Investment Planning and Delivery Report **2022**

September 2023

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EirGrid

ESB NETWORKS

Contents

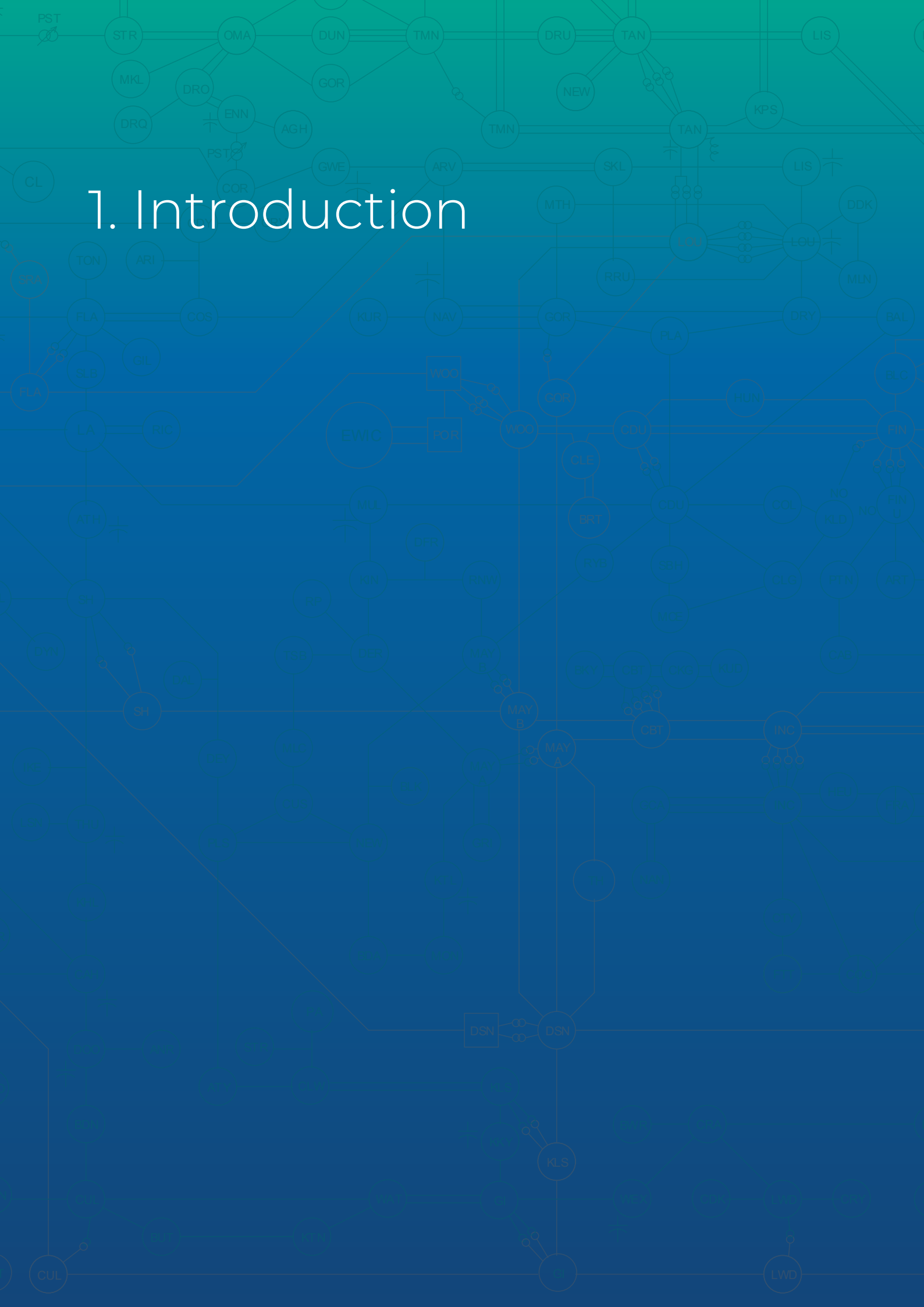
EirGrid and ESB Networks have clearly defined roles and responsibilities in relation to the transmission network, as set out in an Infrastructure Agreement.

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. More recently, EirGrid has been mandated to operate, develop, and own Ireland's offshore 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. Introduction



The Investment Planning and Delivery Report gives stakeholders an overview of EirGrid and ESB Network's annual infrastructure development and delivery progress across the portfolio of transmission projects.

EirGrid and ESB Networks share the Commission for Regulation of Utilities' (CRU's) strategic objectives for the PR5 period (2021-2025) and continue to develop our transmission infrastructure plans to deliver on the ambition of:

- Facilitating a secure low carbon future.
- Resolving local security of supply.
- Increasing efficiency and protecting customers.

This Investment Planning and Delivery (IPD) 2022 report will:

- Provide stakeholders with an overview of the unconstrained transmission Network Delivery Portfolio (NDP) as at the end of calendar year 2022, the second year of the Price Review Five (PR5) period; and
- Advise stakeholders how the development and delivery of grid infrastructure is progressing relative to expectations.

The IPD 2022 report includes an overview of the infrastructure development highlights and benefits delivered in 2022 (section 2), and progress in each of the six steps relative to previous years and with reference to what was expected to be delivered (sections 5-10). The report contains information on how we prioritise projects (section 11) and an overview of stakeholder engagement activities (section 12).

This report forms part of the enhanced PR5 reporting and monitoring requirements outlined in CRU/20/154. We recommend that it is read in conjunction with our Electricity Transmission Performance Report 2022, which contains an overview as to how the transmission system was operated, developed and maintained in 2022 by EirGrid and ESB Networks. We look forward to engaging with our stakeholders further as we continue to deliver on our ambitious 2030 targets.

1.1 Strategy for planning and delivering the grid

EirGrid Group's Strategy[1] is shaped by climate change and the need for a secure, reliable, and sustainable transition of the electricity sector to low-carbon, renewable energy. The Shaping Our Electricity Future[2] initiative takes a whole of system approach and considers transmission network development, public and stakeholder engagement, evolution of system operations and appropriately incentivising electricity markets.

Central to EirGrid's strategy for infrastructure delivery is our six-step approach for grid development.

It sets out how the general public and stakeholders can influence the decisions that EirGrid makes on grid development projects. It is an agile and flexible framework which includes transmission infrastructure projects and programmes of different types and scales.
Projects enter the framework once they are sufficiently developed whilst also taking account of the applicable project need and the project driver. The framework is flexible and enables EirGrid and ESB Networks teams to appropriately combine steps and activities to deliver transmission infrastructure in a timely manner, in accordance with best practice, environmental, social, regulatory and technical requirements.

Progress during 2022 on each of the above steps is outlined in Section 4 of this report.

Step 1

How do we identify the future needs of the electricity grid?

Step 2

What technologies can meet these needs?

Step 3

What's the best option and what area may be affected?

Step 4

Where exactly should we build?

Step 5

The planning process

Step 6

Construction, energisation and benefit sharing

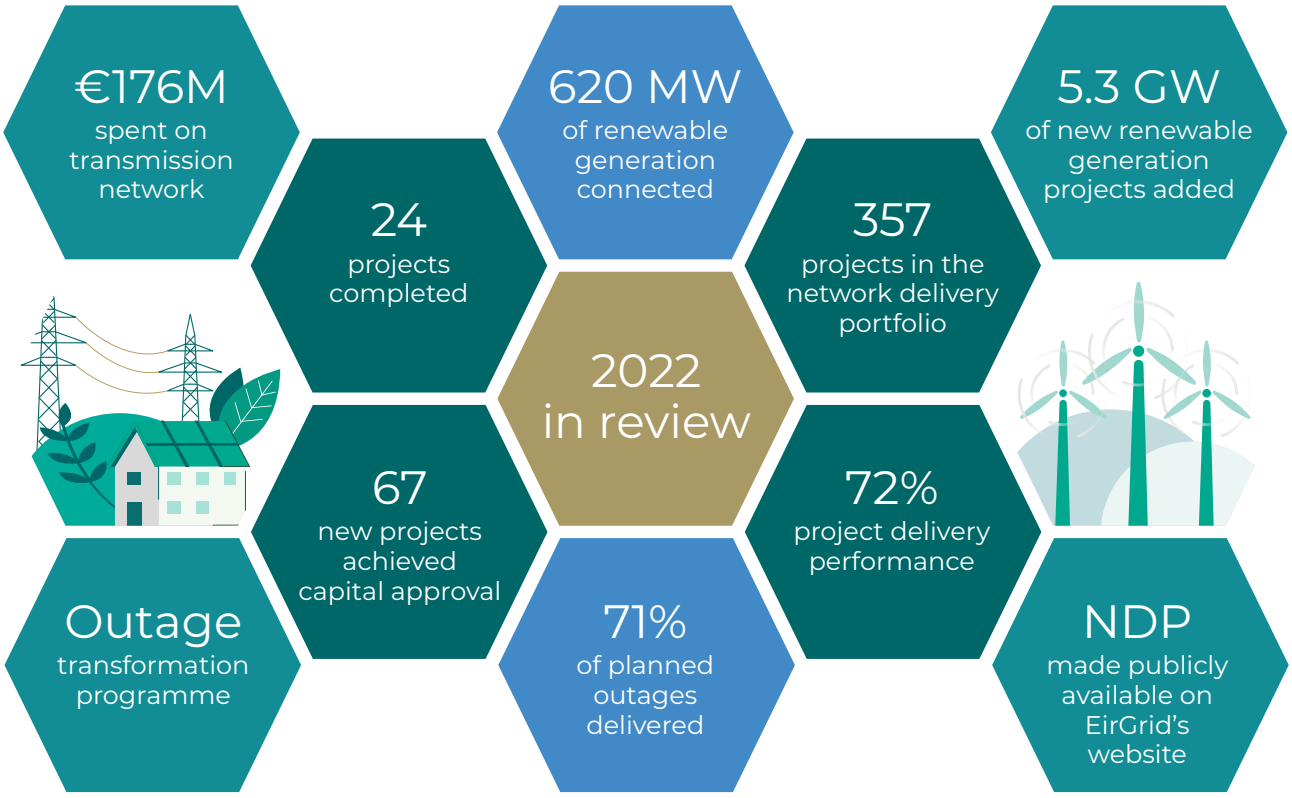
1 https://www.https://www.eirgrid.ie/about-us/our-strategy-2020-2025
2 https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping_Our_Electricity_Future_Roadmap.pdf

2. Transmission development highlights 2022

EirGrid manages a complex programme of transmission capital projects at various stages of development. ESB Networks has responsibility for efficiently and safely managing the delivery of these projects, including aspects such as procurement and construction. Projects are planned and delivered in line with the needs identified by EirGrid and the jointly agreed work programmes.

The successful rollout of an upgraded electricity network is a key requirement in achieving the ambitious Climate Action Plan 2023[3] targets and maintaining a safe and secure transmission system. Summarised below are the highlights in Transmission Development for 2022.

EirGrid's average project delivery outturn performance in 2022 is an acceptable performance, achieving 72% of key project milestones delivered in line or ahead of plan. This is an assessment of the quantity of capital approvals and project agreements achieved within the calendar year, and the quantity of energisations achieved within PR5 to date, against the quantity of these milestones planned.



3 Published in December 2022 – https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/

EirGrid published a new quarterly report called the Network Delivery Portfolio (NDP) in 2022, giving stakeholders and industry a regular status update on the progress of approximately 360 projects through the six-step process towards completion. Further details on the NDP are included in section 4 of this report.

Twenty-four projects were energised and/or completed in 2022, contributing to a total regulatory spend of €176m. Infrastructure delivery is not without its challenges. This has been evident in recent years with increasing challenges encountered in completing the annual transmission outage programme (TOP). EirGrid and ESB Networks delivered 71% of the works contained in the TOP 2022 baselined plan. This figure includes an adjustment made for TOP delivery issues which were outside of the network companies' control.

The major challenges impacting the completion of works within the outage programme include issues such as forced outages on the transmission system, low generation capacity margins, project scoping and outage complexity challenges.

The outage related challenges are a key contributor to a lower than expected project completions delivered in 2022. The reasons for this and the contributing factors are outlined in greater detail in section 4 of this report.

We also introduce details regarding the ongoing Outage Transformation project which commenced in 2022 and which, when concluded, will propose solutions to address how the outage process can be updated to facilitate increased levels of projects delivery. Further details on the Outage Transformation project are included in section 11.

2.1 Renewable connections and battery energy storage

The completion and connection of new renewable generation projects to the transmission network is vital to achieving the 2030 climate action plan targets. The following Wind Farm and Solar Farm projects were completed in 2022, and are expected to deliver over 600 MWs of new Renewable Generation:

- The Croaghonagh, Cloncreen, Oweninny Power 2, Cloghan and Lisheen 3 Wind Farm projects providing 311 MWs of renewable generation.
- The Gallanstown, Rosspile and GIllinstown Solar Farm projects providing an additional 309 MWs of renewable generation.

During 2022, two new BESS technology projects totalling 33 MW MEC were completed. BESS technologies facilitate renewable energy on the grid by supporting system reserve provision, generation adequacy and congestion management.

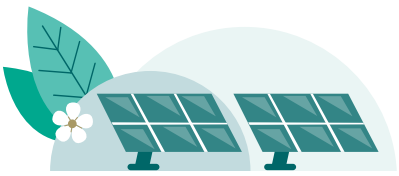
The battery technology captures the electrical energy at one time for it to be used at a later time. The following BESS connections were energised in 2022:

- The Porterstown Battery Energy Storage System project was energised in February 2022.
- The Golagh Battery Energy Storage System project was energised in February 2022.

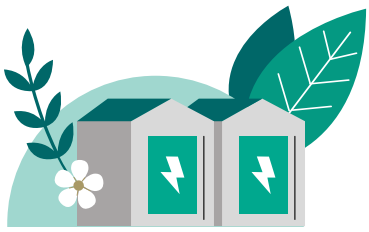
In addition to energisations in 2022, a large number of Capital Approvals were achieved in 2022 for Renewable Generation projects. The completion of these projects will facilitate an additional 5.3 GW of renewable energy on the transmission system and deliver a big step in the delivery of the renewable targets out to 2030, utilising the following renewable generation technologies:

- Approx. 4 GW of offshore wind generation.
- Approx. 1.2 GW of other renewable generation.
- Approx. 0.1 GW of battery energy storage systems.

5 wind generation projects
Total capacity of 311 MW



3 solar generation projects
Total capacity of 309 MW



2 battery technology projects
Total capacity of 33 MW

2.2 Powering Up Dublin

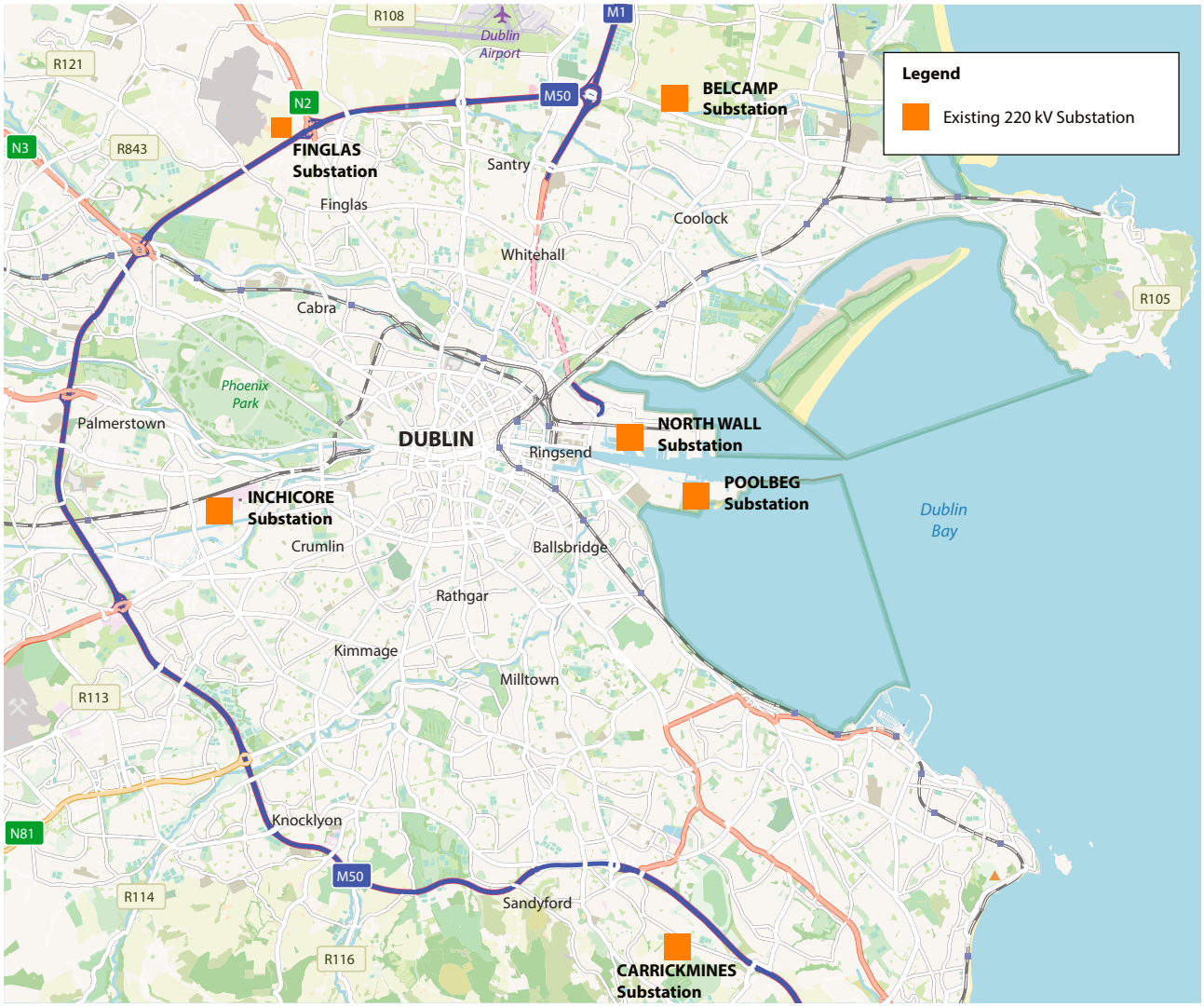
EirGrid launched the 'Powering Up Dublin' programme in May 2022 which will replace and upgrade older underground cable infrastructure that is reaching the end of its life and facilitate renewable electricity, specifically offshore capability (being 'offshore ready'). This will help ensure the security of supply in the Dublin region and improve the overall resilience of the power system.

The Dublin programme involves the installation of circa 50km of new cables across the city, with the upgrading of some electricity substations and the construction of new substations to improve Dublin's transmission network.

The map below[4] shows the routes of the cables and the location of stations which will be upgraded or built to achieve the objectives set out above. The applicable study has identified that the underground cables linking North Wall and Poolbeg, Finglas and North Wall, Poolbeg and Carrickmines and two cables linking Inchicore and Poolbeg will need to be replaced.

A series of Dublin Reinforcement projects are also included in the Dublin programme including the provision of Bulk Supply Points to meet the Distribution System Operator's identified need for further grid capacity to meet projected demand growth from residential, commercial and electrification of the heat and transport sectors.

4 https://www.https://www.eirgrid.ie/dublin?twclid=2-7is96kmw47xftzsnxspoa6lni



Powering Up Dublin study area map

The benefits of the Dublin programme are as follows:

- Security and reliability of supply
  Building a more resilient and reliable electricity grid helps ensure that everyone has power when and where they need it. This upgrade will also enable greater energy independence by harnessing energy sources close to the city.
- Meet future needs
  These improvements will help meet the growing and changing electricity needs of Dublin. This includes the electrification of transport systems, vehicles, heating and the development of housing, offices, and large energy users.
- Sustainability
  Powering Up Dublin will get Dublin renewable ready, so the city's grid has the capacity to utilise electricity generated from offshore wind energy. This is a vital step to help Ireland transition to a low carbon electricity future.
- Economic
  These critical upgrades will help strengthen Dublin's economy, encouraging and supporting future investment.
- Community
  Our community benefit policy will directly support local communities in the areas that host the project infrastructure.

Since the launch of the Dublin Programme in May 2022, EirGrid has been developing projects through the Framework for Grid Development. The planning application for the expansion of the substation at Belcamp has been submitted and is awaiting approval from Fingal County Council. The design of the new Substation at Poolbeg has also been progressed through Step 4 of the Framework for Grid Development and is on track for planning submission in 2023.

There has been significant progress in the development of the cable routes through the city. The initial feasibility study for the cable routes was completed in early 2022 and since then an initial long list of route options has been developed. The long list will be shortlisted to 3 options per route in 2023. The main criteria used to evaluate the options comprises Technical, Deliverability, Economic, Environmental and Socio-economic factors. As part of an innovative approach working in conjunction with ESB Networks, EirGrid identified an opportunity to agree the detailed design for the installation of cable ducting as advance works along a 4km stretch of the Royal Canal. This forms part of a collaborative greenway project with Waterways Ireland and Dublin City Council.

The works undertaken to date have been underpinned by extensive public consultation carried out in the latter stages of 2022 on the options long list. Please refer to section 12.3 of this document which discusses the Dublin Infrastructure Forum.

2.3 Security of Supply

Security of supply continued to be an important area of focus for EirGrid in 2022 with a number of workstreams in operation across the company. This includes the development and implementation of operational measures, fast-tracking certain infrastructure delivery and market innovations to advance security of supply solutions. EirGrid has been tasked by the CRU to deliver on particular elements of the CRU's Security of Supply Programme of Actions as set out in CRU21115[5]. In addition, the CRU's PR5 Local Security of Supply TSO Incentive, as set out in CRU/20/154[6], obliges EirGrid to develop Local Security of Supply specific plans for the PR5 period. Further information on the outturn performance for the Local Security of Supply incentive can be found in the Annual Performance Report 2022.

2.4 Demand connections and data centres

There has been a continued interest by large energy users such as data centres in Ireland in recent years. The key focus area for such connections to the transmission system is in the Dublin area.

This is principally driven by the need for Information, Communications and Technology (ICT) industries and high-tech manufacturing companies which are supported by the Industrial Development Authority (IDA) to locate in urban locations which can meet their requirements. One of the main requirements is to be able to connect to a high-quality power supply. Many multinational organisations have chosen Ireland as the location of their data centre operations or European headquarters. The data centre projects referenced below are projects from contracted parties made before CRU's direction on Data Centre grid connection processing from November 2021 contained in CRU/21/224[7].

5 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU21115-Security-of-Electricity-Supply--Programme-of-Actions.pdf

6 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf

7 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU21124-CRU-Direction-to-the-System-Operators-related-to-Data-Centre-grid-connection-.pdf

During 2022, the following projects which facilitate data centre connections were energised and/or completed:

- The Cruiserath 220 kV Station in North West Dublin, was energised in June 2022. This is to facilitate the connection of a data centre via two new underground circuits.
- The Clutterland station in North Dublin, was energised in October 2022, which facilitated a connection from a new data centre to the existing Castlebagot 220 kV station and Kilmahud 110 kV station.
- The Barnageeragh 110 kV station in North West Dublin, was energised in July 2022 facilitating a connection between a new data centre and the Cloghran and Snugborough Stations.

2.5 Associated Transmission Reinforcement (ATR) projects

Two ATR projects were completed in 2022, a new 220 kV underground cable and a 220 kV line uprate. The completion of ATR projects is important for generators as it may result in the generator gaining financial firm access. Firm access means that if a generator is constrained on or off, it is eligible for compensation. One of the ATR projects completed in 2022 facilitated the connection of 541 MW of firm access quantity (FAQ) to the transmission system in 2022. The completion of ATR projects also alleviates constraints and strengthens the transmission network.

Firm Access review 2022 and ATRs

EirGrid recently concluded its review of the Firm Access methodology as requested by the SEM committee and CRU, details of which are included in the SEM committee's Market Monitoring Unit Quarterly Report for Q4 2021 (SEMC-22-004)[8].

8 https://www.semcommittee.com/files/semcommittee/media-files/Market%20Monitoring%20Unit%20Quarterly%20Report%20Q4%202021%20-%20SEM-22-004.pdf

2.6 New technology

In 2022, EirGrid and ESB Networks progressed a number of transmission projects utilising new technologies, with significant progress made in the application and consideration of new non-wire technology solutions in 2022.

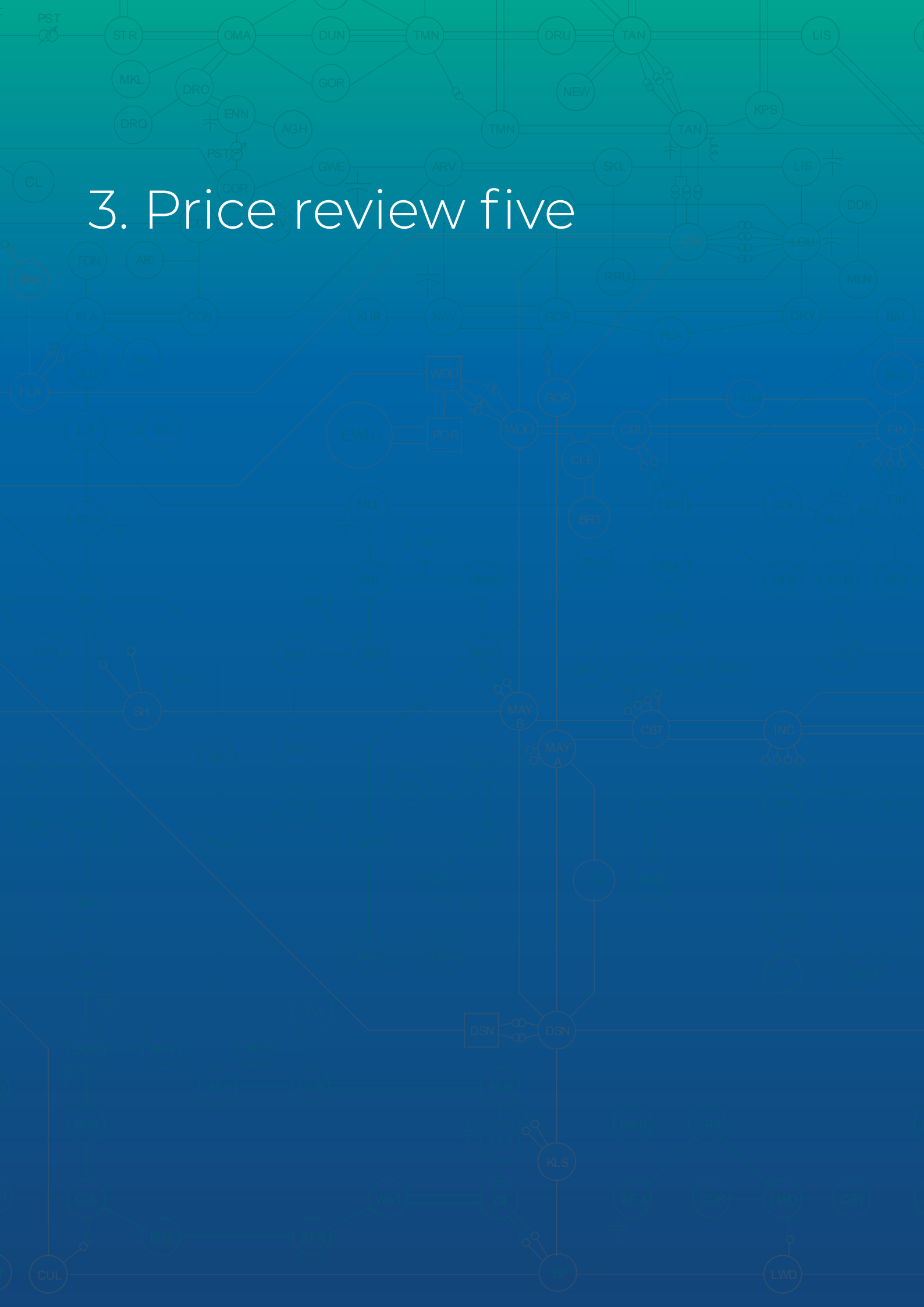
EirGrid's network analyses performed as part of the Shaping Our Electricity Future (SOEF) Roadmap, and published in November 2021[9], identified 11 candidate reinforcements for which non-wire solutions and technologies could be considered. Of these candidate reinforcements, Dynamic Line Rating (DLR) has been identified as an option for 5 projects, and Power Flow Controllers have been identified as an option for a further 6 projects. The use of these technologies will be evaluated as part of the options evaluation, with selection of the best performing option and capital approval expected between 2023 and 2026, as per the Q1-23 NDP.

In Q3 2022, DLR technology was installed on the Lisheen – Thurles 110 kV circuit, as part of the connection method for a new windfarm in County Tipperary, the first use of this technology in Ireland. Installation of DLR allows existing lines to operate at a higher load rating based on ambient conditions, and in this case, has eliminated the need for the line to be uprated whilst also facilitating a new windfarm connection.

Further detail on the Joint TSO/TAO Incentive performance for 2022, which includes additional information on new technology aspects of portfolio delivery, is included in the Annual Performance Report 2022.

9 This refers to SOEF Version 1.0, which was published in November 2021. SOEF Version 1.1 was later published in July 2023 – https://cms.eirgrid.ie/sites/default/files/publications/Shaping_Our_Electricity_Future_Roadmap.pdf

3. Price review five



Every five years the CRU determines the revenue price control for the TSO and the TAO. 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 changing needs.

The total TSO and TAO network capex allowance for the PR5 period was determined by CRU in the PR5 Final Determination, CRU/20/152, as €1,048m (2020 Prices), of which €254m was allocated to 2022. Further information on the PR5 final determination can be found in the determination paper on CRU's website[10].

The PR5 programme evolved in 2022 as projects were completed, progressed, added, rescheduled, or removed. At the end of 2022, the total network capex regulatory spend for 2022 was €176m. Regulatory spend increased in 2022 by €31m when compared with 2021 but was €78m lower than the PR5 2022 capex allowance of €254m.

Table 1: TSO/TAO total network Capex regulatory spend 2022

PR5 allowance 2022	PR5 actual outturn 2022	PR5 outturn vs PR5 allowance
€254m	€176m	-€78m (-31%)

10 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU20152-TSO-and-TAO-Transmission-Revenue-2021-20252.pdf

The Network Capex spend profile is heavily influenced by spending on major projects (such as North Connacht, North South 400 kV Interconnector, major station and cable projects). The graph below shows the Network Capex spending trend over the last 5 years across from 2018 to 2022.

It is anticipated that the Network Capex delivery on major projects, and therefore the spending trend, will ramp up significantly in the period 2023-25. This aligns with EirGrid's Q4-22 Network Delivery Portfolio forecast for the remaining three years of PR5 as published in January 2023[11].

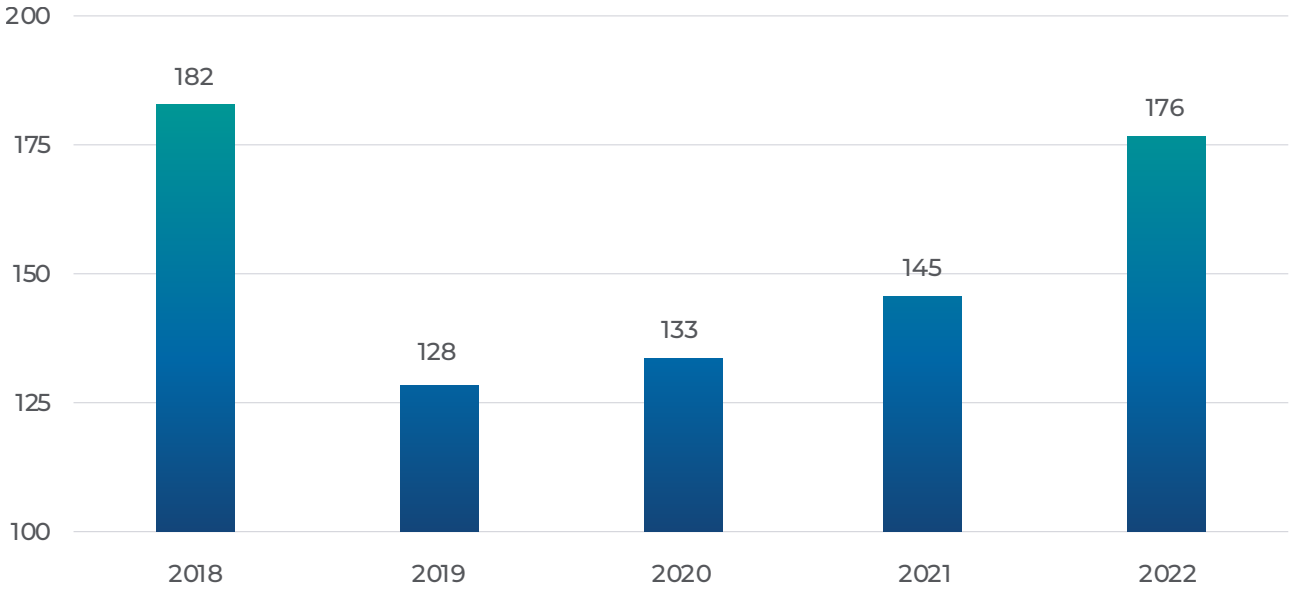
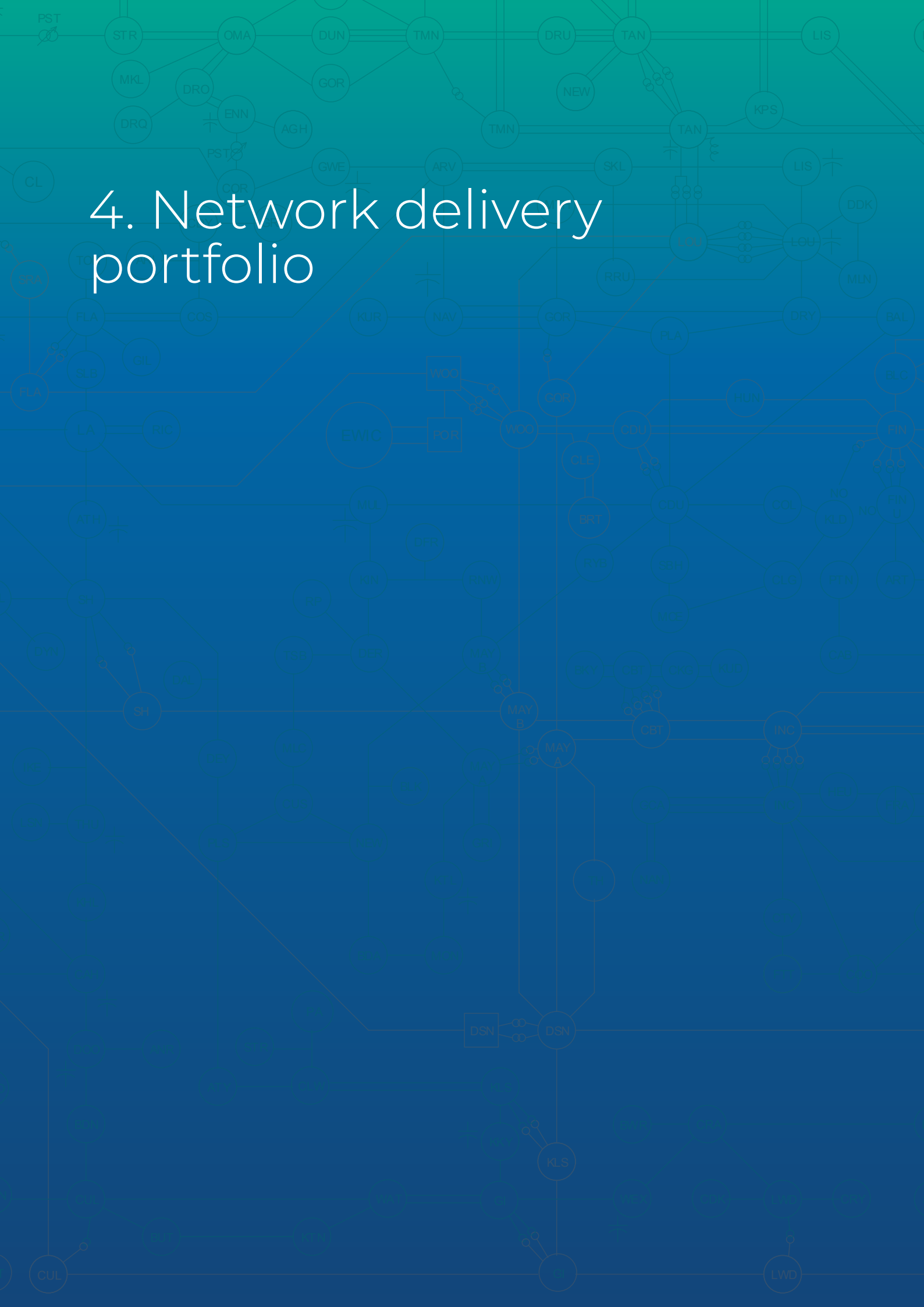


Figure 1: TSO/TAO total network Capex regulatory spend by year (€m)

11 https://cms.eirgrid.ie/sites/default/files/publications/Network-Delivery-Portfolio-Guidance-Document-Published-on-27th-January-2023.pdf

4. Network delivery portfolio



EirGrid has developed and published a new quarterly Network Delivery Portfolio (NDP) publication for stakeholders and industry to meet new CRU reporting requirements, as set out in CRU/20/154. The NDP contains an up to date programmatic view of the ongoing and pipeline transmission capital projects which span the period 2022-2030, covering the PR5 and PR6 periods.

The quarterly NDP publication is a dynamic and agile unconstrained[12] programme which contains the projects from the PR5 submission, newly added pipeline projects and additional requirements identified by the analysis carried out as part of the Shaping Our Electricity Future initiative. The NDP provides a quarterly status update on the three major project milestones of EirGrid Capital Approval, Project Agreement with ESB Networks and Energisation for ca. 360 projects.

The objective of the NDP is to deliver on the EirGrid Group Strategy[13] to transform the power system by 2030, in accordance with the Climate Action Plan 2023[14]. EirGrid does this by providing a clear and transparent programme over multiple years which maximises the amount of project related work that can take place to reinforce the system, connect customers and ensure the required level of maintenance of the transmission system while ensuring a safe and secure system. The Q4-22 NDP project milestone data provides the status updates that forms the basis for EirGrid's Transmission Development Plan 2023 and the information contained within this report.

The first edition of the NDP was published on the Customer and Industry section of EirGrid's website in October 2022, and quarterly updates continue to be published at this location[15]. Future NDP reporting enhancements will include the addition of mapping, data summaries and relevant NDP insights.

12 Project dates and timelines provided in the NDP are based on an unconstrained scenario and are, therefore, indicative in nature and subject to change for a variety of reasons.
13 https://www.eirgrid.ie/about-us/our-strategy-2020-2025
14 https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/
15 https://www.eirgridgroup.com/customer-and-industry/general-customer-information/network-delivery-portfoli/

4.1 Network delivery trends in 2022

The second year of PR5 saw significant progress made by the TSO and TAO in terms of project development and delivery. Notable trends in 2022 include the continued strong progression of pipeline projects to approved 'ongoing' capital projects in step 3 of the six-step framework, and the strong completion of signed project agreements in step 6.

These metrics are indicators of the volume of projects progressing through the six-step process towards energisation and completion over the remainder of PR5, ultimately contributing towards the delivery of security of supply, 2030 climate change decarbonisation and customer connection targets.

Capital Approvals

Sixty-seven projects achieved capital approval in 2022. This volume of newly approved projects greatly exceeds the number achieved in 2021, sustaining a significant increase on previous years (see Figure 2).

Further details on the projects which achieved a capital approval is available in section 7 of this report.

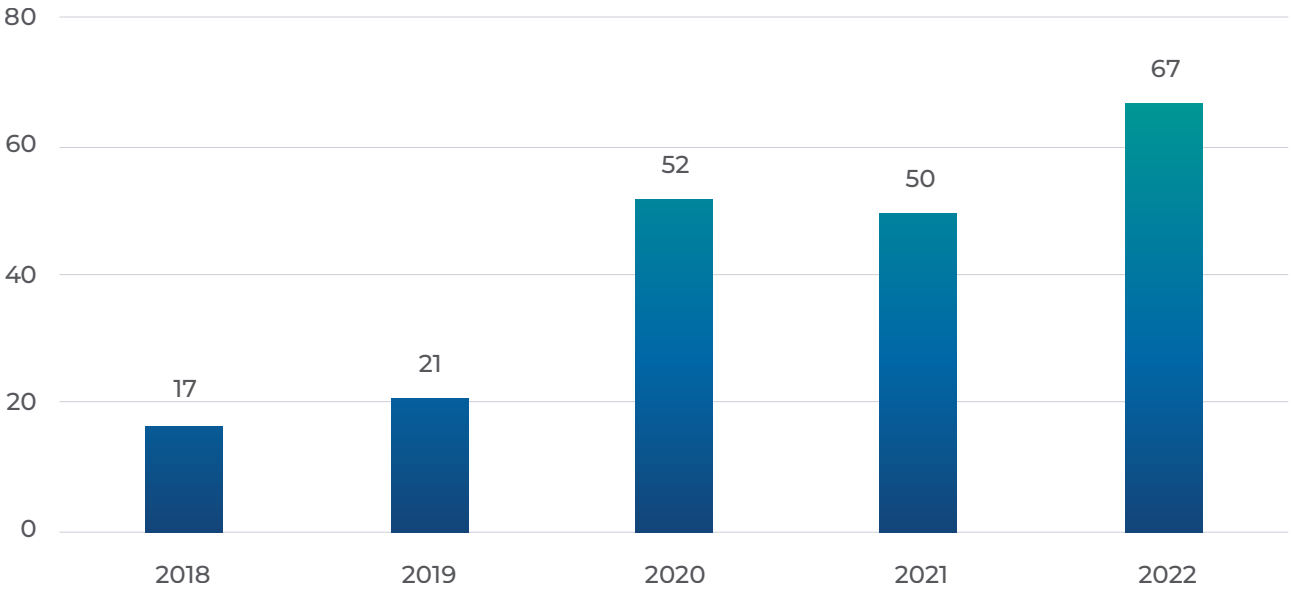


Figure 2: New Capital Approvals – 5 year period

Project Agreements

Twenty-seven Project Agreements (PA) were concluded between the TSO and the TAO in 2022 (see Figure 3). The quantity of PAs achieved is dependent on the pipeline of projects, which is subsequently reflected in the planned number of PAs annually.

It is not unusual to have peaks in the delivery of PAs, illustrated most notably with the inclusion of fifteen Protection Upgrade project PAs in 2021.

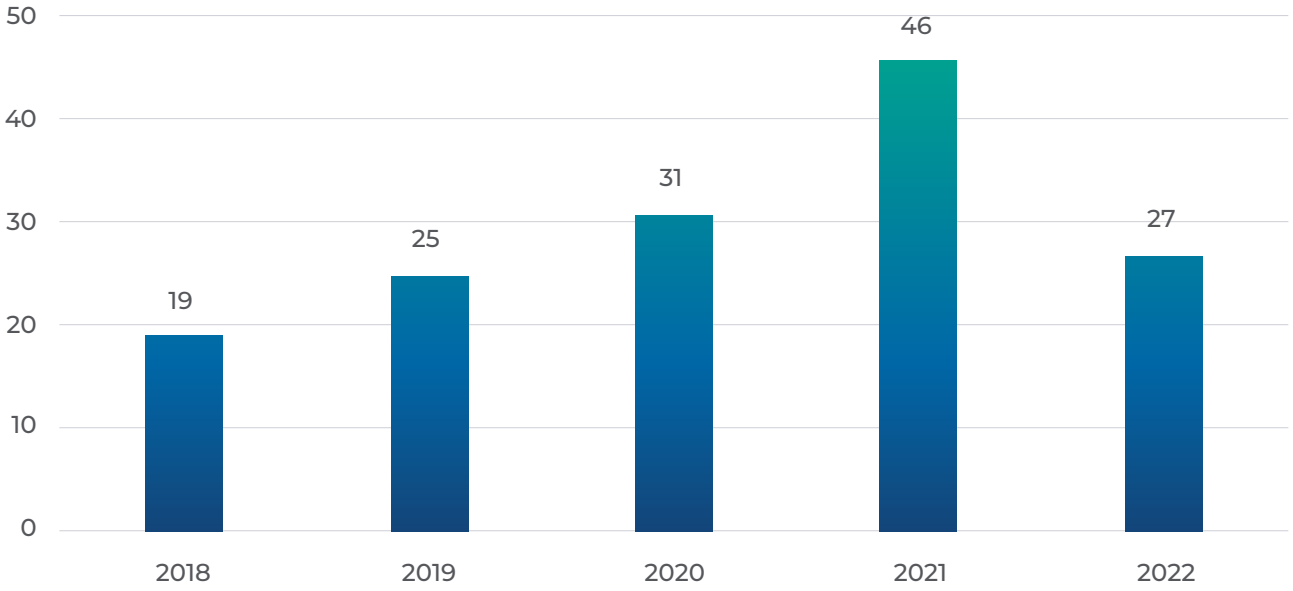


Figure 3: Project Agreements signed – 5 year period

Energisations and completions

Twenty-four projects were energised and/or completed in 2022, continuing a trend of a consistent growth in the number of completions in recent years (see Figure 4). However, 2022 saw the projects that were completed or achieved energisation were less than the original target of forty-nine for 2022.

Difficulties in granting the volume of outages needed to deliver all system reinforcement, connection projects and maintenance works led to challenges in achieving the targeted energisations, which is further discussed in section 11. In addition, please refer to section 4.2 for further details regarding the challenges faced throughout the year in the energisation and/or completion of projects.

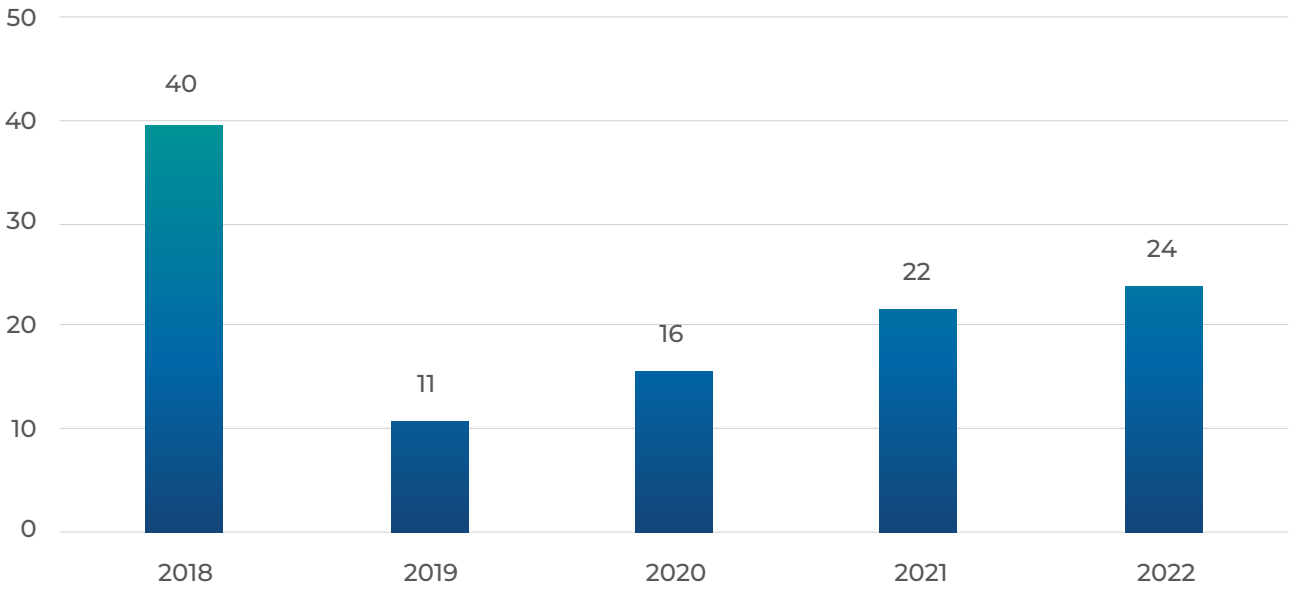


Figure 4: Energisations/Completions – 5 year period

4.2 Project delivery dependencies and challenges

Since EirGrid and ESB Networks' submission of the PR5 Programme to CRU in December 2019, a number of projects have experienced development and delivery challenges leading to revised energisation dates. Our ability to deliver grid infrastructure is dependent on a large number of external factors. Where there are changes to project energisation dates, these are communicated in quarterly and annual publications on EirGrid's website in our Customer and Industry[16] section.

Some of the more common reasons for these changes are as follows:

- Outage scoping and complexity, particularly for existing brown field station projects, accommodating changes and the difficulty in achieving large volumes/durations of outages regionally.
- The efficient use by all parties of outage windows to maximise delivery.
- Security of Supply constraints or other system conditions restricting the ability to obtain sufficient outages.
- Delays on the part of customers – in making payments required, achieving consents and/or in changing programmes for contested builds.
- Difficulties in land acquisition, gaining access to land in a timely manner at various stages of project development and legal challenges.
- Discharge of extensive planning and environmental conditions on some projects.
- Issues with the quality of contested builds.
- Co-ordination and sequencing of multiple interdependent projects.
- Availability of materials from suppliers and/or manufacturers with the challenges caused through global supply chain shortages.

16 http://www.eirgridgroup.com/customer-and-industry/general-customer-information/operational-constraints/

5. The six-step grid development process: Step 1

How do we identify the future needs of the electricity grid?

In Step 1, EirGrid confirms the need for a project by considering potential changes in the demand for electricity. These changes are influenced by factors such as how and where electricity is and will be generated, and changes in electricity use.

Key to this process is considering a range of possible ways that energy usage may change in the future. We call this scenario planning. We test whether the grid of today can support a range of possible future energy scenarios or if the grid needs further investment.

In 2019, we published Tomorrow's Energy Scenarios (TES) 2019 System Needs Assessment (SNA)[17]. The purpose of the SNA is to highlight the long-term needs of the grid in Ireland out to 2040.

The SNA report was the output of a process that started with the publication of, and consultation on, TES in 2019. We must adhere to technical standards when planning the network. These technical standards are detailed in EirGrid's Transmission System Security and Planning Standards (TSSPS)[18] as approved by the CRU. If it is established that the current grid cannot meet expected future needs under the TSSPS, the grid will need further investment.

In addition, in 2021, we published Shaping Our Electricity Future (SOEF) Roadmap[19]. SOEF sets out our planned approach – our roadmap in market operations, network development and system operations – to achieve our renewable ambition. The ambition, at the time of publication in 2021, was to have at least 70% of our electricity coming from renewable sources by 2030. This has since increased to 80% in SOEF Version 1.1, as published in July 2023.

17 http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-System-Needs-Assessment-Report_Final.pdf
18 http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Transmission-System-Security-and-Planning-Standards-TSSPS-Final-May-2016-APPROVED.pdf
19 https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping_Our_Electricity_Future_Roadmap.pdf

The projects highlighted in SOEF and TES are in addition to projects that are already being undertaken by EirGrid. Most importantly, each individual project will follow the six-step process, ensuring the necessary assessments take place, relevant planning regulations are met, and appropriate engagement takes place prior to moving forward. These projects will be incorporated into the NDP as and when they achieve a TSO capital approval.

When we have identified and confirmed a system need, a formal process of project development is initiated. At this point, the only decision that has been made is to confirm that there is a need for a grid development project and the details of the solution have not yet been considered.

5.1 What happened in Step 1 during 2022?

Network needs are identified through a number of different processes, including TES, SOEF and the connection offer process. In 2022, a number of needs located across the network were analysed, in line with the six-step process for developing the grid, to better understand and define the network needs before preparing a list of solution options during Step 2. Following completion of Step 1, the needs progress to Step 2, where options to meet those network needs will be analysed

The following network needs were confirmed in 2022:

- Confirmation of need for transmission capacity enhancement in the South Dublin East Kildare area of the network and the requirement to provide further connections to the Distribution System in West and South County Dublin. The need is driven by the integration of renewable energy generation both onshore and offshore, integration of new interconnectors and connection of demand in Co. Dublin, Meath, and Kildare.

- Confirmation of need to increase the thermal capacity of the Donegal Srananagh network corridor in the north-west, which will facilitate the connection of renewable energy and import/export of power in Donegal area.
- Confirmation of need to increase the thermal capacity of three 110 kV circuits which will facilitate the integration of renewable energy sources in various regions across the country, namely in the southern part of Ireland.
- Confirmation of need to increase the thermal capacity of one 220 kV circuit which will manage power flows on the east of the country, facilitate power flows between Ireland and Northern Ireland, facilitate the connection of offshore wind generation off the east coast and feed high demand areas.
- Confirmation of need to upgrade transformers at Great Island station to address asset condition need. This will also facilitate power import/export through the Greenlink and Celtic interconnectors.
- Confirmation of need to increase capacity at existing Ballyvouskill station by addition of new 220/110 kV transformer, to reduce the loading of an existing transformer and facilitate integration of more renewable generation connections.
- Confirmation of need to commission new 220/110 kV Bulk Supply Points at various locations to increase capacity, increase security of supply and relieve the existing stations. The proposed locations include Dublin Central, North County Dublin and West County Dublin.
- Confirmation of need to increase the busbar rating of existing stations. This will facilitate removal of thermal limits on the 110 kV circuits thereby increasing the amount of renewable generation in the area.

Combining and compressing project steps

EirGrid and ESB Networks combine and compress the grid development framework steps for eligible transmission projects, to improve the speed of project delivery across the Network Delivery Portfolio, where possible and appropriate. This involves completing activities in parallel, particularly at the early investment planning stages, reducing the time between steps, early engagement with ESB on scoping, the implementation of joint specialist teams and greater joint coordination of outage activities.

This agility and flexibility, mainly for smaller projects where the technology, option and/or route is clear, allows us to progress projects to completion in a timely manner to meet challenging targets.

In 2022, Steps 1-2 were combined for three projects; an example of this is the approval of new 220/110 kV Dublin Central Bulk Supply Point.

Similarly, Steps 1-3 were combined for eleven projects; an example of which includes the thermal uprate of the Louth – Woodland 220 kV circuit.

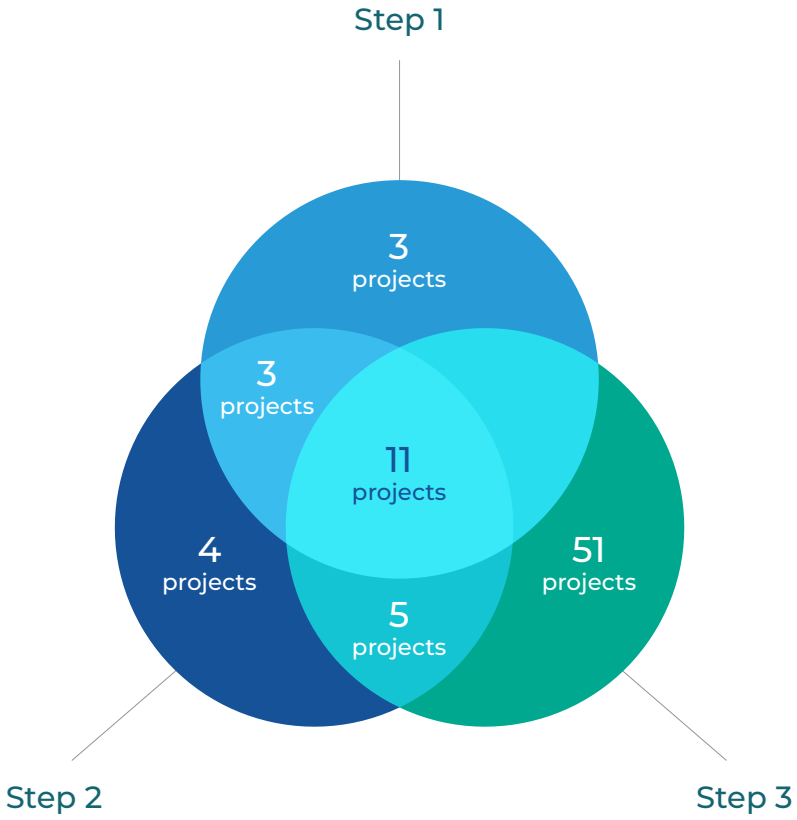


Figure 5: Projects with combined steps in 2022

6. The six-step grid development process: Step 2

What technologies can meet these needs?

Step 2 involves the creation of a shortlist of options which meet the future needs as confirmed in Step 1. As part of this process, EirGrid seeks feedback from our stakeholders on the list of potential solutions.

We want to understand which options our stakeholders think are suitable and which are not. We will study stakeholders' feedback and produce a shortlist of options to consider in more detail in Step 3.

When compiling the shortlist of options to consider in more detail, we try to balance stakeholder preferences with technical, cost, and environmental suitability. This means we may include options that meet the TSSPS and have a strong public preference but are technically less suitable than alternatives. We will consider the issue of overall suitability in more detail when progressing to Step 3. If a major new line or linear development is shortlisted, an underground cable option will also be considered.

We place new technologies into three broad categories. These are:

- New Technology at Research and development Stage.
- New Technology Ready for Trial Use
- Technology Available Now.

Technologies that are available now can be considered as potential solution options straight away. New technologies that are ready for trial use may be considered depending on their level of maturity.

6.1 What happened in Step 2 during 2022?

In 2022 work related to Step 2 of the six-step process was carried out on the following projects:

- A strategic reinforcement project in South Dublin region known as South Dublin Reinforcement completed Step 2. This project addresses an identified need for transmission capacity in the South Dublin East Kildare area of the network and the requirement to provide further connections to the Distribution System in West or South County Dublin. The need is driven by the integration of renewable energy generation both onshore and offshore, integration of new interconnectors and connection of demand in Co. Dublin, Meath, and Kildare.
- Two new 220/110 kV Bulk Supply Points (BSPs) completed their step 2; these new BSPs will increase the network capacity, facilitate more load connections, help increase reliability and security of supply in North Dublin County Dublin, and Central Dublin area.

Several other projects to increase the network capacity also completed Step 2 in 2022. These projects include the following:

- A project to alleviate a thermal transmission network problem relating to the transfer of power across the existing 110 kV transmission network between Sligo and Flagford transmission stations. The need is driven by the integration of renewable generation in the West and North-West part of the country. Along with the thermal uprate, this project incorporates an asset condition and refurbishment related need for the existing Flagford Sligo 110 kV circuit to replace 70% of the existing wood polesets.
- A project to increase the thermal capacity across the Arklow – Ballybeg – Carrickmines 110 kV circuits in the South East area. The need is primarily driven by the integration of renewable generation and interconnection in the South East part of the country and to ensure a stable supply.
- A thermal uprate project to address a need regarding the transfer of power across the 110 kV busbar at Bandon station, driven by the connection of renewable generation in the South-West and integration of Interconnections.
- A project to address two needs regarding the transformers located in Great Island 220/110 kV station in Co. Wexford, a network capacity need regarding the transfer of power between the 220 kV and 110 kV busbars at Great Island station, and an asset condition need.

7. The six-step grid development process: Step 3

What's the best option and what area may be affected?

During this step, EirGrid studies the benefits and impacts of the different options and where these can be built.

Step 3 identifies:

- The best performing option; and
- The study area where this option could be placed.

When considering where a project can be built, it is necessary to start by looking at a study area. This is a broad area within a region, rather than a specific, detailed route. Typically, this step is used to identify potential issues that may restrict options within the study area.

During Step 3, stakeholders' views are sought on a specific technology option and on the study area where the project is planned for. This consultation helps us to understand what is important to stakeholders and to learn more about the local area.

EirGrid has appointed Agricultural Liaison Officers (ALOs) and Community Liaison Officers (CLOs), who are available to discuss the siting of new lines and cables, land access and proximity payments. Contact details for our ALOs and CLOs can be found on the EirGrid website.

When making our decision a multi-criteria decision-making process is employed. This involves assessing the relative performance of options across agreed criteria. A decision is then based on a detailed analysis of stakeholder feedback and on economic, technical, social, and environmental criteria.

7.1 What happened in Step 3 during 2022?

In 2022 sixty-seven new projects with a forecast total capital cost of €991m were added to the PR5 programme having achieved capital approval in Step 3 of the six-step process.

This includes the following types of projects:

- 40 Customer Connections.
- 17 System Reinforcement.
- 9 Asset Refurbishment.
- 1 Conflict/diversion.

These projects will help to maintain and enhance the security of supply and facilitate the integration of renewable energy onto the transmission system. A selection of the projects achieving capital approval in 2022 includes:

- Five Offshore Wind generation projects expected to deliver 4 GW of Renewable Generation.
- A further 1.3 GW to be delivered across Wind Generation, Solar Generation and Battery Storage.
- Two 220 kV circuit thermal uprates which will manage power flows on the east and south-east part of the country. These uprates will facilitate power flows in the areas, facilitate new RE generation connections and the south eastern thermal uprate will greatly facilitate import/export of power through the Greenlink and Celtic interconnectors.
- Six 110 kV circuit uprate projects which will help remove the transmission system constraints and facilitate the integration of renewable energy sources in various regions across the country.
- Replacement and upgrade of transformers at Great Island station to address asset condition need, which will also facilitate power import/export through the Greenlink and Celtic interconnectors.
- Addition of new 220/110 kV transformer at existing Ballyvouskill station to reduce the loading of existing transformers and facilitate integration of more renewable generation connections.
- Increase the busbar rating of existing Derryiron station to facilitate removal of thermal limits on the 110 kV circuits thereby increasing the amount of renewable generation in the area.

A notable highlight in 2022 was the progression of the East Meath – North Dublin Upgrade project from Step 2 to Step 3. In Step 3, the best performing option was chosen. This project will help meet the growing demand for electricity in the east of the country due to the increased economic activity in recent years. It will also facilitate increasing amounts of renewable electricity and more efficient fossil fuelled generation located elsewhere to be transported for use in the east of the country. Stakeholder and community engagement will continue as the project progresses.

Accelerating the throughput of investment decisions

EirGrid has improved the efficiency of its capital approval processes by streamlining procedures and internal governance approval frameworks. This has facilitated the conclusion of a greater number of capital approvals, increasing the overall number of investment decisions made in 2022 when compared with previous years. 67 capital approvals were completed in 2022, when compared with 52 in 2020, equating to an increase of approximately 30%.

Early engagement with ESB Networks, industry and stakeholders

EirGrid has been engaging with ESB Networks, industry, and public stakeholders at an earlier stage in project development to identify and address issues that may cause delays. This approach has enabled improved management of project risks, reduced the likelihood of delays, and ensured that stakeholders are informed and involved throughout the project development process to a greater degree.

In 2022, there were four major projects where the Early Engagement with ESB Networks was undertaken, along with the creation of the new Powering Up Dublin Business and Community engagement forums. EirGrid hosted two of the Powering Up Dublin forums in 2022, which brought together people and organisations from across the programme area to enhance delivery.

Following the positive outcomes of the early engagement activities in 2022, and engagement with CRU, EirGrid and ESB Networks have identified major infrastructure projects which will benefit from early engagement between both parties in 2023 and beyond.

Progression of 2021's Capital Approval projects

In 2021, EirGrid approved 50 new projects in Step 3 with a total capital cost of €1,208m. By the end of 2022, 28% of the projects achieving capital approval in 2021 had progressed into Step 6 (detailed design/construction/energisation), representing good progression of projects in the transmission capital programme. Projects classified as on hold are not currently being progressed.

Projects in Steps 4/5 were in the scoping stage and will be progressed to Step 6 in due course. Comparably in 2021, 73% of the projects had progressed to Step 6, however the scale of these projects were significantly smaller.

By the end of 2022, the status of all projects which achieved capital approval in 2021 was as follows:

- Projects completed: 1.
- Projects achieved project agreement: 14.
- Projects progressing towards project agreement: 33.
- Projects on hold: 2.

28%

of projects approved in 2021, progressed from Step 3 and into Step 6 in 2022

8. The six-step grid development process: Step 4

Where exactly should we build?

Following consultation and engagement in Steps 1, 2, and 3, EirGrid will have made some key decisions and know which technology is best for use on a project and roughly where the project will be built. We continue to examine and consider both an overhead line option and an underground cable option if a new circuit is needed.

In Step 4, we assess where exactly the most appropriate place to build the project is going to be. This could be either a circuit or station, or both. Some projects will not go through Step 4, primarily uprates or similar works where the circuit and/or station is already built and therefore the location is already determined.

Key inputs will be local, social, and environmental 'on-the-ground' information, combined with higher-level datasets used in Step 3, to determine and verify local constraints and opportunities. These will identify potential station sites or circuit route corridors within the study area for the best-performing technology solution.

Once again stakeholders' views are sought and depending on the size of the project, this could take many forms, such as public meetings or web pages with response forms. We promote consultations through the EirGrid website and in local or national media depending on the scale of the project.

8.1 What happened in Step 4 during 2022?

Letterkenny station project

The Letterkenny 110 kV station upgrade is a proposed reinforcement of the station in Letterkenny, County Donegal. The project is essential to ensure greater security of supply for County Donegal and to enable the further integration of renewable energy in line with Irish Government targets. It will also be a key enabler in creating electricity demand opportunities in Donegal. A detailed engineering evaluation of options was concluded in 2022, which has informed the development of the 110 kV substation. Additionally, substation planning layout designs and single line diagrams were completed in December 2022.

Great Island Transformers Upgrade

The Great Island Transformers Upgrade project addresses two needs regarding the transformers located in the Great Island station in Co. Wexford. A network capacity needs and an asset condition need has been identified and the new transformers will replace the two existing transformers.

A feasibility study was performed in September 2022 and a best performing option was identified minimising the extent of future outages required to complete the project.

Kildare-Meath grid upgrade

As part of step 4, EirGrid undertook consultation and engagement on the major Kildare Meath Upgrade project in 2022. The project will add a high-capacity underground electricity connection between Dunstown substation in County Kildare and Woodland substation in County Meath.

The upgrade will help to transfer power more effectively to the east of the country and distribute it within the electricity network in Meath, Kildare and the surrounding counties. The project is essential to meet the Irish Government's Climate Action Plan targets. This includes transporting electricity from offshore renewable sources.

In March 2022, following feedback gathered during an extensive public consultation process and a range of assessments evaluating the four possible route options, a best performing route option was identified.

In June 2022, following further technical assessments and extensive public consultation, the project team announced where exactly the cable will be located where the best performing route avoids villages and town centres. The project moved onto step 5 where the project team commenced more detailed technical assessments and continued consultation with landowners, public and other key stakeholders along the proposed route.

In late 2022, EirGrid undertook the first phase of ground investigations along the proposed route. These works are required to determine the presence of underground services, to identify the ground conditions, and to help design the layout and location of the proposed cable.

HV interface forum

In 2022, EirGrid and ESB Networks commenced the establishment of a new major stakeholder forum involving the Department of the Environment Climate and Communications, Department of Transport, the CRU, Transport Infrastructure Ireland, and County City Management Association. The aim of this forum is to increase collaboration on major projects, pre-planning assessments, costs and liabilities, technical standards, and other provisions. This forum kicked off in early 2023 and will continue to convene throughout the year.

9. The six-step grid development process: Step 5

The planning process

The objective of Step 5 is to achieve the necessary statutory consent for a project; if no statutory consent is required, the decision underpinning this is documented appropriately. This includes the preparation of plans and particulars in respect of the project proposal that will be used in the statutory consents process (or in obtaining a confirmation or Declaration of Exempted Development where no statutory consent is required).

Where a project requires planning permission, EirGrid will submit a planning application to the planning authority – either An Bord Pleanála or the local planning authority. In certain cases, a confirmation, or Declaration of Exempted Development (Section 5 Declaration) will be given internally or by the relevant planning authority where no statutory consent is required. This also requires the preparation of plans and particulars for such projects.

When a project reaches Step 5 and requires planning permission, EirGrid is legally obliged to publish details of its proposed plan in the relevant newspapers. These notices give details on how you can make a submission to the relevant planning authority. We also publish and update this information on the EirGrid website[20].

The conclusion of this Step involves the receipt of a planning decision from the relevant authority or a confirmation or declaration of exempted development. When the planning application process ends, the planning authority will do one of the following:

- Grant permission; or
- Grant permission on the basis that EirGrid makes some changes to its application; or
- Refuse permission.

20 https://www.eirgrid.ie/

9.1 What happened in Step 5 during 2022?

In 2022, several projects entered or passed through Step 5 of the framework, including eight projects which received TSO's approval to submit planning applications.

Of these, planning applications for five of the projects were submitted in 2022 to the relevant authorities, with one of these projects receiving its planning consent within the year. The remaining three planning applications will be submitted in 2023. It is anticipated that these projects will receive planning consent in 2023, subject to conclusion of the statutory planning process.

The sections below detail the progress made for a selection of major projects that entered or passed through Step 5 in 2022.

North Connacht 110 kV project

This project is a new circuit linking substations at Moy in Co. Mayo and Tonroe in Co. Roscommon, with an upgrade to an existing Overhead Line in Co. Roscommon. The Governments Climate Action Plan sets out the target to achieve 80% of electricity from renewable sources by 2030 and North Connacht is a vital infrastructure project to enable these targets. It will assist the electricity network manage an influx of renewable energy generation planned for the West and Northwest areas in the coming years.

In June 2022, a Strategic Infrastructure Development planning application was submitted to An Bord Pleanála following technical assessments, consultations, and engagements with local communities as well as other stakeholders. EirGrid awaits a decision from the planning authority to progress to the next stage of this project, and subject to planning approval, the project will move into the construction phase.

Woodland 400/220 kV station redevelopment

Woodland is one of the most important stations on the transmission system. The strategic importance will increase further given it is the proposed connection point of several major infrastructure projects such as the Kildare Meath project, the East Meath North Dublin project, and the North South 400 kV Interconnector. Woodland station is located in Batterstown, Co. Meath, and enables transfer of power to and from the East Coast.

During 2022, a planning consultant was appointed to progress the planning application to the local authority Meath County Council, and a planning application was submitted in November 2022.

Belcamp busbar extension

This project will accommodate offshore renewable generation connections, distribution system demand growth, network expansion requirements and large energy user demand connections. The extended substation is intended to become a bulk supply point to support domestic and industrial demand growth in the North Fringe of Dublin city. The driver of this project is security of supply as it will facilitate the connection of, and supply to, forecasted increased demand.

In December 2022, internal approval was received to submit the planning application for the busbar extension, and the planning application was subsequently submitted to Fingal County Council in early 2023.

10. The six-step grid development process: Step 6

Construction, energisation and benefit sharing

In Step 6, EirGrid and ESB Networks agree a construction programme. ESB Networks has responsibility for efficiently and safely managing the delivery of these projects, including aspects such as procurement and construction. Projects are jointly monitored and refined as the project progresses. During Step 6, a project is under construction and depending on scope and complexity this can take approximately 1 to 5 years.

10.1 What happened in Step 6 during 2022?

In 2022, progress was made in Step 6 with projects reaching this step, progressing through, and completing the step. The sections below include a summary of 2022's progress regarding Project Agreements signed by EirGrid and ESB Networks, projects that achieved energisation and an update on the progression of major projects in step 6. Further updates on other major projects are available on EirGrid's website[21].

North South 400 kV Interconnector

The North South 400 kV Interconnector is a cross border overhead line project between Ireland and Northern Ireland transmission systems. In September 2020, the Northern Ireland Minister for Infrastructure approved planning permission for this project in Northern Ireland, and the High Court upheld that decision in October 2021 following a judicial challenge. In October 2022, following a judgment from the NI Court of Appeal, the project has planning consent in both jurisdictions.

This project is 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.

21 https://www.eirgrid.ie/community/projects-in-your-area

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.

ESB and NIE Networks have been carrying out procurement for construction and materials and both SONI and EirGrid will be engaging with landowners and communities both North and South, to secure land access to allow the commencement of construction. This includes environmental, engineering surveys and site investigations at various tower locations along the route as well as landowner engagement.

During 2022, EirGrid conducted a number of technical and environmental surveys. This involved engaging with nearly 20% of those landowners who have a tower located on their land.

Laois Kilkenny Reinforcement Project

The Laois Kilkenny Reinforcement Project is a portfolio of projects which will ensure quality and security of supply for the south east region. This portfolio consists of two new substation sites, new overhead lines at 400 kV and 110 kV, and upgrades of the current network in Kilkenny.

In 2022, site enabling works for the new Coolnabacky substation were completed, with civil works due to commence in 2023. Civil works and electrical installation works for the Ballyragget substation were also completed in 2022, with commissioning activities now underway. In addition to these station works, minor civil and electrical works are ongoing at the Kilkenny substation.

Progress was also made in 2022 on the overhead lines elements of this project, with completion of the Coolnabacky substation line diversion, and significant landowner engagement on the route of the planned Ballyragget-Coolnabacky line. The Ballyragget-Kilkenny 110 kV line is expected to be completed in 2023.

During 2022, 12 community organisations were awarded funding as part of the EirGrid Phase 1 Community Benefit Fund. This will provide support to local community groups, not-for-profit organisations, and social enterprises that service communities near the new infrastructure.

Cross Shannon cable

The Cross Shannon Cable Project is a submarine cable that will link the electricity substation at Kilpaddoge in North Kerry to the Moneypoint

generation station in Clare. There are large amounts of renewable electricity generation being connected to the electricity grid in the south and west of Ireland. During times of high wind, the Cross Shannon Cable Project will facilitate the flow of this power to the east of the country via the 400 kV Transmission Network.

Planning permission was granted by An Bord Pleanála in June 2021 and the foreshore license executed in June 2023. It is planned to construct the Cross Shannon Cable project in 2024, with it being energised in 2025.

10.2 Project Agreements concluded

The first priority of Step 6 is for EirGrid and ESB Networks to sign a Project Agreement (PA). In 2022, twenty-seven projects reached PA, and one project progressed through to energisation before the end of the year.

These project agreements concluded in 2022 represent a total Capex project cost of €155m and are forecasted to be delivered by 2026.

The 27 projects that reached project agreement in 2022 include the following:

- Three Solar Farm projects and two Wind Farm projects, expected to deliver approximately 360 MW of renewable generation.
- Two combined BESS and FlexGen generation projects, expected to deliver 250 MW.
- A BESS project providing approximately 60 MWs of energy storage.
- A FlexGen generation project that will provide an additional 70 MW of generation.
- A 110 kV line refurbishment project, a 110 kV line alteration project and two 110 kV circuit uprate projects.
- Six protection upgrade projects to replace ageing relays across a total of nine 220 kV stations and twelve 110 kV stations.
- Connection of a new DSO 110 kV station, a 220 kV station transformer replacement project, and a project to uprate the bays in a 110 kV station.
- A Synchronous Condenser project which achieved PA in February and was later completed in September 2022.

- A project for the connection of the Greenlink Interconnector, a subsea and underground electricity interconnector between the electricity grids in Ireland and Great Britain.
- A project to procure a new spare transformer, capable of being transported and installed if required in any of the 400 kV stations in Ireland.
- A customer connections project, facilitating three 110 kV customer connections.
- A project to install a new 220 kV underground cable ducting as part of a new road scheme, avoiding the need to interfere with the new road in the future.

Projects can progress directly from Step 3 to Step 6 of the six-step process, particularly where the customer is responsible for achieving the planning consent or where EirGrid has confirmed a declaration that a project is an exempted development.

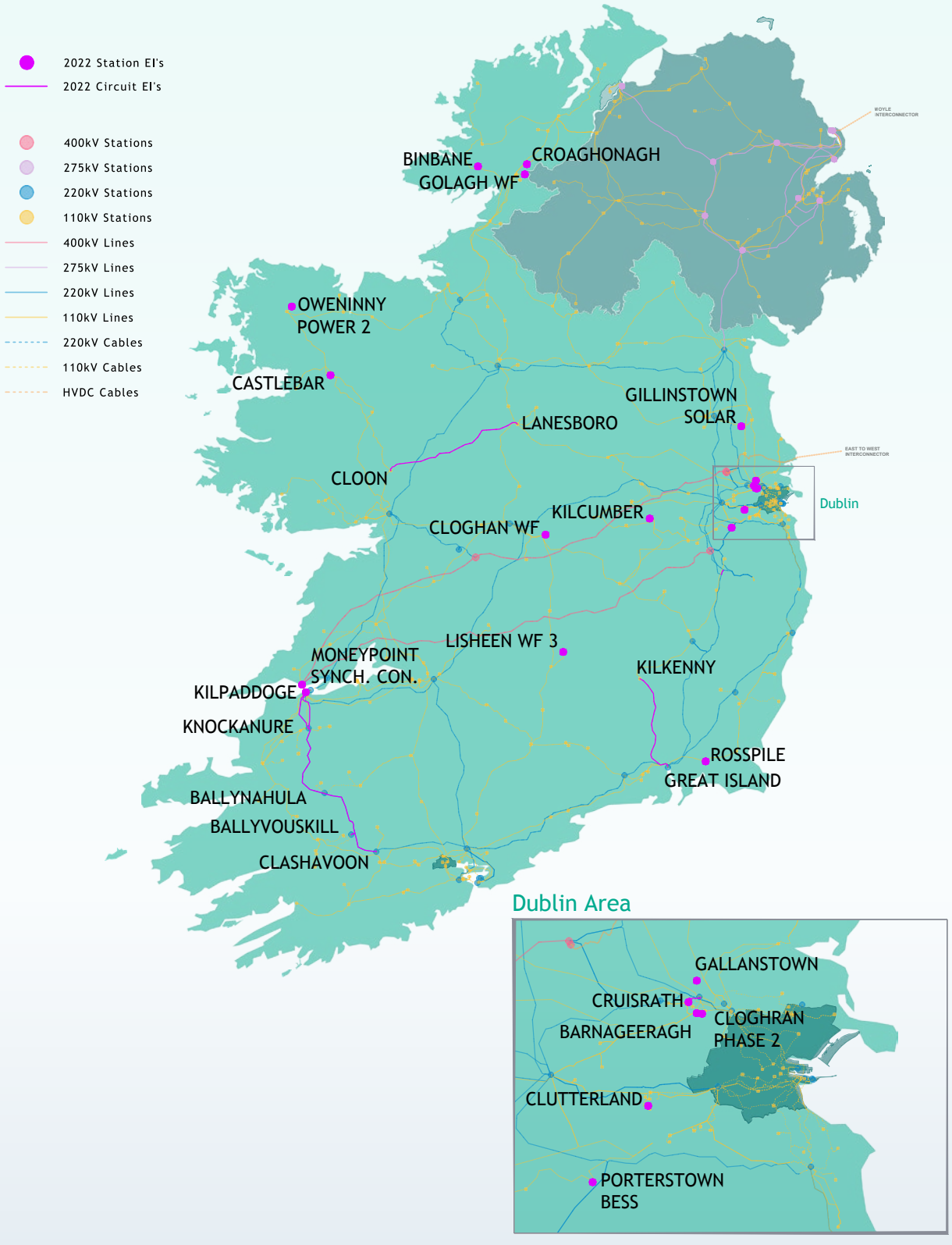
Once a PA has been finalised, the project progresses into the detailed design and construction stage.

A notable project that achieved PA in 2022 was the Greenlink Interconnector project, it is a customer project to connect a customer constructed subsea and underground electricity interconnector cable between the electricity grids in Ireland and Great Britain, with a nominal capacity of 500 MW. 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 will provide Ireland with a link to the EU and Nordic electricity market via Great Britain. EirGrid will be facilitating the connection into Great Island 220 kV station.

10.3 Projects energised and/or completed in 2022

Twenty-four projects were energised and/or completed in 2022, the distribution of these projects across Ireland are represented in the map below.

- Energisation of five Wind Farm projects and three Solar Farm projects, totalling over 600 MWs of new Renewable generation connected to the system.
- Energisation of two new BESS projects totalling 33 MW MEC. These projects will provide system services that allow the electricity system to carry a greater proportion of renewably generated power.
- Connection of three data centres totalling 407 MVA MIC.
- Completion of project to facilitate the replacement and uprate of two customer transformers.
- Energisation of the final circuit transfers for the new 220/110 kV Kilpaddoge station in County Kerry.
- Installation of a new 220 kV Underground Cable between the Kilpaddoge and Knockanure stations in County Kerry.
- Completion of a 110 kV circuit refurbishment in the West & Midlands areas.
- Completion of two 220 kV and one 110 kV line uprates across the South West & South East of Ireland.
- Completion of a 400 kV Voltage Uprate trial, an Innovation project to trial retrofitting structural components to enable the uprating of existing 220 kV overhead lines to operate at 400 kV.
- Connection of a Synchronous Condenser, a new technology project that will enable higher volumes of renewables on the transmission network.
- Completion of a station upgrade to facilitate a DSO connection.
- Completion of a station busbar uprate project, providing an adequate future rating for the existing and planned generation connections in the County Mayo area.



Transmission system map: 2022 energisations

11. Prioritisation and delivery

A major part of the delivery and completion of each project involves the transmission network outages required to complete the construction within substations or on linked circuits. Outages required for maintenance work must also be included.

There are a number of steps in the annual outage planning process, including:

- Identification of outage requirements, including the sequence of work, expected timing, duration and the plant required for these outages;
- Assessment of readiness for outages in a given year; and the sequences of work, expected timing, duration and plant required for these outages;
- Consultation with impacted stakeholders and the Distribution System Operator (DSO), where appropriate; and
- Prioritisation of works to maximise the delivery of projects within the annual outage programme.

11.1 Programme prioritisation approach

The sequencing and delivery of electricity transmission infrastructure is very complex as it involves incorporating multiple interacting outages, and where it is not possible to accommodate all proposed infrastructure works in the period requested, prioritisation decisions may be required. EirGrid's Outage Prioritisation Guidance Document is published on our website[22].

Where the need to prioritise work does arise, EirGrid will consider and seek to balance its licence and statutory obligations with customers' requirements, cognisant of security of supply issues, the need to transform the power system, our Climate Action Plan targets, and other relevant factors.

22 http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Outage-Prioritisation-Guidance-Document-Final.pdf

Priority has been given to works that align with delivering on our EirGrid Group Strategy to transform the power system by 2030. This is summarised in the hierarchy below which will be reviewed and updated as part of the Outage Transformation Programme.

Table 2: Outage priority	
	Project/Project activity categories
1	Works to ensure safety of People, Plant, Equipment & Operating Security Standards (OSS), including Priority Maintenance[23, 24]
2	Works to connect new usable generation greater than 50MW, which do not fall within the category above
3	New generation, refurbishments, or general backbone transmission reinforcements of existing assets, not associated with the categories above
4	Works to connect new demand
5	Other (diversions, etc.)

11.2 Transmission outage programme and delivery

Based on the programme prioritisation approach and the outage needs identified for each project, detailed system studies are carried out and a final transmission outage plan is agreed. This annual plan is known as the Transmission Outage Programme (TOP) and is published in February for the current calendar year.

In 2022, 71%[25] of the TOP was delivered representing an acceptable outturn performance for the calendar year. In comparison with 2021, the TOP outturn delivery performance was 72.5%. It should be noted that this is an ex-post delivery percentage which accounts for third party delays and includes additional works over and above the baseline TOP22 programme. 63% of the baseline TOP22 programme was delivered in 2022.

Challenges remain in delivering the annual transmission outage programme. Transmission outages are a scarce and valuable resource, with a substantial volume of outages needed to deliver all system reinforcement, connection projects and maintenance works. The development of the transmission system and delivery of the programme of works is therefore dependent upon adequate generation capacity margins and low numbers of forced outages.

23 As per EirGrid's Guide to Transmission Equipment Maintenance.
24 Excluding upgrades or replacements that are not deemed essential to operating the system over the next year.
25 This TOP22 delivery percentage includes an ex-post adjustment for issues outside of the control of the TSO and TAO.

11.3 Transmission outage transformation programme

In the 2021 IPD report, EirGrid advised that there are insufficient outage opportunities to carry out all of the work planned for the Transmission System without a change to the current approach. The ability to provide the increased number of outages is not expected to improve in future years as generation capacity margins remain tight, and the provision of outages has therefore been identified as a key risk to delivering on our strategy of transforming the power system.

In 2022, EirGrid initiated an outage transformation project to examine methodologies to deliver as much increased transmission grid network as possible. Included in this programme is the review of best international practice in the delivery of complex transmission outage programmes in order to introduce new processes and procedures within the Irish system. As this project develops EirGrid will provide more detail regarding what this entails, the changes required, the proposals that will be implemented and the expected benefits.

12. Stakeholder engagement and community benefit

EirGrid and ESB Networks are committed to stakeholder and public engagement. Through working together with stakeholders, customers, industry, the public and local communities, we make better decisions.

In 2022, EirGrid demonstrated a further step change in approach, methodology and channels of stakeholder engagement. We continued to work to ensure that the evolution of our stakeholder engagement was in line with our principles; how we identify stakeholders and how we work to involve them in key decisions.

Throughout 2022, ESB Networks and EirGrid maintained regular interaction with Landowners, Landowner Representative Organisations regarding land access issues and arrangements. EirGrid and ESB Networks also worked co-operatively with statutory bodies and agencies to deliver projects and the inputs needed for the delivery of projects over the coming years.

For further details regarding EirGrid's Stakeholder Engagement in 2022, please refer to EirGrid's Stakeholder Engagement Report 2022, which can be found on EirGrid's website[26].

12.1 Engagement approach

EirGrid uses a consistent, six-step public engagement process to explore options and make decisions. The level of stakeholder engagement is dependent on the type of project, as some technical projects such as the Cross-Shannon 400 kV cable have a limited number of impacted stakeholders. Large infrastructure projects such as Powering Up Dublin, Kildare – Meath Grid Upgrade and the East Meath North Dublin projects involve a much wider range of stakeholders with larger numbers of landowners and communities affected by the proposed development. Our approach to the engagement is tailored to suit the particular project. Supporting this approach is our Public Engagement Strategy[27].

12.2 Landowner engagement

The landowner team engaged with landowners across a wide range of transmission infrastructure projects during 2022, ranging from works on existing lines to proposals for new circuits. For those landowners who host existing overhead lines which have been identified for refurbishment and/or uprating, we explain the works required, anticipated timeframes and seek access to carry out survey works on the lands to help inform the extent of works required.

26 https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Stakeholder-Engagement-Report-2022.pdf
27 https://cms.eirgrid.ie/sites/default/files/publications/EirGrid-Public-Engagement-Strategy.pdf

For new build projects, we engage with potential landowners at the earliest stage possible. For example, on new circuits, where we have a number of potential options proposed, early landowner engagement and feedback forms an important part of the overall consideration in the evaluation of options. This approach ensures that the specific local knowledge of the land and any associated constraints can be understood ahead of any further decision making. The landowner team are also involved in discussing proposals with landowners in relation to requirements for the development of new substations or the enhancement of existing stations.

In our Stakeholder Engagement Plan 2022, we outlined our intention to engage in 2022 on a range of projects including the North Connacht 110 kV Project, the North South 400 kV Interconnector Project, the Laois-Kilkenny Reinforcement Project, the Celtic Interconnector, the East Meath to North Dublin Reinforcement and the Kildare – Meath Grid Upgrade. Further information on the approach to and impact of the engagements on these specific projects can be found in the Stakeholder Engagement Report 2022.

12.3 Dublin Infrastructure Forum

In 2022, EirGrid led the development of the Dublin Infrastructure Forum[28]. This initiative was announced by the Minister for the Environment, Climate and Communications at a briefing in March 2022. The forum membership is made of Chief Executives or their designate from across a number of Government agencies and semi-state bodies who have a remit for delivering infrastructure or relevant supporting economic activity in the greater Dublin area. A key focus of the forum is to minimise disruption for stakeholders and work as efficiently as possible with other state-owned utilities, transport providers and local authorities. This forum is independently chaired, and meetings took place in May and September 2022.

Through the forum, advanced ducting opportunities were established with Waterways Ireland, Dublin City Council and the National Transport Authority on the Royal Canal Greenway project.

28 This is independent of the HV Interface Forum.

12.4 Benefits sharing

When EirGrid plans development or expansion of the transmission grid, this work will affect communities near new transmission infrastructure. This infrastructure, in some locations, may have a visual impact on the landscape, cause disruption during the construction phase or require access to public or private land to support delivery. However, the benefits of safe, secure, and sustainable energy will be long lasting. We work closely with communities and stakeholders to minimise disruption and maximise benefit.

EirGrid's Community Benefit Policy[29] enhances the objective of our community benefit schemes to ensure we leave a positive legacy in communities who facilitate the delivery of grid infrastructure projects and that we build long lasting relationships.

Under this initiative, EirGrid creates a scheme in proportion to the scale of the project once planning consent has been achieved. We work with the established Community Forum on the project to ensure that the scheme is designed for the local community, by the local community through the development of a local community benefit strategy. The scheme is based on 3 pillars: biodiversity, community, and sustainability.

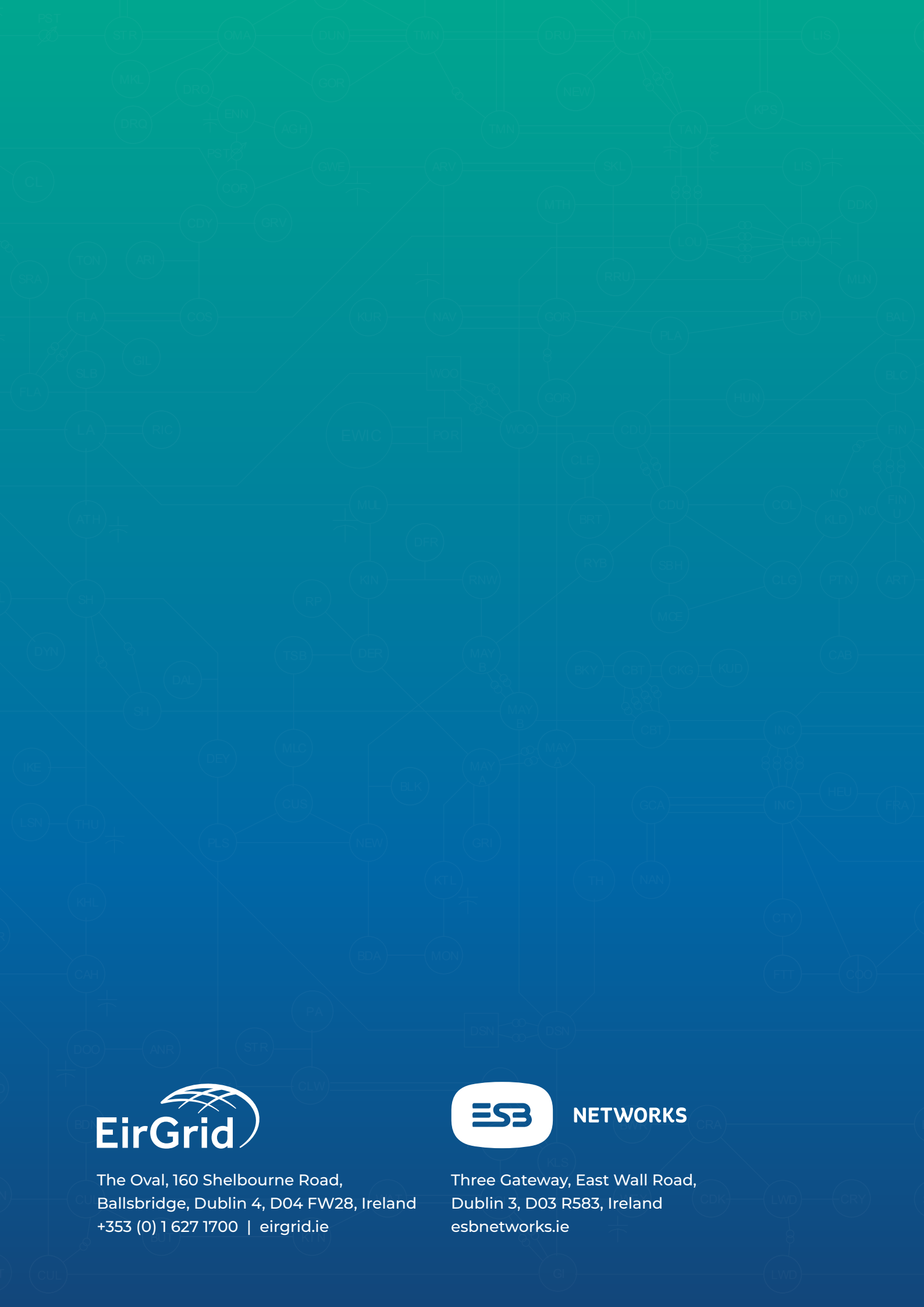
The scheme is delivered over 3 phases: upon commencement of construction, mid-way through cabling or stringing, and upon energisation. The scheme provides grant funding to local community organisations with a focus on leveraging other funding streams and working in partnership. Further details on EirGrid's Community Benefit policy and fund can be found on EirGrid's website[30].

Community benefit schemes that were active in 2022 include Laois Kilkenny, more information is available in EirGrid's Stakeholder Engagement Report for 2022.

29 https://cms.eirgrid.ie/sites/default/files/publications/EirGrid-Community-Benefit-Policy-Brochure%20June%202023.pdf
30 http://www.eirgridgroup.com/about/in-the-community/community-fund/

Acronyms

ALOs	Agricultural Liaison Officers
ATR	Associated Transmission Reinforcement
BESS	Battery Energy Storage System
BSP	Bulk Supply Point
CA	EirGrid Capital Approval
CAPEX	Capital Expenditure
CLOs	Community Liaison Officers
CRU	Commission for Regulation of Utilities
DLR	Dynamic Line Rating
DSO	Distribution System Operator
FAQ	Firm Access Quantity
GW	TSO Six-Step Framework Gateways
GW	Gigawatt
HV	High Voltage
IPD	Investment Planning and Delivery
KM	Kilometre
kV	Kilovolt
MEC	Maximum Export Capacity
MIC	Maximum Import Capacity
MVA	Megavolt Amperes
MW	Megawatt
MYDP	Multi-Year Delivery Programme
NDP	Network Delivery Portfolio
PA	Project Agreement
PR4	Price Review 4 (2016 to 2020)
PR5	Price Review 5 (2021 to 2025)
PR6	Price Review 6 (2026 to 2030)
RE	Renewable Energy
SEAI	Sustainable Energy Authority of Ireland
SNA	System Needs Assessment
SOEF	Shaping Our Electricity Future
TAO	Transmission Asset Owner
TES	Tomorrow's Energy Scenarios
TOP	Transmission Outage Programme
TSO	Transmission System Operator
TSSPS	Transmission System Security and Planning Standards


EirGrid
The Oval, 160 Shelbourne Road,
Ballsbridge, Dublin 4, D04 FW28, Ireland
+353 (0) 1 627 1700 | eirgrid.ie
ESB NETWORKS
Three Gateway, East Wall Road,
Dublin 3, D03 R583, Ireland
esbnetworks.ie