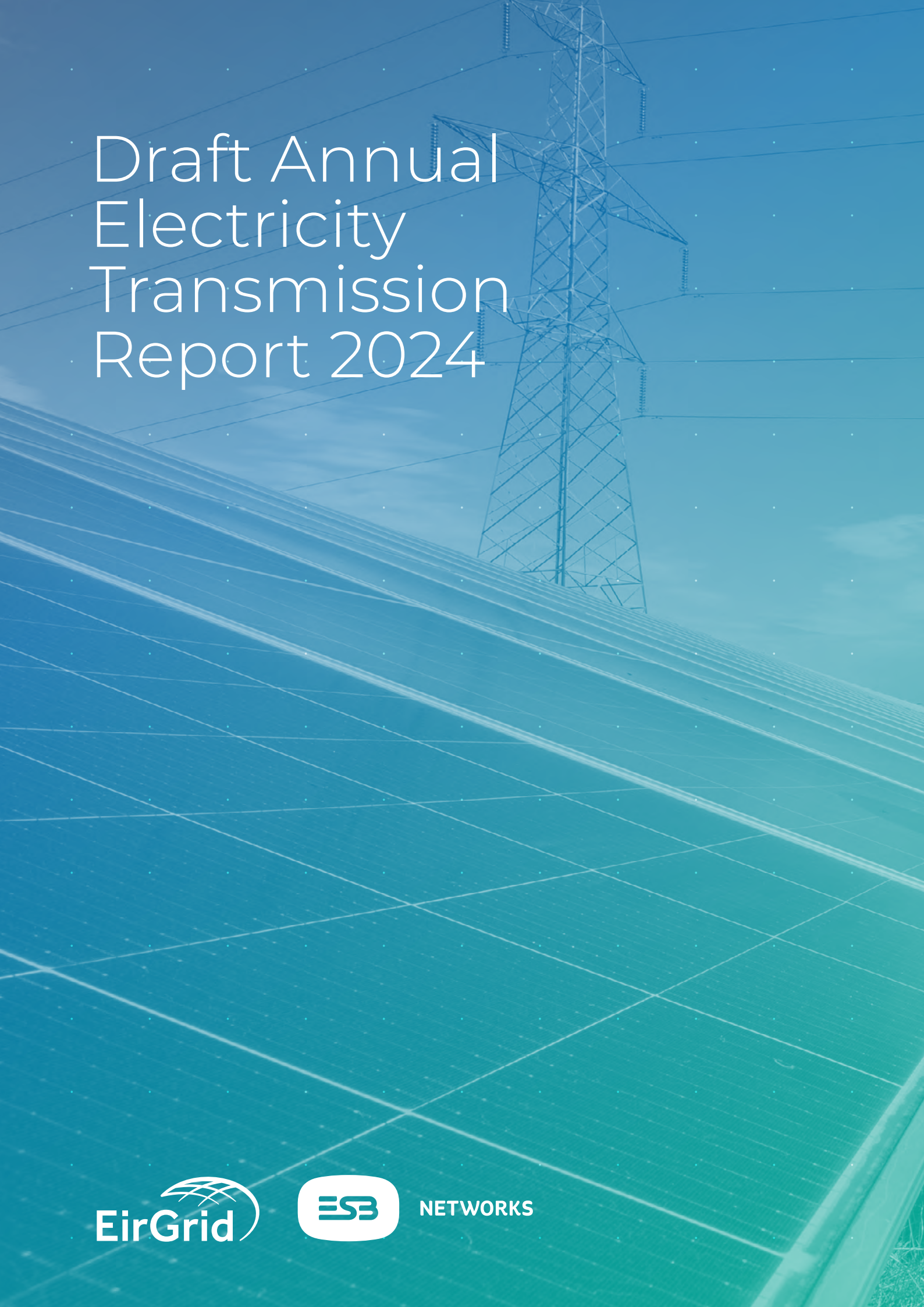
Draft Annual Electricity Transmission Report 2024



EirGrid

ESB NETWORKS

Contents

EirGrid in its role as Transmission System Operator (TSO) is responsible for operating and ensuring the maintenance and development of a safe, secure and reliable electricity transmission system – now and in the future. To achieve this, EirGrid continues to develop, manage and operate the electricity transmission grid. In December 2021, EirGrid was designated as TSO and Asset Owner of the Offshore Electricity Grid.

ESB is the Transmission Asset Owner (TAO) and its business unit ESB Networks carries out the licensed onshore TAO functions. ESB Networks is responsible for delivering the detailed design, construction and maintenance of the onshore transmission network, in accordance with the TSO's development plan.

We work closely together to ensure that all steps in the operation, maintenance, development and construction of grid infrastructure are carried out as safely, securely, efficiently and cost effectively as possible.

1. Welcome

Welcome to the eighth annual EirGrid and ESB Networks' Electricity Transmission Performance Report. This report seeks to provide customers, industry and stakeholders with clear and accessible reporting on our operation, development and maintenance of the transmission system throughout 2024.

2024 was the fourth year of Price Review Five (PR5). The PR5 Determination contains the Commission for Regulation of Utilities (CRU) decision on EirGrid and ESB Networks' revenues for 2021 to 2025. The activities and outcomes in 2024 align with the PR5 Determination[1] objectives and ambition set out by the CRU in relation to grid delivery, decarbonisation and local security of supply and is underpinned by cost efficiency and a regulatory framework which supports the delivery of value to customers.

EirGrid and ESB Networks are fully committed to the successful delivery of PR5. The annual delivery of capital investment in transmission projects has increased year on year making steady progress towards overall delivery of the PR5 programme of work[2].

In October 2024, EirGrid and ESB Networks submitted its Price Review Six (PR6) proposal to the CRU for the period 2026 to 2030, including a retrospective on PR5 and updated performance forecasts. The submission reflected strong progress, with key delivery targets for Capital Approvals (CAs) and Project Agreements (PAs) exceeded ahead of the period's end. As EirGrid and ESB Networks prepare for the transition into PR6, continued focus remains on accelerating project delivery.

The Climate Action Plan (CAP[3]) includes a national target of delivering up to 80% of our electricity generation from renewable sources, 9GW of which is to be generated by onshore wind, 8GW by solar and at least 5GW of electricity generation coming from offshore wind, by 2030. The Climate Action Plan is updated each year with new actions to account for the latest data and to EirGrid and ESB Networks strongly support this vision for Ireland's future. Renewable generation accounted for 40%[4] of all electricity consumed in Ireland in 2024.

1 Price Review 5
2 See Draft Investment Planning and Delivery Report 2024 for further detail on the progress of Capital projects in 2024.
3 Climate Action Plan 2024
4 EirGrid System and Renewable Reports

EirGrid and ESB Networks maintained their efforts to address security of supply concerns throughout 2024, working collaboratively with key stakeholders. As part of the CRU's Electricity Security of Supply Programme, EirGrid works closely with the CRU and the Department of Climate, Energy and the Environment (DCEE[5]) to implement a coordinated approach to address security of supply challenges in Ireland in the short, medium and long term.

During 2021 and 2022, the CRU directed EirGrid to secure approximately 750MW of Temporary Emergency Generation (TEG). In 2024, TEG projects equating to approximately 462MW of capacity became operational. This was supported by an additional 64MW of capacity from FlexGen developments, which can provide rapid response capabilities to support sudden fluctuations in electricity demand. EirGrid and ESB Networks continued to develop and update emergency communication plans to respond to potential security of supply issues in 2024.

EirGrid's Shaping Our Electricity Future (SOEF) 1.1 Roadmap[6], published in July 2023, built on SOEF 1.0 to take account of the updated government electricity ambitions of 80% renewable electricity by 2030 and further definition of sectoral carbon emission limits as set out in CAP23. In 2024, planning for future network requirements continued with the publication of Tomorrow's Energy Scenarios 2023[7]. This report considers how electricity demand and generation might evolve from 2035 to 2050.

In relation to offshore wind, EirGrid continued work on the Knowledge & Information Management, Warehousing, Health & Safety, and Legal programmes during 2024. EirGrid continued preparations to undertake marine surveys within the proposed area for the Offshore Phase 2 South Coast Programme. The application for a Maritime Usage Licence was submitted to the Marine Area Regulatory Authority (MARA) in November 2024 to undertake these marine surveys during Summer 2025. EirGrid also developed new template offshore connection contracts and conducted a public consultation in the Autumn of 2024 on same.

ESB Networks' Strategy 'Networks for Net Zero'[8] was published in January 2023 setting out ESB Networks' role in enabling the delivery of the Government's CAP. The Strategy outlines the actions that ESB Networks is taking towards delivering the transmission electricity network for Ireland's clean electric future. Joint working and collaboration between ESB Networks and EirGrid is fundamental to the delivery of the Strategy and continued in 2024 in areas such as digital collaboration and outage management, through initiatives like the Joint Outage Transformation Programme (JOTP).

5 Formerly the Department of the Environment, Climate and Communications (DECC)
6 Shaping Our Electricity Future
7 Tomorrow's Energy Scenarios 2023
8 ESB Networks Strategy: Networks for Net Zero

There were significant developments in infrastructure delivery in 2024 with EirGrid confirming the Best Performing Route Option (BPRO) in January 2024 for three key 220 kV cable replacement projects: Carrickmines to Poolbeg, Finglas to North Wall, and North Wall to Poolbeg. Two grid reinforcement projects, Fingal - East Meath and Kildare - Dublin, situated in the Greater Dublin Area were also progressed during 2024. Engagement with local communities and stakeholders continued to progress in 2024 through initiatives such as the Energy Citizen Roadshows and Community Benefit schemes[9].

A particular highlight for 2024 was the improvement in the Transmission Outage Programme (TOP) delivery compared with previous years, increasing from 84% in 2023 to 88% in 2024, exceeding the increased performance targets set out by the CRU in CRU202405.

Additionally, the Greenlink Interconnector was energised in 2024 through close collaboration, with the TSO facilitating its connection and the TAO delivering the requisite transmission network infrastructure. This is a major strategic project, linking the electricity systems of Ireland and Great Britain via a subsea cable and is the third interconnector completed between Ireland and the UK. This interconnector provides a capacity of 504 MW, increasing the resilience and efficiency of Ireland's transmission grid.

The Celtic Interconnector project also continued to progress through 2024 with civil works at the Converter Station in Ballyadam substantially completed and onshore cable routing also progressed substantially.

Collaboration between ESB Networks and EirGrid remains central to delivering a secure, reliable, and sustainable transmission electricity system for Ireland. Together, both organisations work closely to plan, develop, and operate the national transmission electricity grid, ensuring that homes, businesses, and communities across the country have access to safe and resilient power supplies. This partnership supports the integration of renewable energy, drives innovation in grid infrastructure, and helps meet Ireland's climate and energy goals. Through ongoing coordination and shared commitment, ESB Networks and EirGrid continue to enable a cleaner energy future for all.

We hope that you find this document of use and we look forward to working together with you to further develop our plans. We welcome all feedback with regard to the information set out in this booklet and any additional information you might wish to see included in future versions.

Please contact us at:
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9 2024 Stakeholder Engagement Report.pdf

2. What is the electricity transmission system?

Electricity transmission encompasses the operation, planning and development of the high-voltage network in Ireland, predominately assets that operate at 110 kV, 220 kV or 400 kV, ensuring that supply and demand is balanced on a minute-by-minute basis.

The transmission system moves power around the country. It brings power directly to industry and businesses that use large amounts of electricity and also powers the distribution network. The transmission system supplies the electricity used every day in our homes, businesses, schools, hospitals and farms. For further information on the TSO's and TAO's activities in the delivery of the transmission network, please see the 2024 Annual Investment Planning and Delivery (IPD) report published on the EirGrid and ESB Networks' websites. Working closely together, we develop and build energy infrastructure when it is needed. Through our operation and maintenance of the transmission system, we ensure a safe, secure and reliable supply of electricity.

How we work together is governed by the TSO and TAO licences granted by the CRU and by an Infrastructure Agreement (IA) which sets out how the two organisations develop, maintain and operate the transmission system. Efficient operation of TSO/TAO working arrangements is essential and we can report satisfactory operation of these arrangements during 2024.

CRU have requested a comprehensive review of the IA in readiness for PR6. EirGrid and ESB Networks have undertaken to progress the IA review in 2025.

An Infrastructure Delivery Charter with joint committee structures underpinning the mutual working arrangements between the TSO and TAO is in operation. This charter commits both companies to renewed levels of engagement and partnership to meet the evolving needs of the electricity customer and society into the future.

The operation of a Joint Programme Management Office (JPMO) and other agreed processes are important aspects of TSO/TAO co-operation. EirGrid and ESB Networks continued to effectively operate, review, develop and communicate regular updates to key stakeholders regarding these arrangements throughout 2024. The TSO and TAO Transmission Programme teams jointly plan the delivery of the full pipeline of projects out to 2030, as set out in EirGrid's SOEF Roadmap and ESB Networks' "Networks for Net Zero" strategy.

This year was the fourth year of the operation of the PR5 Joint TSO/TAO Incentive for EirGrid and ESB Networks. Details of the performance outcomes for this incentive are provided in *Section 5* of this report '*How we performed against transmission delivery incentives*'.

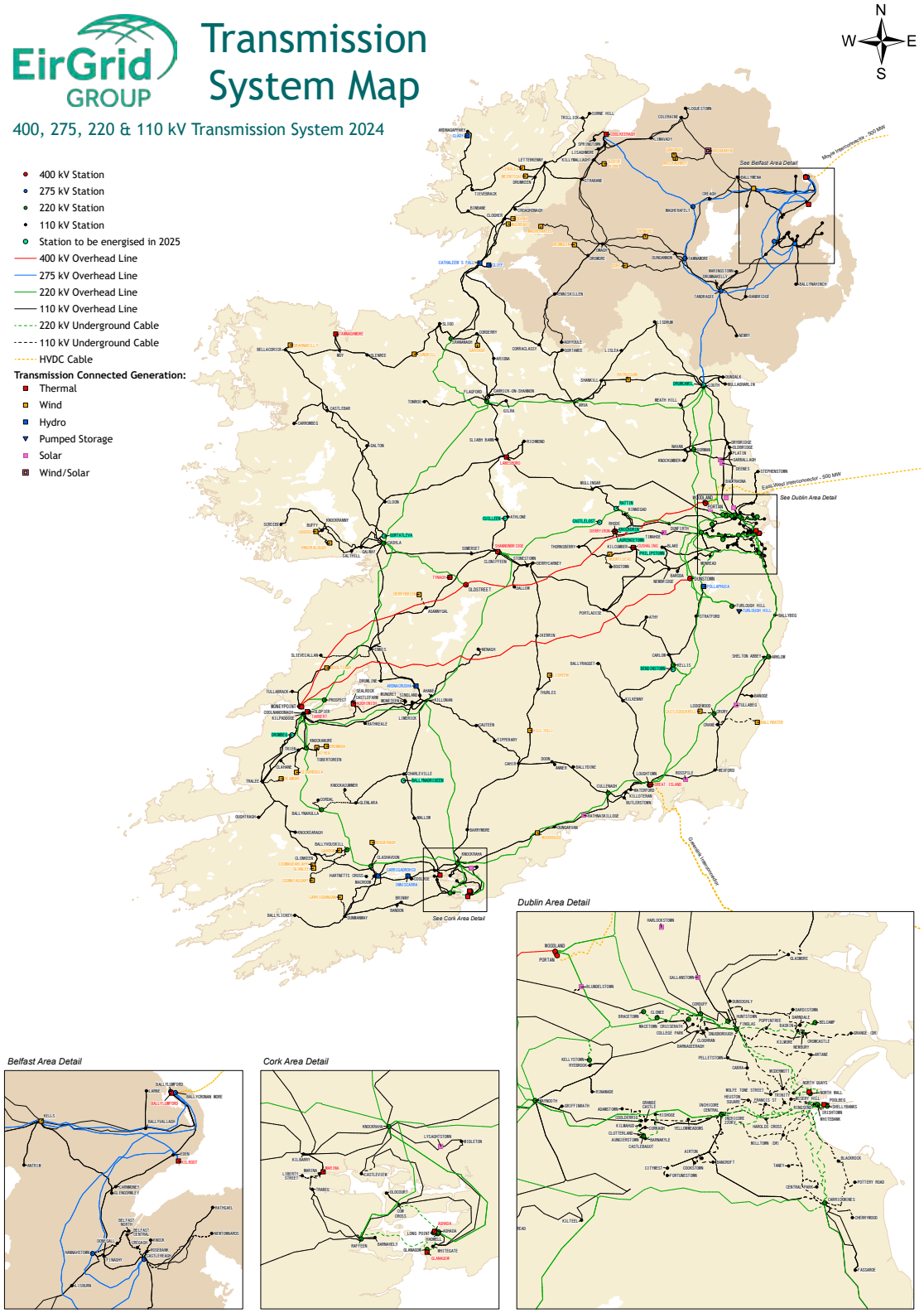


Figure 1: All Ireland Transmission System Map 2024[10]

10 Please note that the Northern Ireland Transmission Network is included for illustration purposes only in the above map. The Northern Ireland Transmission Network is outside of the scope of this report

3. How we plan, deliver and use the network

EirGrid's approach to grid development uses a six-step process which explains why and how the grid is developed. More importantly, it also explains how the general public and stakeholders can influence the decisions that are made. All our projects go through this process. The Joint EirGrid and ESB Networks' IPD Report which accompanies this report highlights the work carried out in each step of the process and project progress in 2024.

2024 was the fifth year of EirGrid's Strategy 2020-25, the aim of which is to transform the power system for future generations. Central to Strategy 2020-25 is EirGrid's six-step approach for grid development. EirGrid's focus has been to increase its value proposition to consumers and stakeholders while improving efficiencies in grid development.

During 2024, EirGrid and ESB Networks partnered with some of the biggest companies in the world, to foster jobs and prosperity across the country. We continued to upgrade and strengthen the transmission grid where necessary.

Figure 2: EirGrid Six-Step Framework for Grid Development

3.1 Summary of 2024

The fourth year of PR5 saw significant progress made by the TSO and TAO in terms of project development, delivery, system and market operation.

In 2024, EirGrid and ESB Networks progressed project delivery with 57 projects receiving CA, 43 advancing to PA (including one TEG project), and 22 projects energised (including five TEG projects).

Notable trends in 2024 include the connection of a large number of renewable energy projects including:

- Three wind farms providing 266 MW of renewable generation[11].
- Three solar farms providing an additional 197 MW of renewable generation[12].
- Two new Battery Energy Storage System (BESS) technology totalling 184 MW were completed.
- Eighteen renewable projects (1,369MW) and two BESS projects (90 MW) achieved CA in 2024.

Figure 3 shows the number of renewable connections and supporting technologies added to the transmission system in 2024.

Further details on transmission infrastructure development and delivery are set out in our 2024 Annual IPD Report.

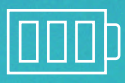
11 This figure includes the temporary connection of Timahoe North Solar Farm.
12 This figure includes the temporary connection of Yellow River Wind Farm.

266 MW

Three wind farms providing 266 MW of renewable generation[11]

197 MW

Three solar farms providing an additional 197 MW of renewable generation[12]



184 MW

Two new Battery Energy Storage System (BESS) technology totalling 184 MW were completed.

1,369MW

Eighteen renewable projects (1,369MW) achieved CA in 2024

90 MW

Three BESS projects (90 MW) achieved CA in 2024

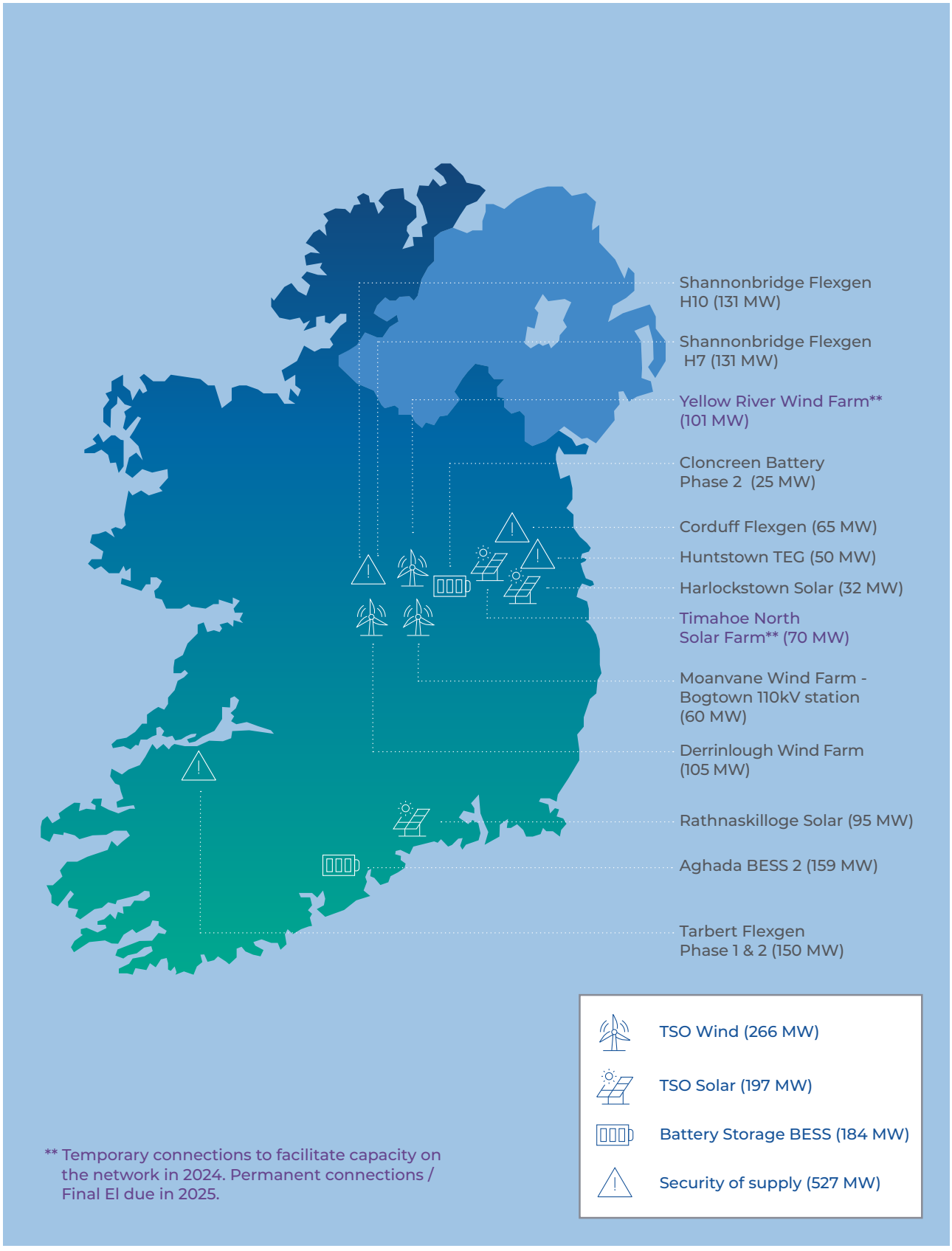


Figure 3: 2024 generation energisations

4. Key performance summary matrix

Table 1: Key performance summary matrix

Metric	Section of this report	2024 target/basis for incentive	2024 performance	2024 incentive outturn[13]	2023 performance[14]	2022 performance[15]
TSO Strategic Objectives Incentive	'How EirGrid performed against strategic incentives' Section 6	Target: 10 incentive metrics with a total incentive available of €0.5m	Performance: 74% success	Incentive: €0.370m	Target: 10 incentive metrics with a total incentive available of €0.5m Performance: 69% success Incentive: €0.345m	Target: 10 incentive metrics with a total incentive available of €0.5m Performance: 67% success Incentive: €0.333m
TSO Transmission System Performance System Frequency (SF)	'How EirGrid manage system performance' Section 7	€0.1m p.a. for each step if exceeds 98%, 99% and 99.5%	SF was operated within the target operating limits of 49.9 Hz and 50.1 Hz for 98.87% of the time	Incentive: €0.10m	Target: 98% Performance: 98.71% Incentive: €0.10m	Target: 98% Performance: 98.52% Incentive: €0.10m
TSO Transmission System Minutes Lost (SML)	'How EirGrid manage system performance' Section 7	0.75-2.5	0.152 SML on the transmission system	Incentive: €0.30m	Target: 0.75 – 2.5 Performance: 4.461 SML. Penalty: (€0.50m)	Target: 0.75 – 2.5 Performance: 0.132 SML Incentive: €0.30m
TSO's Stakeholder Engagement	'Engaging with stakeholders' Section 17	Max score: 10	Performance: 6.9	Incentive: €0.22m	Target: max score:10 Performance: 6.66 Incentive: €0.19m	Target: max score: 10 Performance: 6.86 Incentive: €0.217m
TSO Investment Planning and Delivery Balanced Score Card	'How we performed against transmission delivery incentives' Section 5	Target: 6 incentive metrics with a total incentive available of €0.9m.	Performance: 69%	Incentive: €0.62m	Target: 6 incentive metrics with a total incentive available of €0.9m Performance: 80% Incentive: €0.72m	Target: 6 incentive metrics with a total incentive available of €0.9m Performance: 69% Incentive: €0.62m

13 A penalty is indicated in brackets.
14 2023 APR and IPD
15 2022 APR and IPD

Metric	Section of this report	2024 target/basis for incentive	2024 performance	2024 incentive outturn[13]	2023 performance[14]	2022 performance[15]
TSO Delivering New Connections ECP	'How we manage new connections' Section 14	Issue connection offers to all applicants in the 2024 ECP Batch	Performance: 76%	Incentive: €0.38m	Target: Issue connection offers to all applicants in the 2023 ECP Batch Performance: 6% success. Incentive: €0.03m	Target: Issue connection offers to all applicants in the 2022 ECP Batch Performance: 6% success Incentive: €0.03m[16]
TSO Renewable Dispatch Down Incentive	'How EirGrid manage system performance' Section 7	5%[17]	8.8%	Penalty: (€0.27m)	Target: 5% Performance: 8.9% Penalty: (€0.28m	Target: 5% Performance: 8.3% Penalty: (€0.196m)
TSO System Non-Synchronous Penetration (SNSP) Incentive	'How EirGrid manage system performance' Section 7	82% SNSP	75% SNSP	Penalty: (€0.30m)	Target: 80% SNSP Performance: 75% SNSP Penalty: (€0.30m)	Target: 78% SNSP Performance: 75% SNSPPenalty: (€0.30m)
TSO Imperfections and Constraints Incentive	'How EirGrid manage constraint costs' Section 11	Target: 5 incentive metrics with a total incentive available of €1.5m	Performance: 19% success	Incentive: €0.290m	Target: 5 incentive metrics with a total incentive available of €1.5m Performance: 7% success. Incentive: €0.105m	Target: 5 incentive metrics with a total incentive available of €1.5m Performance: 18% success. Incentive: €0.263m
TSO Renewable Energy Source – Electricity (RES-E) Incentive	'How EirGrid manage system performance' Section 7	Target: 52%[18]	Performance: 40%[19]	Incentive: €0.0m	Target: 49% Performance: 42% RES-E Incentive: €0.0m	Target: 46% Performance: 39% RES-E Incentive: €0.0m

16 EirGrid submitted the Incentive Outturn Report for the 2022 ECP Batch to the CRU in September 2023, which was factored into the 2023 revenue submission and assessed by CRU in its consideration of 2023 outturn, as per Section 2.5.6 of CRU2023104.

17 As per CRU/20/154, an upside payment of €0.054m is applied if the TSO meets the target of 5.0% and an additional €0.054m for every 0.1% below 5.0% up to a maximum of €0.6m. A downside penalty of €0.014m is applied if the TSO meets the limit of 7.0% and an additional €0.014m for every 0.1% above 7.0% up to a maximum of €0.3m.

18 Achievement of RES-E target is binary. If annual target % achieved, the incentive reward will depend on the CRU's assessment of (i) quality of plan, (ii) quality of implementation; and (iii) effectiveness of plan. If annual target % not achieved, no incentive awarded, regardless of plan.

19 EirGrid's Fuel Mix Data confirms RES-E for 2024 was 40%, as per https://cms.eirgrid.ie/sites/default/files/publications/Fuel-Mix-2024.png

Metric	Section of this report	2024 target/basis for incentive	2024 performance	2024 incentive outturn[13]	2023 performance[14]	2022 performance[15]
TSO Local Security of Supply Incentive	'How we performed against transmission delivery incentives' Section 5	Target: 4 incentive metrics with a total incentive available of €1.12m[20]	Performance: 29%	Incentive: €0.33m	Target: 4 incentive metrics with a total incentive available of €1.5m Performance: 26% Incentive: €0.396m	Target: 5 incentive metrics with a total incentive available of €1.5m Performance: 14% Incentive: €0.211m
TAO/TSO Joint Incentive	'How we performed against transmission delivery incentives' Section 5	Target: 4 incentive metrics with a total incentive available of €1.5m for TAO and €0.2m for TSO	Performance: 100%	Incentive: TSO – €0.20m TAO – €1.5m	Target: 4 incentive metrics with a total incentive available of €1.5m for TAO and €0.2m for TSO Performance: 100% Incentive: TSO – €0.20m TAO – €1.5m	Target: 4 incentive metrics with a total incentive available of €1.5m for TAO and €0.2m for TSO Performance: 100% Incentive: TSO – €0.20m TAO – €1.5m
DSO/ TSO Joint Incentive [21]	'How we performed against transmission delivery incentives' Section 5	TSO target: 4 incentive metrics with a total incentive available of €0.2m for TSO	Performance: 90%	Incentive: TSO – €0.18m	Target: 4 incentive metrics with a total incentive available of €0.2m for TSO Performance: 75% Incentive: TSO – €0.15m	Target: 3 incentive metrics with a total incentive available of €0.2m for TSO Performance: 68% Incentive: TSO – €0.135m
Regulatory Transmission Capital Expenditure[22]	'How we monitor expenditure against PR5 allowances' Section 18	CRU Capex Monitoring Process	€221m	N/A	Target: CRU Capex Monitoring Process Performance: €234.8m	Target: CRU Capex Monitoring Process Performance: €176m
TAO Operational Expenditure	'How we monitor expenditure against PR5 allowances' Section 18	CRU Opex Monitoring Process	€77.5m	N/A	Target: CRU Opex Monitoring Process Performance: €71.3m	Target: CRU Opex Monitoring Process Performance: €68m

20 75% allocated annually, 25% allocated at the end of PR5
21 See DSO Annual Performance Report for DSO outturn performance for 2024.
22 Regulatory Transmission Capex Expenditure is not inclusive of Interest During Construction (IDC) of €22.9m and Customer Contributions of €24.4m. See table 7 for Gross Transmission Capex Spend.

Metric	Section of this report	2024 target/basis for incentive	2024 performance	2024 incentive outturn[13]	2023 performance[14]	2022 performance[15]
TAO Project Delivery Incentive	'How we performed against transmission delivery incentives' Section 5	€3.5m	€3.5m 4 Balanced Scorecard Incentive Metrics	€3.5m full incentive payment	Target: 4 Incentive Metrics with a total incentive available of €3.5m Performance: 100% Incentive: €3.5m	Target: 4 Incentive Metrics with a total incentive available of €3.5m Performance: 100% Incentive: €3.5m
TAO Management of planned outages[23]	'How we performed against transmission delivery incentives' Section 5	Complete planned work in less than 10,999 outage days	All planned works completed in 10,133 actual outage days, meeting target	€1m full incentive payment	Target: Complete planned work in less than 10,496 outage days Performance: All planned works completed in 10,061 actual outage days Incentive: €1m	Target: Complete planned work in less than 10,863 outage days Performance: All planned works completed in 10,154 actual outage days Incentive: €1m

23 Per CRU/20/154, this incentive relates to the TAO's ability to meet the 3-week ahead outage plans published on the TSO website

Balanced scorecard based incentives were introduced for PR5. The TSO and TAO's incentive outcomes for each year of PR5 are set out in the table below. The TSO aggregate incentive outcomes increased from 16% in 2021 to 32% in 2024. The TAO was awarded 100% of its total incentive upside for 2021, 2022, 2023 and 2024. The aggregate incentive outcomes for the TSO and TAO over the past three years can be seen in Table 2 below.

Please refer to Tables 3 and 4 for further information regarding trends for each incentive from 2021 to 2024 for the TSO and TAO.

Table 2: Aggregate Incentive outcomes (2019 Money)

	2021		2022		2023		2024	
Incentive Category	%	€m	%	€m	%	€m	%	€m
TSO Balanced Scorecard	11	0.546	37	1.762	43	1.916	44.9	1.99
TSO Numeric/Binary	24	0.681	4	0.121	-24	-0.76	13.43	0.43
TSO Aggregate Total		**1.227**		**1.8834**		**1.156**		**2.43**
Joint Incentives – TAO	100	1.5	100	1.5	100	1.5	100	1.5
TAO Incentives	100	4.5	100	4.5	100	4.5	100	4.5
TAO Aggregate Total		**6**		**6**		**6**		**6**

Table 3: Key Performance Trends – Balanced Scorecard based incentives	
Incentive	Performance trends
TSO Strategic Objectives	Performance in 2024 was strong and broadly comparable with outturn performance in 2023 for this incentive. 2023 saw an improvement over 2022.
TSO Investment Planning and Delivery	There have been strong annual improvements across metrics in the performance of this incentive since 2021.
TSO Imperfections and Constraints	There have been variations in performance against this incentive since 2021, with an increase in performance seen between 2023 and 2024.
TSO Local Security of Supply	EirGrid achieved strong increases in performance against this incentive over 2022 and 2023, with a decrease in performance between 2023 and 2024.
TAO/TSO Joint Incentive	Performance against the TAO/TSO Joint Incentive has been consistently strong over 2021, 2022, 2023 and 2024 with the full incentive awarded each year.
DSO/TSO Joint Incentive	Since 2021, there have been annual improvements in performance against this incentive.
TAO Project Delivery Incentive	Performance against the TAO Project Delivery Incentive has been consistently strong over 2021, 2022, 2023 and 2024 with the full incentive awarded each year.

Table 4: Key Performance Trends – Numeric/Binary incentives	
Incentive	Performance trends
TSO System Frequency	EirGrid has performed consistently in maintaining System Frequency within the target operating limits for over 98% of the year since 2021, with improvements evident year on year.
TSO System Minutes Lost	In 2021 and 2022, EirGrid kept System Minutes Lost within the target band. In 2023, due to a single incident on the system, there was an increase in SML. Had this single incident not occurred, SML for 2023 would have been within the target band. In 2024, SML has seen a return to performance in line with 2021 and 2022.
TSO Stakeholder Engagement	Since 2021, performance from this incentive has ranged from 6.6-6.9 out of a maximum possible score of 10. 2024 saw a slight increase in performance compared with 2023.
TSO Connections - ECP	In 2021 EirGrid received 86% of this incentive, while in 2022 and 2023, an upside of 6% respectively. The outturn for 2024 saw the TSO receive an upside of 76%.
TSO Renewable Dispatch Down	There has been a steady increase in renewable dispatch down over the period 2021-23, in line with increased levels of renewables on the system over the same years. Performance in 2024 was broadly in line with the previous year.
TSO System Non-Synchronous Penetration	In 2021 EirGrid operated with a 75% System Non-Synchronous Penetration limit for 70% of the calendar year. In 2022, 2023 and 2024, EirGrid has had a System Non-Synchronous Penetration limit of 75%. EirGrid has not reached target levels which are set at annual increasing intervals rather than step changes.
TSO Renewable Electricity Sources – Electricity (%)	Performance in 2024 was broadly in line with the previous year for renewable electricity sources - electricity, but EirGrid has not reached the targets set out for this incentive.
TAO Management of planned outages	Performance against the TAO Management of Planned Outages Incentive has been consistently strong over 2021, 2022, 2023 and 2024 with the full incentive awarded each year.

Table 5: Key Performance Trends – Non-incentive metrics	
Metric	Performance trends
TAO Operational Expenditure	Steady
Regulatory Transmission Capital Expenditure	Strong upward investment

5. How we performed against transmission delivery incentives

EirGrid and ESB Networks are incentivised against targets set by the CRU for the delivery of the transmission network as detailed in CRU/20/154. These incentive arrangements apply from 2021 to 2025.

5.1 TAO incentives

Project Delivery Incentive Performance

CRU/20/154 defined a balanced scorecard of incentive measures that applied to TAO investment and project delivery activities during PR5. The performance measures and targets are focused on incentivising activities central to meeting the challenges of the Government's CAP.

The TAO Project Delivery incentive includes both qualitative and quantitative measures, and performance is independently assessed each year by external auditors. The audit report is submitted to CRU to assist in determining the final incentive outturn award. In 2024, CRU awarded an incentive payment of €3.5m to TAO.

Table 6: TAO Project Delivery Incentive Performance

TAO project delivery balanced scorecard	2021	2022	2023	2024
Incentive award	Full	Full	Full	Full
Incentive value[24]	€3.5m	€3.5m	€3.5m	€3.5m

24 A penalty would be indicated in brackets. There are no penalties in this period.

The four performance measures included in the TAO Project Delivery balanced scorecard are:

1. Project Implementation Plans (PIPs)

A PIP is the committed programme of work agreed between TSO and TAO for a new project. The PIP is the baseline schedule against which the work is planned, and progress is monitored. The target list of projects is agreed annually between TSO and TAO. The TAO's performance is measured by the actual percentage of the target PIPs issued during the calendar year.

2. Customer Project Energisation/Connection

The TAO performance is measured by the actual percentage of the target Customer Projects energised/ connected in the calendar year. This includes customer energisation works scheduled in the annual Transmission Outage Programme.

3. Transmission Capex Spend

The TAO performance is measured by the actual percentage of the Budgeted Annual Capital Expenditure (CapEx) spend delivered in the calendar year.

4. Project Delivery Process Improvement

This component is qualitatively audited by independent external auditors and examines the TAO's performance on the quality and rigour of its processes for identifying and implementing efficiencies and improving processes in project delivery.

The Project Delivery Incentive performance for 2024 against the above measures is outlined in Table 7.

The TAO Project Delivery Incentive performance, for the above measures, was verified by external independent audit and following a review, the CRU determined an overall assessment of 'Strong' performance outcome.

Table 7: The Project Delivery Incentive - performance for 2024 against the four performance measures

Item	TAO Project Delivery Measure	2024 Plan[25]	2024 Actual
1	PIPs	46	43
2	Customer Project Energisations (EIs)	17	17
3	Transmission CapEx Spend[26]	€295m	€268m
4	Process Improvement	–	See below

25 Plan adjusted for items outside the TAO control.
26 Transmission Capex Spend in this table refers to the gross transmission capex spend in 2024. Transmission Capital Expenditure figure of €221m (see table 29) for 2024 is calculated as €268m less Interest During Construction (IDC) of €23m and Customer Contributions of €24m.

5.2 Process Improvements – 2024

Two process improvements implemented by the TAO during 2024 are described in the section below. The implementation of these initiatives demonstrates continual improvement in TAO project delivery processes. The external assessors were satisfied that both 2024 Process Improvement candidates demonstrated at audit were delivering significant improvements and benefits to the TAO and the electricity customer.

Annual Work Plan – 2024

ESB Networks, in its role as DSO, DAO and TAO, manages a wide range of project and programme activities across 26 work centres nationally, directing a large field work force and multiple contracting partners. Delivery of transmission projects is an important subset of the annual work plan. The method by which transmission project resource requirements feed into the annual work plan was transformed during the creation of the 2024 work plan. The new and enhanced process ensures that the project managers and programme teams have full visibility and traceability on individual transmission programme needs within the annual work plan. The resource requirements are built from the bottom up and collected in a format specifically developed to feed into the annual workplan with the critical high-level information necessary to drive and align with the existing work planning tool functionality and capabilities. Shortfalls in the plan can be identified and resolutions to resourcing resolved.

This on-going governance and implementation of the annual and quarterly work planning has resulted in improved levels of certainty, support, and delivery for transmission projects at work centre level.

The key benefits of this process improvement are that it:

- Provides essential transmission projects requirements for the annual work planning process.
- Identifies and mitigates resource conflicts and gives priority to transmission project delivery.
- Provides enhanced visibility, certainty, assurance and monitoring of transmission project delivery.

This process improvement comes at a time of a step change in transmission project investments taking place in the run up to the PR6 period which contains the critical transmission projects necessary to achieve the 2030 climate action targets.

Project Management Initiatives

TAO has embarked on a multi-year plan to establish a single Project Management Methodology (PMM) that follows the internationally recognised Project Management Body of Knowledge (PMBOK) across all transmission projects and delivery teams supported by a Project Management Office (PMO), a Project Management Information System (PMIS), and other associated systems and processes.

The plan for 2024, was to embed the Lessons Learned module into business as usual (BAU). The PMO team worked with the business to identify their needs and then set up a working group to address them.

The main components implemented during 2024 and demonstrated to the auditors include the following elements:

- Create a working group to identify the business needs.
- Identify and enlist knowledge area contacts in the business.
- Undertake Lessons Learned Pilot workshops.
- Apply for Sponsor approval to roll out across all business units.
- Collect lessons learned for all transmission projects into PMIS.
- Report back to the Knowledge Area Contacts to action solutions.

The approach taken for the new lessons learned process was to make it as user friendly as possible. The users now input into one system to allow central location for analysis and review in a standardised format.

The categories were simplified to 20 and each category then had a knowledge area contact associated with it. Knowledge creation is the important new step. Sorting the lessons by knowledge area and bringing them to the respective contact points has meant business improvements can be carried out by the resources in those teams. Improvements actioned are then shared with the company via relevant communication channels. This new Governance Structure allows reporting of concerning trends to Management and Project boards but also enables expansion from project to programme and directorate level, sharing valuable insights across the business.

Once a lesson learned is logged in PMIS, it is actively managed, reported and tracked to resolution by the Project Management Methodology Office (PMMO) via formalised processes, meetings and governance arrangements in place with all stakeholders to manage the portfolio of open lessons learned on the system. This process continues to evolve, through the PMMO governance and support arrangements, as the analysis of the landscape of issues and details on progress becomes more evident and the processes are further refined. It provides early indications of new challenges and issues arising at project level and provides focus and resources to their timely resolution contributing added governance and assurance to transmission project and programme delivery.

5.3 Outage Management Incentive Performance

The TAO outage management incentive is designed to improve the availability of the transmission network by reducing outage durations and providing greater certainty to affected parties on expected start and finish dates. This minimises the potential for deviations from the plan and any associated disruption to schedules. The outage incentive mechanism relates to TAO's ability to meet the 3-week ahead outage plans published on the TSO website. Performance is measured against the number of actual outage days relative to the baseline of the published plans.

TAO endeavours to complete the full scope of planned works within the scheduled days target for all activities such as new installation works, refurbishment, and maintenance activities within the outage window except for situations outside the control of the TAO.

CRU/20/154 sets three performance bands. If actual outage days are less than or equal to the baseline total scheduled days, then the full incentive payment €1m is received. There is no incentive if the actual days exceed the scheduled days and there is a penalty of €1m if the actual days exceeds the scheduled days by 5% or more.

In 2024, there were a total of 10,999 scheduled transmission outage days. The total actual outage days in 2024 was 10,133 outage days at year end. The 2024 planned works were delivered within the incentive outage days target and CRU approved the full outage incentive payment of €1m.

Table 8: TAO incentive performance 2021-2024

TAO incentives	2021	2022	2023	2024
Outage Management Performance[27]	€1m	€1m	€1m	€1m

27 A penalty would be indicated as a bracket. There are no penalties in this period.

5.4 TSO and TAO Joint Incentive

The TSO/TAO joint incentive focusses on network project delivery, with an aim of promoting efficiencies through enhanced collaboration.

The TSO/TAO joint incentive is based on a balanced scorecard containing four separate measures as outlined below. The TSO and TAO consult on and submit a 5-year joint incentive plan to CRU annually, outlining targets in each area. Annual performance is assessed by independent external auditors against this balanced scorecard which includes both quantitative and qualitative measures:

1. Deployment of New Technology
   This incentive is to ensure that the TSO and TAO actively deploy new technology on the grid and operate effective processes to enable the trialling and piloting of emerging technologies.
2. Project Initiation to Committed Project Parameters (CPP) Agreed
   This incentive rewards timely project development, measuring from the time that TSO notifies TAO of a new project to the time that the CPP (i.e. outline project scope) is agreed.
3. Joint Process Improvement
   This incentive examines the TSO and TAO's performance on the quality and rigour of application of joint processes, as well as joint efforts identifying and implementing efficiencies in project and programme delivery.
4. Asset and Programme Data Exchange
   This incentive examines the TSO and TAO's performance on the exchange of information with respect to delivery of transmission network capital investment under the PR5 programme.

CRU202405 provided direction and guidance to TSO and TAO on the 2024 Balanced Scorecard joint incentives key performance indicators, targets, and the assessment process.

Joint TSO/TAO performance was assessed by independent external auditors against the 2024 balanced scorecard. The audit report was submitted to CRU to assist in determining the final incentive outturn award. For 2024, CRU awarded the full incentive payment to TSO and TAO as outlined in Table 9.

Table 9: TSO and TAO Joint Incentive Balanced Scorecard Framework 2024

	2024 incentive award	2024 incentive value
TSO incentive award	Full	€0.2m
TAO incentive award	Full	€1.5m

The joint incentive measures delivered by TSO and TAO in 2024 and assessed during audit are detailed below:

1. Deployment of New Technology in 2024

There were 14 specific targets in 2024 across nine technologies for Overhead Lines, Underground Cables, and Substation technology. The TAO and TSO assessed joint progress in 2024 against planned Deployment of New Technology as strong with multiple milestones achieved across a range of new technologies. In particular, and in keeping with the guidance in CRU202405, the TAO and TSO successfully deployed three Static Synchronous Compensator (STATCOM) projects in 2024 following a period of testing.

The installation of STATCOMs in areas of the network with high levels of wind generation helps to maintain a good quality of electricity on the transmission system in those areas. This means the system voltage is maintained within acceptable standards, any potentially harmful harmonics are filtered out and system disturbances due to network faults are minimised.

This will enable more non-synchronous renewable energy generation to be connected to the system without driving a need to reinforce the existing transmission network by building new circuits or uprating existing circuits. The installation of STATCOMs helps to maximise the utilisation of existing circuits. Further deployments of STATCOMs are planned as they are an essential requirement for facilitating the connection of very large windfarms to the transmission system.

In 2024, the TSO and TAO continued to operate a joint New Technology working group which maintains the Technology Toolbox tracker. The tracker utilises an industry standard approach to assigning a Technology Readiness Level (TRL) to each technology. Dynamic Busbar Rating was a new addition to the Technology Toolbox during 2024 which is following the technology readiness assessment process towards deployment.

Further information on TSO and TAO collaboration on new technology is contained in Section 15 ‘Innovation’ of this report.

2. Project Initiation to CPP Agreed

Developing and agreeing the technical scope of works for new transmission infrastructure projects to meet system and customer needs is a critical milestone stage for a project to proceed. It is a complex process involving onsite assessment, outage planning and consultation with multiple agencies. Many unknowns exist at this early stage of a project and customer projects can be refused or delayed by planning, environmental or other permissions.

During 2024, the TSO and TAO reached CPP Agreed stage for 33 projects. The TSO and TAO agreed the project scope for 29 projects within the incentive target timeline of 98-days, meeting the incentive threshold set for 2024.

Enhanced collaboration and process improvements are on-going between the TSO, TAO, and stakeholders to mitigate risks and accelerate these processes to ensure as many projects as possible benefit from accelerated early-stage project development. Through diligent planning, effective collaboration, and proactive risk management, this area surpassed expectations, reinforcing a culture of continuous improvement.

3. Joint Process Improvement

This qualitative metric examines the TSO and TAOs performance on the quality and rigour of application of joint processes for identifying and implementing efficiencies in project and programme delivery and other areas of collaboration.

Transmission Outage Planning (TOP) 2024 and beyond

The TOP plans, prioritises and delivers outages which are required to complete system reinforcement, refurbishment, and customer connection projects. In 2024, the Transmission Outage Programme (TOP24) was issued earlier than in previous years, giving ESB Networks more time to plan and schedule work. While this improved preparation, it also required managing changes over a longer period. To support this, the Optimisation team was fully involved, and planning steps were adjusted to improve quality. A review and lessons learned exercise from the TOP25 planning process was initiated to inform a proposed new approach to planning TOP26 which is intended to further improve the accuracy and efficiency of the process. These efforts aim to minimise disruption and ensure reliable service for customers during essential network upgrades.

Joint Outage Transformation Programme (JOTP)

Improving how outages are planned and managed is essential for speeding up the delivery of new electricity infrastructure and supporting Ireland's CAP. In 2023, EirGrid and ESB Networks launched the JOTP to increase the number and efficiency of planned outages. This helps deliver more projects faster, including those that connect renewable energy to the grid, reducing emissions and supporting a cleaner environment. A notable innovation under trial is the Winter Outage Plan, which extends the traditional 40-week outage season by an additional 10 weeks.

This pilot has already contributed to increased work completion in the TOP24 cycle and will be formally evaluated in the 2025 Joint TAO/TSO Incentive Performance Report. The JOTP includes seven key workstreams and 18 targeted actions, which focus on areas such as project delivery, system operations, programme management, regulation, policy, and digital integration.

The three main JOTP interventions that have been delivered and became BAU during 2024 and their associated benefits are outlined in Table 10 below:

Table 10: JOTP Interventions implemented in 2024

Workstream	JOTP Process	2024 Improvement
1. Project Delivery	Energised Mast Foundations	Implementation of Foundation strengthening on 220kV intermediate steel masts while the circuit remains energised.
2. Regulatory	Early Engagement on Projects	Processes are in place for TSO and TAO to engage at an early stage during the project lifecycle to optimise outage requirements for project delivery.
3. Policy	Brownfield Substation Policy	Implementation of an optimised standard for uprating of existing outdoor substation conductors.

Each JOTP workstream is jointly led by EirGrid and ESB Networks and aims to improve how outages are planned, approved, and used. These efforts are expected to have a growing impact over time. Progress is being tracked and reported to the CRU to ensure continued improvement.

1. *Energised Mast Foundations*
   The TAO has developed and implemented work procedures allowing for major civil works to take place to reinforce steel mast foundations at the legs of intermediate 220 kV steel tower locations on existing in situ overhead lines while the circuit remains energised and in operation. Foundation strengthening is a major component of the refurbishment and reinforcement of existing steel towers during overhead line projects. Doing this work while the circuit remains energised also allows more of the outage dependent works to be planned and completed during the available outage windows for the project. It gives added flexibility to the TAO to schedule the civil works throughout the year and not just during available outage windows which must be strictly scheduled.

2. Early Engagement on Projects

The JOTP identified an opportunity for the TAO and TSO to engage earlier in the project life cycle to consider the full outage implications of a project that is in development and to share information that would lead to a scope of work and project implementation plan that is optimised in respect of outage availability and utilisation.

These new early engagement processes are providing maximum TSO/TAO engagement and information exchange allowing the TSO to fully consider the project options from a scoping, timeline, and outage perspective. The early engagement has the added benefit that when these projects come to detailed submission to, and scoping by, the TAO for implementation, very few queries arise, and the projects move more quickly through project development thereby reducing the end-to-end project delivery timescale.

3. Brownfield Substation Policy

Substation design standards have evolved to include higher busbar and equipment ratings, ensuring minimum capacity requirements are met to support future needs. A new policy has been introduced to guide the upgrading of existing (brownfield) substations. The benefit of the revised approach is that it reduces the civil works, overall costs and the outages that are required.

In some cases, the policy allows a project that was otherwise unconstructable due to outage impacts to be deliverable. In particular, this new policy greatly reduces the number of full busbar and half busbar outages that are required. The elimination of these outage requirements benefits the completion schedule for the project but also makes more outages available for the delivery of other capital project works.

Transmission Line Assessment (TLA)

The TAO and TSO identified the need to review and enhance the Transmission Line Assessment (TLA) process in 2024 to support the delivery of critical grid infrastructure in line with PR5 objectives. This was driven by the need to meet growing electricity demand, enable renewable energy connections, and support national climate targets. A joint scoping review was completed, resulting in a revised TLA process that is now being implemented.

The revised TLA process is designed to improve efficiency, reduce delivery risks and align with emerging technologies and sustainability goals. Key benefits of the updated TLA process include:

- Improved project readiness through clearer roles, responsibilities, and early-stage planning, helping to reduce delays and improve alignment with the Infrastructure Delivery Programme.
- Increased sustainability by incorporating carbon impact assessments into TLA reports and retaining existing infrastructure where possible to reduce environmental impact.
- Enhanced flexibility and innovation by integrating new technologies and work delivery methods trialled under the JOTP.
- Better risk management through a proposed asset risk classification approach, enabling more targeted and cost-effective refurbishment and uprate decisions.

The revised process was approved by EirGrid and ESB Networks in February 2025 and will be subject to ongoing review.

4. Asset and Programme Data Exchange

This incentive is intended to optimise EirGrid and ESB Network's collaboration arrangements for information exchange to support the delivery of transmission network investment.

In 2024, EirGrid and ESB Networks improved their operational efficiency and stakeholder communication by implementing new reporting tools, aligning asset data, and enhancing information sharing. These efforts optimised work planning and decision-making, ensuring stakeholders were well-informed and supporting better performance.

Transmission Outage Programme (TOP) Dashboard

In 2024, EirGrid and ESB Networks implemented a Power BI dashboard for Joint Transmission Outage Programme (TOP) reporting and streamlined change request coordination via SharePoint Online. Accessible to users from both EirGrid and ESB Networks, the application displays current TOP delivery performance, analyses change requests and compares outage delivery performance with previous years. This platform enhances information exchange, performance analysis, and decision-making for TSO and TAO managers, replacing manual reporting methods. Additionally, it supports a proposal for a new annual joint TOP delivery performance and incentive metric.

Asset Information Exchange

In 2024, EirGrid and ESB Networks enhanced asset data exchange to align their asset databases, addressing a gap between the unique identifiers used by both organisations. This systematic data exchange ensured ongoing alignment, improving the accuracy of the TSO's database for the annual workplan inclusion and enabling quicker, more efficient creation of work orders by ESB Networks.

The improvement in data alignment also facilitated better work planning, scheduling, and reporting by linking work orders, functional locations, and Feeder IDs. This optimisation of the annual Transmission Outage Programme (TOP) maximised the overlap between capital project works and maintenance, enhancing the overall efficiency.

Programme Reporting

In 2024, the TAO and TSO enhanced their reporting to strategic stakeholders, improving communication and understanding by providing accurate, timely information with detailed explanations and analysis. Key improvements included new reports to the CRU and DCEE such as annual overviews of TOP24 and comprehensive reports for the JOTP. These efforts ensured that stakeholders were well-informed about progress, risks, and next steps, thus supporting better decision-making and assurance.

5.5 TSO and DSO Joint Incentive Performance

The Joint System Operator Programme (JSOP) was established to facilitate collaboration between EirGrid in its role as the TSO and ESB Networks in its role as the DSO in jointly addressing system and customer needs.

The CRU published an information paper on the 2024 incentives in March 2024, CRU202405. This information paper contains direction and guidance on the 2024 balanced scorecards targets and the performance assessment process. For this joint incentive, a single balanced scorecard applies for both System Operators. The aspects included in the balanced scorecard are outlined in Table 11.

Table 11: TSO and DSO Joint Incentive Balanced Scorecard Framework 2024

Whole of system approach	The quality of the outputs will be important here. Report against how the actions delivered against the whole of system approach requirement. All project documents should clearly demonstrate the benefits of a whole system approach and how outputs have deepened TSO and DSO collaboration.
Facilitating new technology and system services	The TSO and DSO must demonstrate how the actions delivered through enhanced collaboration have facilitated the delivery of new technology or removed barriers for existing technology.
Reducing dispatch down of renewable generation	The TSO and DSO must demonstrate the benefits in the collaborative actions in 2024 to target reduced dispatch down/and or curtailment compared to 2023 levels after allowing for the impact. Positive incentive award will require clear evidence to show how the TSO and DSO's collaborative actions will lead to a curtailment reduction. A strong submission will show a clear link to whole system benefits, demonstrating actions that deliver quantifiable outcomes. A number of actions overlap with other incentives, so it will be important to focus on the impact of collaboration.
Addressing security of supply (referred to as 'Secure Future Power System')	The TSO and DSO should clearly demonstrate the collaboration with each other, and any insights gained through collaboration when achieving the actions as set out. The TSO and DSO should document the collaborative steps taken to improve the outcome for market participants.

CRU202405 states that each aspect of the balanced scorecard will be assessed against the following: quality of the plan and defined actions (20%); quality of implementation of the plan (40%); and effectiveness of the plan and demonstrable impacts (40%).

In 2024, both EirGrid and ESB Networks regularly met and collaborated on a number of shared topics outlined in the 2024 JSOP Multi-Year Plan[28]. This included development of a High-Level Design and next steps for reactive power coordination, trialling initial data exchange systems and processes, agreeing and improving processes for a number of pilots (including Flexibility Pilot of Scale, Dynamic Instruction Sets, and Beat the Peak Business), collaborating on requirements and capabilities for DER visibility, forecasting, controllability, modelling, and performance for system security. The system operators also collaborated on work ongoing to develop solutions and standards to manage the response of Large Energy users to system faults.

The main area of focus of the JSOP in 2024 continued to be the development of the TSO-DSO Operating Model. Building on the work delivered in 2023 to outline the vision and principles for such a model through an agreed high level design, the system operators jointly hosted two significant virtual briefing webinars in June 2024, aimed at engaging stakeholders in understanding the evolving landscape of electricity production and consumption in Ireland and how the High-Level Design of the TSO-DSO Operating Model fits into that and will affect them.

The system operators also developed a high-level implementation plan considering the tasks required to deliver this model. This included considerations of a phased implementation approach where some aspects of the Operating Model could be accommodated earlier through operational processes prior to being able to implement the full enduring model through system changes. A view of this was included in the 2025-2029 JSOP Multi-Year Plan for Whole of System Approach[29].

28 DSO/TSO Multi-Year Plan 2024–2028 – Joint System Operator Programme – September 2023
29 ESB Networks – DSO/TSO Multi-Year Plan 2025 - 2029

Following this, the system operators commenced work on detailed design for the Operating Model, including scoping the topics to be considered and holding workshops between the relevant subject matter experts in both system operators to develop the detail of the operating approaches within these topics. These details include design concepts, processes, protocols, and systems that will be required for effective coordination between the TSO and DSO. This work has continued into 2025.

The programme allowed for effective and efficient co-ordination between the system operators. Effective governance structures are in place for both the wider JSOP and the specific TSO-DSO Operating Model work. For the JSOP, the Management Liaison Board met monthly to govern the consistent delivery across the whole programme, while for the TSO-DSO Operating Model a structure was established of a Working Group developing the design and a Leadership Group providing oversight and decision-making.

In accordance with the detail in CRU202405 (the CRU's 2024 Balanced Scorecard Information Paper), the CRU has confirmed a joint 90% incentive award to the TSO and DSO, with an incentive amount of €0.18m to be applied to EirGrid for 2024.

5.6 TSO Transmission Infrastructure Delivery Incentive Performance

As required by CRU, EirGrid has developed a Balanced Scorecard Framework in order to facilitate an annual assessment on the quality and rigour of its end-to-end processes for investment planning and delivery. CRU/20/154 contains direction and guidance to the TSO on incentives and reporting arrangements for PR5. Section 7.8 of the CRU's decision paper relates specifically to the TSO's IPD.

The CRU's 2024 Balanced Scorecard information paper CRU202405 provides additional guidance to the TSO on the 2024 IPD incentive framework as set out in Table 12 below:

Table 12: PR5 TSO IPD Incentive Balanced Scorecard Framework 2024

Area	Metric no./type	%	Steps	Strong €0.9m	Acceptable €0.2m	Below acceptable -€0.5m
Investment planning (40%)	Metric 1 Qualitative	10%	Step 1	Demonstrating full assurance	Demonstrating satisfactory assurance	Demonstrating limited/ unsatisfactory assurance
	Metric 2 Qualitative	10%	Step 2			
	Metric 3 Qualitative	20%	Step 3			
Delivery (40%)	Metric 4 Quantitative	20%	Step 4-5			
	Metric 5 Quantitative	20%	Step 6	Greater than 80%	70-80%	Less than 70%
Timeliness (20%)	Metric 6 Quantitative & Qualitative	20%	–	Strong (ahead of plan)	Acceptable (in line with plan)	Below acceptable (behind on plan)

The incentive payment is determined by the CRU, informed by an independent audit, and performance is graded as “strong”, “acceptable”, or “below acceptable”. An independent audit was carried out on the balanced scorecard for 2024, and the findings of the audit were submitted to the CRU for their consideration. The incentive payment range is outlined in Table 12 above. Per CRU202405, the CRU thereafter considers performance on a holistic basis when setting the final score.

For 2024, EirGrid’s performance on the aspects outlined in the balanced scorecard above can be summarised as follows:

- Metrics 1-4: EirGrid demonstrated a strong performance across steps 1 to 5 in 2024, building on the progress of previous years. This was evidenced by the achievement of 57 CAs during the year, surpassing the 2023 total and highlighting sustained momentum across the project portfolio. The projects newly approved in 2024 are located right across the transmission network, with a focus on facilitating the connection of renewable energy sources (RES) across Ireland, contributing towards the 2030 climate goals. In addition to this, several projects that have progressed will increase the capacity and resilience of the existing network to meet domestic, commercial, and other demand needs.
- Metric 5: EirGrid achieved a strong performance in 2024, delivering 87.9% (adjusted) and 73% (unadjusted) of TOP 2024. This represents an improvement compared to the outturn performance for 2023 of 84% (adjusted) and 70% (unadjusted).
- 115 projects requested outages in TOP24, including 95 Capital Projects and 20 Minor Capital/DSO Projects. Of these, 51 projects were fully accommodated and 22 were partially accommodated in the TOP24 baselined programme, representing a total of 810 outage weeks for the TOP24 season.
- Metric 6: Timeliness – EirGrid’s average project delivery outturn performance range in 2024 was considered by EirGrid to equate to a below acceptable - acceptable performance, with strong performance in CAs and PAs. The overall performance resulted in 63% - 77% of the major project milestones of CA, PA with ESB Networks and EIs in line with or ahead of the current PR5 plan.

In addition to the performance in each of the 6 metrics listed in Table 12, EirGrid develops and implements process improvements across the 6-step framework annually, and in 2024 significant progress was made. EirGrid and ESB Networks jointly developed and implemented the JOTP. A joint EirGrid/ESB Networks’ statement in relation to the ambitious programme that is being collaborated on was agreed in December 2023, formally communicated to DCEE and CRU, and published on EirGrid[30] and ESB Networks[31] websites in January 2025.

30 https://www.eirgrid.ie/
31 https://www.esbnetworks.ie/

The TSO and TAO have worked closely and effectively throughout 2024 to progress JOTP workstreams. Some of the interventions are now BAU and delivering real positive impacts. Both the TSO and TAO also utilised early engagement processes to collaborate on 20 projects, with 11 completing early engagement, 7 still in progress, and 2 in initiation phase. A new process was developed for Pipeline and Customer projects. Through engaging with ESB Networks teams earlier than during the traditional Committed Project Parameters (CPP) phase, the project teams were able to benefit from input and advice in the following areas: programme validation, constructability, outages, site investigations and procurement strategy/ supply chain.

EirGrid's performance against the IPD incentive and associated metrics underwent an independent audit in March 2025, which confirmed EirGrid's assessment of an overall "Strong" IPD incentive performance for the 2024 calendar year.

For 2024, EirGrid maintained strong performance across five metrics outlined in Table 12. EirGrid further enhanced its position for achieving a strong performance assessment from CRU by demonstrating the implementation of targeted process improvements, reinforcing its commitment to continuous operational excellence.

5.7 TSO Local Security of Supply incentive performance

The CRU highlighted the importance of resolving the local security of supply issues within its PR5 Strategic Objectives. The CRU considered that given the significant forecasted growth in demand in the Greater Dublin Region, constraints in the Dublin Region represent a security of supply risk. CRU/20/154, the CRU's decision on the PR5 regulatory framework, incentives and reporting, introduced the Local Security of Supply (LSoS) incentive the aim of which is for EirGrid to demonstrate progress in addressing and managing key transmission network security of supply/ constraint areas during PR5.

EirGrid submitted the LSoS multi-year plan for 2024–2028 to CRU in October 2023. In March 2024, the CRU's balanced scorecard for 2024 was set out in CRU202405, outlining four main aspects of the LSoS incentive.

The CRU's 2024 balanced scorecard for this incentive is outlined in Table 13.

Table 13: Local Security of Supply Incentive Balanced Scorecard 2024		
Item	**Projects/Actions**	**Required Evidence**
Infrastructure		
Stakeholder and Public Engagement	Dublin Programme Infrastructure Forum quarterly meetings	Report on progress against planned engagements (as per TSO submission), outputs of the engagements, what was expected and what was achieved in terms of progressing/accelerating/de-risking the Dublin Programme.
	Community Forums meeting quarterly.	
	Business Forums meeting quarterly.	
	Project specific engagements in line with individual project timelines	
	Quarterly website/FAQ updates	
Planning and Environment	Complete the process for Declaration of Exempted Development on Best Performing Cable route options.	Evidence of completion of the process and timeliness for those projects identified as Exempt. It is expected that a preliminary list be submitted to CRU in early 2024 (no later than Q1 2024) so it can be ascertained whether the full list has been completed on time in 2024.
	Submission of planning application(s) for those cables (or portions thereof) that are not Exempted Development	Evidence of submission and timeliness of planning applications for those that are not exempted. It is expected that a preliminary list of expected projects be submitted to CRU in early 2024 (no later than Q1 2024) so it can be ascertained whether the full list has been completed on time in 2024.
Major Project Delivery	Specific milestones for projects in the Greater Dublin area as listed in TSO submission.	Report on specific milestones listed in Appendix 2 of TSOs submission. Report to quantify impact each project will have in resolving local security of supply issues, including specifically short circuit issues and with quantification of the impact of remedies/actions. Additional details in the text below.

Item	Projects/Actions	Required Evidence
Market		
T-3/T-4 Project Delivery	100 MW delivery	Evidence of outcomes and actions to ensure timely delivery of the circa 100MW by end of 2024. Evidence of actions to mitigate 3rd party risks and planned outage risks. See further discussion in text below.
Short Circuit Levels in Dublin	Progress investigation of Short Circuit Levels in Dublin	Short Circuit Report delivered and report and updates to CRU.
		Interim report to be provided by Q2 2024 and finalised Report by end 2024.
Operation		
Operations/ Demand	Progress Operations and Demand actions and initiatives outlined in this plan for 2024	Report on actions as defined under Section 3.3.2 of the TSO's submission.
		The report must clearly identify and quantify impact of actions on addressing Local Security of Supply issues.
Quantification		
Quantification	As with the previous year's requirement, the CRU expects EirGrid to develop a methodology for quantifying the local security of supply issues and the quantitative impact of each action proposed and implemented.	Report with method and estimates of numbers quantifying SoS issues and impacts

EirGrid's performance against the areas set out in the balanced scorecard for 2024 are summarised as follows:

- Project milestones for the 13 projects reported under the major project delivery aspect were 65% complete, with consenting and project delivery progressing in 2024.
- In 2024, the Stakeholder Engagement and Communications Plan continued to play a critical role in the Dublin Programme by engaging key stakeholders at the appropriate stages. These engagements support the identification and agreement of the correct options, which are essential to delivering the infrastructure required to meet supply needs.
- EirGrid continued to strengthen its planning and consenting processes to support the timely delivery of critical infrastructure. The internal exempted development process played a key role in securing robust determinations for key projects. Significant engagement and coordination with planning authorities enabled the timely progression applications for onshore and offshore elements of strategic projects. This was supported by regular pipeline updates and early-stage consultations, reinforcing commitment to proactive planning and the efficient advancement of priority projects.
- The Corduff FlexGen project achieved energisation bringing an additional capacity of 64 MW of thermal generation to the transmission system. This project was delivered through the T-3 Capacity Auction 24/25. Poolbeg and Ringsend FlexGens were energised in November and December 2023, respectively. All three became operational in 2024.
- In 2024, the System Operators introduced the Market Readiness Certificate[32] to support timely capacity delivery. This allowed projects to enter the capacity market once key commissioning milestones were met, ahead of full Grid Code compliance. The measure has proven effective, particularly for T-3 projects and those facing third-party delays.
- EirGrid delivered its investigation and report into short circuit levels in Dublin, identifying which circuit breakers needed uprates, and the different capital projects that already are in development to resolve the issues, as well as a long-term plan to resolve high short circuit levels in Dublin.

As per CRU/20/154, 25% of this incentive reward will be withheld until the end of the PR5 period.

Therefore 75% of the incentive reward/ penalty will be applied annually and the remaining 25% of each years' reward/ penalty will be at stake at the end of price review period and will be subject to resolving the Dublin Security of Supply issue.

In accordance with the detail in CRU202405 (the CRU's 2024 Balanced Scorecard Information Paper), the CRU has confirmed an outturn award be applied for the above incentive for 2024 of €0.33m.

32 Market-Readiness-Certificate-Requirements_2.pdf

6. How EirGrid performed against strategic incentives

We are in a time of unprecedented change to the electricity system as we move to a low carbon future. EirGrid is at the forefront of guaranteeing that this change is brought about in a timely and cost-effective manner while realising a broad range of benefits for end users and market participants.

We do this by maintaining a safe, secure, and reliable transmission system while integrating an ever-increasing number of renewables. This is supported by our development of a wide variety of innovative projects and the roll out of new system services.

The CRU PR5 Regulatory Framework Reporting and Incentives Decision Paper (CRU/20/154) invited the TSO to propose key performance indicators for its strategic incentive, in the following three areas:

- Facilitating a secure low carbon future;
- Increasing efficiency and protecting consumers; and
- Anticipation of future investments.

EirGrid built on the CRU's three proposed incentive areas above and put forward a number of initiatives for 2024. As per CRU202405, in 2024, the TSO's performance in relation to this incentive was based on the initiatives set out in Table 14.

Table 14: Strategic Objectives Incentive Balanced Scorecard 2024		
Networks	Publish Tomorrow's Energy Scenarios.	• Provide a detailed analysis of the future scenarios and identify the most optimum paths/approaches that can be taken in order to decarbonise the power system & describe the long-term benefits of these to customers and market participants. • Description of enhancements to TES process and impact of improvements on customers and market participants.
	Complete Asset Reliability Study.	• Publish Asset Reliability Report detailing reliability performance of transmission assets over the period 2017 – 2023 and benchmark against published international data, including a description of the benefits the TSO anticipates seeing once implemented in terms of planning maintenance activities and identifying trends. • This report should also refer to the 'Flexible Network Strategy', the new Computerized Maintenance Management System, new transmission maintenance approach and other initiatives previously incentivised and describe the cumulative impact/improvement for customers/market participants.
	Participate in an International Transmission Asset Management Survey (ITAMS).	• Report on the outcome of the International Transmission Asset Management Survey, provide a summary of key takeaways and lessons learned and how and when these may be implemented by the TSO to improve asset management, including the benefits to the consumers and market participants.
Markets	Implement Tranche 1 of the Scheduling & Dispatch Programme which includes Operation of Non-Priority Dispatch Renewables, Energy Storage Power Station, and Improvements to Wind/Solar Dispatchability.	Subject to clarification on funding and costs: • Specification for software designed and submitted to vendors within 9 months of funding clarification. • Submit all required market and grid code modifications for approval within 9 months Report outlining: • Improvements to battery/wind/solar dispatchability and estimate impact on the dispatch balancing cost. • Progress in designing an enduring solution for demand response aggregators in the wholesale market.
	Publish a recommendations paper to the CRU around a Long Duration Energy Storage market mechanism.	• Submit a detailed recommendations paper on Long Duration Energy Storage Market Mechanism to the CRU. Outlining proposed definition of long duration energy storage, system need, funding if required and recommendations on how to proceed. • Evidence of consideration/inclusion of stakeholder views and evidence of integration of regulatory views should be included in the recommendations paper.

Markets	Future Arrangements for System Services – Layered Procurement Framework	• Publish a Design Consultation Paper on the Layered Procurement Framework. • Submit a Design Recommendations Paper to the CRU on the Layered Procurement Framework outlining how this supports industry in making investment decisions and promotes competition in the system services.
	Future Arrangements for System Services – Daily Auctions.	• Completion of Daily Auctions. • Provide report on steps being taken operationally to deliver the Daily Auctions and how lessons learned will be considered for subsequent auction rounds. • TSO will submit a Procurement Design Recommendations Paper to the RAs on the daily auction framework, publish a Product Review Consultation Paper for the daily auction framework & submit a Product Review Recommendations Paper to the CRU.
Operations	Have entered into contractual arrangement for the delivery of Low Carbon Inertia Service for the power system.	• Publication of notices of award of contract (to be signed in Q1 2024). • Evidence of execution of contractual arrangements with successful participants of the Request for Proposal
	Commence the implementation plan to facilitate hybrid technology connections and commence development of proposals for transmission Renewable Hubs pilot process.	• Carry out assessment of Regulatory Authority decisions. • Commence workstreams relating to facilitating hybrid technology connections. • Develop proposals to progress renewable hub pilots at a transmission level, proposals must show consideration of industry consultation.
	Complete studies/ analysis to inform the decision to commence 80% SNSP trial.	• Provide report of the completed studies/analysis to inform the decision, clearly highlighting the lessons learned and the potential benefits of commencing an 80% SNSP trial i.e. whether this trial can facilitate greater energy production from low carbon technologies and reduce the levels of curtailment. • Report to include timeline for implementation of 80% SNSP
	Develop business specifications for priority tools and capability outlined in the Control Centre of the Future Implementation Plan.	• Submit a detailed delivery plan to develop business specifications for priority tools and capability outlined in the Control Centre of the Future Implementation Plan. This should include a description of the actions/ activities to be undertaken, relevant timeframes and the potential impacts and outcomes on consumers and market participants.
	Commence operational readiness for offshore wind.	• Submit a detailed plan outlining how the TSO intends to reach operational readiness for offshore wind incl. developing asset owner role, resourcing expertise, acceptance of Phase 1 assets, Preparing for O&M, Phase 2 build out and Transition plans for Phase 1 and 2. • Quarterly updates to CRU on the above plan.

EirGrid understands its crucial role in delivering on our climate targets. Our strategic objectives are a vital component of the radical change we will see in the run up to 2030. We will continue to operate and maintain a system, which will see dramatic positive change, as we enter a new era of low carbon, for the benefit of all.

In accordance with the detail in CRU202405, the CRU confirmed an outturn incentive award be applied for the above incentive for 2024 of €0.37m against a total possible incentive upside of €0.5m.

7. How EirGrid manages system performance

In a highly competitive global marketplace, continuity of supply is crucial to attracting inward investment and ensuring economic growth, especially in the technology sector. A changing generation portfolio with increased penetration of variable renewable generation makes it more difficult to maintain current high levels of security of supply.

As an island with limited interconnection, Ireland is leading the way in resolving the complex technical challenges that the integration of high levels of renewable generation presents. Examples of this include the Celtic and Greenlink interconnectors.

Two of the primary metrics by which a transmission system's performance is measured are System Frequency and System Minutes Lost. These measures are a recognised, robust way of measuring the reliability and quality of supply delivered by an electricity transmission system. Given their importance, EirGrid is incentivised to maintain certain levels for each of these.

For further information see the All-Island Transmission System Performance Report 2024[33].

7.1 System Frequency (SF)

Frequency must be maintained at the standard level in order to support the stability of the system. If the frequency is not maintained within defined limits, the system will collapse leading to wide-scale power outages. For the Irish transmission grid, the standard for frequency is 50 Hz. This means that at this level load and generation are perfectly balanced. If the system becomes significantly unbalanced, transmission equipment can be damaged. Household devices are also designed to only handle a certain range of frequencies and can be damaged if this range is not maintained.

Ensuring control of the SF is critical and challenging as EirGrid seeks to further increase the level of renewable generation connected to the grid. EirGrid continues to be incentivised to maintain SF within prescribed limits. As per CRU/20/154, the target is to keep SF between 49.9 Hz and 50.1 Hz. In 2024, the SF was operated within the target operating limits of 49.9 Hz and 50.1 Hz for 98.87% of the time. Therefore, EirGrid achieved a partial incentive award of €0.1m for this incentive.

33 All-Island-Transmission-System-Performance-Report-2024.pdf

7.2 System Minutes Lost (SML)

SML is an internationally recognised measure of transmission system performance. It measures the severity of each system disturbance relative to the size of the system. By measuring SML EirGrid's performance can be compared against other TSOs.

EirGrid is incentivised to ensure SML remain low. EirGrid has maintained downward pressure on SML through diligent frequency management, developments in generator performance incentivisation and monitoring, and through the transmission system protection upgrade programme. As per CRU/20/154, the SML annual target is 0.75-2.5 for the PR5 period.

In 2024, there were 0.152 SML on the transmission system. There were no Under Frequency Load Shedding disturbances in 2024.

EirGrid received an incentive of €0.3m for this metric in 2024.

7.3 Renewable Dispatch Down (RDD)

Dispatch-down of renewable energy refers to the amount of renewable energy that is available but cannot be used by the system. The dispatch down percentage is based on the average RDD for the aggregate of both constraints and curtailment (as currently measured) over the 12 months of the calendar year. It is expected that as the energy share of renewables increases, so too will the percentage of renewable generation dispatched down.

EirGrid concluded a trial to reduce the required minimum number of conventional units online (MUON) constraint from five conventional fossil fuel generators to four in Ireland in March 2024 and transitioned it into enduring policy, further reducing system constraints and enabling greater renewable integration. Reducing this constraint was previously identified as the next critical step in the evolution of operational policy and in reducing dispatch down of renewable generation.

The target for 2024, per CRU/20/154, is outlined in Table 15 below. In 2024, 8.8% of renewables were dispatched down. As a result, in accordance with CRU/20/154, EirGrid received a penalty of €0.266m for 2024. RDD is discussed further in section 10.

Table 15: RDD Incentive

	2024
PR5 upside target	5%
PR5 downside target	7%
TSO 2024 achieved	8.8%

7.4 System Non-Synchronous Penetration (SNSP)

EirGrid has significant obligations to undertake studies and implement relevant policies to help realise the Irish Government's renewable energy targets and objectives. This includes a target of having up to 80% of all electricity generated from RES by 2030.

EirGrid has a responsibility to enable increased levels of renewable energy generation on the power system while making sure that the system is operated safely and securely. As part of the PR5 Regulatory Framework, the CRU introduced a new annual incentive focused on increasing SNSP operating policy levels. SNSP operating policy sets the maximum allowable level of renewable generation on the power system, referred to as the SNSP limit. A target SNSP operating policy of 82% was set for 2024 by the CRU.

The TSO successfully concluded the 75% SNSP trial in March 2022 and 75% SNSP became enduring operational policy. EirGrid concluded the trial to reduce the MUON constraint from five conventional fossil fuel generators to four in Ireland in March 2024 and transitioned it into enduring policy, further reducing system constraints and enabling greater renewable integration. The MUON constraint relates to the number of large conventional fossil fuel generation units which must be online at a point in time. Following this, the TSO progressed and completed feasibility studies on increasing SNSP limits to 80%.

These studies were completed in December 2024 and identified a number of key system risks that require mitigation before the 80% SNSP trial can commence. Work is currently ongoing to assess mitigation measures ahead of future SNSP increase trials in line with EirGrid's SOEF 1.1 Roadmap.

As noted in *Section 16 'How EirGrid performs relative to comparator TSOs internationally'*, EirGrid is leading the way in both its trialling of higher SNSP limits and in its translation of these increasing limits into operational policy, in comparison to TSOs internationally.

Increasing SNSP is part of the SOEF 1.1 Roadmap and will facilitate higher levels of non-synchronous renewable generation on the system. This is just one step in the pathway towards 95% SNSP by 2030, which is required to fulfil government RES-E targets.

There is no balanced scorecard related to the SNSP incentive. SNSP Operating Policy remained unchanged at 75% in 2024 and as a result, in accordance with the direction in CRU/20/154, the full penalty of €0.3m applied for 2024.

7.5 Renewable Energy Source – Electricity (RES-E)

The PR5 RES-E Incentive is binary. The total award is subject to meeting a 52% RES-E target for 2024. If the annual target as specified by the CRU is achieved, the incentive rewarded is subject to an assessment of performance against the quality of the applicable plan (20%), quality of implementation of the plan (40%) and the effectiveness of the plan (40%).

Despite much progress being made on EirGrid's part in relation to the deliverables initially proposed in EirGrid's RES-E plan, the 52% RES-E target for 2024 was not achieved. A RES-E level of 40.0% was achieved on an all-island basis in 2024 while the RES-E level achieved in Ireland in 2024 was 40.1%[34].

In accordance with the detail in CRU/20/154, no incentive award applied for the above for 2024.

40.1%

RES-E level achieved in Ireland in 2024

34 Per EirGrid System and Renewable Reports – Fuel Mix 2024

8. Interconnector Development

Co-financed by the Connecting Europe Facility of the European Union

EirGrid, along with our French counterpart Réseau de Transport d'Électricité (RTE) is continuing the development of the Celtic Interconnector project, a planned subsea High Voltage Direct Current (HVDC) electricity link between Ireland and France.

8.1 Development of the Celtic Interconnector

The Celtic Interconnector will deliver a wide-ranging package of benefits to consumers and businesses in both Ireland and France. It will apply downward pressure on the cost of electricity, enhance Ireland's security of electricity supply, and facilitate our national transition to a low-carbon economy.

The interconnector power cables will reach landfall in Ireland at Claycastle Beach, near Youghal in East Cork. From there an underground cable will run inland and continue north of Midleton to the converter station. This is being built at Ballyadam, on part of an IDA-owned site, to the east of Carrigtwohill. The final connection is by underground cable from Ballyadam to a substation on the national grid at Knockraha. Underground cable works are substantially complete with works ongoing on the underground cable works from Youghal to Ballyadam, with cable pulling and jointing in progress.

The Celtic Community Forum is made up of local community representatives. It facilitates dialogue between stakeholders with interests in the project and the project team and represents local communities in the design and implementation of the Community Benefit Fund. Celtic Community Forum meetings continue to be held on a quarterly basis during the construction phase of the project. The Celtic Interconnector Community Benefit Fund has been established by EirGrid with the overall aim of increasing public and environmental wellbeing in the community and leaving a positive legacy in the communities hosting this grid infrastructure. The fund is released in three phases, when construction begins, mid-way through the project and when the project is energised. Funds for Phase I have already been awarded to local community projects and applications for Phase II of the fund are currently under evaluation. More information on the Celtic Interconnector Community Benefit Fund can be found here.

During 2024, works continued in East Cork. Civil Works at the Converter Station site in Ballyadam are substantially complete with the installation of main equipment by Siemens Energy. The HVDC cable route from Ballyadam to Knockraha is also substantially complete with trenching and ducting works complete, cable pulling and jointing complete and final road reinstatement in progress. Trenching and Ducting works on the underground HVDC cable route from Youghal to Ballyadam is substantially complete with cable pulling and jointing in progress.

Construction for the landfall at Claycastle Beach in Youghal are in progress with underground ducts placed in the beach. Works will continue with final required ducting to be placed in the tidal zone.

As a European Project of Common Interest, EirGrid and along with our French counterpart Réseau de Transport d'Électricité (RTE) maintain a dedicated project website www.celticinterconnector.eu. Full details on the ongoing activities of the project are published on the website which is available in both English and French.

For up-to-date information please see our website that is updated regularly here.

Co-financed by the Connecting Europe Facility of the European Union

8.2 Development of the Greenlink Interconnector

The Greenlink Interconnector is an underground electricity interconnector cable between the electricity grids in Ireland and Great Britain, with a capacity of 504 MW, constructed by Greenlink Interconnector Limited. The project transfers electricity via submarine and underground cables over 190 km between the Great Island 220 kV Station in County Wexford and the Pembroke Station in Wales. The interconnector power cables reach landfall in Ireland at Baginbun Beach, near Ramstown in South Wexford. From there, underground cables connect via Campile Converter Station to the Great Island 220kV Station.

This project brings significant benefits on both sides of the Irish Sea, Ireland and Wales, for the integration of low carbon energy sources. This project provides Ireland with a link to the EU and the Nordic electricity market via Great Britain. EirGrid and ESB Networks facilitated the connection into Great Island 220 kV Station.

Construction and Commissioning of the Greenlink Interconnector has been completed and the interconnector is now in commercial operation.

9. How we ensure network resilience

EirGrid designs and plans the transmission network in accordance with the Transmission System Security and Planning Standards (TSSPS)[35] and operates it in accordance with the Operating Security Standards[36] while ESB Networks constructs and maintains the transmission network on the ground.

As the transmission network is vital to the supply of electricity for all customers and end users, these standards are critical to ensuring that the transmission network is designed in a way which guarantees this in a safe, secure and robust manner. The operation of the grid once in place is supported and underpinned by robust policies and procedures both in our control centres and on the ground.

On-going transmission system maintenance is crucial to ensuring the resilience of the network.

The Asset Maintenance Policy is kept under review to ensure that it continues to meet the requirements of the system and best international practice. The most up to date Guide to Transmission Equipment Maintenance can be found on the EirGrid website here.

The transmission network contains a large number of overhead lines, cables and substations distributed across the country and at customer's installations. Transmission maintenance work requires a wide range and high volume of complex maintenance tasks to be undertaken annually. EirGrid and ESB Networks agree an annual maintenance programme based on the applicable Transmission Maintenance policies and standards. ESB Networks delivers the transmission maintenance programme utilising teams of highly skilled technicians and specialists distributed nationally. The maintenance expenditure in 2024 was €27.5m (including both planned and fault maintenance). ESB Networks delivers transmission maintenance efficiently and to a high standard contributing to the health, performance, life and resilience of the transmission system. There is some flexibility in scheduling maintenance within the year, or from year to year.

EirGrid and ESB Networks report and manage the maintenance work programme actively and dynamically, based on criticality, on an on-going basis. The ability to deliver the full maintenance work programme is affected by the availability of outages; interdependencies with capital project works; weather and other unplanned maintenance or faults arising; additional work or materials requirements identified following inspection; and a wide range of other issues.

35 EirGrid Transmission System Security and Planning Standards (TSSPS) | eirgrid.ie
36 Operating-Security-Standards | eirgrid.ie

A resilient network requires prioritisation of maintenance work to ensure that the most important maintenance is completed first. ESB Networks has a Prioritised Maintenance Process that involves the analysis of data and, working with EirGrid, takes account of the outages required to complete the necessary remedial actions. This ensures we address high risk issues, and that network safety/ resilience driven work is prioritised.

Throughout 2024, EirGrid and ESB Networks continued to work closely to ensure the resilience of the transmission network through a combination of robust planning, proactive maintenance, and coordinated outage management. As the volume and complexity of transmission infrastructure projects increase, maintaining a resilient network requires not only effective asset maintenance but also strategic planning of outages to support both operational reliability and long-term system development.

A key enabler of resilience in 2024 was the continued implementation of JOTP. As mentioned in *Section 5: How we performed against transmission delivery incentives*, this programme, jointly led by EirGrid and ESB Networks, delivered several important interventions during the year that have now transitioned into BAU. These included the introduction of energised mast foundation works, early-stage project engagement processes, and a new brownfield substation policy. These measures have improved the efficiency and coordination of outage planning, directly contributing to enhanced network resilience.

Co-ordinated outage planning is another core requirement to ensuring network reliance on a day-to-day and week-to-week basis. The ability of the system to meet demand, even where generation or system assets are unavailable, is carefully monitored and planned for. The All-Island Generation Outage Plan ensures co-ordination of planned outages when power stations will not be available due to maintenance or other reasons. The plan takes into account security of supply in Ireland, as well as economic operation of the power system, and the maintenance/resource needs of generators.

The All-Island Generation Outage Plan is published in September each year. During the year, the plan for that year is updated on a daily basis, or as necessary. Details regarding the All-Island Generation Outage Plans can be found on the Single Electricity Market Operator (SEMO) website here. Generators can send outage requests to EirGrid using the Generator Outage request form on EirGrid's website here.

Transmission Outages involve planned times when lines, cables and substations will be maintained and not in service. It also involves times when plant testing, connection of new plant and decommissioning of old plant is carried out. The annual TOP includes all outages of transmission infrastructure which are planned to occur in the year.

The outturn delivery percentage of planned outage-related capital works and EIs is reported with reference to the annual TOP. In 2024, the TOP delivery percentage was 87.9%.

There are a number of risk factors that impact on the ability to deliver investment and maintenance work programmes at this scale. These generally fall into one of the following seven categories; the consenting process and legal matters, technical complexity, resourcing and global supply chain constraints, public and stakeholder challenges, land accessibility and affordability, as well as issues arising on third-party customer projects and outage risks.

The CRU introduced Short Notice Outage Adjustment Mechanism (SNOAM) provisions, providing for the reduction of the duration of planned outages at short notice. In March 2020, the CRU published an information paper CRU/20/038 containing further details of this mechanism. In 2024, the SNOAM provisions were not employed in relation to any outages.

Further Information on the Transmission Outage Programme can be found here.

9.1 Network resilience in an ever-changing system

One of the biggest challenges is maintaining network resilience in an increasingly diverse and complex power system with ever increasing levels of renewable generation.

EirGrid's SOEF 1.1 Roadmap[37] seeks to address this issue.

With the SOEF programme, EirGrid continues to aim toward 95% SNSP in 2030 and studies are ongoing to investigate mitigating measures needed to commence an 80% SNSP trial. Reducing the minimum number of large conventional units online in Ireland is one enabling measure that was focused on in 2024. Further details on this can be found in Section 11.

It is also important to optimise the delivery of maintenance on the transmission system in order to enhance its resilience. In 2024, critical maintenance plans were again incorporated earlier in the transmission outage planning process giving higher priority to critical maintenance considerations in developing the outage plans and schedules. The JOTP between the TAO and TSO is another programme progressed in 2024 that is aimed at optimising the outage process and is covered in section 5.

9.2 Network resilience in action

In 2024, there were a number of incidents where it was required to manage interruptions to the network and maintain its resilience, ensuring that a constant, safe and secure supply of electricity was always available.

Seven loss of load events occurred in 2024:

- On 21 January at 19:34, Bellacorick – Castlebar 110 kV circuit tripped for a single-phase to earth fault during Storm Isha. The Circuit tripped at both ends and reclosed in Castlebar. The National Control Centre (NCC) closed the Castlebar circuit breaker in Bellacorick 110 kV station at 19:38 and the circuit tripped again at 19:39. At 20:21, the line was successfully switched back into service. The fault cleared in approximately 60 ms. An interruption to end-users occurred, resulting in 0.041465 SML.
- On 21 January at 21:00, Binbane – Cathaleen's Fall 110 kV circuit tripped for a single-phase to earth fault. The fault cleared in approximately 280 ms. An interruption to end-users occurred, resulting in 0.008981 SML.
- On 23 February at 20:16, Knockearagh – Oughtragh – Tralee 110 kV circuit tripped for a three-phase to earth fault. The cause of the fault was lightning. The fault cleared in approximately 60 ms. An interruption to end-users occurred, resulting in 0.000039 SML.
- 0n 9 June at 17:20, Lenalea – Letterkenny 110 kv circuit tripped for a single-phase to earth. Heavy rain was recorded in the area at the time of the fault. With the Binbane – Cathaleen's Fall 110 kV circuit out of service for planned works, this resulted in the loss of four 110 kV stations; Lenalea, Tievebrack, Ardnagappary, and Binbane. Supply was restored at 17:30. The fault cleared in approximately 40 ms. An interruption to end-users occurred, resulting in 0.028699 SML.
- On 11 August at 22:21, Lenalea – Tievebrack 110 kV circuit tripped for a single-phase to earth fault. The cause of the fault was lightning and a weather warning was in place at the time of the disturbance. The circuit tripped and reclosed in Lenalea. With the Binbane – Cathaleen's Fall 110 kV circuit out of service for planned works, this resulted in the loss of two 110 kV stations; Ardnagappary and Binbane. Supply was restored to Binbane at 22:27 and to Ardnagappary at 22:31. The fault cleared in approximately 60 ms. An interruption to end-users occurred, resulting in 0.016211 SML.
- On 6 December at 23:36, Arigna – Carrick-on-Shannon – Corderry 110 kV circuit tripped for a single-phase to earth fault during Storm Darragh. The circuit tripped, reclosed and tripped again. Supply was restored to Arigna 110 kV station at 23:47. The fault cleared in approximately 60 ms. An interruption to end-users occurred, resulting in 0.015448 SML.

- On 7 December at 08:39, Knockearagh – Oughtragh – Tralee 110 kV circuit tripped for a single-phase to earth fault during Storm Darragh. The circuit tripped, reclosed and tripped again. Supply was restored to Oughtragh 110 kV station at 08:55. The fault cleared in approximately 40 ms. An interruption to end-users occurred, resulting in 0.041323 SML.

In addition to Storms Isha and Darragh, a fault occurred on the transmission system during Storm Ashley on 20 October 2024 at 21:07. Great Island – Lodgewood 220 kV circuit tripped and reclosed at one end due to high winds, during a Status Yellow weather warning. No interruption to end-users occurred.

Ensuring transmission assets are resilient to climate change has required greater focus with stakeholder engagement necessary to identify the latest projections and climate risks. ESB Networks continues to engage with the Office of Public Works on their climate models and flood maps to identify climate risks on the transmission network and will be working further with them as stakeholders in the development of their Flood Risk Management Sectorial Adaption Plans (SAPs).

Please refer to Section 12 of the IPD for further details on EirGrid's proposed climate adaptation measures relevant to the transmission system.

9.3 Power System Emergency Communications Plan

EirGrid has worked with DCEE and the Government Information Service to establish and exercise the Energy Emergency Communications subgroup, which is activated under the National Emergency Coordination Group (NECG) in the event of a national emergency.

In 2024, EirGrid led two energy sector exercises with Gas Networks Ireland, ESB Networks, DCEE, CRU, and the National Cyber Security Centre (NCSC). These exercises are vital in supporting Ireland's risk preparedness and emergency planning.

In addition, EirGrid supported DCEE in the planning and design of a National Emergency Coordination Group (NECG) exercise (along with all government sector departments) in November 2024.

10. How EirGrid manages network constraints

EirGrid implements system operational constraints, in conjunction with SONI, the TSO of Northern Ireland, in order to maintain acceptable levels of system stability and voltage levels to enable efficient and secure operation of the power system. More information can be found in the Operational Constraints Update, which is published weekly.

There is an annual process in place whereby all operational constraints are reviewed at the beginning of the business year. Based on inputs from various teams across EirGrid and a review of the weekly Operational Constraints Update, the specific operational constraints to be reviewed are selected and subsequently analysed. A review of operational constraints is also carried out if there have been significant network changes made to a particular area of the transmission system, connection of significant generation in an area of the transmission system, or closure of significant generation in an area of the transmission system. EirGrid can confirm that all Operational Constraint Update reports for 2024 were published in a timely manner and are publicly available here.

Short-term management of network constraints is carried out by Control Centre Engineers through the use of specialist software tools. Information is provided to the NCC to ensure that the most cost-effective action is taken. The most effective measure of performance in managing constraints is action taken to reduce constraint costs. This is discussed further in the next section.

10.1 Information on 2024 Curtailment Volumes

Curtailment refers to the dispatch-down of wind/solar for system-wide reasons (where the reduction of any or all wind/solar generators would alleviate the problem). There are different types of system security limits that necessitate curtailment including:

1. System stability requirements (synchronous inertia, dynamic and transient stability).
2. Operating reserve requirements, including negative reserve.
3. Voltage control requirements.
4. SNSP limit.

Table 16 below shows a breakdown of Curtailment volumes for wind and solar in Ireland. There was no curtailment of solar generation in 2021 and 2022 as there was no transmission-connected solar generation until 2023.

The level of dispatch-down is affected by a number of factors which vary from year to year, such as the amount of wind and solar connected to the system, system demand, interconnector imports and the capacity factor[38] of renewable generation. The capacity factor of wind farms was 24% in 2024 which is a slight reduction from 2023.

In recent years, significant capital works have been undertaken to upgrade the transmission system to allow more wind and solar generation to be exported on to the power system. Every year a range of planned transmission outages are undertaken which at times will increase constraints. Increasingly complex operational switching was performed in 2024 to maximise renewable output wherever possible across the transmission system.

EirGrid is currently working to develop a methodology to quantify the cost of curtailment. This information will be included in future reports once available.

Table 16: Renewable Curtailment Volumes

Year	Wind Curtailment Volumes (MWh)	Solar Curtailment Volumes (MWh)
2024	627,440	32,006
2023	594,595	9,548
2022	412,827	–
2021	291,412	–

38 The capacity factor is the amount of energy produced (MW output) relative to the theoretical maximum that could have been produced if the generator operated at full capacity. Therefore, it represents the generation's average output.

11. How EirGrid manages constraint costs

Sometimes EirGrid will have to dispatch or call in some power generators differently from the market schedule, in order to ensure security of supply to end users and market participants. This is because of the technical realities of operating a dynamic and fast–changing power system, such as preventing overloads or maintaining enough generation reserve.

Where power stations are run differently from the market schedule, it is termed 'constraint'. Generators are kept financially neutral with the original market schedule and the cost associated with doing this is the constraint cost.

Constraint costs are the most significant part of dispatch balancing costs. Dispatch means the sending of instructions from the EirGrid control centre to power generators, demand side units, interconnectors or pumped storage plant about their times, fuel, manner of operation or output. Dispatch balancing costs are a suite of payments that relate to how generators are instructed.

In addition to constraint costs, dispatch balancing costs also include uninstructed imbalance payments and generator testing charges. Constraint costs are an inherent feature of the SEM design. These costs are levied on suppliers through the Imperfections Charge.

EirGrid, working with SONI, the TSO in Northern Ireland, is responsible for forecasting and managing dispatch balancing costs. They form part of the imperfections charge which is paid for by market participants.

As part of PR5, the CRU has introduced an incentive for Imperfections and Constraints. The aim of the incentive is to promote EirGrid to mitigate and reduce the costs of constraints on the system. The incentive involves EirGrid identifying areas that are related to imperfections costs and putting in place actions to reduce costs.

The CRU published an information paper on the 2024 incentives in March 2024, CRU202405 contains direction and guidance on the 2024 Balanced Scorecards targets and the performance assessment process. The information paper outlines each aspect of the balanced scorecard is assessed against the following: quality of the plan and defined actions (20%); quality of implementation of the plan (40%); and effectiveness of the plan and demonstrable impacts (40%).

The Imperfection and Constraints incentive for 2024 is based on a balanced scorecard containing five key measures as outlined in Table 17.

Table 17: Imperfections and Constraints Incentive Balanced Scorecard 2024	
Reserve Policy Review and Changes	• Final report on outcomes and methodology of the System Services – Layered Procurement Framework (LPF) Product Review & LPF volume methodology, including implications for cost minimisation and volume impacts, impacts on stakeholders. • Final report on the Day Ahead System Services Auction (DASSA) Arrangement Product Review including implications for cost minimisation and volume impacts, impacts on stakeholders • Final report on DASSA Arrangements volume forecast methodology including implications for cost minimisation and volume impacts, impacts on stakeholders. • Reporting should detail how the TSO plans to increase use of reserve provided by market schedule and a roadmap to phase out procurement of reserve services from carbon sources by end 2027.
Transmission Constraint Group (TCG) Review and Roadmap	• Report on the now annualized review of thermal and voltage based TCGs that are constraining the power system and outline what measures the TSO plans to take following the review to alleviate constraints. • Report should include clear and quantitative evidence of what constraints were found (incl. cause of constraint), cost impact, and how they were or will be reduced as part of the TCG review and process – see CRU20154 for full guidance. • Report should identify enhancements in the 2024 TCG review compared to 2023. • Evidence of plan to transition to weekly TCG study and process updates by H1 2025.
Inertia	• Report detailing potential for jurisdictional inertia floors. • Report should include details of cost and benefits of potential changes as well as how such a policy will compare to the now mooted 20MW All-Island floor and near future benefits from international interconnection. • Report should give details of potential interaction of other aspects of constraints such as MUON impact inertia floors (or vice versa).

Minimum Conventional Units Online (MUON)	• Report on the completion of MUON trial and review of the outcomes of the trial. • Subject to outcome of review, report to include description of decision to confirm enduring operational policy for operation with a minimum of 7 large synchronous units. • Report to detail what operational policies were developed, impacted, and what remaining actions are needed for confirmation and associated timeline. • Report to detail next steps to achieving secure system operation with three or fewer conventional units on the island by 2030.
Imperfections and Constraints Reporting	• Publish four Quarterly Imperfections Cost Reports with clear evidence of imperfection reductions actions, progress on annual plan and the future improvements that the TSO will make to remove or reduce the cost of each constraint in the next period. • Amend existing imperfections cost reporting to include ROI annual Dispatch Balancing Costs (DBCs) assigned to delayed infrastructure identified in the Network Delivery Portfolio reports. Reporting format to be agreed with the CRU. • Outturn report to include imperfection cost reductions for each measure undertaken by the TSO in the year (measures should not have been previously accounted for in an outturn submission). • Submit mid-year report to the CRU by the end of March to provide an analysis of imperfections spend for the first 5 months of tariff year and a view of the imperfections spend for the last 7 months of the tariff year. • Detail improvements to imperfection reporting in 2024 and how this is leading to changes in TSO actions to address system constraints. • Outturn report to include detail on all active/removed constraints for 2024, how long each has been in place for and how long each is forecasted to be in place for (report to be in line with CRU guidelines). • The constraints outturn report should also include volume of system services dispatched by the TSO through non-energy actions during 2024 and the associated cost. The report should provide a comparative analysis of performance against 2023. • Reports should include estimates of the GHG/carbon impact of system limitations (e.g. constraints and curtailment), and reductions due to actions or new initiatives'. Proposed reporting framework to comply with obligations under Article 13(4) of Regulation 2019/943 by end H1 2024.

The CRU included EirGrid's MUON operational trial in its Imperfections and Constraints Incentive Balanced Scorecard for 2024.

The focus of the MUON operational trial was on reducing the minimum number of large conventional units online in Ireland from five to four. Studies for reducing the minimum number of units began in the second half of 2022 and were completed in early 2023. In May 2023, the MUON operational trial commenced and continued through to early 2024.The results of the trial were approved on the 28th of March 2024 with the Republic of Ireland constraint limit relaxed from five to four, enabling operation of the all-island power system with the minimum of 7 large synchronous units. This became enduring operational policy, effective from 23:00 on Sunday 7th April 2024.

In accordance with the direction in CRU202405, the CRU has confirmed an outturn incentive award be applied for this incentive for 2024 of €0.29m against a total possible incentive allowance of €1.5m.

2023/24 Main constraint changes and TSO Initiatives for cost savings

While a number of initiatives were progressed during the period, these did not result in quantifiable reductions in imperfections cost for 2023/24.

These initiatives included

- South TCG Study
- Dynamic Line Rating (DLR) Review

Further information on these initiatives can be found in Table 19 below.

For reference, previous imperfection cost savings due to TSO initiatives and total imperfections spend are shown in Table 18 below.

For a full list of changes to constraints and the full set of constraints that are currently applicable, please see the Weekly Operational Constraints Update report located here.

During 2023/24, EirGrid progressed a number of studies to assess the impact of recent changes to the power system. Table 19 gives a summary of the studies and the work done.

Table 18: Imperfections Cost Savings and Imperfections Spend		
	Cost Saving to Imperfections from TSO Initiative (€m)	Total Imperfections Spend (€m)
2023/24	N/A	437
2022/23	1.43	559
2021/22	10.2	512
2020/21	22.44	274

Table 19: Transmission constraint studies/reviews undertaken in 2023/2024	
Workstream	Details
South TCG study	The purpose of this study was to replace the current South TCGs due to the new network realities while also allowing space for the move towards a reduced number of conventional units on the island to achieve low carbon targets. As a result of this study, it was identified that there were no issues in Southwest region under different load conditions driven by the installation of STATCOMs in the region and the energisation of the Greenlink interconnector. Therefore, it was agreed that 3 sets of TCGs (STHLO1, STHLO2 and STHHI1) could be removed. The studies were considered and approved by the Operational Policy Review Committee (OPRC) and implemented on 10/02/25.
Dynamic Line Rating (DLR) Review	Phase 1 of the DLR project went live in March 2024. The initial phase of the project saw the implementation of DLR on a transmission line feeding a tailed station connecting a significant installed capacity of wind generation. Following on from this initial implementation of DLR feeding a tailed station, we are currently in the process of implementing DLR onto a transmission line which forms part of the meshed network.

12. How the financial impact of transmission losses on consumers are minimised

When electricity is transported through electricity networks, there are inherent losses, which means that not all of the power generated reaches end users. This occurs on both the transmission and distribution networks, although higher voltages generally reduce losses.

12.1 Treatment of losses in the wholesale market

To ensure that the all-island wholesale market is settled correctly, transmission losses are allocated to generators in Ireland and Northern Ireland (including generators connected to the distribution system), using Transmission Loss Adjustment Factors (TLAFs). TLAFs are only applied to generators so the costs of transmission losses are not directly charged to end consumers.

The TLAFs for the island of Ireland are calculated annually by EirGrid, jointly with SONI in Northern Ireland, and approved jointly by the CRU in Ireland and the Utility Regulator (UR) in Northern Ireland. They effectively discount the value of lost generation being produced by individual generators.

The further power must flow through the system from where it is generated to where it is needed, the greater the potential losses. As a result, TLAFs are location specific. The regional TLAFs for 2024 are shown in Figure 4 with green indicating a higher and therefore financially better TLAF. The second map indicates the change in regional TLAFs from 2023. These changes are influenced by yearly dispatch, demand and topology changes.

Such signals provide a commercial incentive for generators to make informed investment decisions concerning their use of the transmission system.

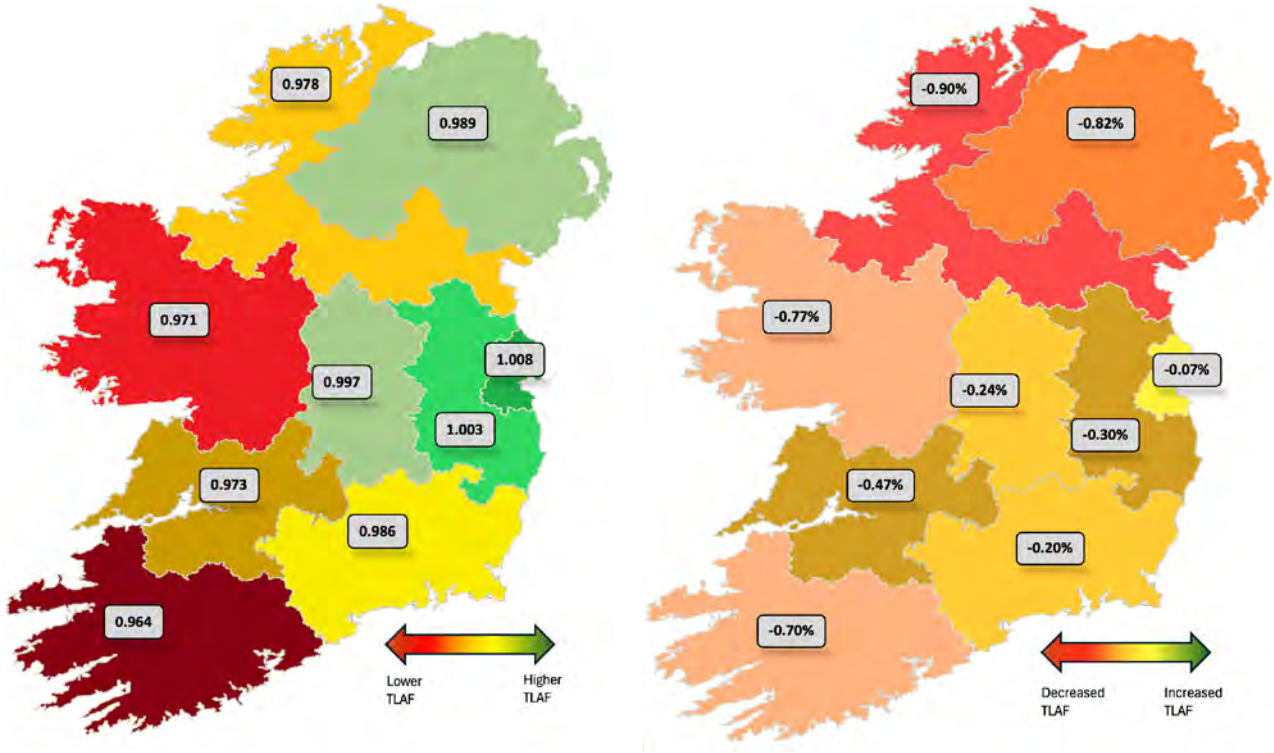


Figure 4: 2024 regional TLAFs % change from 2023 to 2024 – regional TLAFs

TLAFs are designed to provide locational signals to facilitate a more efficient real time dispatch. They are calculated using a forecast annual dispatch based on the latest assumptions for the tariff year ahead (forecast demand, fuel prices, generator outages, etc.). The All Island TLAF average typically sits in the 0.98 to 0.99 band, however, the average TLAFs of individual participants have ranged from, but are not limited to, 0.95 to 1.015 (a range of approx. 6%) in 2024.

Given the possibility for improving real time dispatch efficiency, even if the TLAFs conservatively achieved just a 1% reduction in lost energy, it would have accounted for a saving in the all-island wholesale energy required of approx. 420GWh in 2024. Using the average Imbalance Settlement Price for 2024 of €110/MWh this would equate to a reduction in all-island costs of around €46m. Further information on TLAFs can be found on EirGrid's website located here.

12.2 Overall Transmission Losses

Total system losses were 1.81% and 1.00% for 2024 and 2023, respectively.

Supporting data can be found in the Table 20 below:

Table 20: Data on transmission losses for 2021 - 2024

Total Injections in Transmission Network (GWh)	
2021	25,232
2022	24,959
2023	25,891
2024	27,149

Total Withdrawals from Transmission Network (GWh)	
2021	24,838
2022	24,630
2023	25,631
2024	26,657

Losses in Transmission Network (GWh)	
2021	394
2022	329
2023	260
2024	492

Total System Losses	
2021	1.56%
2022	1.32%
2023	1.00%
2024	1.81%

Transmission losses vary between 0.99% and just under 3.96% across European TSOs, as per the Council of European Energy Regulators (CEER) report on Power Losses published in 2025[39]. Irelands transmission losses are below the European average.

39 https://www.ceer.eu/wp-content/uploads/2025/02/3rd-CEER-Report-on-Power-Losses.pdf

Measures to reduce network losses

EirGrid undertakes long term strategic transmission network planning to determine where network adequacy is likely to be compromised in the future and to determine network and market-based solutions. When determining future transmission network development, a number of measures are considered to reduce network losses on the transmission system.

- When comparing network reinforcement options in Step 3 of the framework for grid development, the impact on losses for each option is considered. Minimising overall electricity system cost, including minimising losses, is a key factor in the creation of generator dispatches used for network analysis in the network design phase. SOEF highlighted the need to optimise the connection of new generation in regions with realisable capacity through renewable hubs and locating new large demand customers closer to renewable generators. Both these approaches will help to avoid transmitting large volumes of power over long distances, often on lower voltage circuits, and in doing so avoid transmission losses increases.
- The Control Centre 'Voltage Control Policy' provides recommended voltages ranges across various times of the day. The recommended voltages are higher than the nominal voltages which has the effect of reducing losses.

13. How EirGrid supports market operations

In its role as TSO, EirGrid provides critical support in the operation of the SEM.

The market arrangements are designed to integrate the all-island electricity market with European electricity markets, making optimal use of cross border interconnectors, enhancing security of supply, delivering increased competition and further enabling the integration of renewables onto the system.

New market arrangements for the All-Island Single Electricity Market came into operation on 1st October 2018 under the Integrated-Single Electricity Market project. A number of Capacity Market auctions have been held which are central to generation adequacy. New types of capacity such as batteries and flexible generators have entered the market as a result.

The second North South Interconnector remains critical to improving the security of electricity supply across the island of Ireland. It resolves an historical bottleneck on the all-island grid that is vital if the system is to carry more renewables in the future. It will allow for the flow of at least 900MW of renewable electricity across the border, in both directions. This is enough to power 600,000 homes using clean electricity from renewable sources.

While the capacity auctions ensure provision of adequacy in the near to medium term, the second North South Interconnector remains essential to ensuring long term security of supply across the island.

EirGrid and SONI are working towards the delivery of the second North South Interconnector as soon as possible. Together with the SEM, this will enable all consumers on the island of Ireland to realise the ambition of maximising the considerable benefits of an all-island electricity system and market.

Demand in Ireland is increasing, and long-term demand is forecast to increase significantly, due to the expected expansion of many large energy users and as the heat and transport sectors move towards electrification.

One of our key responsibilities is providing accurate system demand forecasts. This is a crucial aspect of ensuring generation adequacy and maintaining security of supply. Using a complex modelling system which predicts electricity demand based on changes in economic parameters, and with the support of bodies such as the Economic and Social Research Institute (ESRI), we ensure that market participants can make informed decisions due to the accuracy of our demand forecasts.

Further details on our work in demand forecasting can be found in the All-Island Resource Adequacy Assessment 2025-2034[40]

40 All-Island Resource Adequacy Assessment 2025-2034

The All-Island Resource Adequacy Assessment (AIRAA) looks at the balance between electricity demand and supply on the island of Ireland for the next 10 years. The AIRAA is an evolution of the Generation Capacity Statement (GCS), supported by the CRU, which implementing an updated methodology, is required to represent the evolving power system where the mix of technologies on the system is becoming increasingly diverse with increasing levels of renewable generation, energy storage, demand side flexibility and interconnection. The new methodology ensures our analysis appropriately reflects the contribution from each technology to the reliable operation of the power system.

The AIRAA 2025-2034 report includes data from the 2024 reporting period. In the median scenario, electricity demand is forecasted to increase 45% by 2034 from 2023 levels.

The long-term demand forecast in Ireland continues to be heavily influenced by the expected growth of large energy users, primarily data centres. By 2034, 31% of all electricity demand is expected to come from data centres and new technology loads (NTLs). Furthermore, there will be new additional load from the heat and transport sectors as they move towards electrification.

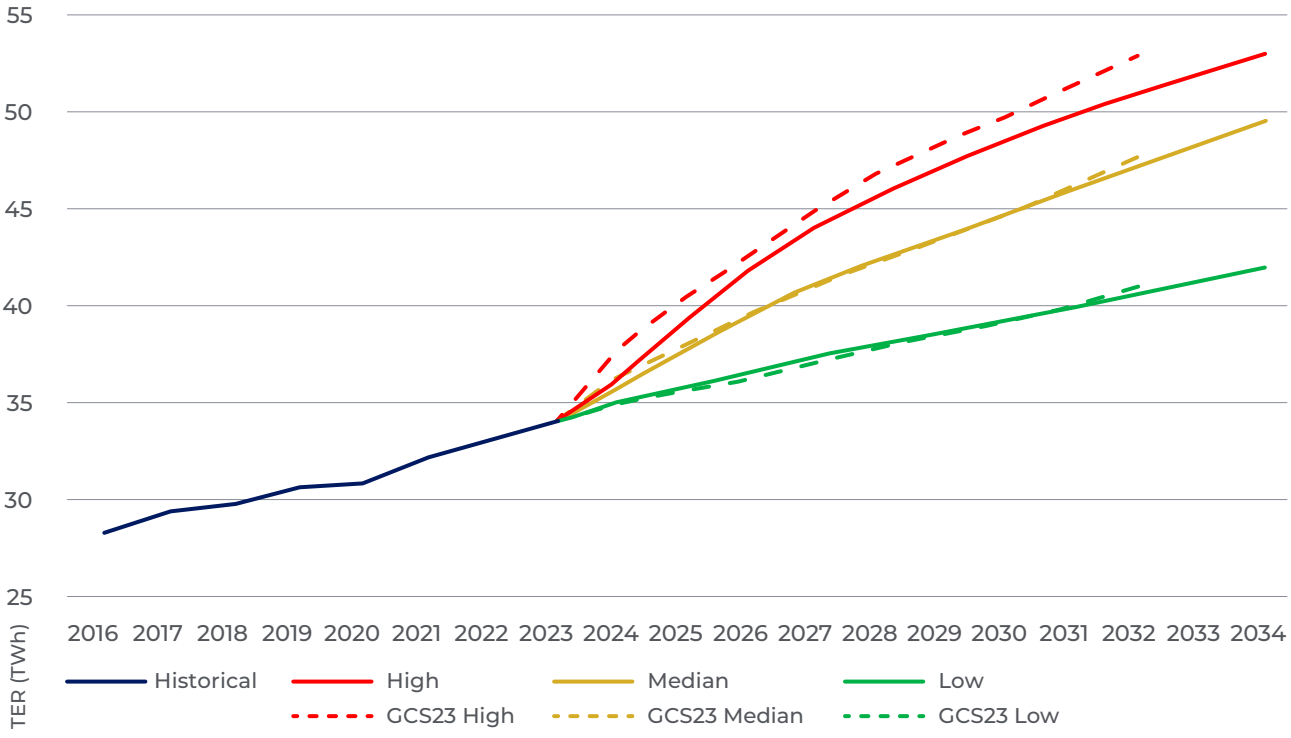


Figure 5: Total electricity requirement forecast for Ireland 2025-2034.

13.1 Capacity Auctions

EirGrid, working with SONI, also has a critical role in the operation of the Capacity Market, securing generation capacity to meet the further demand needs of the all-island network. This is achieved through Capacity Auctions.

In April 2024, the TSOs ran a T-1 Capacity Auction for the 2024/2025 Capacity Year (October 2024 to the end of September 2025). The auction secured a total of 784.97MW of Capacity (11 MW has since been terminated). The auction clearing price was €147,580 per MW per year.

Of the 32 units that qualified to take part in the auction, 22 units submitted offers in to auction. A total of 22 units were successful. From this auction, a total of €114 million of capacity payments will be paid during the period October 2024 to September 2025.

In December 2024, the TSOs ran a T-4 Capacity Auction for the 2028/2029 Capacity Year (October 2028 to the end of September 2029). The auction secured a total of 5,942.494 MW of capacity. The auction clearing price was €149,960 per MW per year.

Of the 195 units that qualified to take part in the auction, 149 units submitted offers into the auction. A total of 142 units were successful. A total of €954 million of capacity payments will be paid during the period October 2028 to September 2029 resulting from this auction.

The capacity required from these auctions considered peak demand, security of supply, as well as the reliability and performance of generators, and a range of demand forecasts and interconnection. The final results are available to view in the 2024/2025 T-1 Capacity Market Auction Results Report[41] and the 2028/2029 T-4 Capacity Market Auction Results Report.[42]

In the event that not all the Awarded Capacity achieves successful completion in the designated timeframes, the SEM Committee may direct the system operators to hold supplementary T-1, T-2 or T-3 auctions in order to procure the additional volume necessary to ensure security of supply.

41 2024/2025 T-1 Capacity Market Auction Results Report | sem-o.com
42 2028/2029 T-4 Capacity Market Auction Results Report | sem-o.com

14. How we manage new connections

EirGrid issues connection offers to large scale generators, interconnectors and demand customers, who seek connection to the transmission system in line with connection policy and directions as issued by CRU. This section provides a summary of connections for 2024.

14.1 Connecting generators and interconnectors

Large generators, typically with a capacity of more than 40 MW, connect to the transmission system. Offers are issued to generators seeking connection in line with the regulatory framework set down by the CRU. EirGrid also provides system operator connection offers to the DSO so that distribution generation connections can connect to the distribution network and export power onto the transmission system.

Generator types include thermal plants using fossil fuels, hydro, Combined Heat & Power (CHP) plants, wind and other newer generation types such as solar power or utility scale battery energy storge solutions (BESS).

EirGrid operates the connection process for new generators in close co-operation with ESB Networks, as DSO, and in line with regulatory policy.

The total renewable generation provided to the grid at the end of 2024 was 13,734 GWh which supported 40% of the total demand[43].

When an offer is issued it means that the TSO, or the DSO, has issued a connection offer to an applicant.

This does not mean the offer has at the time been accepted by the applicant. A connection offer which is accepted in one year is also unlikely to impact on connected generation capacity in the same year given the lead times associated with construction. Once a connection agreement is executed, it typically takes several years for the connection to be completed, subject to system outage constraints.

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

EirGrid also facilitates the connection of interconnectors between the transmission system in Ireland and transmission systems in other countries. Offers are issued to companies seeking to construct an interconnector in line with the rules determined by the CRU[44].

43 https://www.eirgrid.ie/grid/system-and-renewable-data-reports
44 Electricity interconnectors | CRU.ie

Table 21: Offers issued – new and modifications – total in 2024		
	No.	MEC (MW)
New Transmission Generator Connection Offers Issued	50	4225.2
Modifications to pre-existing Transmission Generator Connection Agreements Issued	22	0
Modifications to pre-existing Interconnector Connection Agreements Issued	0	0
Modifications to pre-existing Autoproducer Connection Agreements Issued	0	0
New Transmission Autoproducer Connection	**1**	**288**
Total	**73**	**4,513.2**

When a connection offer is executed, this means that the applicant has signed a connection agreement. The total number of offers executed in 2024 detailed in Table 22 below also includes offers which may have issued prior to 2024 but were executed in 2024.

A list of the currently contracted and connected customers to the Transmission system is located on EirGrid website here.

Table 22: Offers executed – new and modifications – total in 2024		
	No.	MEC (MW)
New Transmission Generator Offers Executed	41	3798.3
Modifications to pre-existing Transmission Generator Connection Agreements Executed	19	66.9
Modifications to pre-existing Interconnector Connection Agreements Executed	0	0
Total	**60**	**3865.2**

14.2 Connecting demand Customers

A demand customer is a large commercial or industrial user of power. They can apply to connect to either the transmission or the distribution system. In general, customers who require a power supply of over 20 megavolt-amperes (MVA) connect directly to the transmission system. Table 23 sets out the demand customer offers executed in 2024.

At the end of 2024, there were a total of 32 demand customer sites connected directly to the transmission system. When a connection agreement is executed for a new connection, it typically takes a number of years before it is connected to the transmission system, subject to system outages constraints. This period includes project development, time taken to obtain consents and to construct the connection. In 2024, two demand customer projects were completed, contributing an additional 48 MVA of Maximum Import Capacity (MIC) to the transmission system.

Table 23: Demand offers issued and executed – total in 2024

	No.	MIC (MVA)
New Demand Connection Offers Issued	10	100.50
Modifications to Demand Connection Offers Issued	8	588.50
New Demand Connection Offers Executed	1	100.50
Modifications to Demand Connection Offers Executed	5	238.50

14.3 Demand Side Units

Demand Side Units (DSUs) do not receive connection offers. A DSU is a single demand site or group of demand sites that can reduce their electricity consumption when instructed by the NCC. These are registered in the market and are offered system services contracts. By the end of 2024, there were 52 DSUs contracted with a total capacity of 421.282 MW.

14.4 Efficiency Improvements in the processing of connection offers and modifications

EirGrid has conducted a lessons learned review and taken measures to improve efficiencies in its connection offer process in 2024. These include enhancements to its early engagement process with customers, enhancements to its Application Form, and the refinement of a number of its internal processes to reflect the changing customer dynamic. EirGrid continues to explore opportunities to introduce efficiencies into its connection offer process and will be taking additional measures in this regard in 2025 to enable it to facilitate the additional requirements and future uncapped batches under the Renewable Energy Direction III (RED III) and the ECP-GSS CRU Direction.

14.5 Contestable Delivery projects

Contestable Delivery is the arrangement whereby customers can opt to construct the new network required to connect their facility to the transmission system. This approach has been available to transmission customers since the year 2000 and provides flexibility to customers to manage and control the costs, programme and risks associated with their transmission connection. Customers can still opt for TSO and TAO to quote, manage and construct the new connection infrastructure but Contestable Delivery has become the preferred approach for customers. This has required the TSO and TAO to put multidisciplinary teams and processes in place to support and facilitate the increasing levels of contestably delivered connections.

The TSO and TAO work closely together with customers to manage the design review, construction quality monitoring, due diligence, commissioning, and asset transfer processes associated with contestably delivered projects to ensure the connected assets are fit for purpose. This provides the necessary assurance on behalf of TSO, TAO and the electricity customer and gives feedback to industry on issues arising and lessons learned at an early stage in each project's development. Ownership of the new assets transfers to TAO, and then TSO takes over operational control when the new network is energised and becomes part of the transmission system.

Eighteen contestably delivered projects (including renewable generation, battery and the Greenlink Interconnector) were connected to the transmission system in 2024.

The number of contestably delivered projects is illustrated in Table 24. Thirty-five new contestable delivery projects were in design review stage during 2024.

Table 24: Contestably delivered renewable generation, battery and interconnection projects

	2021	2022	2023	2024
Projects Connected/Energised	5	10	7	18
Additional MW Connected*	229 MW (100%)	541 MW (83%)	442 MW (94%)	1745.30 MW** (94%)
Number of Projects in Design Review	20	23	39	35

*The percentage (%) of all additional Renewable MW capacity that was connected via the Contestable Delivery process included in brackets.
** Note the Greenlink Interconnector comprised of 504 MW

14.6 Connection Policy Developments 2024

Enduring Connection Policy (ECP)

The process for issuing generation offers was consulted on in 2017 resulting in the ECP which has led to a significant increase in the number of new generation capacity offers issuing in 2019 and 2020.

The CRU ECP-2 decision CRU/20/06 published in June 2020, prioritises the issuance of connection offers for large renewable energy projects in the first instance, in line with the CRU strategic priority of delivering sustainable low-carbon solutions with well-regulated networks.

Since its introduction, ECP-2 has led to a significant increase in the number of new generation capacity offers issuing.

A number of iterative ECP-2 batches have been processed to date. The application window for ECP-2.3 opened in September 2022 with batch offer processing taking place across 2023 and 2024.

In April 2023, the CRU issued CRU202326, a direction to hold a fourth ECP-2.4 batch in 2024. The application window for ECP-2.4 closed in November 2023 with batch processing scheduled to take place across 2024 and 2025.

In September 2024, CRU issued CRU/2024101, a direction to process a final batch under the existing ECP-2 policy (ECP-2.5). The application window for ECP-2.5, closed in November 2024.

Additionally, in CRU/2024101, the CRU issued a direction to establish the new ECP – Generation and System Services (ECP-GSS). ECP-GSS applies to onshore renewables, conventional generators, storage and other system services technology projects connecting to the electricity system. It does not apply to interconnectors, demand connections, micro-generation, or offshore electricity connections. The first "Batch Closing Deadline" under the new policy is to be on 30 September 2025. Thereafter, Batch Closing Deadlines will be on 31 March and 30 September each year.

14.7 Data Centre Grid Connections

In November 2021, following public consultation, the CRU published its Direction to the System Operators (SOs) related to Data Centre grid connection processing, CRU/21/124, which directed the SOs to implement a set of additional assessment criteria by which to process data centres applications.

Since the direction, there have been a number of further developments, including the Government Policy Statement on Security of Electricity Supply (November 2021)[45] and The Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy (July 2022)[46]. EirGrid has been engaging to date with the CRU, data centre developers and all relevant stakeholders to ensure that data centre applications are processed in line with CRU/21/124 and relevant government and national policy. This engagement has also included EirGrid's response to the CRU's consultation on LEU connection policy, CRU2024001.

45 Policy Statement on Security of Electricity Supply Nov 2021
46 Government Statement on the Role of Data Centres in Ireland's Enterprise Strategy Jul 2022

14.8 Security of Supply

Over the 2024 period EirGrid and ESB Networks continued to work closely with the CRU and DCEE to implement and delivery the strategic programme of actions under the CRU's Electricity Security of Supply Programme.

EirGrid continued to engage with, and support where required, ESB Generation, as they advanced the necessary consents and works to enable the retention of the units at Moneypoint on heavy fuel oil (HFO) for the provision of security of supply services.

In addition a number of initiatives and actions were undertaken across system operations including:

- A number of Emergency Preparedness cross-organisational Exercises were carried out
- The Power System Emergency Communications Plan was updated
- EirGrid TEG policy and tools were embedded in the control room processes
- The NTC Procedure was updated and published on 28 June 2024. – including the treatment of TEG, and is published here: Day-Ahead Interconnector Net Transfer Capacity Procedure
- CRU and EirGrid commenced the second cycle of updating the Risk Preparedness Plan for Ireland (RPP), with input to the European Network of Transmission System Operators (ENTSO-E) regional electricity crisis scenarios.
- Winter Outlook Report published 8 October with new methodology and greater representation of interconnector flows and inclusion of TEG units at North Wall, Huntstown, and Shannonbridge – link here. Loss of Load Expectation decreased from 21 hours in 2023/2024 to 3.6 hours in 2024/2025.

14.9 Offshore grid connections

Further to the Maritime Area Planning (MAP) Act 2021 and the Policy Statement on the Framework for Ireland's Offshore Electricity Transmission, enacted in December 2021, the role and remit of EirGrid as TSO was significantly expanded to incorporate new functions related to the development of offshore renewable activity. It provides that EirGrid can own offshore assets in its capacity as TSO. As part of this role, EirGrid is playing a leading part in transitioning our electricity system to accommodate this magnitude of offshore wind onto our grid and into the electricity market.

Much of the focus of 2024 was further development of EirGrid's Offshore Asset Readiness Programme ('OARP') and the 31 programmes and capabilities required to ensure delivery of EirGrid's Offshore Programme. Key 2024 highlights in the OARP include work on the Knowledge & Information Management, Warehousing, Health & Safety and Legal programmes. In October 2024, EirGrid submitted its PR6 Offshore Business Plan to the CRU which included scenarios and associated provisions for the period 2026 to 2030.

EirGrid continues to engage extensively with Phase 1 developers to ensure a comprehensive understanding of timelines to ensure alignment between the earliest Phase 1 developer timeline and the OARP.

In connection with the Offshore Phase 2 South Coast Programme (Tonn Nua), EirGrid continues to work closely with DCEE and the CRU regarding the next offshore support scheme ORESS 2 Auction. 2024 also saw EirGrid continue preparations to undertake marine surveys within the proposed area. This culminated in November 2024 with the application for a Maritime Usage Licence from the Maritime Area Regulatory Authority to undertake these during summer 2025.

Furthermore, in 2024, CRU published a number of decisions relating to offshore which include the *Offshore Revenue – Model*[47] *Phase 2 Offshore Wind - Grid Connection Pathway*[48] and *Phase 2 Offshore Wind – Grid Connection Charging Policy*[49]. EirGrid continues to engage extensively with CRU on the implementation of these decisions.

47 CRU202499_Offshore_Revenue_Model_for_EirGrid_Decision_Paper.pdf
48 *Grid_Connection_Pathway_for_Phase_2_Offshore_Wind.pdf*
49 Phase_2_Offshore_Wind_-_Grid_Connection_Charging_Policy.pdf

15. Innovation

EirGrid and ESB Networks have innovation programmes through which we research, develop and use innovative solutions which help us manage the ever-changing power system. We innovate to bring value to all users of the power system.

Both innovation and research are essential in getting us to where we need to be, enabling solutions to realise sustainable energy benefits. Throughout 2024, EirGrid, together with the Northern Ireland TSO, SONI, have strategically innovated to deliver key projects, such as SOEF and, Tomorrow's Energy Scenarios as well as delivering a number of smaller individual projects that enhance the way we operate.

The focus in 2024 was on continued implementation of the EirGrid and SONI Innovation and Research Strategy[50] which outlines the necessary support structures, frameworks, and people needed to enhance innovation and research capability on an all-island basis.

The strategy complements publications from EirGrid and SONI on the SOEF Roadmap to 2030, by focusing our collective research and innovative strategies to deliver on Ireland's and Northern Ireland's respective ambitions to 2030, while enabling and supporting the innovation and research in our ecosystem to deliver on longer term net zero carbon commitments. There is a need to understand the options and solutions which will work best for the island of Ireland, to ensure we are on the right path to deliver on a cleaner energy future.

EirGrid's collaboration with partners has been, and continues to be, fundamental in delivering innovation programmes. Enhancing these strong relationships, as well as building new ones will be vital as we strive to innovate further with our strategic innovation programmes of work. Throughout 2024, progress has been made by EirGrid on various strategic innovation programmes. The 2024 Annual Innovation Report documents progress of EirGrid and SONI on the strategic innovation programmes throughout 2024 and points out our ambition for future developments of the programmes and new initiatives.

50 Innovation & Research Strategy | eirgrid.ie

In 2024, some of the key projects from the strategic innovation programmes included:

- EirGrid initiated a NexSys project to assess the impact of Green Hydrogen integration onto the All-Island Power System. The goal of this project is to investigate optimal location, scheduling and dispatch of electrolysers as well as the impact of large-scale hydrogen production from offshore wind on the SEM.
- Research in 2024 led to a better understanding of Inverter Based Resource (IBR) behaviour and modelling requirements for weak grid conditions and assessment of Grid Forming technologies. Engineers across EirGrid and SONI have been upskilled to address challenges related to planning and operation with high levels of IBR.
- Evidence-Based Environmental Guidelines (EBEG) are a new programme of work that has been identified and will be focused on. EBEGs set environmental topic activities into the context of EirGrid's 6-Step Framework for Grid Development and help mitigate multiple risks to EirGrid's social licence to operate, and therefore delivery of the CAP.
- Building on the success of the previous year's CleanerGrid Competition, in 2024 students presented their vision of what the growing energy sector will need to look like in 2050 to have sustainably achieved net-zero.

Progress has been made on the development of an offline tool for identifying the sources of low frequency oscillations and enhance the security of supply for the all-island system. The initial phase of the analysis successfully identified key oscillation parameters.

Membership of a number of groups, including the Electric Power Research Institute, Energy Systems Integration Group and Industry Research and Development Group gives EirGrid access to expertise in many different areas as well as wide networks of companies and colleagues in innovation.

For more information, please refer to EirGrid's 2024 Annual Innovation Report[51].

51 Annual Innovation Report 2024 | eirgrid.ie

Collaboration on innovation between TSO and TAO plays an important role in meeting the system resilience and capacity challenges within the CAP for the electricity transmission network. The required levels of system security and investment require new ways of thinking, innovation and collaboration between TSO and TAO focused on several key enabling systems, processes, and technologies to:

1. Safely maximise and optimise the load carrying capability of existing network.
2. Optimise Operations and Maintenance processes and policies.
3. Identify 'non-wires' solutions to defer traditional reinforcement projects and expenditures.
4. Upgrade networks utilising innovative assessment and investment approaches and strategies.
5. Interconnect with other transmission systems.
6. Develop interoperability with the Distribution system.
7. Develop infrastructure to connect largescale offshore wind generation.

The joint TSO and TAO innovation working group continued to operate during 2024 in line with the framework agreement on Innovation that sets out how both companies work together to proactively progress viable technology options.

The Joint Working Group meets monthly and maintains a register of new technologies that are under consideration (studies, surveys, trials, etc.) for inclusion in the 'technology toolbox'. Progress is measured using an agreed assessment of the TRL.

Key milestones for each technology are planned and monitored. The CRU has linked progress on certain innovation initiatives to the joint annual incentive available to both companies as outlined in *Section 5: 'How we performed against transmission delivery incentives'*.

16. How EirGrid performs relative to comparator TSOs internationally

This section includes a benchmarking assessment of EirGrid's performance relative to the best performing relevant TSOs internationally. Considering the characteristics and challenges particular to the Irish electricity transmission system, the benchmarking results show that EirGrid is overall performing well relative to its comparators. This includes leading the way in integrating intermittent renewables whilst maintaining a resilient system and developing the transmission network.

16.1 Aims and approach

The aims of this assessment were to understand how EirGrid performs relative to other TSOs, to identify best practice and to establish areas for improvement. EirGrid's performance was compared with TSOs in nine Organisation for Economic Co-operation and Development (OECD) jurisdictions for the most recent four years (2021-2024). In some instances, either due to data availability or to understand longer-term trends, we observed data outside this range. The assessment considered EirGrid's actual performance against comparator companies' actual performance but did not consider the performance of comparators relative to their targets and/or incentives.

The assessment considered performance in three key areas: (i) system reliability and resilience; (ii) facilitating the energy system transition; and (iii) developing the network (see Table 25).[52] These were selected because they correspond to network activities that underpin our key objectives and that have associated Performance Incentives set by the CRU. Facilitating the energy system transition is especially pertinent to analyse, given that it includes activities that are relatively new developments in Ireland and internationally and can provide insights on any innovative steps that are being taken by other TSOs.

52 Where possible, we sourced data for the assessment from the TSOs or the relevant regulators' websites. Where this was not possible, we sourced data from research papers prepared by internationally recognised research bodies or scientific papers that have been subject to double-blind peer review.

This year's report uses the same performance measures and comparator TSOs as last year.

While the performance measurements in the scope of the assessment are principally the responsibility of EirGrid as TSO, there are also some dependencies in certain areas with our delivery partners. These include the TAO, ESB Networks, and the DSO, ESB Networks DAC.

Table 25: Selected performance measures and comparator TSOs

	System reliability and resilience	Facilitating the energy system transition	Developing the network
Performance measures	SML Energy Not Supplied (ENS) as a proportion of energy consumed SF deviation	Share of renewables in the generation mix Renewables dispatched down relative to energy share of wind SNSP and other system stability measures	Imperfection costs per capita Connections offers per capita Planned outage days per capita Approving and energising transmission infrastructure
Comparator TSOs[53]	Great Britain (GB) New Zealand Italy Denmark Australia – Tasmania	California Portugal Cyprus Israel	
Rating	• Extent to which performance in TSO control • Data comparability rating • Overall results comparability		

53 From a longlist of OECD jurisdictions, we selected comparator TSOs based on comparability of institutional and regulatory frameworks, as well as on data availability.

16.2 Summary of results

A summary of the results is outlined in the table below. For each area of performance, a performance rating out of three was assigned, which indicates how EirGrid performs relative to the comparator TSOs over the observed timeframe. Each performance rating is an average of the scores assigned to the underlying measures in that area of performance:[54]


A score of 3 indicates that EirGrid is demonstrating consistent best practice among our observed comparators


A score of 2 indicates that EirGrid is broadly in line with the median performance among our observed comparators


A score of 1 indicates that observed comparators demonstrate relatively stronger performance than EirGrid

Table 26: Summary of Benchmarking results

Area of performance	Measure	Results comparability[55]	Performance rating (out of three)
System reliability and resilience	SML	High	 (2.5, relative to 2.25 last year)
	ENS as a proportion of energy consumed	High	
	SF deviation	High	
Energy system transition	Share of renewables in the generation mix	Medium	 (2.5, relative to 2.5 last year)
	Renewables dispatched down relative to energy share of wind	Medium	
	SNSP and other system stability measures	Low	
Network development	Imperfection costs per capita	Medium	 (2.25, relative to 2.5 last year)
	Connection offers per capita	High	
	Planned outage days per capita	Medium	
	Approving and energising transmission infrastructure	Medium	

54 A score of 3 means that, on average across the three performance measures, EirGrid outperformed 75% of TSOs. A score of 2 means that on average EirGrid outperformed 50% of TSOs. A score of 1 means EirGrid on average only outperformed 25% of TSOs at best.

55 The comparability of performance across TSOs is affected by two key factors – data comparability and the influence of external factors. We created a balanced "results comparability rating" of high, medium or low for each measure to capture whether results are comparable across TSOs based on these factors. The performance rating (in the right-hand column) only considers measures with a high or medium results comparability rating. However, measures with a low results comparability rating provided helpful context.

Despite the unique challenges facing the Irish electricity transmission system, EirGrid is performing well relative to comparators. It has the second highest penetration of wind energy of the observed TSOs and demonstrates levels of renewables dispatched down (RDD)[56] comparable with Great Britain (GB) for similar energy shares of wind. While some other TSOs, like Denmark and California, have lower levels of RDD, these jurisdictions have significantly higher interconnection capacity as well as access to a larger synchronous system containing jurisdictions with relatively low penetration of intermittent renewables.

Below, we spotlight key measures from each area of performance, outlining observations on EirGrid's performance and supporting explanatory factors.

Finally, we reflect on some of the challenges with comparing the TSO performance internationally.

16.3 System reliability and resilience

Of the TSOs assessed, all have resilient and reliable systems, within which EirGrid has demonstrated relatively strong performance over the period observed.

For SF, we maintained frequency within a narrow range of 50 ± 0.1 Hz for 99.67% of recorded intervals in 2020, outperforming GB and Tasmania, where the normal operating frequency bands (NOFBs) are wider (see Figure 6). Despite marginal reductions in resilience between 2020 and 2022, our performance rebounded in 2023 and again in 2024, surpassing the levels achieved in 2021. Since 2022, we have shown greater resilience than our comparators.

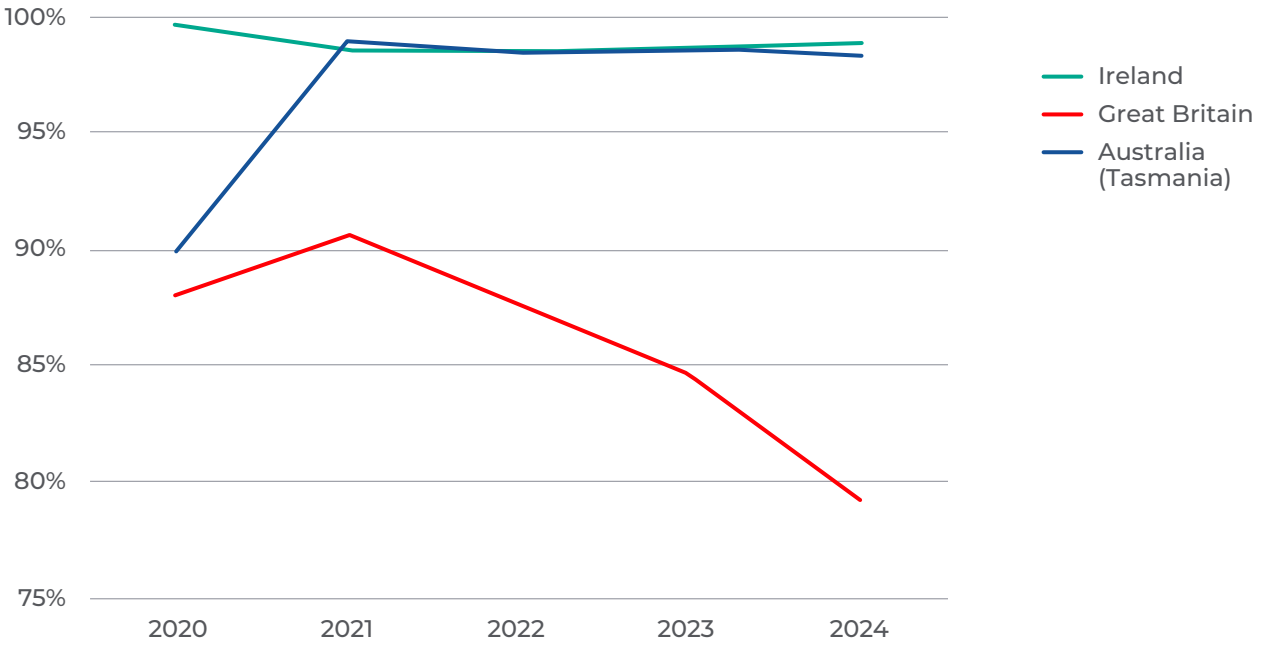


Figure 6: Proportion of time SF sits within 50 ± 0.1 Hz (%), 2020-24

56 RDD refers to the amount of renewable energy that is available but cannot be used by the system, for example due to constraints of the network.

For SML, the networks used for comparison are Tasmania, GB, New Zealand and Portugal. All observed networks demonstrate less than 0.4 SML across 2020-2022, and all but Tasmania demonstrate less than 0.15 SML across the same period.

In 2023, New Zealand and Ireland both exhibited a large increase in SML due to isolated incidents. In New Zealand, this was caused by the impact of Cyclone Gabrielle on a substation.[57] On our own network, SML increased as a result of a single incident on November 25, 2023, caused by a fault at Cunghill 110 kV station in the North Mayo Region. This resulted in an outage on the network, and the consequent interrupted supply was 4.4 of SML. Without this event, SML in 2023 would have shown an improvement on our 2022 performance.

Portugal also saw an increase in its SML in 2023. Of the 240 incidents impacting the National Transmission Network, three (1.3%) affected the electricity supply, causing seven interruptions lasting more than 3 minutes. These interruptions resulted in a total ENS of 2,579.4 megawatt hours (MWh).

In 2024, all comparators demonstrated less than 0.4 SML, and all but Tasmania demonstrated less than 0.15 SML across the same period. The SML in Ireland was narrowly impacted by Storm Darragh which occurred in December 2024.

EirGrid maintained frequency within our target bands for **98.87%** of recorded intervals in 2024

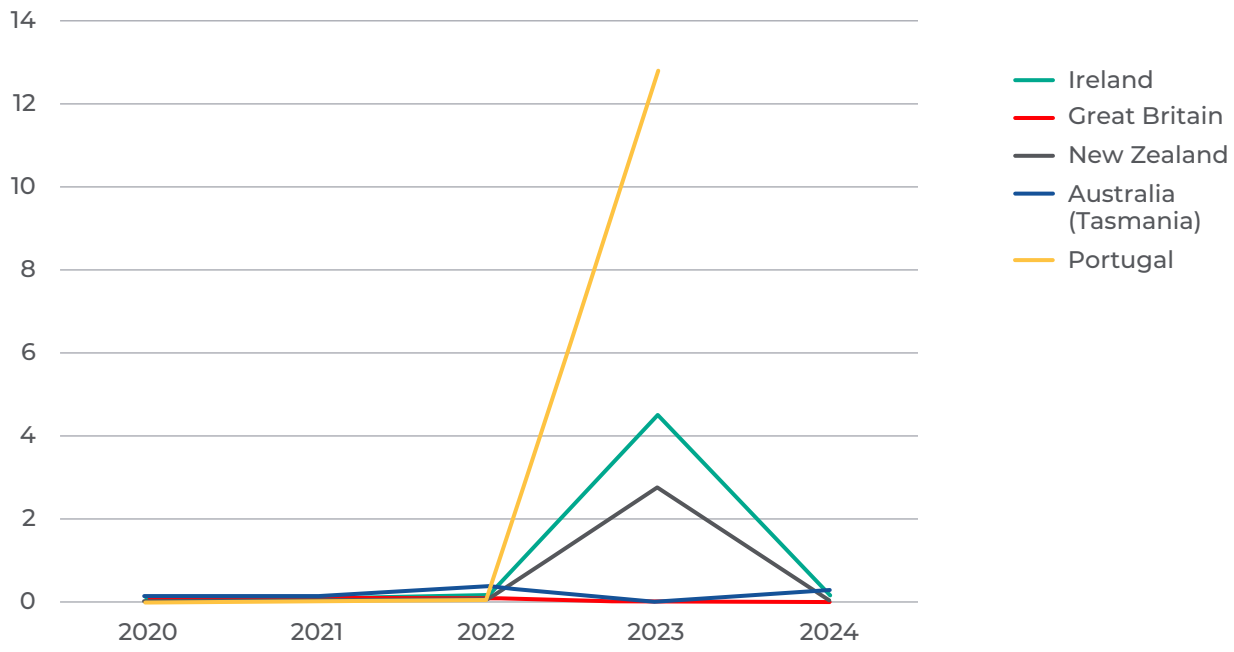


Figure 7: SML (System Minutes Lost, 2020-24

57 Transpower FY23 Integrated Report (static.transpower.co.nz)

In summary, we have exhibited strong SF performance in recent years. With the exception of the isolated incident in 2023, we have exhibited strong performance for SML and Energy Not Served over recent years. It will be important for EirGrid to continue to focus on developing innovative solutions to maintain a reliable and resilient system, as more variable renewables are integrated. This could include increasing the adoption of energy storage technologies, facilitating better interconnection with the European energy market (already underway through the Celtic Interconnector, which is under construction), and collaborating with the DSO on measures such as increasing the capacity of demand response on the network.

16.4 Energy system transition

The evaluation of a TSOs performance in facilitating the transition to a net zero grid, whilst maintaining secure and resilient systems is a significant and multi-faceted task. It is important to consider the composition of the renewables considered given national and regional variables, making performance metrics highly sensitive for the applicable TSOs. However, comparison to equivalent TSOs performance can be a useful barometer on overall performance and offer valuable comparative insights.

When compared to equivalent OECD and non-OECD comparable TSOs, Ireland's overall Renewable Energy Share (RES) (40.1%) is superseded by comparator TSO's with significantly higher RES such as New Zealand, Denmark, Portugal & Tasmania, all having shares of renewables above 60%.

Ireland's wind generation increased by 17% from 2021 to 2024

Despite a lower RES share compared to other TSOs, Ireland has seen significant increases in its Renewable Generation recently, accounting for 40.1% of all electricity consumed in 2024.

However, the area that has seen the most significant growth is wind generation (increased 17% from 2021 to 2024).

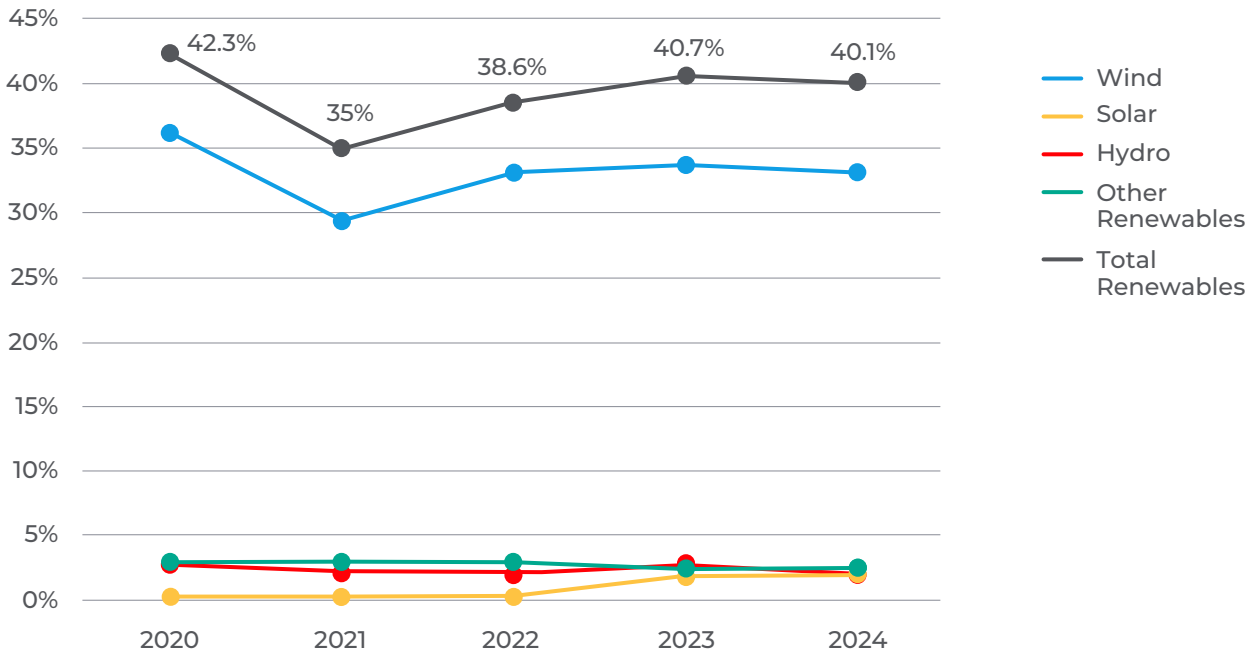


Figure 8: Ireland Energy mix as a percentage of demand (%), 2024

Ireland has the second highest penetration of wind energy of all TSOs compared. Additionally, the results show that Denmark consistently has the highest share of wind based on consumption, and Ireland has the second highest. In 2024, Denmark's energy share of wind was 31% onshore and 28% offshore[58] whilst Ireland's share was all onshore, except for a single small offshore installation.

To harness the potential of offshore wind energy and achieve RES-E targets, offshore electricity will now become a greater component of our electricity supply over the coming years. EirGrid's role as TSO has been expanded to own and operate the offshore transmission network and we are actively involved in developing the infrastructure needed to integrate offshore wind energy into the national grid.[59]

58 Energi data service: Energi Data Service | Datasets | Production per Municipality
59 Offshore Energy Future | Projects | EirGrid

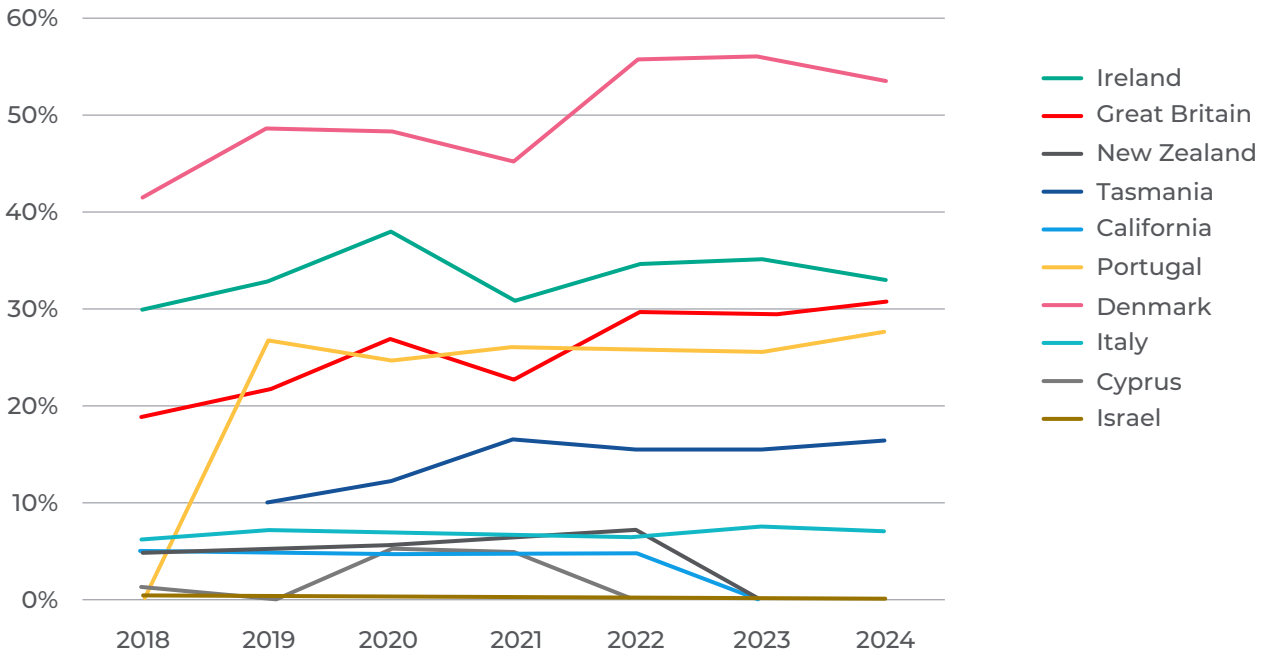


Figure 9: Energy share of wind based on consumption (%), 2018-2024

EirGrid's SOEF Roadmap sets out the target and plans to increase SNSP limits to 95% by 2030. Significant progress to increase SNSP limits have been made in recent years. In April 2021, the power system moved to permanent system operation policy at 70% SNSP and a trial with an SNSP limit of 75% began. The 75% trial continued into 2022 and was successfully completed by the end of March 2022 when a limit of 75% SNSP became operational policy. In 2024 the TSO progressed feasibility studies on increasing SNSP limits to 80%. These studies were completed in December 2024 and identified key system risks that require mitigation before the trial can commence. Work is currently ongoing to assess mitigation measures ahead of future SNSP increases in line with EirGrid's SOEF 1.1 Roadmap.[60]

EirGrid is performing well and outperforming comparator TSOs in some areas of the transition. EirGrid have the second highest penetration of wind energy of all TSOs compared. EirGrid demonstrates international best practice in progressing the increase of SNSP limits over time. It is important to note that EirGrid's system is also highly resilient and in line with international best practice, evidencing our capabilities in maintaining a secure and resilient system whilst facilitating the transition to net zero.

60 https://cms.eirgrid.ie/sites/default/files/publications/EirGrid-SONI-Operational-Policy-Roadmap-2025-2035.pdf

16.5 Network development

Our **imperfection costs** per capita over recent years have been broadly comparable with our comparator in GB. In 2024, our imperfection costs per capita decreased from 2023 levels from €75.8 to €60.4. They decreased at a faster rate than our comparator in GB. We have performed strongly despite a challenging context, including high penetration of renewables and other non-synchronous sources, tight generation margins, and a relatively low integration with the European Electricity Market through interconnectors.

Our generation connection offers per capita increased between 2020 and 2024, despite a dip in 2021. We have seen an increase in the size of generation connection batches, which has driven our work throughout the performance year. This has not yet transpired into connection offers, which means the scale of transmission connection offers is set to continue the upward trajectory in the coming years.

As more variable renewable generation comes online, the management of imperfection costs will become increasingly challenging. To meet this challenge, EirGrid will continue to facilitate a balanced portfolio of technologies and continue with efforts to develop the network both in terms of regional transmission links and interconnectors with other transmission networks.

EirGrid is addressing these network needs through a programme of planned network developments. This is reflected in our improvement in planned outage days performance in 2024, when we completed 88% of the Transmission Outage Programme (TOP), relative to 84% in 2023 and surpassing the CRU's "strong" threshold of 75%. On a larger scale, EirGrid will continue to support the deployment of more variable renewables through increasing storage capacity on the network and through the Celtic Interconnector to France.

Our efforts to address network needs are further evidenced in our performance in approving and energising transmission infrastructure. We have delivered consistently against the CRU's targets for implementing the PR5 plan in a timely manner. Against the TSO Investment Plan and Delivery (IPD) incentive, we achieved 63% of overall projects against target in 2024, placing us in the "Below Acceptable" threshold of 70%. However, it is to be noted that the reduction in 2024 from prior year performance was due, in the main, to the change in the methodology by CRU as referenced in Footnote 20 within CRU2024120. Through working with our delivery partner, ESB Networks, together we have rapidly deployed additional transmission circuits (see Figure 10).

2024

EirGrid achieved a reduction in imperfection costs per capita in 2024

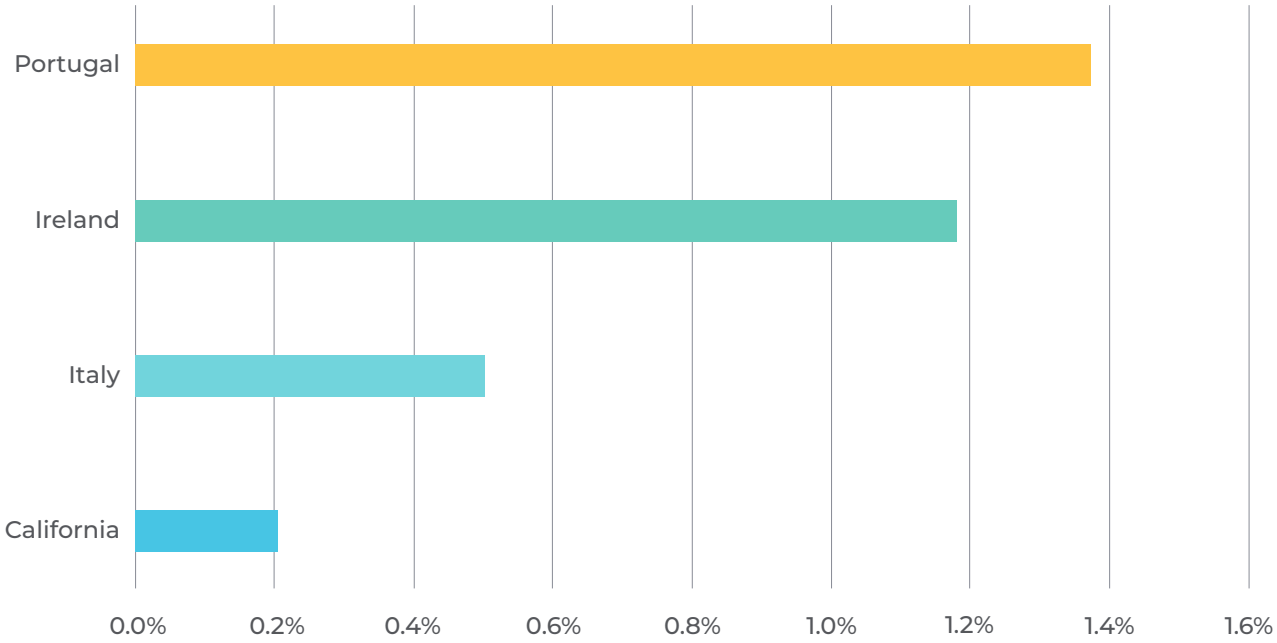


Figure 10: Average annual change in transmission circuit length, 2019-24

16.6 Key findings

By facing a number of system-related challenges first, EirGrid is identifying solutions and paving the way for other TSOs in many areas.

For example, EirGrid is leading the way in both its trialling of higher SNSP limits and in its translation of these increasing limits into operational policy. EirGrid's performance is also demonstrated through its collaboration and knowledge sharing with other best performing TSOs through the Global Power System Transformation (G-PST) consortium, of which EirGrid is a founding TSO.[61]

Through collaborating on research and development, sharing best practice and advocating for policy change, the G-PST consortium plays an important role in accelerating the transformation of the electricity sector to a low carbon future.

EirGrid continues to perform strongly compared to its peers and remains committed to delivering value for electricity consumers. As the energy system evolves, there is an opportunity to ensure that performance targets continue to reflect both the complexity of the work involved and the progress already achieved.

61 Other founding system operators include National Grid ESO (GB), Energinet (Denmark), CAISO (California), AEMO (Australia) and ERCOT (Texas).

Some targets require year-on-year improvements, even in areas where EirGrid is already operating at a high level. For example, increasing SNSP levels depends on completing key technical steps, meaning progress happens in planned stages.

Looking ahead, it will be important to ensure that targets are designed to support meaningful progress and reflect the full value of EirGrid's contributions. This includes recognising the benefits delivered to consumers and ensuring that incentives continue to encourage innovation and high performance.

EirGrid

has performed strongly relative to peers in various metrics

17. Engaging with stakeholders

17.1 EirGrid stakeholder engagement

Working closely with our stakeholders remains critical in ensuring EirGrid continues to support Ireland's progress towards a cleaner, more sustainable future.

Stakeholder engagement is built into EirGrid's 2020-25 corporate strategy via the following supporting goals:

1) Working with stakeholders for positive change & engage for better outcomes for all

2) Enhance the all-island grid and market

EirGrid's PR5 stakeholder engagement documentation is captured on the EirGrid website.

Effective stakeholder engagement is centred around ensuring that those who are impacted by our work have the opportunity to influence an outcome before a decision is made, while being cognisant of EirGrid's regulatory obligations.

Our stakeholder portfolio is vast, but we broadly categorise our stakeholders under the following groups: industry, society, and statutory and European.

Industry engagement

We recognise that our stakeholders are key to obtaining 80% of our electricity from renewable sources in line with Government targets and achieving net-zero emissions no later than 2050.

By working closely with key stakeholders such as EirGrid customers, as well as representative bodies and market participants, EirGrid aims to deliver quality services to customers and other industry stakeholders within our regulatory constraints.

To ensure we regularly engage and gather feedback from industry stakeholders, we manage a significant number of strategic channels for feedback and engagement which are detailed EirGrid's 2024 Stakeholder Engagement Report. These strategic channels include the SOEF Advisory Council, various industry forums, working groups, workshops and bilateral meetings, review panels, specific programme of work engagements, taskforces and also EirGrid's Account Management Team.

Societal engagement

Before we develop or upgrade the grid, we engage with landowners, community representatives, interest groups and local stakeholders to better understand both their needs and the local area, while also sharing information in a timely and inclusive manner.

EirGrid's Public Engagement Strategy outlines how we develop relationships on-the-ground and get feedback on projects before they start so that we can achieve better outcomes for all.

As part of our approach, we use a consistent, six-step process to explore options and make decisions. This means we follow the same steps for every project. The decision-making tools we use, and the amount of engagement we carry out at each step, depends on the scale and complexity of each project. Engagement with the public, local communities and landowners typically takes place during steps 3 and 4, and again at steps 5 and 6 via our Community Benefit Fund scheme which is how EirGrid gives back to the communities that are impacted by our work.

In 2024, EirGrid awarded a total of €992,437 to a total of 43 community projects in Laois, Kilkenny and East Cork. Funding is divided into three streams to support projects across the following themes: community, sustainability and biodiversity.

Our Community Forums are integral to the designing of our community benefit strategy for each new project and play a key role in identifying the needs of the area. The scheme helps communities transform their area and become more sustainable, with opportunities to support local community energy initiatives, town and village enhancement and biodiversity projects.

Statutory and European engagement

EirGrid engages in active and ongoing consultation with Government and regulatory authorities on key policies and strategic issues as required by legislation. This is done through formal correspondence, bilateral engagement and participation in working groups, taskforces and meetings. EirGrid also actively engages with the UK and across continental Europe with bodies such as the ENTSO-E and the Ostend Forum as well as The North Seas Energy Cooperation (NSEC) and the International Energy Agency (IEA).

Effective stakeholder engagement is critical for enabling EirGrid's continued alignment at a Government and regulatory level, as well as at a European level, to support continued progress towards our shared climate ambitions. In practice, developing and operating a net-zero emissions system will entail significant stakeholder engagement with Government departments, SEAI, GNI and academia to determine the generation, storage and supply of renewable energy sources such as green hydrogen.

In addition to the above, we are also heavily engaged with other TSOs across Europe, not only for interconnection purposes but also for sharing insights and fostering innovation.

Mapping our stakeholders

We believe that identifying our stakeholders is a dynamic activity we must complete regularly to capture the constant changes that occur in the energy ecosystem. Recognising stakeholder's changing needs, demands and interests, allows us to improve our engagements by tailoring the activities to address specific stakeholder requirements. To promote inclusivity, we perform this mapping exercise at a granular level, which ensures we capture all our stakeholders.

The stakeholders that we engage with most frequently are listed in EirGrid's 2024 Stakeholder Engagement Report.

The Stakeholder Wheel exemplifies the range of stakeholders EirGrid engages with across society, industry and statutory bodies.

Figure 11: EirGrid Stakeholder Wheel

The Networks Stakeholder Engagement (NSEE) Panel

EirGrid's performance (as Ireland's TSO) in relation to the PR5 Stakeholder Engagement Incentive is assessed annually by the NSEE Panel, which is convened by our regulator, the CRU. The panel is composed of representatives from industry, academia and wider stakeholders and is tasked with assessing the quality, implementation and effectiveness of EirGrid's stakeholder engagement strategy on an annual basis. The NSEE Panel's feedback and recommendations are key considerations as we continue to build on and strengthen our stakeholder engagement strategy and activities.

In 2024, EirGrid was awarded a score of 6.9 out of a possible 10 by the NSEE Panel for its stakeholder engagement activities in 2024.

Improving our engagement

In 2024, EirGrid greatly enhanced our stakeholder engagement documentation in response to NSEE panel feedback. Our enhanced approach includes:

- A much stronger focus on our strategy for engagement as well as our planned outcomes.
- Metrics for each area - which we've captured as part of our NSEE 2024 report.
- We also ensured earlier publication of our 2025 Stakeholder Engagement Plan and respective Consultation Response Document which were both published before the end of the year (19th December 2024 - in response to NSEE 2022 Panel Close Out Report panel feedback).

In recognition of our work, the consultation responses to EirGrid's 2025 Stakeholder Engagement Plan and 2024 Stakeholder Engagement Report readily acknowledged our considerable efforts to revitalise EirGrid's stakeholder engagement documentation, and we're delighted with the support and positive feedback received to date.

EirGrid has also maintained a strong focus on the initiatives highlighted in the panel's CRU202319 2022 Close Out Report (published November 2023) which are highlighted in EirGrid's Stakeholder Engagement 2024 Report and 2025 Plan.

17.2 ESB Networks stakeholder engagement

As Transmission Asset Owner, ESB Networks is committed to working closely with EirGrid, the CRU, the electricity industry, customers, stakeholders and society to ensure that the electricity network can support national policy objectives and enable Ireland's clean electric future.

Stakeholder engagement is essential for the successful management of our business and is led from the top by the Senior Leadership Team. It is integral to our day-to-day operations and a fundamental enabler of our strategy.

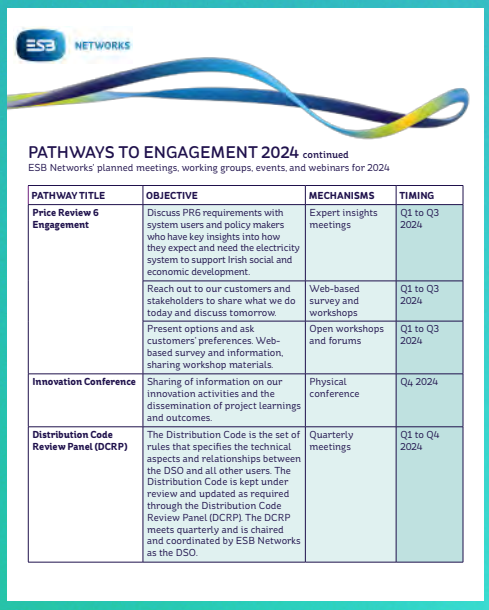
Our stakeholder engagement programme provides key insights that help us to shape the future of our business and the development of the electricity network. It allows us to track changing priorities, tap into specialist or local knowledge and gives us the opportunity to 'road-test' proposals or initiatives with stakeholders. It also helps us to identify emerging issues and risks and enhance our services to electricity customers.

For our customers and stakeholders, engagement provides opportunities to contribute to projects and programmes, have their issues heard and inform the decision-making process. It gives these groups better understanding of our priorities, increased ownership of outcomes and greater capacity to engage in how energy will be used in the future.

Given the pace of change in the electricity sector, we tailor our engagement approach to meet the needs of a dynamic and diverse stakeholder base. We continually review and improve our engagement methodology and benchmark our systems and processes against international best-in-class practice in this field.

Our stakeholder engagement strategy and plans are published on an annual basis and contain our proposed engagement priorities, activities for the year ahead and channels of engagement.

Figure 12: Stakeholder Engagement Strategy 2024



PATHWAYS TO ENGAGEMENT 2024 continued

ESB Networks' planned meetings, working groups, events, and webinars for 2024

PATHWAY TITLE	OBJECTIVE	MECHANISMS	TIMING
Price Review 6 Engagement	Discuss PR6 requirements with system users and policy makers who have key insights into how they expect and need the electricity system to support Irish social and economic development.	Expert insights meetings	Q1 to Q3 2024
	Reach out to our customers and stakeholders to share what we do today and discuss tomorrow.	Web-based survey and workshops	Q1 to Q3 2024
	Present options and ask customers' preferences. Web-based survey and information, sharing workshop materials.	Open workshops and forums	Q1 to Q3 2024
Innovation Conference	Sharing of information on our innovation activities and the dissemination of project learnings and outcomes.	Physical conference	Q4 2024
Distribution Code Review Panel (DCRP)	The Distribution Code is the set of rules that specifies the technical aspects and relationships between the DSO and all other users. The Distribution Code is kept under review and updated as required through the Distribution Code Review Panel (DCRP). The DCRP meets quarterly and is chaired and coordinated by ESB Networks as the DSO.	Quarterly meetings	Q1 to Q4 2024

Figure 13 : Pathways to Engagement Plan 2024

17.3 Our Strategy

Our stakeholder engagement programme directly supports the objectives set out in our Networks for Net Zero Strategy (launched in January 2023). During 2024, a key focus was on the development and publication of our PR6 Business Plan, which sets out our proposed investments in the network from 2026 to 2030.

Networks for Net Zero Strategy outlines ESB Networks' role in facilitating the implementation of key national policy objectives, including housing, economic growth and climate action. It sets out our ambition to deliver a net zero ready electricity network by 2040 to enable Ireland to reach its legally binding target to achieve net zero by 2050. The transition to a net zero future will not be achieved without ongoing active customer and stakeholder collaboration, engagement, and support

ESB Networks has identified three strategic objectives, which are core to delivering a reliable, resilient, net zero energy system for Ireland. Our engagement programme is aligned with these objectives, and responsive to the needs of Government, the CRU, and our wider stakeholder base at a time of immense change in our industry.

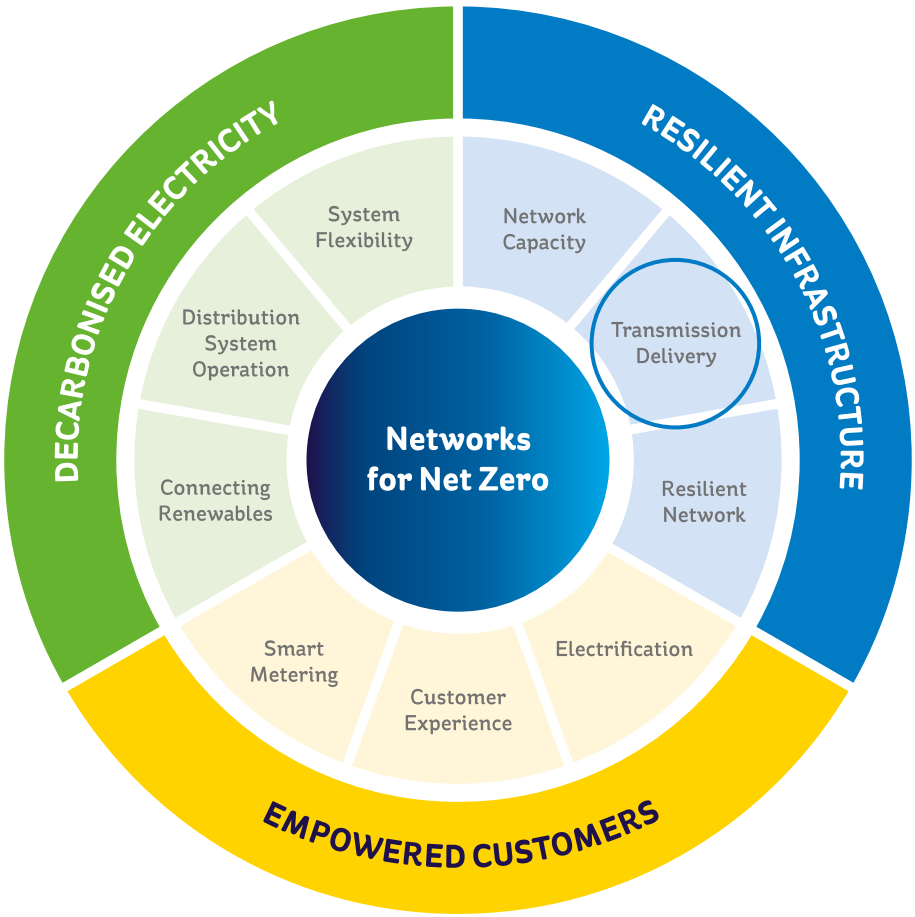


Figure 14: Networks for Net Zero Strategy - Transmission Delivery

Transmission Delivery

ESB Networks is the licenced onshore transmission asset owner (TAO) in Ireland. As TAO, ESB Networks is responsible for building and maintaining the transmission network according to the capital and operational investment plans and policy decisions advised by EirGrid, the TSO. Network assets are constructed by ESB Networks and ESB Networks must maintain these assets in line with maintenance policies set out by the TSO. The transmission network is critical to ensuring a safe, secure, and reliable supply of electricity to all electricity customers in Ireland in real time.

TAO Engagement highlights 2024

Stakeholder engagement throughout 2024 supported the key actions that we set out in our Networks for Net Zero Strategy to deliver the transmission network needed for Ireland's clean electric future. Some key achievements supported by transmission related stakeholder engagements in 2024 include: EirGrid/ESB Networks' JOTP, a multi-year programme to minimise outage requirements, increase outage availability, maximise outage utilisation and improve the efficiencies of outages.

ESB Networks' outage co-ordination team worked extensively with their EirGrid counterparts to develop actions to improve how we co-ordinate work and outages on the transmission system. EirGrid/ESB Networks worked closely with one another during 2024 to develop and agree the proposed TAO/TSO PR6 investment framework for PR6. This supports EU and national policy targets and addresses the strategic outcomes outlined in the CRU PR6 Strategy Paper. The framework includes eight investment portfolio categories and comprises delivery of approx. 231 projects within the price review period plus development work on a further 138. ESB Networks and EirGrid worked together to develop an engagement process for pipeline projects established with EirGrid. Three-way, EirGrid, customer and ESB Networks engagements took place quarterly in 2024 with key industry bodies (WEI, ISEA, ESI and SEAI) to ensure processes were understood and developed to enable achievement of CAP deliverables. Through early engagement with developers of renewable generation projects, ESB Networks offered a free initial assessment of potential grid connection options, allowing customers to make a better-informed decisions regarding their participation in the Enduring Connection Policy (ECP) process. ESB Networks participated in the National Planning Forum to support the new Planning Act with the formation of national guidelines to support ESB Networks and the electricity industry.

ESB Networks issued formal responses to twenty-two externally led stakeholder consultations in 2024. Comprehensive responses were submitted to DCEE, CRU and EirGrid-led consultations, amongst others, providing a constructive basis for further engagement with all stakeholders.

- ESB Networks continued to engage with customers and stakeholders to support the ECP 2.4 process to optimise connection offers.
- ESB Networks continued to work closely with the TSO, EirGrid, to develop and refine collaboration structures, hold one another to account and ensure that the transmission network is safe, secure, and reliable. This also allows us to jointly assess and address any challenges arising and meet the requirements and expectations of CRU, customers and other stakeholders, to deliver on the climate action targets.

Continued engagement is of vital importance and both organisations are committed to working together to meet our strategic objectives and to making the country's goal of net zero by 2050 a reality.

18. How we monitor expenditure against PR5 allowances

Every five years the CRU determines the revenue price control for EirGrid and ESB Networks as TSO and TAO for the following five-year period. The price control sets out the amount of revenues the companies are allowed to recover through tariffs. The allowances are designed to ensure that we, both EirGrid and ESB Networks, have adequate revenues to carry out our activities as TSO and TAO respectively while delivering value for all our stakeholders.

In the interest of delivering value to our customers more efficiently, the current PR5 places more emphasis on the results of the network companies' work, while building in agility to adapt to the changing needs of the system.

Within the price control periods there is an opportunity each year for the companies to submit adjustments in advance of tariffs being set. This is to make sure that the most up to date information is used. The CRU publishes updated information on the approved revenues on an annual basis.

After each year, EirGrid and ESB Networks carry out a review of what was required to carry out our functions. Updates would include any changes to costs outside of our direct control, updates for inflation rates and incentive payments. We also look back on the previous year and compare the amount the CRU approved to be recovered against the amount that was recovered through the tariffs in that year. Any under or over recovery of monies against those approved by the CRU is fed into future tariffs. This is done using the k factor mechanism.

The k factor captures the difference between what was required by the TSO and TAO to carry out their responsibilities and what was recovered through the tariffs. This figure is then included as a line item in the following year's tariffs. If there was an over-recovery, meaning that the amount recovered was more than required, this figure is taken off the next year's revenue allowance. Likewise, if there is an under-recovery this figure is added to the next year's revenue allowance.

Please see below tables setting out the TAO and TSO's k factors for 2024, which are included in the 2026 revenue allowance.

The Agile Investment Framework (AIF) is one of the main components of the delivery phase of PR5. The AIF comprises of mechanisms to allow access to additional revenues in response to the changing needs of the electricity system.

The mechanisms relevant to the TSO and TAO include:

- Uncertainty Mechanism – requests for additional revenue arising from newly identified system requirements;
- Capex Adjustment Mechanism retained from Price Review Four (PR4) and allows the TSO and TAO to request adjustments to the overall infrastructure development capital allowance;
- Innovation and Research and Development Mechanism; and
- The TSO Monitoring Committee (TMC).

The TMC was officially established in February 2024 and EirGrid facilitated meetings of the TMC throughout the year.

Please note that the tables below will be updated following the CRU's publication of the Electricity Transmission Network Allowed Revenues for 2026 and Demand Transmission Use of System (D-TUoS) Tariffs 2025/26 information paper.

Table 27: TAO 2024 allowed outturn and resulting k-factor			
	PR5 allowance for 2024 (ex-ante) €m	CRU outturn allowance (ex-post) €m	2024 adjustments €m
Pass through/external costs			
CRU regulatory levy			
Local authority rates			
Uncertain costs: non-capitalised			
Additional use of system (AUoS)	–		
PR5 audit costs	–		
Incentives	–		
Inflation correction			
Uncertain costs: capitalised			
Depreciation	–		
Return	–		
Total K-factor adjustment (before interest) in 2024 prices			
Total K-factor (after interest) in 2024 prices			

Table 28: TSO 2024 allowed outturn and resulting k-factor		
	CRU Tariff decision for 2024 revenues €m	CRU approved updated actual costs of 2024 €m
External Costs		
Inter TSO compensation		
CRU levy		
CORESO subscription		
Interconnector services		
DUoS costs		
Ancillary services		
DS3 System Services		
EWIC TUoS entitlement		
Dublin Security of Supply		
TAO payment (€m)		
Rolling Retention		
Allowed TSO Operating Revenue		
Internal costs		
Depreciation (€m)		
Return on Stage 1 working capital (€m)		
Return on other working capital (€m)		
Return on fixed assets in the RAB (€m)		

	CRU Tariff decision for 2024 revenues €m	CRU approved updated actual costs of 2024 €m
Approved adjustments		
PR4 adjustment		
Strategic projects side-RAB (2019 Adjustment) updated – Celtic		
Celtic - debt service and liquidity costs		
Adjustments GoO		
Adjustments constraints bank fee		
Land Acquisition		
Offshore		
Greenlink readiness - Depr & Rtn		
Abandoned projects/unrecovered Stage 1 Costs		
Security of Supply costs - expedited return to service costs		
TSO market system release capital		

Incentives		
2024 Incentive allowance		
K-factor Y-3		
Total (2024 Prices)		
Total CRU approved updated actual costs of 2024 (2024 prices)		
TUoS collected in 2024 (2024 prices)		
Total k-factor adjustment in 2024 prices		

18.1 Network development costs

As part of the revenue price control for PR5 the CRU sets a revenue envelope to cover the development of the national transmission grid. This is referred to as network CapEx under which EirGrid and ESB Networks carry out their capital works programme over a five-year period. This envelope can be adjusted, if necessary, during the five years to allow for the changing needs of grid development. The costs associated with development of the national transmission grid are recovered over a 50-year period consistent with the expected network asset life.

Funding arrangements for the construction of the national transmission grid (network capital works) are the responsibility of ESB Networks. Costs incurred by EirGrid as part of the development of network capital works are ultimately recovered by EirGrid from ESB Networks.

The total TSO and TAO network capex allowance for the PR5 period was determined by the CRU in the PR5 Final Determination, CRU/20/152, as €1,048m (2019 Prices), of which €210m (2024 prices) was allocated to 2024. Further information on the PR5 final determination can be found here.

The CRU does not approve individual projects. The CRU monitors our actual spend against the overall envelope, with the monies identified by the CRU being provided via the regulated Use of System Tariffs on an annual basis. EirGrid and ESB Networks jointly submit detailed reports to the CRU annually on our network expenditure as required under the enhanced PR5 reporting arrangements.

The PR5 programme evolved in 2024 as projects were completed, progressed, added, rescheduled or removed. The total regulatory spend on transmission capital projects for 2024 was €221m, a decrease of €14m when compared with 2023. The variance of 2024 outturn versus the 2024 allowance in the PR5 determination was €11m (expressed in nominal 2024 money).

It is anticipated that the Network Capex delivery on major projects, and therefore the spending trend, will ramp up significantly in 2025. This is in line with EirGrid's Q4-2024 Network Delivery Portfolio[62] forecast for the remaining year of PR5, which predicts an increased joint delivery of PAs and EIs.

Expenditure in relation to the network is covered in more detail in our IPD Report 2024.

The annual investment by ESB Networks in new or refurbished transmission assets is known as Capital Expenditure and is shown in Table 29.

This capital investment less the annual depreciation of the asset gives the net value of the transmission assets also known as the Regulated Asset Base (RAB) shown in Table 30.

Day to day expenditure not related to building assets are referred to as Operating Expenditure or Opex. The TAO Opex is shown in Table 31.

62 Network Delivery Portfolio Publication Q4 2024

Table 29: TAO capital expenditure (nominal)				
	PR5			
	2021 €m	2022 €m	2023 €m	2024 €m
Gross capital expenditure	182	204	258	245
Customer contributions	(37)	(28)	(23)	(24)
Total regulatory spend	**145**	**176**	**235**	**221**

Table 30: TAO Regulated Asset Base (RAB) (nominal)				
	PR5			
	2021 €m	2022 €m	2023 €m	2024 €m
Closing net book value	2,663	2,713	3,272	3,432

Table 31: TAO operating expenditure (nominal)				
	PR5			
	2021 €m	2022 €m	2023 €m	2024 €m
Transmission operations	3	3	3.6	3.3
Planned & fault maintenance	18	23	26	27.5
Asset management	1	1	0.1	0.1
Non-controllable costs	33	29	32	33.4
Controllable costs	14	12	9.6	13.2
Total	**69**	**68**	**71.3**	**77.5**

19. How we ensure safety

19.1 EirGrid Health and Safety

EirGrid is committed to achieving and maintaining the highest standards of health, safety and welfare for all of its staff and for any other persons who may be affected by our activities, and to the protection of the environment.

EirGrid health & safety management system

EirGrid operates a Health, Safety & Environmental (HS&E) Management System based on the requirements of the International Occupational Health & Safety Standard: ISO45001:2018. Our HS&E Management System enables us to consider various risks associated with our activities, to staff and others who may be affected by these activities, and those to the environment; and to place these risks in the context of any relevant legal or other requirements, thereby ensuring that preventative and control measures are adequate and meet best practice standards.

EirGrid aims to ensure that all operations and activities are carried out at all times in such a manner as to minimise the health, safety and welfare risks to workers and others who may be affected by our activities. EirGrid are committed to ensuring compliance with statutory and TSO licence requirements which are associated with its business.

2024 health and safety update

EirGrid maintained safe Management Controls in relation to Health & Safety which was successfully achieved. The proactive monitoring (audits and inspections) continued to provide opportunities to improve the system and overall HS&E performance.

A major milestone during this period was the successful recertification for ISO45001 accreditation and our EirGrid TSO technical and safety audit with zero non-conformances identified on all external audit reports.

2024 health and safety initiatives

Developments of note in 2024 included:

- Successfully completed recertification audit for ISO Health & Safety 45001 / 14001 Environment accreditation standards with no findings.
- Health and Safety strategic partner ensured that EirGrid continually had access to up-to-date professional skills and capability in this area of expertise.
- Legal Compliance registers were updated with the latest legislation requirements for all jurisdictions for EirGrid.
- Construction stage of the Celtic project involved civil contractors appointed for both the convertor station and the onshore cable contract with system audits completed in relation to the construction regulations 2013.
- Regular ESB Networks / EirGrid executive meetings took place together with quarterly H&S meetings to discuss operational issues for the purposes of information sharing and H&S collaboration.
- A new training platform was rolled out in 2024 to manage all training certification and facilitate Health & Safety onboarding across EirGrid.

Electric and Magnetic Fields (EMFs)

Electric and Magnetic Fields are produced when electric current flows. EMFs are created from electrical appliances and power lines which produce extremely low frequency in the electro – magnetic spectrum. Following research, measurement and monitoring the consensus from health and regulatory authorities is EMFs do not present a health risk. However, some people have genuine concerns about the EMFs found near electricity lines and cables. Information on the EirGrid website here explains the facts about EMFs, based on current information from health and scientific agencies.

19.2 ESB Networks' safety

The safety, health and wellbeing of our staff and contractors as well as the communities and customers we serve, continues to be a core strategic priority and area of focus. Our Safety Strategy sets out our strategic intent and commitment to how we keep our network safe. It outlines how we raise awareness about the importance of safety, health and wellbeing among our staff and contractors, as well as the dangers of coming into contact with, or being in close proximity to, our electricity networks and equipment for the general public. In 2024, we continued to make improvements across the key areas of safety compliance, engagement, communications, safety culture transformation, road safety and public safety, while all the time ensuring the provision of essential services to the communities we serve.

External validation of safety management system

In keeping with our aim to continuously improve and develop our capability and performance levels in safety, health and wellbeing, ESB Networks successfully retained its certification to the international ISO 45001 Occupational Health and Safety Management System standard in 2024. ESB Networks was also found to be in compliance with the public safety conditions set out the in the Distribution System Owner, Distribution System Operator and Transmission System Owner licences issued by the CRU. The National Standards Authority of Ireland (NSAI) recognised the continued effort and commitment that is required to continuously drive safety improvements.

Safe & Sound – Safety Culture Transformation Programme

During 2024, through our internal 'Safe & Sound' programme we continued with our commitment to creating and embedding a positive, proactive and engaging workplace safety culture where safety, health and wellbeing is at the centre of everything we do. Safe & Sound is an employee-centred safety culture transformation programme based on changing attitudes and perceptions to safety, health and wellbeing. The objective of the programme is to build and embed a world class values-based safety culture that is sustainable over time, where people speak up, challenge unsafe practices, and take responsibility for their own safety and the safety of others.

A key structure in the Safe & Sound culture transformation programme is our local and regional Safe & Sound Leadership Teams. These teams are comprised of a cross-section of the local team who are interested in taking on complex safety culture challenges and developing our culture. ESB Networks has approximately 40 of these safety culture teams operating at local, regional, functional and senior management levels. The teams drive and embed safety culture improvement at a local level and are the backbone to safety culture transformation in the business.

Throughout 2024 a key focus was on how we learn from information that our people provide, whether this be from Good Catch and Near Miss reporting, analysing incidents or creating engaging team meetings where people feel that they can openly and honestly share. Based on feedback from our people our processes of team briefings, investigating and sharing learning, and engagement around reporting have been revised and improved.

It is important in any safety culture journey to periodically assess and reflect on progress, and towards the end of 2024 we began a safety culture review. This takes the form of a standardised safety culture survey along with focus groups to gather qualitative data. The review will inform our next steps in Safety, Health & Wellbeing in the organisation.

Competence and assurance

In line with our commitment to the safety of staff, contractors and the public and to ensure compliance with standards, the Competence & Assurance team continued to carry out independent audits across key risk areas for ESB Networks. The main strands of audit focus delivered by the team are:

- Safe Behaviour Assessments
- Competence Assessments

We have seen a significant level of conformance across all of the focus areas year-on-year. A key driver of this improvement is the use of feedback and coaching style audits by the Competence & Assurance team when interacting with ESB Networks front line staff and approved contractors.

Critical safety processes

We continued to implement critical public safety interventions by serving 'Notifications to Stop Work' where ESB Networks staff became aware of unsafe work near electricity networks of all voltages up to an including transmission assets. A Mobile App for 'stop work notices' has been embedded in the business and allows staff to easily log these proactive safety interventions and to indicate if the Health and Safety Authority (H.S.A.) should be notified where appropriate.

The 'Dial Before You Dig' service provided maps of the overhead and electricity networks to construction companies to support compliance with H.S.A. approved Codes of Practice in relation to electricity.

Public education and awareness

Our customers are at the heart of everything we do, and we continue to strive to ensure their safety and the safety of those who work on, or may come in close contact with, the electricity network. Increasing awareness of electrical safety risks is essential, and safety education and awareness programmes continue to be a strategic objective of our public safety activities.

In 2024, we continued to implement our Public Safety Strategy (2021 – 2025), which is anchored in the core purpose of our business and continues to be a core strategic priority and area of focus for ESB Networks.

We re-ran our Safety campaign, 'Are You Sure It's Safe' to continue on the momentum of our safety message. The simple and clear campaign messaging of 'Are You Sure It's Safe?' and 'Stay Safe, Stay Clear' helps to encourage the public to stop and think of the danger when they are close to the electricity network. This campaign has continued to resonate with our key at risk groups since its creation in 2016.

In 2024, our safety advert ran across TV, video-on-demand, radio, digital audio, social media, display, and paid search. English and Irish creative was used across majority of platforms. Our campaign includes four key risk scenarios:

- builders using scaffolding near overhead wires.
- people using drones near overhead wires.
- people hanging flags and bunting on electricity poles; and
- a generic fallen wires message.

Awareness figures for the campaign remained high. From our research, the awareness level of the campaign averaged 87% in 2024.

ESB Networks' social media channels continued to target key at-risk audiences, with always on safety messaging targeting our key ‘at risk’ sectors (i.e. farming, construction, general public, schools).

ESB Networks promotes educational resources on safety in primary schools nationally. The 'Stay Safe, Stay Clear' primary school competition calls for primary school children to create posters with electricity safety tips. This competition helps to educate primary school children about how to stay safe when they are playing outdoors near electricity poles and overhead wires. We’ve received great engagement with the competition to date. In 2024, a total of 1,794 entries were received from 104 primary schools. These schools were located across 23 counties, providing an excellent geographical spread of engagement.

In 2024, an interactive game was created for school visits, e.g. with HSA to teach children safety tips.

We issued several press releases on topics such as storm safety and fallen wires, winter safety, and working near electricity wires. This provided an opportunity to engage with large audiences through both national and local radio. We provide more detail on sector specific initiatives relating to farm, construction and local authorities, state agencies and emergency services below.

As part of the ESB Networks Sitefinity website upgrade project, we updated the safety section on the ESB Networks website to enhance the user experience and make content accessible to all users.

Farm safety

In 2024, through our partnership with the Irish Farmers Journal, we ran six full page adverts / advertorials which were issued to both their online and offline readers. Our informative videos issued during Farm Safety Week 2024, along with ESB Networks own social media channels continued to extend our reach among the Irish farming community. For example, our May-July digital advertising campaign delivered over 350,000 digital impressions with an average click-through-rate of 0.13%. Our display campaign with Agriland resulted in over 2.5 million impressions. Our ‘Safe Family Farms’ partnership with the Irish Farmers Journal continued into its tenth year.

In 2024, to raise awareness of electrical safety on farms, we made further additions to the library of general farm safety videos, regular safety pages and created full-page public safety advertorials. We delivered safety talks to Teagasc colleges and University College Dublin's Agriculture and Food Science School as part of the 'Champions for Safety' initiative, in association with the Health and Safety Authority (HSA) and FBD Insurance. Our sponsorship of the Farming News podcast, which included sponsor name check in intro and outro by host, a 30 second mid roll advert and branding on all print and digital material, resulted in 5,165 listeners. We sponsored fifteen productions of Farm Tech Talk. Michael Murray, Public Safety Manager, was featured as an ESB Networks representative in four episodes, which had 6,211 listens and 8,881 watches.

Construction Safety

Our partnership with the CIF resulted in a strong focus on electricity for 'Construction Safety Month 2024', with electricity recognised and promoted as one of the five key construction risks via a webinar discussion. This panel discussion was chaired by our partners in CIF, with contributors from other CIF member bodies and utility providers. In 2024, we were also featured in the Construction Management Ireland Yearbook and CIF Construction Magazine.

Local Authorities, State Agencies and Emergency Services

Electrical awareness sessions were delivered to front line operational staff and contracting partners of Uisce Eireann and various local authorities during 2024. In addition to this, the ESB Networks' Training Centre hosted electrical appreciation sessions with the Uisce Eireann and the Health & Safety Authority in order to raise their awareness levels associated with the hazards and risk of working close to the electricity network.

During 2024, electrical safety sessions were also held with all OPW outdoor staff and an e-learning module on electrical safety was developed in collaboration with Coillte for onward delivery to their timber harvesting contracting partners.

As part of our commitment to engaging with the emergency services sector, we delivered awareness training to approximately 30 newly appointed Fire Service Incident Commanders at national training events in Sligo and Bray, as well as attending other local training event. ESB Networks continued to participate in the An Garda Síochána-led metal theft forum, which met during the year to share information and coordinate responses to break-ins and metal theft. Our staff continued to provide an excellent emergency response service in all situations, including major storms, emergency calls from the public and from the other emergency services.

20. How we manage our environmental footprint

20.1 Minimising EirGrids impact on the environment

EirGrid was one of the first semi-state bodies to have our carbon footprint assessment and targets for reduction validated by the Science Based Targets (SBTs) initiative in March 2022. SBTs provide a clearly defined pathway for companies to reduce greenhouse gas (GHG) emissions, helping prevent the worst impacts of climate change and facilitate sustainable business growth.

Our SBTs are as follows:

- EirGrid Group commits to reduce absolute scope 1 and 2 GHG emissions 50% by 2030 from a 2019 base year.
- EirGrid Group also commits to reduce scope 3 GHG emissions from dispatch balancing services by 35% per MWh of overall system demand within the same timeframe.
- EirGrid Group further commits to reduce all other absolute scope 3 GHG emissions 30% by 2030 from a 2019 base year.

EirGrid Group has also committed to the following public sector 2030 carbon targets:

- 50% energy efficiency improvement compared to 2009.
- 51% absolute emissions reduction compared to 2016-2018 baseline.
- 51% Fossil emissions reduction compared to 2016-2018 baseline.

Scope 1, 2 and 3 categories include direct and indirect emissions namely mobile combustion, stationary combustion, fugitive emissions, purchased electricity and heating, business travel, employee commuting, purchased goods & services, capital goods, fuel and energy related activities and waste.

Further detail on EirGrid's progress against the targets set out above are included in the EirGrid Annual Report 2024[63]

Electricity consumption at our offices drives the vast majority of the emissions in Scope 1 and 2 – whilst we have made some modest improvements due to energy efficiency measures in our offices, our overall consumption remains broadly similar. In 2024, EirGrid consumed 2,742.88 MWh of electricity and 445.78 and 113.61 MWh of purchased gas and direct gas, respectively, in our four offices plus EWIC sites.

63 Annual Report 2024

Throughout 2024, EirGrid continued to support the Business in the Community Ireland's Low Carbon Pledge, committing to reducing Scope 1 and Scope 2 emissions and the monitoring and measuring of Scope 3 emissions. As a signatory of this pledge, we have committed to a collective platform to track the journey towards emissions reduction.

Following a successful recertification process in 2024, EirGrid Group was re-accredited with the Business Working Responsibly (BWR) Mark by Business in the Community Ireland. The BWR Mark is an independently audited standard for Corporate Social Responsibility in Ireland, certifying excellence in responsible and sustainable business practices. Our recertification of the Mark further evidences our primary goal and notes our position amongst leading companies committed to sustainability.

EirGrid has committed to reporting annually on our performance against each pillar outlined in our sustainability strategy, including performance against our Science Based Targets. In March 2023, EirGrid made its first submissions to the NewERA Commercial Semi State Bodies Climate Action Framework and continue to do so on an annual basis. This framework outlines our progress in relation to the following commitments:

- Commitment 1: Governance of Climate Action Objectives
- Commitment 2: Emission Measurement and Reduction Target
- Commitment 3: Emissions Valuation in Investment Appraisal
- Commitment 4: Circular Economy and Green Procurement
- Commitment 5: Climate-Related Disclosures

In 2024, we continued our preparation to align our sustainability reporting with the EU Corporate Sustainability Reporting Directive (CSRD). Due to recent developments of the Omnibus Proposal[64], EirGrid will now be required to report under this directive on FY2028. This directive will elevate all areas of our Sustainability Programme, under the pillars of Environmental, Social and Governance.

In 2024, we also continued our financial support for the Friends of the Earth 'Our Energy Future' campaign. This project seeks to facilitate inclusive discussions and reflections with communities, civil society organisations, local groups, and other stakeholders.

64 Omnibus package - European Commission

We recognise that we have a responsibility to demonstrate sound environmental management and promote sustainability. We have in place a programme to manage our environmental impacts responsibly through setting strategic objectives annually and will endeavour to implement best practice when practicable. We set strategic objectives annually to support the 'Preservation' area of our corporate social responsibility strategy. Our Preservation Pledge is: 'We respect the environment: We strive for best practice in environmental protection when developing the grid. We enable the grid to carry ever-growing amounts of renewable electricity. We carefully manage our own environmental impacts'.

Our commitment is to conduct our activities in an environmentally responsible manner to protect the environment from harm and degradation, prevent pollution, deliver nature restoration and continually improve the management systems performance.

In the context of climate change and the need to de-carbonise the electricity supply, EirGrid is playing a key role in connecting high levels of renewable energy and in developing the electricity grid to connect renewable sources, in line with EU and Government targets. EirGrid is developing the Transmission System with due regard for the environment through sound environmental practices and full compliance with its environmental obligations.

How EirGrid manages its environmental impact when planning the network

Respect for the environment is a key part of the development and operation of the transmission system. Electricity transmission infrastructure (overhead lines, underground cables, substations) interacts with many environmental factors including biodiversity, landscape and cultural heritage.

Our grid implementation plan integrates Ireland's Grid Development Strategy, the latest and approved Transmission Development Plan (TDP) and identifies policies and objectives that guide sustainable grid development and drive nature protection and restoration, onshore and offshore. In accordance with European and National law, we undertake Strategic Environmental Assessments (SEA) of our grid implementation plans every five years and Appropriate Assessment (AA) of projects. This is to ensure that our approach to developing the Grid is sustainable and in line with best environmental practice.

The Grid Implementation Plan 2023-2028 was published in September 2024[65] along with the SEA[66]. This was following an extensive consultation process which included Irish Environmental Authorities for SEA, the general public and a wide range of public authorities, as well as Government departments in Ireland, the UK and France.

65 Grid Implementation Plan 2023-2028.pdf
66 SEA Statement for EirGrid Grid Implementation Plan 2023-2028

Between the five yearly SEAs, an annual Environmental Appraisal Report (EAR) has historically been produced by EirGrid for each TDP. This ensures any new projects in TDPs, not subject to SEA, are consistent with the strategic environmental objectives of the SEA. In 2023 and 2024, there were no EAR produced, given that the TDP 2023 was subjected to an SEA, and the actual adoption of the Grid Implementation Plan was in 2024.

We are now evolving our approach to environmental monitoring and assessment during the 5-year cycle of our grid plans. The EAR process is to be replaced by our SEA Monitoring Methodology, having regard for statutory obligation for plan-makers to monitor plan implementation under the SEA Directive 2001/42/EC.

Our SEA Monitoring approach builds on, and will replace the EAR process.

The input data for first SEA monitoring analyses of the Grid Implementation Plan 2023-2028 will include additional projects in TDPs published since Implementation Plan adoption. We will publish the SEA Monitoring data for the first two years of the Grid IP 2023-2028 plan cycle in 2025. This data will take account of new projects added in the TDP 2024 and TDP 2025 (once published). Significantly, the SEA monitoring data will be accompanied by necessary process improvements, and/or solutions to fill any data gaps.

Further details on the SEA of our Grid Implementation Plans, SEA monitoring and associated documents are published on the EirGrid Group website.

At project level, individual projects are all subject to environmental assessment outside of the SEA process. Some projects fall under a class of development requiring an Environmental Impact Assessment Report (EIAR). In these situations, we submit an Environmental Impact Assessment Report to the relevant planning authority. EirGrid submits a non-statutory Planning & Environmental Considerations Report, where an EIA is not required.

In 2024, we submitted two EIARs to An Bord Pleanála (East Meath-North Dublin and Kildare-Meath Grid Upgrade Projects). Both EIARs required substantial pre-application discussion with the Board, Local Authorities, Transport Infrastructure Ireland (TII), heritage and environmental consultees to ensure the EIARs addressed any concerns the bodies may have and to streamline comments post-submission. A large number of other engagements occurred with these consenting authorities to ensure there was a clear understanding of the need for, and scope of the proposed developments, to determine and agree consenting pathways, and through pre-application engagement (where facilitated) to address any issues identified by those authorities in the scope and content of the subsequent planning applications.

In 2024, EirGrid also attended two meetings of a new forum with the Irish Planning Institute (IPI) to seek alignment on key matters of planning and ecology. EirGrid's Lead Planning Consultant presented to the IPI National Conference focused on sustainable planning, development and delivery of grid infrastructure. Following on from this engagement, EirGrid has agreed to contribute to training events and joint publications with the Chartered Institute of Ecology and Environmental Management (CIEEM) and the IPI to advance compliance and sustainable practices of both organisations.

In line with the organisation's biodiversity commitments, EirGrid advanced key biodiversity initiatives in 2024. Our Grid Implementation Plan 2023-2028, published in 2024, contains 8 policies and 5 objectives committing to biodiversity protection and restoration. As reported in our Annual Report 2024[67], in 2023-24, we delivered No Net Loss of Habitats on 100% of our overhead line uprate projects (whereby we increase the capacity or rating of electrical equipment), and 100% of our station projects. We went further and delivered Net Biodiversity Gain on one our uprate projects, and one of our station projects. We helped mitigate bird collision risk with existing overhead lines by retrofitting 'Bird Flight Diverters' (BFDs) on 28 km of overhead lines spans (to a total of 53.2 km).

This more than triples the length of retrofit as of 2023. EirGrid submitted 2,318 ecological records to the National Biodiversity Data Centre in 2023-24. This more than doubles the number submitted in the previous year. Our work on biodiversity was recognised in 2024 when were a finalist in the Business and Finance Awards' 'Biodiversity Leadership in Business' category.

20.2 Minimising ESB Networks impact on the environment

Minimising our Impact on the Environment

At ESB Networks we are committed to operating our business so that we can be proud of our environmental performance. We recognise that our activities have environmental impacts and that we have a responsibility to manage these impacts in a manner that prevents pollution and provides a high level of protection for the natural environment. ESB Networks' Policy Statement on the Environment is available on our website.

67 Annual Report 2024

Environmental Management System (EMS)

Since 2010, ESB Networks has been using an Environmental Management System (EMS), which has received external certification for compliance with the ISO 14001 Standard. The EMS presents a structure that enables ESB Networks to methodically recognise, evaluate, prioritise, and handle environmental hazards connected with its business activities. The EMS encompasses all of ESB Networks' operations, services, and processes linked with managing the electricity network.

During 2024, ESB Networks' EMS underwent one surveillance audit by an external Certification Body, against the requirements of the ISO 14001:2015 standard. This surveillance audit sampled a large range of activities within the scope of ESB Networks' certification. No major non-conformances were identified by the Auditors during any EMS Audits in 2024. ESB Network EMS continues to be certified in line with ISO 14001:2015.

Managing the environment during construction

A sustainability approach is a key consideration in the design and construction stage of all our projects. This is in line with our commitments to deliver PR5 by 2025 and in keeping with our ESB Networks' Networks for Net Zero Strategy. ESB Networks has remained committed to achieving timely and cost-effective project delivery, despite the demanding landscape of project planning and consenting. To this end, ESB Networks has made continuous improvements and adapted to the challenges of the environment to ensure successful project implementation.

At the planning and design stage for each project, multi-disciplinary technical teams work to develop projects and site-appropriate construction methodologies in order to deliver connections to customers, while protecting sensitive receiving environments. Detailed construction packs, capturing all of the requirements (e.g. planning consents) are provided to our external contractors who are increasingly important to project delivery. Project support through document review processes (e.g., inputs to Construction Environment Management Plans, Traffic Management Plans, Resource Waste Management Plans, etc.) is key to ensuring delivery on planning permission condition requirements. Oversight of construction projects is achieved through the appointment of specialists such as Environmental Coordinators, Project Ecologists, Ecological Clerks of Works, Project Archaeologists, etc.

The Waste Enforcement Regional Lead Authorities (WERLA) oversees enforcement of waste regulations and ensures the appropriate handling of construction and demolition waste at a national level. When requested, ESB Networks provides WERLA with data on their construction undertakings that could produce construction and demolition waste. This information is then passed on by WERLA to waste enforcement officers from Local Authorities throughout the country, who conduct inspections to verify that waste and materials are being properly managed at construction sites. This effort is part of a strategic approach to managing construction and demolition waste in the state.

Enduring environmental monitoring

ESB Networks has a Supervisory Control and Data Acquisition (SCADA) system which is continually monitoring the network. Faults on our system are notified to staff in our 24/7 control room in Leopardstown Road. In 2024, ESB Networks had four Local Authority notifiable leaks totalling 2,436 litres related to the Transmission fluid-filled cables Network.

In 2024, 55.4 kgs of sulphur hexafluoride (SF6) was emitted due to equipment faults on Transmission electrical equipment. SF6 is commonly used in ESB Networks' high voltage switchgear on the Transmission network. It is used because of its very high electrical insulating properties which facilitate efficient and safe operation of the switchgear. Emissions rates for SF6 gas are reported to the Environmental Protection Agency (EPA) on an annual basis in line with Regulation (EC) No 166/2006. There has been a trend of consistent leakage reduction over a number of years, as repair techniques improve, and we replace older equipment.

24/7

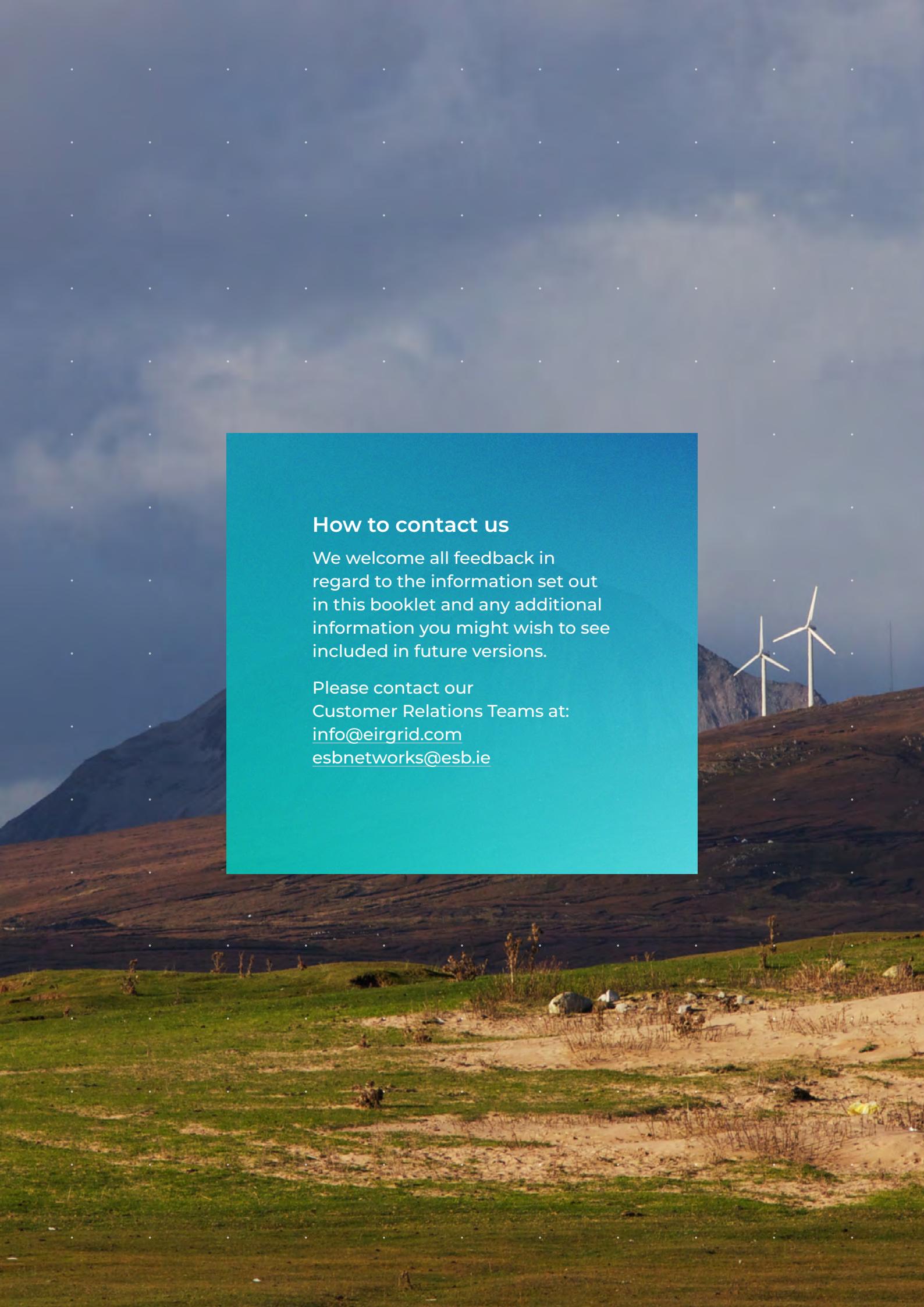
Faults on our system are notified to staff in our 24/7 control room

21. Acronyms

AA	Appropriate Assessment
AIF	Agile Investment Framework
BESS	Battery Energy Storage System
BFDs	Bird Flight Diverters
BPRO	Best Performing Route Option
BWR	Business Working Responsibly
CA	Capital Approval
CAP	Climate Action Plan
CAP23	Climate Action Plan 2023
CapEx	Capital Expenditure
CCMO	Commercial and Contract Management Office
CHP	Combined Heat & Power
CIF	Construction Industry Federation
CMMS	Computerised Maintenance Management System
CPP	Committed Project Parameters
CRU	Commission for Regulation of Utilities
CSRD	EU Corporate Sustainability Reporting Directive
DASSA	Day Ahead System Services Auction
DCEE	Department of Climate, Energy & the Environment
DER	Distributed Energy Resource
DSO	Distribution System Operator
DSU	Demand Side Unit
DTS	Distributed Temperature Sensing
D-TUoS	Demand Transmission Use of System
EAR	Environmental Appraisal Report
EBEG	Evidence Based Environmental Guidelines
ECP	Enduring Connection Policy
EI	Energisations
EIA	Environmental Impact Assessment
EMFs	Electric and Magnetic Fields
EMS	Environmental Management System
ENS	Energy Not Supplied
EPA	Environmental Protection Agency
EPON	Energy Press Officers Network
ESRI	Economic and Social Research Institute
FASS	Future Arrangements for System Services
GB	Great Britain
GHG	Greenhouse Gas
G-PST	Global Power System Transformation
H.S.A.	Health and Safety Authority
HFO	Heavy Fuel Oil
HS&E	Health, Safety & Environmental
HVDC	High Voltage Direct Current
IA	Infrastructure Agreement
IBR	Inverter Based Resource
IPD	Investment, Planning and Delivery
IPI	Irish Planning Institute
JEERT	Joint Energy Emergency Response Team
JOTP	Joint Outage Transformation Programme
JPMO	Joint Programme Management Office
JSOP	Joint System Operator Programme
LEUs	Large Electrical Users
LSoS	Local Security of Supply
KPI	Key Performance Indicator
MARA	Marine Area Regulatory Authority

MEC	Maximum Export Capacity
MUON	Minimum number of conventional units online
MVA	Megavolt Amperes
MW	Megawatt
NDP	Network Delivery Portfolio
NECC	National Emergency Coordination Centre
NECG	National Emergency Coordination Group
NGOs	Non-governmental Organisations
NOFBs	Normal operating frequency bands
NSAI	National Standards Authority Ireland
NSEE	Networks Stakeholder Engagement Evaluation
OECD	Organisation for Economic Co-operation and Development
OLCM	Online Condition Monitoring
OPW	Office of Public Works
ORESS	Offshore Renewable Electricity Support Scheme
P&S	Planning & Scheduling
PA	Project Agreement
PIPs	Project Implementation Plans
PMBOK	Project Management Body of Knowledge
PMIS	Project Management Information System
PMM	Project Management Methodology
PMMO	Project Management Methodology Office
PMO	Project Management Office
PR4	Price Review 4
PR5	Price Review 5
PR6	Price Review 6
PSECP	Power Systems Emergency Communications Plan
PSI	Process, Systems and Information
PUD	Powering Up Dublin
RAB	Regulatory Asset Base
RDD	Renewables Dispatch Down
RES	Renewable Energy Source
RES-E	Renewable Energy Source – Electricity
RESS	Renewable Energy Support Scheme
RoCoF	Rate of Change of Frequency
RTE	Réseau de Transport d'Électricité
SAPs	Sectorial Adaption Plans
SCADA	Supervisory Control and Data Acquisition
SEA	Strategic Environmental Assessments
SEM	Single Electricity Market
SEMO	Single Electricity Market Operator
SF	System Frequency
SF6	Sulphur Hexafluoride
SML	System Minutes Lost
SNOAM	Short Notice Outage Adjustment Mechanism
SNSP	System Non-Synchronous Penetration
SOEF	Shaping Our Electricity Future
SOs	System Operators
STATCOM	Static Synchronous Compensator
TAO	Transmission Asset Owner
TCG	Transmission Constraint Group
TDP	Transmission Development Plan

TEG	Temporary Emergency Generation
TLA	Transmission Line Assessment
TLAFs	Transmission Loss Adjustment Factors
TMC	TSO Monitoring Committee
TOP	Transmission Outage Programme
TOP24	Transmission Outage Programme 2024
TOP25	Transmission Outage Programme 2025
ToR	Terms of Reference
TRL	Technology Readiness Level
TSO	Transmission System Operator
TSSPS	Transmission System Security and Planning Standards
UR	Utility Regulator
WERLA	Waste Enforcement Regional Lead Authorities



How to contact us

We welcome all feedback in regard to the information set out in this booklet and any additional information you might wish to see included in future versions.

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