# Transmission Development Plan 2023

EirGrid

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## Document structure

The structure of the document is as follows:

The **Abbreviations and Terms** provides a glossary of terms and acronyms used in the document.

The **Executive Summary** gives an overview of the main highlights of the document and presents a summary of the Plan.

**Section 1: Introduction** – our statutory and legal obligations are introduced. The purpose and context of the Transmission Development Plan (TDP) is outlined.

**Section 2: Investment drivers and needs** – the drivers of network development are introduced and discussed, as are the needs of the network which result from these drivers. The needs are identified through the application of the grid development approach discussed in Appendix B.

**Section 3: Changes to the Plan since 2021** – provides information on the changes to the plan between TDP 2021 and TDP 2023.

**Section 4: Planned network developments** – summarises the development projects that are currently in progress.

**Section 5: Regional view** – summarises and categorises the development projects that are currently in progress by region.

**Section 6: Projects in early stages of development** – projects in early stages of development are outlined.

**Section 7: Summary of Environmental Appraisal Report (EAR)** – summarises the EAR of TDP 2023.

**Appendix A: Irish projects in European Plans**

**Appendix B: Approach to grid development**

**Appendix C: References**

# Abbreviations and terms

## Abbreviations

| | |
|---|---|
| **AA** | Appropriate Assessment |
| **ABP** | An Bord Pleanála |
| **ATR** | Associated Transmission Reinforcement(s) |
| **CP No.** | Capital Project Identification Number |
| **CPP** | Committed Project Parameters |
| **CRU** | Commission for Regulation of Utilities |
| **DSO** | Distribution System Operator |
| **EAR** | Environmental Appraisal Report |
| **EC** | European Commission |
| **ECD** | Estimated Completion Date |
| **EIA** | Environmental Impact Assessment |
| **EIAR** | Environmental Impact Assessment Report |
| **ENTSO-E** | European Network of Transmission System Operators for Electricity |
| **ER** | Environmental Report |
| **ESB** | Electricity Supply Board |
| **EU** | European Union |
| **EWIC** | East West Interconnector |
| **GCS** | Generation Capacity Statement |
| **GIS** | Gas Insulated Switchgear |
| **GW** | Gigawatt |
| **HV** | High Voltage |
| **HVDC** | High Voltage Direct Current |
| **IA** | Infrastructure Agreement |
| **IP** | Implementation Programme |
| **LPA** | Local Planning Authority |
| **MEC** | Maximum Export Capacity |
| **MIC** | Maximum Import Capacity |
| **MW** | Megawatt |
| **NDP** | Network Delivery Portfolio |
| **NIS** | Natura Impact Statement |
| **PA** | Project Agreement |
| **RegIP** | Regional Investment Plan |
| **RES** | Renewable Energy Sources |
| **RES-E** | Renewable Energy Sources – Electricity |
| **RESS** | Renewable Electricity Support Scheme |
| **RGNS** | Regional Group North Sea |
| **RIDP** | Renewable Integration Development Project |
| **SAC** | Special Area of Conservation |
| **SEA** | Strategic Environmental Assessment |
| **SI60** | Statutory Instrument No. 60 of 2005 |
| **SI147** | Statutory Instrument No. 147 of 2011 |
| **SI445** | Statutory Instrument No. 445 of 2000 |
| **SI227** | Statutory Instrument No. 227 of 2022 |
| **SONI** | System Operator Northern Ireland |
| **SPA** | Special Protection Areas |
| **SNSP** | System Non-Synchronous Penetration |
| **TAO** | Transmission Asset Owner |
| **TDP** | Transmission Development Plan |
| **TSO** | Transmission System Operator |
| **TSSPS** | Transmission System Security and Planning Standards |
| **TYNDP** | Ten Year Network Development Plan |
| **TYTFS** | Ten Year Transmission Forecast Statement |

## Terms

### Bay
A connection point to a busbar and comprising switchgear and measurement equipment.

### Busbar
An electrical conductor located in a station that makes a common connection between several circuits.

### Capacitor
An item of plant normally used on the electrical network to supply reactive power to loads (generally locally) and thereby support the local area voltage.

### Capital Project Number (CP No.)
Each project has a unique Capital Project Number to help coordination between EirGrid and the TAO, and for reporting purposes.

### Circuit
A line or cable, including associated switchgear, which carries electrical power.

### Circuit breaker
A device used to open a circuit that is carrying electrical current.

### Constraint
A change in the output of generators, scheduled in the market or not, due to transmission network limitations – specifically the overloading of transmission lines, cables and transformers.

### Contingency
An unexpected failure or outage of a network component, such as a generation unit, transmission line, transformer or other electrical element.

### Coupler
This is a device which can be used to either connect or disconnect sections of busbars. A coupler increases Security of Supply and flexibility under both fault and maintenance conditions. A coupler can also be known as a Sectionalising Circuit Breaker.

### Deep reinforcement
Refers to network reinforcement additional to the shallow connection that is required to allow a new generator or demand to operate at maximum export or import capacity respectively.

### Demand
The amount of electrical power that is consumed by a customer and is measured in Megawatts (MW). In a general sense, the amount of power that must be transported from transmission network connected generation stations to meet all customers' electricity requirements.

### Demand-side management
The modification of normal demand patterns usually through the use of financial incentives.

### Deterministic methodology
The deterministic methodology is often referred to as the N-1 criterion. This means that the system must have sufficient capacity so that in the eventuality of a probable system outage, there are no resulting system problems such as overloading, under-voltage, over-voltage or instability.

### Distribution system operator
In the electrical power business, a distribution system operator is the licensed entity responsible for:

- Operating and ensuring the maintenance and development of the distribution system in a given area (and its interconnections), if necessary and where applicable; and
- Ensuring the long term ability of the system to meet reasonable demands for electrical power.

### EirGrid
The independent statutory electricity Transmission System Operator in Ireland.

### Embedded generation
Refers to generation that is connected to the distribution network or at a customer's site.

### Estimated Completion Date (ECD)
The estimated completion or forecast energisation date of a project. The estimate is subject to the:

- Planning process where applicable;
- Construction progress; and
- Availability of transmission outages and commissioning.

*ECDs are indicative dates and subject to change.

### Gas Insulated Switchgear (GIS)
A compact form of switchgear where the conductors and circuit breakers are insulated by an inert gas (that is, typically SF6).

### Gate
A group processing mechanism to efficiently process large volumes of connection applications from renewable and conventional generators wishing to connect to the transmission or distribution systems. This is a CRU approved and directed approach.

### Generation dispatch
The configuration of outputs from the connected generation units.

### Grid
A network of high voltage lines and cables (400 kV, 275 kV, 220 kV and 110 kV) used to transmit bulk electricity supplies around Ireland. The terms grid, electricity transmission network, and transmission system are used interchangeably in this Development Plan.

### Intact network
The transmission network with no network element removed for maintenance, replacement or repair.

### Interconnector
The electrical link, facilities and equipment that connect the transmission network of one jurisdiction to another.

### Maintenance trip conditions
This condition occurs when a network component (generation unit, transmission line, transformer or other electrical element) is out of service for maintenance, and there is an unexpected failure or outage of another network component.

### Maximum Export Capacity (MEC)
The maximum export value (MW) provided in accordance with a generator's connection agreement. The MEC is a contract value which the generator chooses as its maximum output.

### Maximum Import Capacity (MIC)
The maximum import value (MW) provided in accordance with a customer's connection agreement. The MIC is a contract value which a customer chooses to cater for maximum demand at their site.

### Network development driver
A factor based on national and European energy policy objectives that influences or 'drives' the investment in the transmission network.

### Network development need
A deficiency or problem on the network which arises as a result of one or a number of network development drivers. Network reinforcement is required to solve a network development need.

### Power flow
The physical flow of electrical power. It is typically measured in Megavolt-Amperes (MVA) which is the complex combination of both 'active' and 'reactive' electrical power. The flow of 'active' power is measured in Megawatts (MW); the flow of 'reactive power' is measured in Megavars (Mvar).

### Phase Shifting Transformer (PST)
A type of device employed on the electrical network to control the flow of active power.

### Reactive compensation
The process of supplying reactive power to the network to compensate for reactive power usage at a point in time.

### Reactive power
The portion of electricity that establishes and sustains the electric and magnetic fields of alternating current equipment. Reactive power is measured in Megavars (Mvar).

### Reactor
An item of plant comprising a coil of electrical wire. It is typically employed on the electrical network to either:

- Limit short circuit levels; or
- Prevent voltage rise,

depending on its installation and configuration.

### Series compensation
A technology that boosts flows on very long transmission lines. There have been recent advances in this technology and its control systems. This allows for greater flexibility and more benefits when using series compensation.

### Shallow connection
The local connection assets required to connect a customer, or customers, to the transmission network. These types of connections are typically for the specific benefit of that particular customer or group of customers.

### Single contingency conditions
This condition occurs when the transmission network is intact and there is an unexpected failure or outage of one network component (generation unit, transmission line, transformer or other electrical elements).

### Summer valley
The annual minimum electrical demand that usually occurs in August.

### Summer peak
The week-day peak electrical demand value between March and September, inclusive, which is typically 80 % of the winter peak.

### Switchgear
A combination of electrical equipment such as disconnects and/or circuit breakers used to isolate equipment in or near an electrical station.

### Transformer
An item of electrical equipment that allows electrical power to flow between typically two different voltage levels in an alternating current (AC) power system.

### Transmission Losses
A small proportion of energy is lost as heat or light whilst transporting electricity on the transmission network. These losses are known as transmission losses.

### Transmission peak
The peak demand that is transported on the transmission network. The transmission peak includes an estimate of transmission losses.

### Transmission system security and planning standards

The set of standards that the transmission system is designed to meet. The criteria are deterministic as is the norm throughout the world. They set out objective standards which have been found to deliver an acceptable compromise between the cost of development and the transmission service provided. The Transmission System Security and Planning Standards were previously referred to as the Transmission Planning Criteria.

### Transmission system operator

In the electrical power business, a transmission system operator is the licensed entity that is responsible for:

- Operating and ensuring the maintenance and development of the transmission system in a given area (and its interconnections), if necessary and where applicable; and
- Ensuring the long term ability of the system to transmit electrical power from generation plants to transmission connected demand and regional or local electricity distribution operators.

### Uprate

To increase the capacity or rating of electrical equipment.

### Winter peak

This is the maximum annual system demand. It occurs in the period October to February of the following year, inclusive. Thus, for transmission planning purposes the winter peak 2022 – 2023, the first year of this Plan, may occur in late 2022 or early 2023. The winter peak figures take account of the impact of projected Demand-Side Management initiatives.

# Contents

# Executive summary

The Transmission Development Plan (TDP) 2023 – 2032 lists the committed projects and projects under development for the enhancement of the Irish transmission network over the coming ten years.

Committed projects are those that have received EirGrid capital approval and are in Steps 4-6 of our six-step process for developing the grid. Indicative completion dates have been included for these projects. These projects are detailed in Chapter 5.

The projects which are in the development stages are those which have not yet received capital approval and are in Steps 2-3. These projects are detailed in Chapter 6.

## Introduction

The TDP 2023 – 2032 succeeds the TDP 2021 – 2030. The plan has been prepared in accordance with our statutory and licence obligations.

Additional projects will be included in future TDPs as the needs identified in the Tomorrow's Energy Scenarios System Needs Assessment and candidate reinforcements presented in the latest version of Shaping Our Electricity Future[1] are brought through our six-step process for developing the grid. Inherent in this is the Government target to achieve 80% electricity from renewable energy sources (RES-E) by 2030.

## Changes to the Plan since TDP 2021

There were 145 active projects in TDP 2021. Since then:

- 47 projects that were active in TDP 2021 have been completed;
- Three new projects added in the period covered by this TDP have been completed;
- One project that was active in TDP 2021 has been removed;
- Two projects that were active in TDP 2021 have been put on hold; and
- 110 projects have been added to the Development Plan. Thus, there are 202 active projects in this version of the TDP. The changes since TDP 2021 are described in greater detail in Chapter 3.

It is important to mention that from this version of the TDP onwards, the main input to the list of reported projects in this document is obtained from the Network Delivery Portfolio, NDP.

The NDP publication provides a quarterly status update on three key milestones, EirGrid Capital Approval, Project Agreement with ESB and a forecast energisation date. Dates shown in the NDP are based on an unconstrained scenario and are, therefore, indicative and subject to change due to operational requirements and emergent equipment conditions. Associated Transmission Reinforcement (ATR) system reinforcement updates are contained in EirGrid's NDP. If necessary, Generator customers will continue to receive direct ATR related communications from their System Operator.

The NDP is the most ambitious programme of works ever undertaken on the transmission system in Ireland. To place the NDP in context, EirGrid has anticipated that over 350 projects need to be completed to reinforce the system, connect Industry and meet the target by 2030. Of the 350 projects listed in the NDP, the TDP reports the projects that received capital approval as of the data freeze date.

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.

1 https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping-Our-Electricity-Future_Version-1.1-Plain-English-Summary_07.23.pdf

## Transmission network development

The development of the Irish electricity sector is guided by several national and European Union (EU) policy and strategic objectives. These objectives guide investment in the Irish transmission network and are summarised as follows:

- Ensuring the security of electricity supply;
- Ensuring the competitiveness of the national economy;
- Ensuring the long-term sustainability of electricity supply in the country; and
- Ensuring that the targets of the Climate Action Plan are met.

In order to achieve these strategic objectives, we must invest in the development and maintenance of the electricity transmission network. Drivers of investment include:

- Securing transmission network supplies;
- Supporting market integration; and
- Supporting the integration of Renewable Energy Sources, interconnectors development, thermal generation and system services providers.

As demand for electricity and/or the mix and location of generation changes, or the transmission network becomes more interconnected with neighbouring transmission networks[2], the flow of electrical energy throughout the transmission network changes. To accommodate these changes in power flows, it is often necessary to modify or strengthen the transmission network to maintain a secure, reliable high performing system, to meet the needs of the energy citizen, businesses and the all users of the transmission network.

In addition, the timely maintenance and/or replacement of transmission assets is required to provide the necessary continuity of service, to facilitate the transport of electricity from where it is generated to where it is used.

2 The European electric power transmission networks are interconnected, so as to be able to transmit energy from one country to the other.

## Shaping Our Electricity Future

The Government's first Climate Action Plan was published in 2019[3] setting out an ambitious plan for decarbonising Ireland's economy. Specifically, for the electricity sector, it set a target that at least 70% of our electricity will come from renewable energy sources (RES) by 2030.

In response to this, EirGrid initiated a programme of work called Shaping Our Electricity Future[4] with a core objective of establishing a roadmap for delivery of the 70% RES-E target. In March 2021, EirGrid launched a 14-week stakeholder consultation providing four options for how the target could be achieved. A number of reports were published in support of this consultation, including a technical report, outlining our views on the many network, operational and market requirements that need to be put in place by 2030. EirGrid received approximately 430 responses to the consultation from a wide range of stakeholders. This feedback was used to prepare the Shaping Our Electricity Future v1.0 roadmap which was published in November 2021.

The SOEF v1.0 roadmap identifies activities required across four separate workstreams; networks, operations, markets and stakeholder engagement. Network planning studies carried out for the networks workstream identified 40 candidate reinforcements that are required in addition to already committed network projects. Our commitment to maximising the use of the existing grid is demonstrated by the study results; 35 of the 40 reinforcements involve the use of existing assets, replacement of existing assets or the use of non-network technologies such as power flow controllers or dynamic line ratings.

The studies show that the additional projects assist in achieving RES-E levels in excess of 70%, establishing a strong platform to achieve the long-term ambition of net zero emissions by 2050. The proposed reinforcements will be studied in more detail before progressing through the six-step grid development framework and potentially appearing in future versions of the transmission development plan.

3 https://www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/
4 https://www.eirgridgroup.com/the-grid/shaping-our-electricity-f/

The Shaping Our Electricity Future roadmap is a dynamic plan that has been updated and published in July 2023. This new version, Shaping Our Electricity Future v1.1[5], reflects the best available information, including changes in climate and energy policy, and reports on progress against specific actions within the roadmap, including the necessary changes for achieving the government's target of up to 80% RES-E by 2030 as detailed in the Climate Action plan of 2021[6], and the electricity sector carbon dioxide emissions limits and budgets as detailed in the latest version of the Climate Action Plan published in December 2022[7].

SOEF v1.1 has reported a selection of transmission network reinforcements that satisfy the needs of the transmission system. Twenty candidate reinforcements have been identified to meet the increased renewable ambition in both jurisdictions. These candidate reinforcements are required in addition to other committed projects that are already progressing through the framework for grid development and are also additional reinforcement to those identified in SOEF v1.0. The candidate reinforcements for Ireland are indicated in section 3.5.1.

In Ireland, sixteen new candidate reinforcements projects have been identified to address new renewable generation connections and demand growth across the country. All these sixteen reinforcements involve the use of existing assets or the use of non-network technologies such as power flow controller or dynamic line ratings, demonstrating EirGrid's commitment to maximising the use of the existing grid.

The main objective of SOEF Roadmaps is to outline how we can make the grid ready to meet the government targets of up to 80% RES-E and low carbon emission by 2030. SOEF uses the data in the latest TDP to determine the base reinforcements for future years and proposes candidate solutions that have the potential to progress the framework for grid development.

The candidate solutions identified in SOEF v1.0 and v1.1, in addition to other identified projects, will require detailed assessment using the framework for grid development to determine the optimum path forward. The projects resulting from this process will be reported in future TDPs.

5 https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping-Our-Electricity-Future-Roadmap_Version-1.1_07.23.pdf
6 https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/
7 https://www.gov.ie/en/publication/7bd8c-climate-action-plan-2023/

# 1. Introduction

The transmission network is a series of high voltage, 400 kV, 275 kV, 220 kV and 110 kV stations, lines and cables. It is the backbone of the power system, efficiently transporting large amounts of power from where it is generated to where it is needed, safely and reliably.

Electricity supply is essential, and a reliable transmission network is the means by which we move electricity around the country. The development of transmission network infrastructure is, therefore, of national strategic importance.

The primary objective of the Transmission Development Plan (TDP) is to describe the transmission network reinforcements which are currently approved for delivery within the next ten years. This is a point in time list that until now has been updated annually. The TDP outlines:

- The drivers of network development;
- The network investment needs; and
- The planned network developments required to address these needs.

This TDP covers Ireland only as it is not an all-island plan. SONI, the electricity System Operator for Northern Ireland, produces the TDP for Northern Ireland[8].

## 1.1 Statutory and licence requirements

EirGrid is responsible for the operation and development of the transmission network in Ireland. We have both statutory and licence obligations to produce a TDP, these are:

- Regulation 8(6) of Statutory Instrument (SI) No. 445 of 2000[9] as amended;
- Regulation 8(6) of Statutory Instrument (SI) No. 227 of 2022[10] as amended;
- Condition 8 of EirGrid's Transmission System Operator (TSO) Licence; and
- Article 51 of Directive 2019/944/EC.

## 1.2 Transmission Development Plan 2023

TDP 2023 is our plan to develop the network through specific projects over the next ten years.

It is possible that changes will occur in the scope and timing of the listed developments. Similarly, given the continuously changing nature of electricity requirements, new developments will emerge. These changes will be accommodated in future TDPs. As such, the long-term development of the network is constantly under review.

8 https://www.soni.ltd.uk/media/documents/SONI-Transmission-Development-Plan-Northern-Ireland-2020-2029.pdf
9 https://www.irishstatutebook.ie/eli/2000/si/445/made/en/print
10 https://www.irishstatutebook.ie/eli/2022/si/227/made/en/print

To help the comparison of network development projects year-on-year and in the interest of routine reporting, data is represented at a fixed point in time – the data freeze date. The freeze date for project inclusion for this TDP is 21 December 2022. The previous TDP, TDP 2021, had a freeze date of 01 January 2021.

In this TDP, we report on projects according to our six-step process for developing the grid and engaging with stakeholders. The six-step process is set out in Appendix B and in our Have Your Say brochure[11].

Our annual stakeholder engagement activities and plans, including project consultations and engagements, are detailed on our website[12].

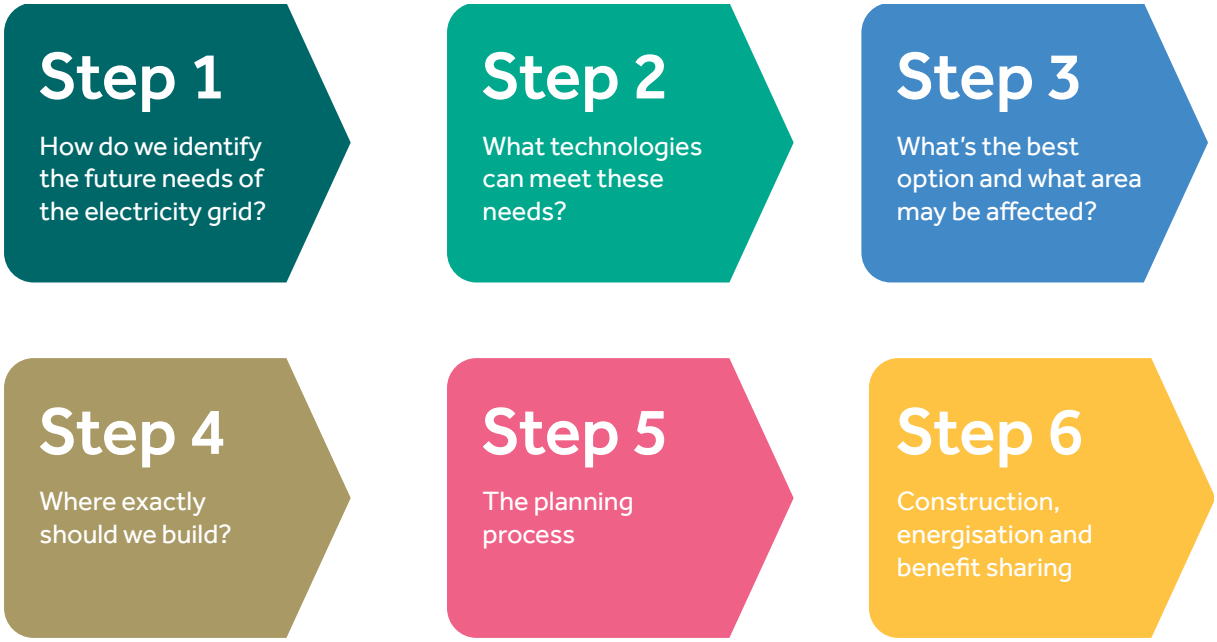



*Figure 1-1: Our framework for grid development*

This TDP describes all committed projects that are in steps 4 to 6 of our six-step process on the freeze date of 21 December 2022.

Committed projects have received EirGrid capital approval which occurs at the end of step 3. Indicative completion dates are included for these projects. These projects are detailed in Chapter 5.

11 https://www.eirgridgroup.com/__uuid/7d658280-91a2-4dbb-b438-ef005a857761/EirGrid-Have-Your-Say_May-2017.pdf
12 https://www.eirgridgroup.com/the-grid/stakeholder-engagement/

This TDP also includes information in Chapter 6 on projects that are in the early stages of development, that is in steps 2 and 3. As these projects progress and get EirGrid capital approval they will move through steps 4 to 6.

EirGrid is required to publish quarterly updates on the progress of all its transmission infrastructure projects as set out in CRU/20/154[13], the CRU's PR5 Regulatory Framework, Incentives and Reporting Decision Paper. Since October 2022, our Network Delivery Portfolio (NDP) status reports has been published on our website[14].It is important to mention that from this version of TDP onwards, the main input to the list of reported projects in this document is obtained is the NDP.

The NDP publication provides a quarterly status update on three key milestones, EirGrid Capital Approval, Project Agreement with ESB and a forecast energisation date. Dates shown in the NDP are based on an unconstrained scenario and are, therefore, indicative and subject to change due to operational requirements and emergent equipment conditions. Associated Transmission Reinforcement (ATR) system reinforcement updates are contained in EirGrid's NDP.

If necessary, Generator customers will continue to receive direct ATR related communications from their System Operator.

The NDP is the most ambitious programme of works ever undertaken on the transmission system in Ireland. To place the NDP in context, EirGrid has anticipated that over 350 projects need to be completed to reinforce the system, connect Industry and meet the target by 2030. Of the 350 projects listed in the NDP, the TDP reports the projects that received capital approval as of the data freeze date.

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.

EirGrid and ESB Networks, in their respective capacity as TSO and TAO, publish an Annual Electricity Transmission Performance Report and an Investment Planning and Delivery Report.

The Commission for Regulation of Utilities (CRU), as part of its decision paper CRU/20/154 PR5 Regulatory Framework, Incentives and Reporting, requires the TSO and the TAO to produce these joint reports setting out their annual performance in regard to the operation and development of the transmission system. The reports are intended to provide customers, industry participants and other interested parties with a clear, accessible, comprehensive, quantified but non-technical report on performance in the previous calendar year. The 2019, 2020 and 2021 reports can be found on our website[15].

13 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf
14 https://www.eirgridgroup.com/customer-and-industry/general-customer-information/network-delivery-portfoli/index.xml
15 https://www.eirgridgroup.com/how-the-grid-works/tso-regulatory-publicatio/

## 1.3 Process for developing the Transmission Development Plan

This TDP covers a period of ten years. As part of the preparation of the TDP, we consult with SONI to ensure that the information is accurate. A public consultation on the draft TDP is held by the CRU. Following feedback received from the public consultation we update the TDP, as required, and provide a report to the CRU on feedback received. We prepare the final version of the TDP and submit it to the CRU for approval.

## 1.4 Context of the Plan

The TDP takes account of a wide range of contexts. This section highlights the fields covered by the document.

### 1.4.1 All-Island and European context

Our TSO license obliges us to carry out transmission planning on a coordinated all-island basis with SONI. This requirement is met by the System Operator Agreement in place between EirGrid and SONI.

Each year EirGrid and SONI jointly prepare the All-Island Generation Capacity Statement (GCS)[16]. The GCS outlines demand forecasts and assesses the generation adequacy of the island of Ireland over the ten-year period covered by the GCS.

EirGrid and SONI also jointly prepare the annual All-Island Ten Year Transmission Forecast Statement (TYTFS)[17]. The TYTFS provides detailed data and models of the transmission system.

The TYTFS is designed to assist users and potential users of the transmission system to identify opportunities to connect to and make use of the transmission system. The demand forecast in the TYTFS is based on the demand forecast in the GCS.

SONI publishes the Transmission Development Plan for Northern Ireland. The TDPs for Ireland and Northern Ireland provide details of the transmission system developments expected to be progressed in Ireland and Northern Ireland in the coming 10 years. These transmission system developments are also included in the data, assumptions and analyses in the TYTFS.

European legislation requires all European TSOs to cooperate through the European Network of Transmission System Operators for Electricity (ENTSO-E). ENTSO-E has six regional groups that co-ordinate network planning and development at regional level. We are members of the Regional Group North Sea (RGNS). ENTSO-E publishes a Ten Year Network Development Plan (TYNDP) every two years. The TYNDP outlines projects of European significance. Irish projects in European plans are detailed in Appendix A.

It is important that readers of this TDP are aware of the all-island and European context. Readers should consider these other documents, our approach to scenario planning, detailed in the next section, and also our Shaping Electricity Future Roadmap. Figure 1-2 below shows the links between the various documents.

16 https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid_SONI_Ireland_Capacity_Outlook_2022-2031.pdf
17 https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Ten-Year-Transmission-Forecast-Statement-TYTFS-2021.pdf

Readers, in particular users or potential users of the transmission system, may also find it beneficial to consult specific sections in the TYTFS. The specific sections 'How to Use the Information for Generation' and 'How to Use the Information for Demand' are in Sections 7 and 8 of the TYTFS respectively. The sections outline how generation and demand customers can use the 'opportunities to connect' information in the TYTFS.

### 1.4.2 Grid development strategy

We published our grid development strategy in January 2017[18]. In it we outline our three strategy statements:

- Inclusive consultation with local communities and stakeholders will be central to our approach;
- We will consider all practical technology options; and
- We will optimise the existing grid to minimise the need for new infrastructure.

Our strategy statements guide and influence how we develop the grid.

### 1.4.3 Offshore grid development

Due to its peripheral location at the edge of the Atlantic, with a sea area of 490,000 square kilometre that is approximately seven times its landmass, Ireland has considerable offshore renewable energy potential.

In addition to onshore renewable energy development, meeting the government targets for 2030 will require development of significant offshore renewable energy infrastructure over the coming years. Harnessing our offshore renewable energy resources will play a key role in the transition towards a sustainable, secure and competitive energy system.

EirGrid will plan, develop and own the offshore transmission system, which will ultimately be managed according to a centralised model. Ownership of the offshore transmission system assets will be vested in EirGrid at all phases of offshore renewable energy development as provided for in legislation under the Maritime Area Planning (MAP) Bill 2021[19].

Offshore grid development will be underpinned by a framework that provides for a phased transition from the current decentralised model towards an enduring centralised offshore grid model, to take place in line with three scheduled offshore Renewable Electricity Support Scheme (RESS) auctions.

The Framework will progress in three phases, which will start with a decentralised plan involving offshore development carried out by EirGrid and developers, (Phases One and Two), and end with a centralised development where EirGrid will plan and build out transmission infrastructure, with the potential, where possible, to optimise the connections of multiple projects to the offshore transmission system from areas deemed suitable for offshore renewable energy development.

18 https://www.eirgridgroup.com/the-grid/irelands-strategy/
19 https://Maritime Area Planning

### 1.4.4 Climate Action Plan

In December 2022, the Irish Government launched its Climate Action Plan 2023, CAP 2023. The revised plan reflects increased ambitions for the decarbonisation of Ireland's economy, including a revised target of renewable sources (RES-E). Among the most important measures in the CAP 2023 is to increase the proportion of renewable electricity to up to 80% by 2030 and a target of 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy plus 2 GW for green hydrogen production.

The new targets for the electricity sector will allow us to operate at higher system non-synchronous penetration (SNSP) levels more often reducing emission by using RES. At the same time, it will allow us to electrify other sector such as transport and heat reducing emissions in these sectors too.

EirGrid will continue to monitor changes in climate and energy policy and update our development plans accordingly. We are focused not only on 2030 targets but also on the long-term ambition of net zero greenhouse gas emissions in Ireland by 2050 which is a legal requirement as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021.

In order to meet decarbonisation targets in the electricity sector, investment will be needed in new renewable generation capacity, system service infrastructure and electricity networks. The transition to low-carbon and renewable energy will have widespread consequences, indeed it will require a significant transformation of the electricity system.

In September 2019, we launched our Strategy 2020-2025[20] which is shaped by two factors: climate change and the impending transformation of the electricity sector. We are committed to leading the change toward net zero carbon emissions from the electricity system and achieving renewable energy targets.

The TDP contains a list of the committed projects as at data freeze day of 21 December 2022. Additional projects will be included in future TDPs as a result of our ongoing assessment of the impact of evolving climate and energy policies including revisions to the Government's Climate Action Plan.

20 https://www.eirgridgroup.com/about/strategy-2025/

### 1.4.5 Capital expenditure

This plan includes 202 active projects that are underway. Funding for transmission projects is approved by the CRU through the price review process. The CRU approved allowable capital expenditure of €1.2 billion for network projects in the current five-year price review period 2021-2025, CRU/20/152[21].

The CRU and EirGrid have a framework in place for monitoring transmission capital expenditure. This framework provides flexibility to respond to the identified needs which are influenced by external factors; including changes in generation and demand, amongst others. Expenditure beyond 2025 will be considered and approved in future price reviews.

### 1.4.6 United Kingdom's referendum on EU membership

The transition period of the UK's exit from the European Union ended on 31 December 2020. The Protocol on Ireland and Northern Ireland[22] provides for the continued operation of the Single Electricity Market (SEM) and maintains the applicability of relevant EU energy law in Northern Ireland. However, since the UK has now decoupled from the EU internal energy market, since 01January 2021, the SEM has in place less efficient cross-border trading arrangements with the GB electricity market.

The EU-UK Trade and Cooperation Agreement[23] calls for the EU and the UK to cooperate to support the delivery of cost efficient, clean and secure supplies of electricity and gas, based on competitive markets and non-discriminatory access to networks as part of their future partnership. As such, new trading arrangements are to be agreed, for operation in coming years and a new co-operation agreement is to be put in place between UK and EU TSOs.

Regardless of the UK leaving the EU, there will always be many shared benefits of working closely with our nearest neighbours. We aim to maintain a strong relationship between Ireland, Northern Ireland and Great Britain on electricity matters.

21 https://www.cru.ie/publications/26864/
22 https://www.gov.ie/en/publication/060fdf-northern-ireland/#the-protocol-and-the-all-island-economy
23 https://commission.europa.eu/strategy-and-policy/relations-non-eu-countries/relations-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

## 1.5 Network design

The development of the transmission network involves forecasting future needs. Solutions to address these needs must strike a balance between network reliability, costs, and environmental impacts. The process is flexible to enable the long-term development of the network.

Considerations that shape the medium and long-term development of the transmission network are outlined below. Tomorrow's Energy Scenarios looks further into the future to 2035, 2040 and 2050 based on changes to the electricity portfolio, such as electricity generation, demand, interconnection and storage. Shaping Our Electricity Future provides an outline of the key developments from a networks, engagement, operations and markets perspective needed to support a secure transition up to 80% RES-E on the electricity grid by 2030. Potential projects identified in Tomorrows Energy Scenarios and Shaping Our Electricity Future are brought through the grid development process and any projects identified will be included in future TDP's.

### 1.5.1 Tomorrow's Energy Scenarios

Scenario Planning was introduced into our grid development process in 2017 to cater for the increased level of uncertainty over the future usage of the grid. We call our scenario planning Tomorrow's Energy Scenarios[24] (TES).

Our scenarios detail a range of potential futures for the electricity sector in Ireland, with specific focus on what this means for the electricity transmission system over the next twenty years and beyond. The underlying assumptions in the scenarios are validated using feedback received from policy makers, industry and the general public as part of an open consultation. This includes feedback from Gas Networks Ireland on projections for gas usage for electricity generation in Ireland.

When the scenarios are finalised, we use them to test the performance of the electricity transmission grid and publish the results in the TES System Needs Assessment (SNA)[25].

Additional projects will be included in future TDPs as the needs identified in the TES SNA are brought through our six-step process for developing the grid. Inherent in this is the requirement to achieve up to 80% RES-E target by 2030.

24 https://www.eirgridgroup.com/customer-and-industry/tes/
25 TES 2017 System Needs Assessment Report: https://www.eirgridgroup.com/site-files/library/EirGrid/TES-2017-System-Needs-Assessment-Final.pdf
TES 2019 System Needs Assessment Report: https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-System-Needs-Assessment-Report_Final.pdf


**All-Island Generation Capacity Statement**

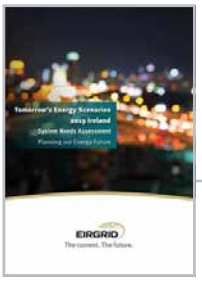
Contains ten year demand forecasts and generation portfolio used as the basis for scenario development in TES


**Tomorrow's Energy Scenarios**

A range of credible pathways for Ireland's energy transition from today until 2040


**All-Island Ten Year Transmission Forecast Statement**

Describes the transmission system and gives an assessment of the opportunities for new demand and generation connections




**Tomorrow's Energy Scenarios System Needs Assessment**

Assessment of the long term needs of the transmission system


**ENTSO-E Ten Year Network Development Plan – Scenarios Report**

Pan-European energy scenarios, used in TYNDP, provides guidance for TES scenario development


**Transmission Development Plan**

Development plans for the transmission network to be progressed over the next ten years


**ENTSO-E Ten Year Network Development Plan**

Assessment of pan-European projects including Projects of Common Interest (PCI)

*Figure 1-2: Links between the various planning documents*

The need and requirement for transmission capacity is continuously evolving. In addition to needs identified in TES SNA, further system needs may be identified in the period between iterations of the Tomorrow's Energy Scenarios. Examples of changes that may arise include plant closures, changes to the condition of network assets and new connections that emerge through the connection offer process.

The needs identified in the TES process are brought through our six-step process for developing the grid. As needs and projects progress through the six-step process, they are included in the TDP.

EirGrid and SONI are in the process of developing revised TES scenarios for Ireland and Northern Ireland out to 2050 – we plan to publish these scenarios for consultation over the summer months with a view to final launch thereafter.

### 1.5.2 Shaping Our Electricity Future

The Government's first iteration of the Climate Action Plan was published in 2019 setting out an ambitious action plan for decarbonising Ireland's economy. Specifically, for the electricity sector, it set a target of at least 70% RES-E by 2030.

In response to this, EirGrid initiated a program of work called Shaping Our Electricity Future with a core objective of establishing a roadmap for delivery of the 70% RES-E target. In March 2021, EirGrid launched a 14 week stakeholder consultation providing a range of options for how the target could be achieved. A number of reports were published in support of this consultation including a technical report[26], outlining our views on the many network, operational and market requirements that need to be put in place by 2030. EirGrid received approximately 430 responses to the consultation from a wide range of stakeholders.

This feedback was used to prepare the final Shaping Our Electricity Future 2030 roadmap[27] which was published in November 2021.

The SOEF v1.0 roadmap articulates activities required across four separate workstreams; networks, operations, markets, and stakeholder engagement. Network planning studies carried out for the networks workstream identified 40 candidate reinforcements that are required in addition to already committed network projects.

26 https://www.eirgridgroup.com/site-files/library/EirGrid/Full-Technical-Report-on-Shaping-Our-Electricity-Future.pdf
27 https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping_Our_Electricity_Future_Roadmap.pdf

Our commitment to maximising the use of the existing grid is demonstrated by the study results; 35 of the 40 reinforcements involve the use of existing assets, replacement of existing assets or the use of non-network technologies such as power flow controllers or dynamic line ratings.

The studies show that the additional projects assist in achieving RES-E levels in excess of 70% establishing a strong platform to achieve the long-term ambition of net zero emissions by 2050. The proposed reinforcements will be studied in more detail before progressing through the six-step grid development framework and potentially appearing in future versions of the transmission development plan.

The Shaping Our Electricity Future roadmap is a dynamic plan that has been updated and published in July 2023. This new version, Shaping Our Electricity Future v1.1, reports on progress against specific actions within the roadmap, including the necessary changes for achieving the government's target of up to 80% RES-E by 2030, and the electricity sector's carbon dioxide emissions limits and budgets, as detailed in the Climate Action plan of 2022.

Shaping Our Electricity Future v1.1 has reported a selection of transmission network reinforcements that satisfy the needs of the transmission system. Twenty candidate reinforcements have been identified to meet the increased renewable ambition in both jurisdictions.

These candidate reinforcements are required in addition to other committed project that are already progressing through the framework for grid development and are also additional reinforcement to those identified in SOEF v1.0. The candidate reinforcements for Ireland are indicated in section 3.5.1.

In Ireland, sixteen new candidate reinforcements projects have been identified to address new renewable generation connections and demand growth across the country. All these sixteen reinforcements involve the use of existing assets or the use of non-network technologies such as power flow controller or dynamic line ratings, demonstrating EirGrid's commitment to maximising the use of the existing grid.

The main objective of SOEF Roadmaps is to outline how we can make the grid ready to meet the government targets of up to 80% RES-E and low carbon emission by 2030. SOEF uses the data in the latest TDP to determine the base reinforcements for future years and proposes candidate solutions that have the potential to progress through the framework for grid development.

The candidate solutions identified in SOEF v1.0 and v1.1, in addition to other identified projects, will require detailed assessment using the framework for grid development to determine the optimum path forward. The projects resulting from this process will be reported in future TDPs.

## 1.6 Regional view

Power flows on the transmission network are not contained within specific counties. To help project reporting and give a regional view to our TDP we group counties together to create regions. In the TDP we use three regions to help communicate the development of the transmission system in Ireland:

1. The Border, Midlands and West;
2. The Mid-West and South-West; and
3. The South-East, Mid-East and Dublin.

These three regions are made up of eight underlying statutory regions and associated counties as follows:

1. Border: Donegal, Sligo, Leitrim, Cavan and Monaghan;
2. Midlands: Longford, Westmeath, Offaly and Laois;
3. West: Mayo, Galway and Roscommon;
4. South-West: Kerry and Cork;
5. Mid-West: Clare, Limerick and Tipperary[28];
6. South-East: Waterford, Wexford, Kilkenny and Carlow;
7. Mid-East: Wicklow, Kildare, Meath and Louth[29];
8. Dublin.

These eight regions are Ireland's regions as per the Nomenclature of Territorial Units for Statistics (NUTS) 3 classification. These regions are also used by government agencies in Ireland, including IDA Ireland and the Central Statistics Office.

The eight statutory regions are illustrated in Figure 1-3 below.

Projects are described by region in Chapter 5 'Regional view'.

28 Formerly Tipperary was split into North Tipperary, which was in the Mid-West region, and South Tipperary which was in the South-East region.
29 Formerly Louth was in the Border region.

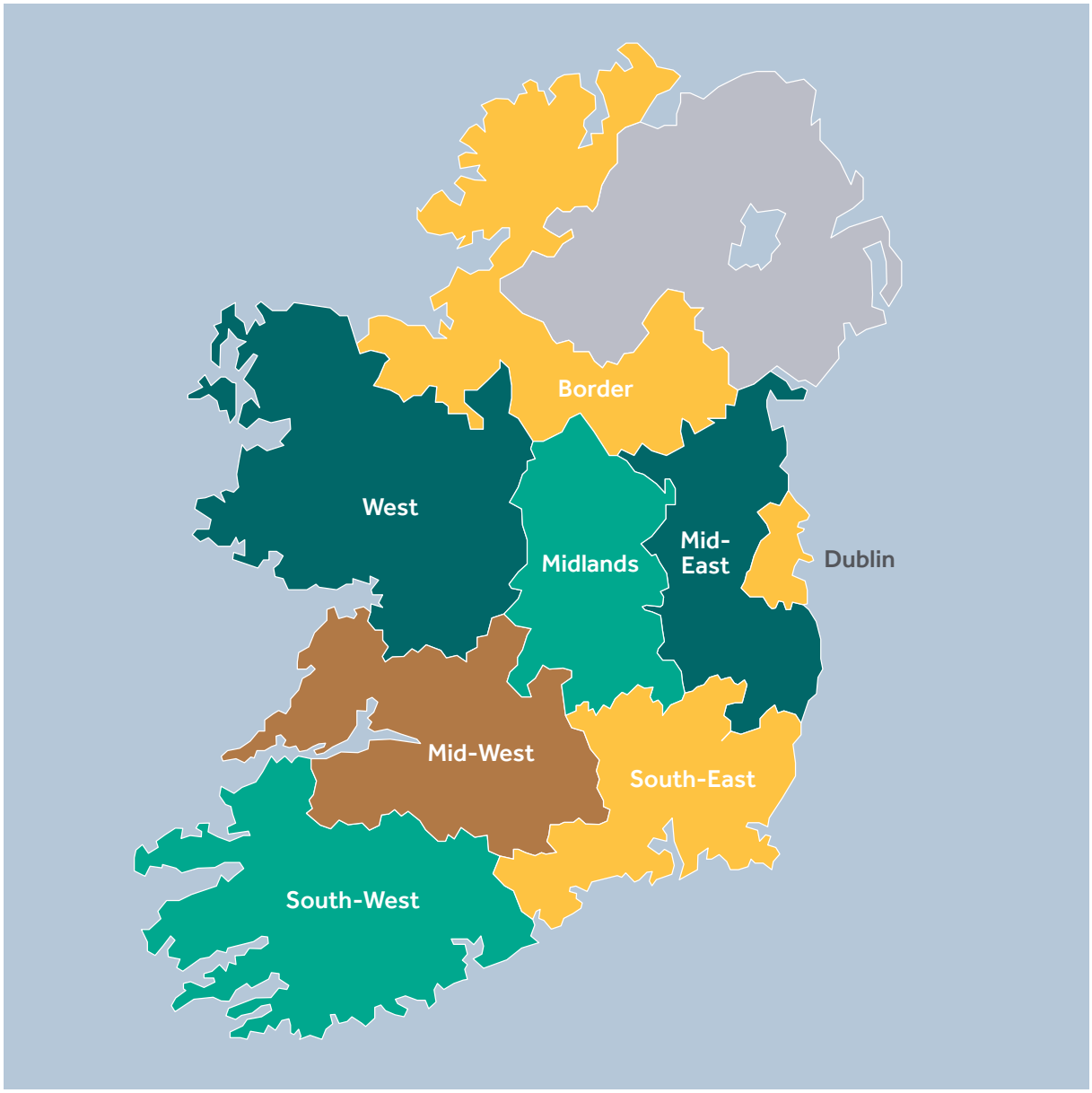



*Figure 1-3: Illustration of Ireland's regions as per the Nomenclature of Territorial Units for Statistics (NUTS) 3 classification*

# 2. Investment drivers and needs

The Irish Government's Energy White Paper[30] released in December 2015 set out Ireland's energy future and continues to be valid. The Climate Action Plan published in December 2022 reflects more recent national and European policy developments. A legally binding target up to 80% RES-E is detailed in Ireland's National Energy and Climate Plan 2023[31], which is Ireland's contribution to the European Union's effort-sharing approach of the Clean Energy Package.

Investment in the transmission system is necessary to enable Ireland's transition to a low carbon energy future. In this regard, the TDP is developed to support Government objectives and enable this energy transition.

## 2.1 Strategic context of transmission network investment

The ability to provide all customers with a secure, efficient, reliable and stable electricity supply is essential for Irish society and to enable economic activity and economic growth.

The Irish electricity industry and its development take direction from a number of broad national and European[32] strategic objectives.

These objectives guide investment in the Irish transmission network and are summarised as follows:

- Ensuring the security of electricity supply;
- Ensuring the competitiveness of the national economy; and
- Ensuring the long-term sustainability of electricity supply in the country.

To ensure these objectives are met we must provide ongoing and timely reinforcement of the Irish transmission network.

30 https://www.gov.ie/en/publication/550df-the-white-paper-irelands-transition-to-a-low-carbon-energy-future-2015-2030/
31 https://www.gov.ie/pdf/?file=https://assets.gov.ie/94442/f3e50986-9fde-4d34-aa35-319af3bfac0c.pdf#page=null
32 https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en

As the TSO for Ireland, EirGrid has a statutory duty to support the development of the Irish economy and society by ensuring the transmission network is able to support all reasonable demands for electricity. In addition, we are required to enter into agreement for connection with parties seeking to connect to the network under terms approved by the CRU.

Changes to demand, generation, or to interconnection with neighbouring transmission networks may alter the flow of electrical power throughout the Irish transmission network. To accommodate these changes in power flows it is often necessary to reinforce the transmission network to ensure adequate performance and reliability levels are maintained.

## 2.2 National and European energy policy

### 2.2.1 Security of supply

Security of supply deals with generation adequacy and the availability of generation to meet the fluctuating demand needs over time. Hence, electricity policy seeks to promote broadening the country's access to generation and promotes further interconnections with neighbouring countries.

Security of supply is also concerned with the reliability and security of the transmission network. Policy therefore also seeks to promote the timely development of the transmission network to maintain an acceptable level of performance and reliability.

### 2.2.2 Competitiveness

Low or competitively priced electricity is viewed as the product of a competitive electricity market. As a result, electricity policy generally seeks to promote increased competition. This is achieved through further market integration, by removing network constraints and broadening the market by interconnecting with neighbouring electricity markets.

### 2.2.3 Sustainability

Ireland is heavily reliant on imported fossil fuels for the generation of electricity. The long-term development of the Irish economy is impacted by the sustainability of the fossil fuels upon which it relies. Furthermore, burning fossil fuels produces greenhouse gases. Electricity policy therefore attempts to address these issues through the integration of energy produced from renewable energy sources.

In December 2022, the Irish Government launched its Climate Action Plan 2023. The revised plan reflects increased ambitions for the decarbonisation of Ireland's economy including a revised target of up to 80% RES-E by 2030. EirGrid is focused not only on 2030 targets but also on the long-term ambition of net zero greenhouse gas emissions in Ireland by 2050 which is a legal requirement as set out in the Climate Action and Low Carbon Development (Amendment) Act 2021.

In order to meet decarbonisation targets in the electricity sector, investment will be needed in new renewable generation capacity, system service infrastructure and electricity networks. The transition to low-carbon and renewable energy will have widespread consequences, indeed it will require a significant transformation of the electricity system.

In September 2019 EirGrid launched our Strategy 2020-2025 which is shaped by climate change and the impending transformation of the electricity sector. We are committed to leading the change towards a carbon-free electricity system and achieving renewable energy targets by 2030.

## 2.3 Policy drivers of transmission network investment

In order to achieve the identified strategic objectives laid out by national and EU policies, we must continue to invest in the development and maintenance of the electricity transmission network. Specific drivers of investment in transmission network infrastructure are identified and described in the following sections.

### 2.3.1 Security of transmission network

Security of supply generally addresses two separate issues:

- The availability of primary energy resources to generate sufficient electricity to meet demand; and
- The ability of the transmission network to reliably transport electrical energy from the generators to the demand centres where it is consumed.

The TDP is aimed at addressing the Security of Supply issues that relate to the transmission network.

Therefore, for this document, Security of Supply means the ability of the transmission network to reliably and securely transport electrical energy from where it is generated to the demand centres where it is consumed.

### 2.3.2 Market integration

With increased market integration, electrical power can flow from areas where it is cheap to produce to areas where it is more highly valued. Therefore, the aim is to make the EU electricity markets more integrated.

The integration of RES and other forms of low carbon generation significantly increases the power exchange opportunities across the region. Differences in national targets combined with varying availabilities of renewable sources across Europe will lead to greater penetration of RES in certain areas compared to others. Therefore, there is a need to reinforce the transmission networks between and within EU countries.

### 2.3.3 Renewable Energy Sources integration

Developing renewable energy is an integral part of Ireland's sustainable energy objectives and climate change strategy. In comparison to fossil fuels, RES have lower or no net emissions. RES contribute to the decarbonisation of the energy supply and reduction in greenhouse gases emissions. They also contribute to energy security, being, for the most part, an indigenous energy source. At the moment, onshore wind farms and hydro stations are the main sources of renewable electricity generation in Ireland. However, as Ireland moves to fully decarbonise its energy system, it is expected that additional renewable energy technologies will be further developed.

This is reflected in the Climate Action Plan 2023 which sets ambitious targets for deployment of renewables including 9 GW from onshore wind, 8 GW from solar, and at least 5 GW of offshore wind energy by 2030. It is also expected that energy storage facilities will be a necessary part of the future energy system, helping to ensure the safe and secure operation of a power system with high levels of variable RES generation.

In order to fulfil both European and national renewable targets, many RES-related projects are expected to be initiated throughout the period of this TDP. Many of these projects are located in rural areas where the transmission network is less developed. This places pressure on the electricity transmission network in these rural areas. Significant challenges will arise in extending and reinforcing the network to connect new RES.

## 2.4 Technical drivers for transmission network investment

Technical drivers of transmission network investment include changes in demand, generation and interconnection, inter-regional power flows and changes in asset conditions.

### 2.4.1 Changes in demand, generation and interconnection

Demand growth, the connection of new demand or interconnectors during periods when power is exported can give rise to higher power flows which may trigger the need to reinforce the network as a result. Closure or reduction in the size of demand facilities can reduce the power flows on lines feeding the load. However, in certain cases where the demand is absorbing local generation and reducing the amount of generation exported from the area, the closure can lead to increased power flows.

Because of the relative size of individual generators, changes in generation installations, whether new additions or closures can have a more significant impact on power flows than demand. This is equally so in the case of interconnectors which are treated as generators during periods when power is imported.

The addition of new generation capacity requires network development to connect the new generator to the network. This provides a path for electric power flow between the new generator and the transmission network. This is commonly known as the shallow connection. The new generation capacity will inevitably alter the power flows across the network, which has the potential to create overload problems deep into the network. To resolve these overloads we need further reinforcements, known as deep reinforcements, to allow full network access.

The connection of large synchronous generators, or groups of generators, combined with the increasingly meshed nature of the transmission network results in lower network impedance, which is the measure of resistance to the flow of electric current, and consequently increased short circuit levels. This can be a safety issue, as under fault conditions, high short circuit currents may cause damage, or in rare cases, catastrophic failure of high voltage equipment. We monitor fault levels on the network and take measures to prevent such conditions occurring.

National and EU policy recognises the economic and technical benefits associated with increased interconnection and therefore seeks to promote interconnection between European transmission systems. Increased interconnection between transmission networks results in a larger energy market.

With increased market integration there is greater competition and the potential for prices to be reduced. With increased interconnection there is also access to a broader generation base, which enhances the networks' Security of Supply. This can potentially defer the need for additional generation to be constructed to meet Security of Supply standards or requirements.

Our annual All-Island Generation Capacity Statement (GCS) 2022-2031, which is available on the EirGrid website, details expected changes in demand, generation and interconnection. The changes are summarised at the system-level.

Our annual All-Island Ten Year Transmission Forecast Statement (TYTFS) 2021 – 2030 describes the expected changes in demand, generation and interconnection at the individual station level. It is important to mention that this document refers to committed generation and demand or customers that have signed a Connection Agreement and not future pipeline projects that are not committed.

To cater for the increased level of uncertainty over the future usage of the grid, we introduced scenario planning into our grid development process. We call our scenarios Tomorrow's Energy Scenarios (TES).

### 2.4.2 Changes in inter-regional power flows

The following factors have the potential to significantly change the flow of electrical power throughout the transmission network:

- Changes in demand;
- Further internal integration of the All-Island Single Electricity Market;
- Further integration with neighbouring countries; and
- Integration of significant levels of new generation (both conventional and renewable).

These factors drive the need for network reinforcements over the next ten years and beyond.

### 2.4.3 Changes in asset condition

Impacted by a number of factors:

- The age of the asset;
- The type of technology used;
- The level of maintenance;
- The environment in which it operates; and
- Utilisation.

In order to ensure appropriate levels of network safety and that Security of Supply is not compromised, routine condition assessments are carried out. These assess the condition of the assets and estimate remaining useful life.

Typically, where asset condition is poor, assets are:

- Refurbished;
- Replaced on a like-for-like basis; or
- Replaced with higher rated equipment to cater for future needs.

## 2.5 Network development needs

The technical drivers of transmission network investment listed above result in network development needs. To address these needs, we must provide ongoing and timely reinforcement of the Irish electricity transmission network.

The primary measure of network development needs is assessed by comparing transmission network performance with the required performance levels set out in the Transmission System Security and Planning Standards (TSSPS).

Our TSO licence, granted by the CRU, specifically requires us to ensure the maintenance of and, if necessary, develop the transmission network in accordance with the TSSPS.

It is possible to categorise the resulting reinforcement needs:

- Reinforcements required to support changes in, or connection of, new demand and generation;
- Reinforcements related to interconnection;
- Reinforcements to facilitate inter-regional power flows; and
- Reinforcements to address the condition of existing assets.

# 3. Changes to the Plan since 2021 and 2022

## TDP 2023 – 2032 has a data freeze date of 21 December 2022 while TDP 2021 had a freeze date of 01 January 2021.

There were 145 active projects in TDP 2021[33]. Since then:

- 110 new projects have been added as they received capital approval.
- 47 active projects in TDP 2021 have been completed.
- Three new projects added in the period covered by this TDP have been completed, CP1176, CP1179 and CP1180.
- One project, CP0837, was on hold and has been reactivated.
- One project that was active in TDP 2021 has been removed.
- Two projects that were active in TDP 2021 have been put on hold.

Thus, there are 202 active projects in this Development Plan. These are identified by region in Chapter 5.

## 3.1 Projects completed in 2021 and 2022

Fifty projects were energised and/or completed in 2021 and 2022:

- Sixteen new assets have been built:
  - Thirty-two kilometres of new transmission circuits, 26 km of UGC and 6 km of OHL.
  - Connection of 557 MW RES, 172 MW of Wind Farms, 275 MW of Solar Farms and 110 MW of BESS.
  - Four new power transformers, two of them are connected at 220 kV to accommodate large customer demands, and the other two connected to the distribution system at 110 kV.
  - Two new reactors connected to the transmission system. One of them is connected to prevent over voltages arising from the amount of underground cable in its area and the other one is a temporary connection while a STATCOM project is completed.
- Twenty uprates were completed, three of them in circuits totalling 152 km of transmission lines uprated. The other uprates were modifications to stations either to facilitate the flow of energy through them or to accommodate RES integration.
- Twelve refurbishment projects were completed, five of them in circuits totalling 188 km of transmission lines refurbishments.
- One composite project was completed, and a voltage uprate project trial was also completed.

33 https://www.eirgridgroup.com/site-files/library/EirGrid/Transmission-Development-Plan-2021-2030.pdf

The completed projects are listed in Table 3-1.

**Table 3-1: Projects completed in 2021 and 2022**

| No. | CP No. | Project title |
|---|---|---|
| 1 | CP0486 | Wexford 110 kV Station Transformer Bay |
| 2 | CP0647 | Kilpaddoge 220-110 kV station |
| 3 | CP0724 | Thornsberry 110 kV Busbar Uprate ATR[34] |
| 4 | CP0726 | Kilpaddoge – Knockanure 220 kV cable |
| 5 | CP0740 | Letterkenny 110 kV Station – Relocation of 110 kV Bay & 2 New Couplers |
| 6 | CP0763 | Clashavoon – Tarbert 220 kV line uprate |
| 7 | CP0771 | Castlebar 110 kV station busbar uprate |
| 8 | CP0794 | Aghada 220 kV Station Busbar Reconfiguration |
| 9 | CP0829 | Clashavoon Macroom No1 110 kV circuit & associated station works & 250 MVA transformer |
| 10 | CP0833 | Mayo Renewable Power Biomass |
| 11 | CP0864 | Tarbert – Tralee No 1 Line Refurbishment |
| 12 | CP0868 | Knockraha – Raffeen 220 kV line refurbishment |
| 13 | CP0883 | Ballyvouskill Knockanure 220 kV Line Uprate |
| 14 | CP0894 | Great Island 110-38 kV trafo DSO and bay works |
| 15 | CP0903 | Cloon – Lanesboro 110 kV No 1 Line Refurbishment |
| 16 | CP0913 | Flagford – Sligo 110 kV Line Conflict |
| 17 | CP0936 | Knockanure Reactor |
| 18 | CP0945 | Great Island Kilkenny 110 kV Uprate |
| 19 | CP0972 | Wexford 110 kV Busbar Uprate |
| 20 | CP1009 | Cruiserath (Amazon) 220 kV Permanent Connection |
| 21 | CP1011 | Carrickalangan 110 kV station |
| 22 | CP1014 | Gemini (Snugborough) Phase 2 |
| 23 | CP1016 | 220 kV Composite Poles Type Testing |

34 Majority of the work, ATR-related, has been completed. Minor work remaining.

## Table 3-1: Projects completed in 2021 and 2022

| No. | CP No. | Project title |
|---|---|---|
| 24 | CP1017 | 400 kV Voltage Uprate Trial |
| 25 | CP1019 | Cashla Tynagh 220 kV Line Fibre Wrap |
| 26 | CP1025 | Corduff 110 kV Station Development Project |
| 27 | CP1036 | Transformer Protection Upgrades |
| 28 | CP1037 | Kilbarry Line Conflicts |
| 29 | CP1040 | Rosspile 110 kV station |
| 30 | CP1047 | Oweninny Power 2[35] |
| 31 | CP1049 | Bracetown 220 kV Station (Clonee Phase 3) |
| 32 | CP1051 | Gallanstown Solar110 kV Station |
| 33 | CP1053 | 220 kV Cable Sealing End Replacement at three transmission stations |
| 34 | CP1058 | Shannonbridge A – New 220 kV transformer bay |
| 35 | CP1077 | Temporary 50 Mvar reactor in Ballyvouskil |
| 36 | CP1083 | Gorman Energy Storage |
| 37 | CP1084 | Lisdrumdoagh 110 kV Battery Storage[34] |
| 38 | CP1085 | Aghada Battery Storage |
| 39 | CP1087 | Porterstown Battery Storage[34] |
| 40 | CP1091 | New 400 220 kV Transformer for Moneypoint Sub-Station |
| 41 | CP1093 | Barnageeragh 110 kV Station (Equinix)[34] |
| 42 | CP1099 | Lisheen 3 Windfarm[34] |
| 43 | CP1101 | Mullagharlin 110 kV Station – 2 New DSO Transformer Bays37[34] |
| 44 | CP1120 | Cloncreen 110 kV Station[34] |
| 45 | CP1130 | Cloghan Wind Farm – New 110 kV transformer bay[34] |
| 46 | CP1131 | Gillinstown Solar (Garballagh 110 kV Station)[34] |
| 47 | CP1135 | Golagh Windfarm Modification[34] |

35 CP1047, CP1084, CP1087, CP1093, CP1099, CP1101, CP1120, CP1130, CP 1131 and CP1135 were added in the previous Development Plan and completed in the period covered by this Development Plan.

| Table 3-1: Projects completed in 2021 and 2022 | | |
|---|---|---|
| **No.** | **CP No.** | **Project title** |
| 48 | CP1176 | Huntstown T2002 Customer Transformer connection[36] |
| 49 | CP1179 | Cloghran Phase 2 Transformer Replacement[35] |
| 50 | CP1180 | Moneypoint Synchronous Condenser[35] |

More information on the completed projects is detailed in our Investment Planning and Delivery Report[37] and Annual Electricity Transmission Performance Report[38].

For a full evaluation of delivery and performance of the annual Transmission Capital programme, readers are directed to our website[39] for the 2022, 2021 and 2020 reports.

The reports are in line with the CRU Reporting and Incentives decisions for Price Review 4 (2016-2020), CER/18/087[40], and Price Review 5 (2021-2025), CRU/20/154[41].

36 CP1176, CP1179 and CP1180 were added and completed during the time covered by this Transmission Development Plan. The projects will be reported as new project as well.
37 https://www.esbnetworks.ie/docs/default-source/publications/draft-investment-planning-and-delivery-report-2021.pdf?sfvrsn=7cdab9bb_6
38 https://www.esbnetworks.ie/docs/default-source/publications/annual-electricity-transmission-performance-report-2020.pdf?sfvrsn=1547347_41
39 https://www.eirgridgroup.com/how-the-grid-works/tso-regulatory-publicatio/
40 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU18087-Reporting-and-Incentives-under-Price-Review-4-Decision-Paper.pdf
41 https://cruie-live-96ca64acab2247eca8a850a7e54b-5b34f62.divio-media.com/documents/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf

## 3.2 Projects removed in 2021 and 2022

One project has been removed: Ballyadam 110 kV Station Development (CP1151).

As TSO, EirGrid has decided to put the project on hold. EirGrid is exploring other options in the area which may result in a brand new project scope to be reported in future TDPs.

**Table 3-2: Project removed in 2021 and 2022**

| No. | CP No. | Project title |
|---|---|---|
| 1 | CP1151 | Ballyadam 110 kV Station Development |

## 3.3 Projects added in 2021 and 2022

One hundred and ten new projects have received capital approval and were added to ongoing projects in 2021 and 2022, these include 46 New Build Connections, 5 New Build Capacity, 21 Replacements, 31 modifications to the system and 7 other projects with other classifications, such as line conflicts.

One project that was on hold in TDP 2021, CP0837, has been re-activated. The project is identified in the table below using footnotes.

**Table 3-3: Projects added in 2021 and 2022**

| No. | CP No. | Project title |
|---|---|---|
| 1 | CP0817 | Flagford – Sliabh Bawn 110 kV circuit uprate |
| 2 | CP0837 | Bellacorick 110 kV Station Uprate[42] |
| 3 | CP0907 | Dalton 110 kV Busbar |
| 4 | CP0917 | Prospect Tarbert Cable Replacement |
| 5 | CP0966 | Kildare – Meath Grid Upgrade |
| 6 | CP1000 | Lanesboro – Mullingar 110 kV line Uprate |
| 7 | CP1001 | Corduff – Finglas 1 & 2 220 kV line refurbishment |
| 8 | CP1021 | East Meath – North Dublin Reinforcement |
| 9 | CP1023 | Letterkenny Busbar Ratings Needs |

42 CP0837 Bellacorick 110 kV Station Uprate was On Hold in previous version of TDP.

| Table 3-3: Projects added in 2021 and 2022 | | |
|---|---|---|
| **No.** | **CP No.** | **Project title** |
| 10 | CP1045 | Finglas Land Acquisition |
| 11 | CP1059 | Shannonbridge B ESS – 220 kV transformer bay |
| 12 | CP1078 | Lanesboro – Sliabh Bawn 110 kV circuit thermal capacity |
| 13 | CP1079 | Binbane – Cathaleen's Fall 110 kV circuit thermal capacity |
| 14 | CP1100 | Finglas – North Wall Cable Replacement |
| 15 | CP1119 | Cashla Flagford 220 kV Line Refurbishment |
| 16 | CP1122 | Physical Security of Transmission Stations – Dublin Region |
| 17 | CP1123 | Physical Security of Transmission Stations – South Region |
| 18 | CP1124 | Physical Security of Transmission Stations – North Region |
| 19 | CP1125 | Physical Security of Transmission Stations – Central Region |
| 20 | CP1128 | Monatoreen Solar |
| 21 | CP1142 | Firlough WF (Carrownaglogh 110 kV Station) |
| 22 | CP1143 | Blackwater Bog Solar 1 |
| 23 | CP1144 | Kinnegad 110 kV station, Derryiron 110 kV bay conductor uprate |
| 24 | CP1145 | Rathnaskilloge Solar Farm |
| 25 | CP1146 | Carrickmines – Poolbeg 220 kV Cable Replacement |
| 26 | CP1149 | Newbridge – Cushaling 110 kV line, Stations bay conductors and lead-in conductor uprate |
| 27 | CP1150 | Inchicore – Poolbeg #2 220 kV Cable Replacement |
| 28 | CP1155 | Glenree – Moy 110 kV Line Uprate |
| 29 | CP1156 | Sligo 110 kV Station – Srananagh 1 & 2 Bay uprates |
| 30 | CP1157 | Inchicore – Poolbeg #1 220 kV Cable Replacement |
| 31 | CP1158 | Clonfad Solar |
| 32 | CP1162 | Irishtown, Shellybanks and connected stations 220 kV protection upgrade |
| 33 | CP1163 | Butlerstown, Killoteran and Waterford 110 kV protection upgrade |
| 34 | CP1164 | West Cork 110 kV Protection Upgrade |
| 35 | CP1166 | Gorman – Platin 110 kV line uprate |

## Table 3-3: Projects added in 2021 and 2022

| No. | CP No. | Project title |
|---|---|---|
| 36 | CP1167 | Drybride – Oldbridge – Platin 110 kV line uprate |
| 37 | CP1168 | Cashla-Salthill 110 kV Thermal Uprate |
| 38 | CP1170 | Bracklone – Portlaoise 110 kV Circuit Thermal Capacity |
| 39 | CP1172 | Crane – Wexford 110 kV Circuit Thermal Capacity |
| 40 | CP1173 | Glencloosagh Phase 1 – Rotating Stabiliser |
| 41 | CP1174 | Aghaleague 110 kV Station |
| 42 | CP1175 | Kishoge 110 kV Station |
| 43 | CP1176 | Huntstown T2002 Customer Transformer connection |
| 44 | CP1179 | Cloghran Phase 2 Transformer Replacement |
| 45 | CP1180 | Moneypoint Synchronous Condenser |
| 46 | CP1181 | Corduff Platin 110 kV Line Conflict |
| 47 | CP1183 | Mooretown 220 kV Station |
| 48 | CP1186 | Agannygal, Ennis and connected stations 110 kV Protection Upgrade |
| 49 | CP1188 | Kilcarbery |
| 50 | CP1190 | Poolbeg 220 kV Station |
| 51 | CP1191 | Cashla – Galway 110 kV circuit 1 Line Uprate |
| 52 | CP1194 | Woodland 400 kV Station Redevelopment |
| 53 | CP1197 | Dunstown Asset Replacements |
| 54 | CP1199 | Derryiron – Thornsberry 110 kV Circuit Uprate |
| 55 | CP1200 | Carrickmines Area 220 kV Cable Ducting |
| 56 | CP1201 | Bogtown 110 kV Station |
| 57 | CP1207 | Lisheen – Thurles 110 kV Protection Upgrade |
| 58 | CP1209 | Brown Boveri Circuit Breaker Replacements |
| 59 | CP1211 | Bandon Dunmanway 110 kV circuit thermal capacity |
| 60 | CP1212 | Bandon Raffeen 110 kV circuit thermal capacity |
| 61 | CP1213 | Belcamp 220 kV Busbar Extension |

## Table 3-3: Projects added in 2021 and 2022

| No. | CP No. | Project title |
|---|---|---|
| 62 | CP1215 | Knockraha station Celtic IC |
| 63 | CP1216 | Poolbeg – North Wall 220 kV Cable Replacement |
| 64 | CP1217 | Philipstown 110 kV Station (Cushaling Wind Farm) |
| 65 | CP1219 | Coole Wind Farm |
| 66 | CP1220 | Garrintaggart 110 kV Station – Pinewoods Wind Farm |
| 67 | CP1222 | Knockraha 220 kV Transformer Replacement |
| 68 | CP1224 | Lysaghtstown 110 kV Station |
| 69 | CP1225 | Finglas Corduff 220 kV Protection Upgrade |
| 70 | CP1227 | Cashla and Connected Stations 220 kV & 110 kV Protection Upgrade |
| 71 | CP1228 | Shannonbridge and connected stations 220 kV & 110 kV Protection Upgrade |
| 72 | CP1229 | Lislea 110 kV Station – Drumlins WF |
| 73 | CP1230 | Darndale Phase 2 – 3 110 kV customer connections in Darndale 110 kV station |
| 74 | CP1231 | Knockdrin 110 kV Station (Yellow River Wind Farm) |
| 75 | CP1232 | Derryiron 110 kV Busbar Rating Needs |
| 76 | CP1234 | Laurencetown 110 kV Station |
| 77 | CP1235 | Louth – Woodland 220 kV Uprate |
| 78 | CP1236 | Timoney 110 kV Station |
| 79 | CP1237 | Ferry View 110 kV Stn |
| 80 | CP1240 | Coumaclovane Solar Extension |
| 81 | CP1241 | Belcamp BSP Transfer |
| 82 | CP1242 | Great Island 220-110 kV transformer upgrades |
| 83 | CP1243 | Blundelstown 110 kV Station – 2 New DSO Transformer Bays |
| 84 | CP1244 | North Arklow Solar Plus Storage Facility |
| 85 | CP1245 | Castletreasure 110 kV Station |
| 86 | CP1246 | Coomnaclohy 110 kV Station (Knocknamork Wind and Solar Park) |
| 87 | CP1247 | New Ballyvouskill 220/110 kV Transformer |

## Table 3-3: Projects added in 2021 and 2022

| No. | CP No. | Project title |
|---|---|---|
| 88 | CP1248 | Harlockstown Solar (Gallanstown Ext) |
| 89 | CP1249 | Porterstown Battery Phase2 |
| 90 | CP1255 | Castlelost FlexGen |
| 91 | CP1256 | Greener Ideas Profile Park |
| 92 | CP1259 | Cuilleen Power |
| 93 | CP1260 | Tracystown Solar |
| 94 | CP1261 | Grahormick Solar |
| 95 | CP1262 | Shanonagh 110 kV Station |
| 96 | CP1264 | Rhode ESS |
| 97 | CP1265 | Corkagh 110 kV Station Phase 2 |
| 98 | CP1267 | Arklow 220 kV – DSO Ballymanus WF |
| 99 | CP1268 | Dunfirth 110 kV – DSO Dysart PV |
| 100 | CP1269 | Lodgewood 220 kV – DSO The Dell SF |
| 101 | CP1272 | Derryiron Temporary Bypass Project |
| 102 | CP1275 | Cashla – Galway 110 kV circuit 2 Line Uprate (Part of CP1191) |
| 103 | CP1276 | Cashla – Galway 110 kV circuit 3 Line Uprate (Part of CP1191) |
| 104 | CP1277 | Intel 110 kV Line Diversion |
| 105 | CP1320 | Barrymore Cahir Knockraha 110 kV Line Uprate |
| 106 | CP1393 | Offshore Phase 1 Project 1 |
| 107 | CP1394 | Codling Wind Park |
| 108 | CP1396 | Arklow Bank Wind Park |
| 109 | CP1397 | North Irish Sea Array |
| 110 | CP1398 | Dublin Array |

## 3.4 Projects on hold

As of 21 December 2022, there were four projects on hold. They are listed in Table 3-4 below.

There are various reasons for placing a project on hold, such as:

- Uncertainty regarding customer plans;
- Reassessment of the need for the project;
- Change in the timing of the need for the project; and
- Reassessment of whether the project is the appropriate solution to address the identified need given the latest information available.

**Table 3-4: Projects on hold**

| No. | CP No. | Project title |
|---|---|---|
| 1 | CP0977 | Glanagow Raffeen 220 kV Cable Diversion |
| 2 | CP1035 | N6 Line Diversions |
| 3 | CP1107 | North Wall 4 & 5 |
| 4 | CP1046 | Banemore Solar Farm |

## 3.5 Candidates solutions progressing the framework for grid development

Shaping Our Electricity Future v1.0 identified candidate solutions, and these are becoming committed projects as they work their way through EirGrid's Framework for Grid Development process.

The candidate solutions progressing through the framework for grid development are given in the Table 3-5.

**Table 3-5: Candidate solutions progressing the framework for grid development**

| No. | Candidate solution | CP No. | Region | Status |
|---|---|---|---|---|
| 1 | Drybridge – Louth 110 kV circuit | CP0808 | Mid-East | Committed |
| 2 | Flagford – Srananagh 110 kV circuit | CP0982 | North-West | Early stage[43] |
| 3 | Sligo – Srananagh 110 kV circuit 3 | CP0982 | North-West | Early stage[44] |
| 4 | Woodland – Finglas 400 kV cable cct | CP1021 | Dublin | Committed |
| 5 | Finglas – North Wall 220 kV circuit | CP1100 | Dublin | Committed |
| 6 | Poolbeg – Carrickmines 220 kV circuit | CP1146 | Dublin | Committed |
| 7 | Poolbeg South – Inchicore 220 kV circuit 2 | CP1150 | Dublin | Committed |
| 8 | Poolbeg South – Inchicore 220 kV circuit 1 | CP1157 | Dublin | Committed |
| 9 | Galway – Salthill 110 kV circuit | CP1191 | West | Committed |
| 10 | Arklow – Ballybeg – Carrickmines 220 kV circuit | CP1196 | South-East | Early stage |
| 11 | Bandon – Dunmanway 110 kV circuit | CP1211 | South-West | Committed |
| 12 | North Wall – Poolbeg 220 kV circuit | CP1216 | Dublin | Committed |

43 A committed project is a development that received capital approval to be constructed. Reported in chapter 5.
44 A project in early stages is a development that has not yet received capital approval. Reported in chapter 6.

## Table 3-5: Candidate solutions progressing the framework for grid development

| No. | Candidate solution | CP No. | Region | Status |
|---|---|---|---|---|
| 13 | Inchicore – Carrickmines 220 kV circuit | CP1226 | Dublin | Early stage |
| 14 | Binbane – Clogher – Cathaleen's Fall 110 kV | CP1233 | North-West | Early stage |
| 15 | Clogher – Srananagh 220 kV circuit | CP1233 | North-West | Early stage |
| 16 | Louth – Oriel 220 kV circuit | CP1235 | Mid-East | Committed |
| 17 | Woodland – Oriel 220 kV circuit | CP1235 | Mid-East | Committed |
| 18 | Great Island 220/110 transformer No.3 | CP1242 | South-East | Committed |
| 19 | Cashla – Dalton 110 kV circuit 1 | CP1321 | West | Early stage |
| 20 | Maynooth – Rinawade 110 kV circuit | CP1390 | Mid-East | Early stage |
| 21 | Maynooth – Timahoe 110 kV circuit | CP1391 | West | Early stage |
| 22 | Rinawade – Dunfirth 0 kV circuit | CP1403 | Mid-East | Early stage |

### 3.5.1 SOEF v1.1

The candidate reinforcements identified as part of the latest Shaping Our Electricity Future Roadmap v1.1 are in addition to the committed projects and solutions in Shaping Our Electricity Future v1.0, and the solution progressing trough the framework for grid development will be reported in future TDPs.

A list of those candidate reinforcements can be found on the Appendix 4 of the Shaping Our Electricity Future v1.1 roadmap report.

All candidate reinforcements identified as part of Shaping Our Electricity Future v1.1 will need to enter EirGrid's Framework for Grid Development process and they will be reported in future TDPs as they receive capital approval.

**Table 3-6: Candidate solutions identified in SOEF v1.1**

| No. | Candidate solution | Path | Domain | Region |
|---|---|---|---|---|
| 1 | Deenes – Drybridge 110 kV | New | Static device (DLR) | North-East |
| 2 | Gorman – Maynooth 220 kV | Uprate | Circuit | North-East |
| 3 | Meath Hill – Louth 110 kV | New | Static device (DLR) | North-East |
| 4 | Lisdrum – Louth 110 kV | New | Static device (DLR) | North-East |
| 5 | Ratrussan – Shankill 110 kV | New | Static device (DLR) | North-East |
| 6 | Baltrasna – Corduff 110 kV | New | Static device (DLR) | Mid-East |
| 7 | Corduff – Blundelstown – Mullingar 110 kV | Uprate | Circuit | Mid-East |
| 8 | Maynooth – Castlelost 220 kV | Uprate | Circuit | Mid-East |
| 9 | Crane – Wexford 110 kV | New | Static device (DLR) | South-East |
| 10 | Cullenagh – Waterford 110 kV | New | Static device (PFC) | South-East |
| 11 | Great Island – Waterford 1 110 kV | New | Static device (DLR) | South-East |
| 12 | Drumline – Ennis 110 kV | New | Static device (DLR) | South-West |
| 13 | Letterkenny – Golagh T 110 kV | Uprate | Circuit | North-West |
| 14 | Cashla – Dalton 110 kV | Uprate | Circuit | North-West |
| 15 | Castlebar – Dalton 110 kV | Uprate | Circuit | North-West |
| 16 | Srananagh – Cathaleen's Fall 2 110 kV | New | Static device (DLR) | North-West |

# 4. Planned network developments

This chapter summarises the network development projects arising from the transmission network development planning process (outlined in Appendix B). Projects are described in greater detail in Chapter 5.

## 4.1 Overview of the Plan

The TDP includes 202 projects that are active and in progress. These projects are categorised as one of the following: New Build; Uprate/Modify; Refurbish/Replace; or Other.

**New Build projects:** are projects that involve the construction of new stations or new circuits. This category also includes projects that involve the installation of new equipment in existing stations.

An example of a new build project is the installation of new transformers or new reactive support devices within existing stations.

New Build projects are segregated in two categories:

- New Build Connection: New connection projects; and
- New Build Capacity: Projects that deliver additional grid capacity.

**Uprate/Modify projects:** are projects that involve the uprating of existing assets. An example of an uprate project is changing equipment to increase the capacity rating of circuits or busbars.

This category also includes projects that involve the modification of existing assets.

An example of a modification project is the installation of new couplers or new bays in existing stations. Reconfiguration of existing stations is also included in this category.

**Refurbish/Replace projects**: are projects that involve the refurbishment of existing stations or existing circuits. This category also includes projects that involve the replacement of existing assets. For example, the replacement of stations at or close to the end of their useful life or replacement and upgrading of protection in existing stations.

**Other:** are projects that do not fall naturally into any of the three categories above.

Table 4-1 below summarises the active projects into their respective categories and regions.

However, the descriptions of these projects have been included in chapter 5 as well as in the tables of this chapter.

| Table 4-1: Summary of projects by category and region | | | | | |
|---|---|---|---|---|---|
| **Project category** | **Border, Midlands, West** | **South-West, Mid-West** | **South-East, Mid-East, Dublin** | **Projects at multiple locations** | **Total** |
| New Build | 28 | 16 | 49 | | 93 |
| Uprate/Modify | 23 | 7 | 18 | 1 | 49 |
| Refurbish/Replace | 8 | 15 | 24 | 5 | 52 |
| Other | | | 5 | 3 | 8 |
| **Total** | **59** | **38** | **96** | **9** | **202** |

## 4.2 Summary of projects in steps 4 to 6

Figure 4-1 shows all projects in Step 4 – Step 6. All new developments shown in figure 4-1 are subject to environmental assessment as appropriate in accordance with the relevant planning requirements. For those projects not yet in the planning process, the location of the reinforcements shown on the map are indicative only and do not represent preferred routes/locations. A full list of projects and their corresponding steps of development is given in Chapter 5.

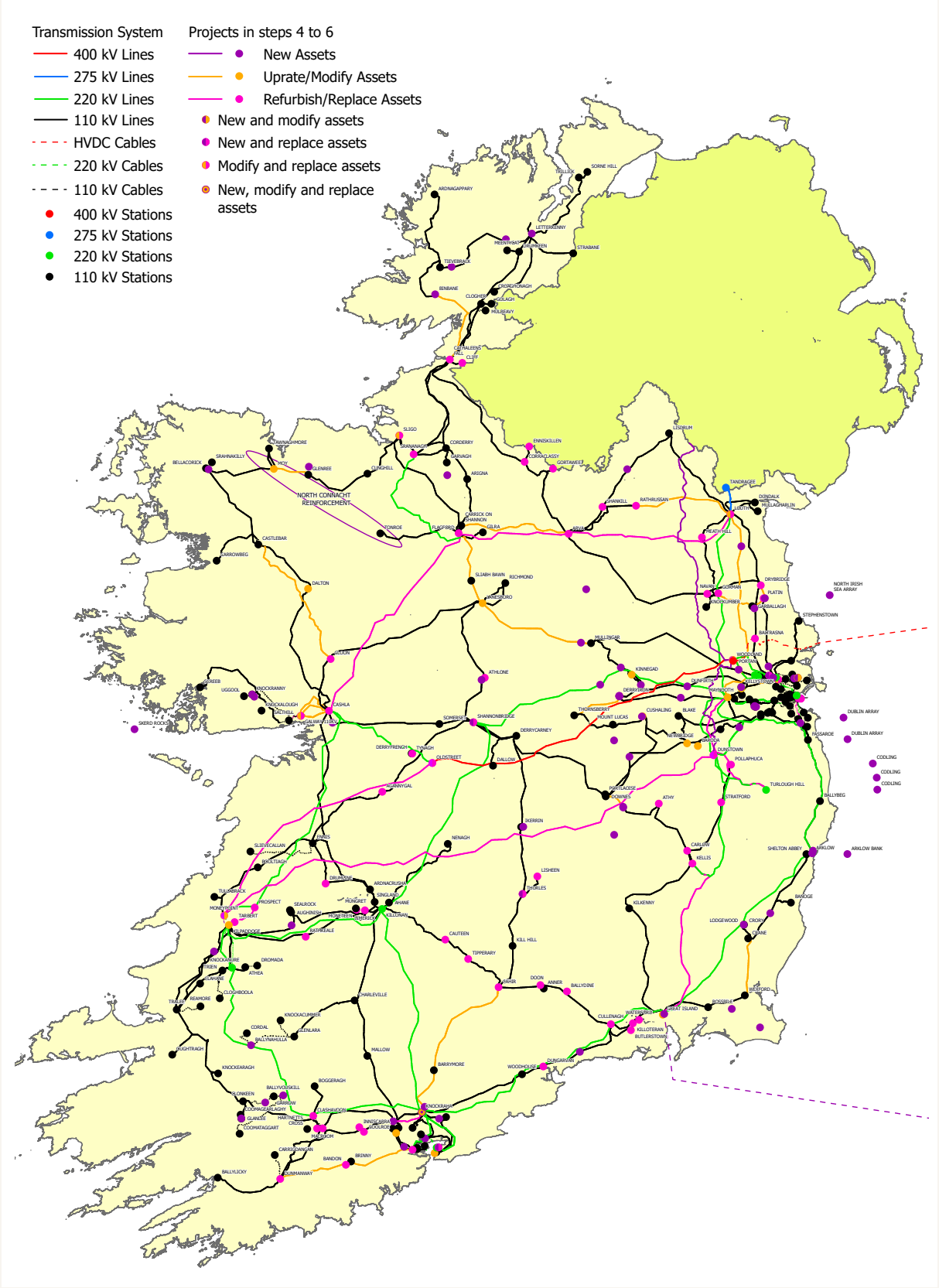
An online version of the map shown in Figure 4-1 can be found on this link[45]. The locations of the new assets are for reference only.

### 4.2.1 Works outside scope of this Plan

In addition to the projects summarised in this chapter, we also coordinate capital projects which are classified as minor capital works with the TAO, such as minor station alterations. These projects are numerous and generally deal with the day-to-day operation and maintenance of the network. These are not included in the TDP.

45 https://eirgrid-ie.maps.arcgis.com/apps/webappviewer/index.html?id=db3b1fce078d493a9fd67d6b5ce4ef8d

*Figure 4-1: Planned network developments in steps 4 to 6 of our six-step process*



## 4.3 Project delivery

The development of the transmission network is subject to delivery risk. We use risk management plans and processes to identify, analyse, monitor and manage project and programme risks. These plans and processes facilitate the management of project dependencies and critical path issues within the context of a changing environment.

Dates related to project completion are provided by EirGrid's Network Delivery Portfolio (NDP) quarterly publication which includes 3 major milestones, EirGrid Capital Approval (GW3), Project Agreement with ESB Networks (GW6) and the forecast energisation date (EI). The dates indicated in the NDP are based on an unconstrained scenario and are, therefore, indicative and subject to change. These dates are reported in the tables in Chapter 5 using the Q4-22 NDP milestone data.

The project schedule is developed initially using standard lead times for generic project types. As a project moves forward through the six steps, a detailed schedule is developed and maintained, milestones are achieved and there is increasing certainty regarding the completion date. The following points need to be taken into account when considering project progression and risk:

- Current level of project maturity;
- Outage availability;
- Land access, planning and consent risks; and
- Project complexity.

We differentiate between moderate and high-risk projects based on project type and project step. Projects that are due for completion in the near-term generally carry less risk than those due for completion in later years. Line and station projects which are due to be completed in the near-term are considered to be within the moderate risk category. Large-scale linear developments scheduled to be completed in later years tend to have a higher level of risk associated with them. When inter-dependent projects take place at the same time, care has to be taken scheduling the required outages. Therefore, the region or location of a project also has an impact on its risk profile. Transmission outage planning is an iterative and ongoing process which is a core aspect of project delivery.

EirGrid's Shaping Our Electricity Future Roadmap identifies network projects as a strategic enabler to achieving 2030 RES-E targets. The programme of network investment needed in advance of 2030 is significant and requires both EirGrid and ESB Networks to streamline how grid infrastructure is delivered. EirGrid and ESB Networks will develop and implement an end-to-end TSO/TAO joint approach to optimise delivery of grid infrastructure projects.

As mentioned, in the project tables in Chapter 5 expected and indicative delivery dates are reported. Some of the more common reasons for changes in Project Agreement or Energisation dates are as follows:

- Difficulty in achieving outages particularly for brown field station projects and projects in the North West;
- Changes in customer's plans;
- Difficulties gaining access to land;
- Changes in project scope;
- Increasing planning consent and environmental requirements; and
- Issues with the quality of contestable builds.

EirGrid publishes the NDP on a quarterly basis to communicate updates and changes to the portfolio to stakeholders. In such cases we endeavour to communicate with and mitigate impacts on customers.

## 4.4 Completion dates

Information in this document with reference to completion dates (Estimated Completion Dates, Forecast Completion Dates and Indicative Completion Dates) has been prepared with all reasonable care and diligence. All and any dates have been estimated and are indicative and subject to change. All dates have been estimated in line with the European Union (Internal Market in electricity) (3) Regulations 2022 (S.I. no 227/2022) and all and any dates are subject to revision.

# 5. Regional view

This chapter details the committed projects as of the data freeze date, 21 December 2022. Committed projects are those projects that are in Steps 4-6 of our six-step process for developing the grid. Committed projects have received EirGrid capital approval which occurs at the end of Step 3. Indicative completion dates are included for these projects*.

## 5.1 Overview

This chapter describes the projects including their drivers, needs, location, EirGrid Capital Approval dates (GW3), Project Agreement with ESB dates (GW6), forecast energisation date (EI), capital project number (CP No.) and step in the six-step process for developing the grid.

Projects are categorised by region, as per Figure 1-3 in Chapter 1.

Table 5-1 below summarises the number of active projects by region.

**Table 5-1: Summary of active projects by region**

| Active TDP projects by region | |
|---|---|
| **Region** | **No. of active projects** |
| Border, Midlands and West | 59 |
| South-West and Mid-West | 38 |
| South-East, Mid-East and Dublin | 96 |
| Projects at multiple locations[46] | 9 |
| **Total** | **202** |

46 These involve multiple individual projects at various locations around the country.

## 5.2 The Border, Midlands and West

| Summary of projects | |
|---|---|
| | |
| New Build | 28 |
| Uprate/Modify | 23 |
| Refurbish/Replace | 8 |
| **Total** | **59** |


### Active TDP projects by region

The Border, Midlands and West has a wide variety of generation sources. These are dispersed around the region and include wind, solar, storage, hydro, diesel, gas, and a co-fired peat/biomass-burning power station. Note that two peat-powered generating plants at Shannonbridge in Offaly and Lanesboro in Longford closed at the end of December 2020.

The existing transmission network is predominantly 110 kV and 220 kV. There is limited high capacity 400 kV infrastructure in the southern part of the region. It is important to note that the North-West area is relatively isolated from the 220 kV network and comprises of a network of 110 kV circuits, many of which are long lines, and is characterised by a strong wind resource and a low electricity demand.

Development of this network is mainly required to connect a high level of renewable generation.

The existing transmission network allows limited power flows between Northern Ireland and Ireland via the existing 275 kV Tandragee-Louth interconnector.

While the eastern part of the country has seen significant increases in new large industry demand, the West and North-West have seen a large amount of renewable generation connections with many requests for further connection. This level of generation is greater than the capacity of the network resulting in local constraints related to power-transfer needs. These large transfers of power create voltage support needs, which are exacerbated by the decommissioning of the peat plants in the Midlands.

To cater for high levels of renewable generation, network reinforcement is necessary. This will enable the efficient export of generation from this area towards areas with high load, such as the eastern seaboard.

One of the main challenges involved in the grid development of the North-West is the fact that there are limited opportunities for outages, and multiple simultaneous circuit outages for maintenance, uprating, new connections or substation works, are often not possible. As part of Shaping Our Electricity Future, EirGrid has launched an initiative to review and transform how outages of the transmission system are planned and granted. This initiative will include a review of outage requirements and durations during construction as well as consideration of outages during project initiation and decision making. This process will seek to minimize the requirement for outages during construction where possible. EirGrid and ESBN will continue to work closely to deliver the outage programme and in turn the grid delivery programme as effectively and efficiently as possible in all areas of the network requiring reinforcement including the Border, Midlands and West.

In summary there are reinforcement needs due to:

- Local constraints related to power-transfer capacity and voltage support needs;
- Asset condition; and
- Further market integration with Northern Ireland.

The projects described in this section will enable the transmission network to accommodate more diverse power flows. They will also provide benefits to existing and future users of the transmission network and facilitate future regional load growth.

The TDP contains a list of the committed projects as at 21 December 2022. Indicative completion dates are included for these projects*.

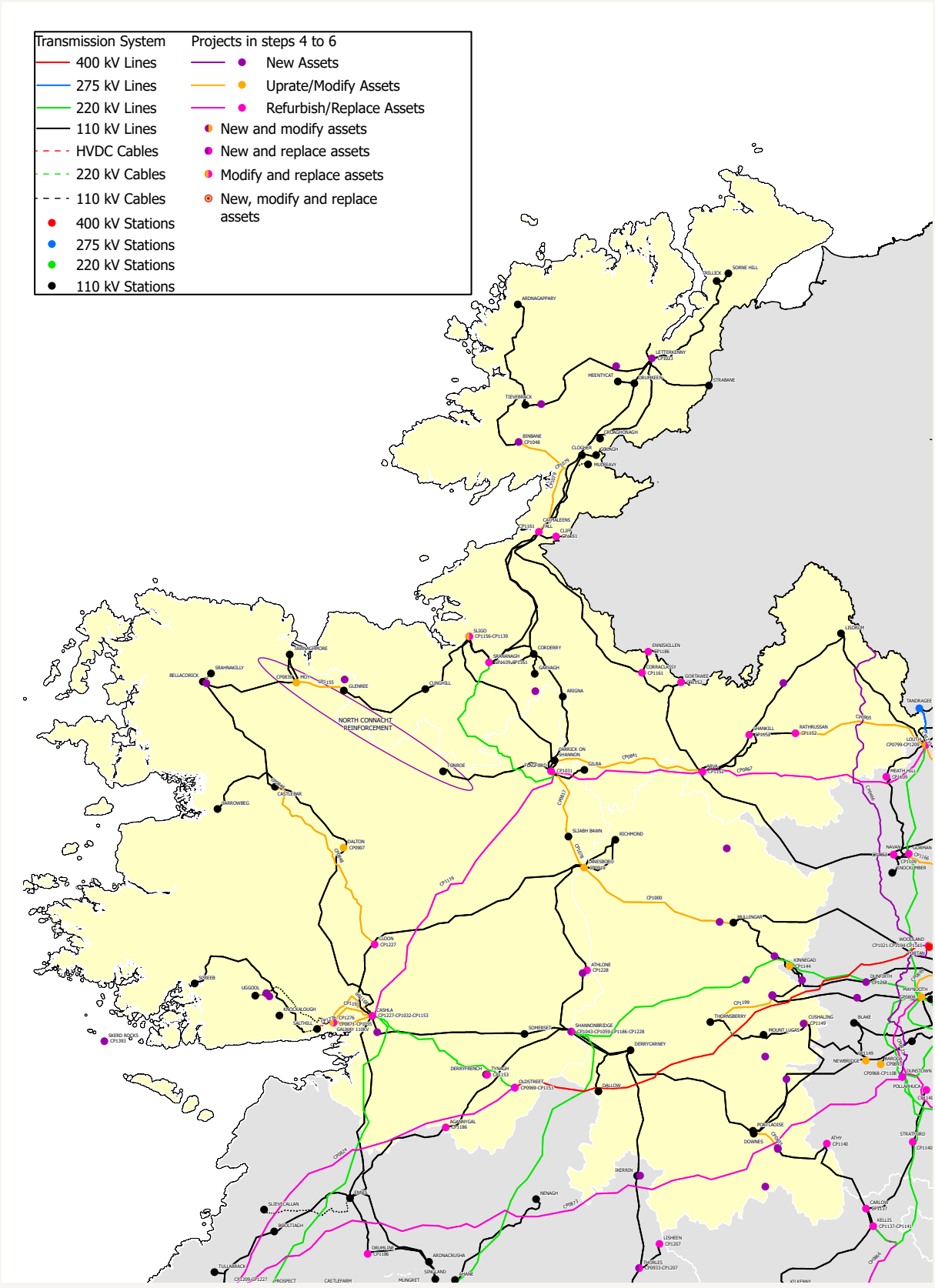
We will continue to assess reinforcement needs in the North-West and to identify candidate solutions as part of the Shaping Our Electricity Future update, aiming to find new projects required in the area beyond those already progressing through the grid development process.

As needs and projects progress through the six-step process they will be included in the TDP.

The projects in the Border, Midlands and West are discussed in more detail below.

Figure 5-1 shows the location of projects in Steps 4 to 6 in the Border, Midlands and West.

*Figure 5-1: Planned network developments in Steps 4 to 6 in the Border, Midlands and West*



### Reinforcement of the transmission network between Ireland and Northern Ireland Project

- North South Interconnection Development (CP0466) – 400 kV Circuit from Woodland Transmission Station in Co. Meath to Turleenan Transmission Station in Northern Ireland[47]

### Description

The drivers for this project are market integration, Security of Supply and RES integration. There is a requirement for increased power to flow between Ireland and Northern Ireland. This is mainly driven by changes to the all-island generation portfolio, plant retirements and the relative operational costs of generation plants in each jurisdiction.

The capacity for power flows between Ireland and Northern Ireland is limited by the existing infrastructure. In particular, there is a risk that a single event could take the existing 275 kV interconnector out of service. This would lead to a system separation of Ireland and Northern Ireland, requiring each system to instantly adjust to achieve a new demand-supply balance.

The North South Interconnection Development will remove this risk of system separation and significantly increase cross-border transmission capacity.

The North South Interconnection Development will offer significant economic benefits, by:

- Improving Security of Supply, by:
  - allowing sharing of generation across the island; and
  - removing the scenario where a single event could lead to system separation of Ireland and Northern Ireland;
- Improving competition and economic operation by removing operational constraints;
- Providing the required flexibility for renewable generation; and
- Ensuring Security of Supply for the North East of Ireland.

This is a joint EirGrid and SONI project.

47 https://www.eirgridgroup.com/the-grid/projects/north-south/the-project/

## Reinforcement of the transmission and distribution network in Donegal

### Projects

- Cathaleen's Fall and Connected Stations 110 kV Protection Upgrade (CP1161)
- Binbane – Cathaleen's Fall 110 kV Thermal Uprate (CP1079)
- Letterkenny 110 kV station Uprate (CP1023)
- Power Flow Control Scheme (CP1048)

### Description

The driver for this project is Security of Supply.

Cathaleen's Fall, Cliff, Corraclassy and Gortawee 110 kV stations, require replacement of aged protection relays and teleprotection interfaces in order to mitigate against suboptimal protection system performance.

Protection system enhancement works are also required to ensure compliance with best practice in transmission system protection. A new busbar protection scheme in Corraclassy 110 kV station and a new combined Current/Voltage transformer will also be installed.

The thermal uprate of Binbane – Cathaleen's Fall 110 kV circuit has been identified as an Associated Transmission Reinforcement (ATR) and will support the need for power-transfer capacity arising due to new RES generation in the North West, as this region does not have the capacity to accommodate the expected future generation.

The Letterkenny 110 kV station upgrade is essential to ensure a more secure supply of electricity for County Donegal and to enable the further integration of renewable energy in line with Government Policy targets. It will also be a key enabler in creating electricity demand opportunities in Donegal. The scope of this project involves a new 110 kV station with a busbar rating of 2500 Amp.

Initially, the Power Flow Control Scheme was defined as an interim project to help manage constraints until Lanesboro redevelopment was completed. However, the Lanesboro station redevelopment has moved forward more quickly than expected, while the process for deploying the new technology proposed for Richmond station was not established quickly enough. Therefore, deployment of the technology that was to be installed at Richmond station to help manage constraints is no longer required at this location.

The project has been rescoped and alternative circuits on which to deploy the Power Flow Controllers have been considered. The project consists of the installation of a power flow control device connected in series at Binbane station on Tievebrack – Binbane 110 kV. This deployment of power flow control devices will have an important role to play from a network and operational perspective in helping to reduce constraints by balancing flows on the network between parallel paths.

## Reinforcement of the transmission network within and out of Mayo

### Projects

- North Connacht 110 kV Project (CP0816), comprising:
  - A new Moy – Tonroe 110 kV circuit;
  - Uprate of the existing Flagford – Tonroe 110 kV circuit; and
  - Redevelopment of the existing Tonroe 110 kV station
- Castlebar – Cloon 110 kV Thermal Uprate (CP0848)
- Bellacorick 110 kV Station (CP0837)

### Description

The driver for North Connacht 110 kV project is RES integration. The need for reinforcement arises due to the requirement to connect new RES generation. The level of generation is greater than the capacity of the local 110 kV network, even when uprated. The generation contracted to connect in the area could result in overloads on the existing infrastructure, under both intact network and single contingency conditions.

We are progressing this project through our six-step process for developing the grid. We are continuing to engage with landowners, communities and stakeholders in the region. The best performing option, that is currently being progressed, is an underground cable for the North Connacht project.

For the most up to date information on the project please visit the project pages on the EirGrid website[48].

The drivers for Castlebar – Cloon 110 kV Thermal Uprate are Security of Supply and RES Integration. The Castlebar – Cloon 110 kV circuit is one of the few transmission circuits in County Mayo and provides an important pathway for power supply into the area but also for transferring renewable generation out from the area to where it is needed. This reinforcement is planned to support the need for increased power-transfer capacity arising due to new RES generation. This project is part of a suite of uprates being progressed in the North-West to aid in the delivery of future renewable generation and alleviate some of the constraints in the transmission network.

The Bellacorick station projects involve the installation of a new 110 kV transformer bay that will facilitate the connection of the distribution connected wind farms via an up-rated distribution transformer at Bellacorick.

48 https://www.eirgridgroup.com/the-grid/projects/north-connacht/the-project/

## Reinforcement of the transmission network in Mayo

### Projects

- Moy 110 kV Station – Busbar Uprate, New Coupler and Refurbishment Works (CP0839)
- Dalton 110 kV Busbar Uprate (CP0907)
- Glenree – Moy 110 kV Thermal Uprate (CP1155)

### Description

The drivers for these projects are RES integration and Security of Supply.

The need for these reinforcements arises due to a shortage of transmission capacity. The existing infrastructure could overload under single contingency and maintenance-trip conditions arising due to new RES generation.

In addition, the projects also involve refurbishment works due to the condition of the assets, these refurbishments will be carried out at the same time as the uprating works.

New couplers will be installed in Castlebar and Moy 110 kV stations. These works will improve Security of Supply and increase operational flexibility. This is of particular relevance during the outage season to facilitate maintenance and construction works.

The need of a busbar uprate at Dalton 110 kV station is primarily driven by the connection of renewable generation in county Mayo. This 110 kV busbar is the limiting component of the station today as it places a restriction on the power that can flow on the two 110 kV circuits (Dalton – Cashla 110 kV and Dalton – Castlebar 110 kV) connected to it and limits generation in the area. Therefore, the uprate is planned to cope with the future transfer of power through this station, as the busbar is at risk of transferring power flows in excess of its thermal rating.

The existing Glenree – Moy 110 kV circuit is a key component in the transmission system located in county Mayo. The planned uprate is part of a suite of uprates being progressed in the North West to aid in the delivery of future renewable generation and alleviate some of the constraints on current connected generation. Therefore, this circuit uprate will increase the future transfer of power through this circuit for intact network or following the loss of nearby circuits.

## New generation and battery connections in the Border, Midlands and West Projects

- Shantallow 110 kV New Station and loop-in to Cashla – Shannonbridge – Somerset Tee 110 kV circuit – Solar farm connection (CP1061)
- Buffy 110 kV Station – New single bay 110 kV AIS station, connected into the existing Knockranny – (CP1094)
- Oweninny Power 3 Windfarm – New single bay 110 kV AIS station, known as Croagh West 110 kV station, to be tailed into the existing Bellacorick 110 kV station – (CP1073)
- Mully Graffy Windfarm – New line bay in the existing Tievebrack AIS 110 kV station connected by 6.1 km UGC to a new single bay 110 kV line/transformer bay AIS station – (CP1126)
- Lenalea Windfarm – New 4 bay 110 kV C-type AIS station looping into the existing Letterkenny – Tievebrack 110 kV OHL – (CP1127)
- Loughteague 110 kV Solar Farm – Direct connection ('Under the fence') to a designated bay of the proposed Coolnabacky 440/110 kV – (CP1060)
- Clonfad Solar Farm – New 4 bay C-type 110 kV AIS station looping into the existing Kinnegad – Mullingar110 kV OHL, connected by OHL – (CP1158)
- Firlough Windfarm – New 4 bay C-type 110 kV AIS station looping into the existing Glenree – Moy 110 kV, connected by UGC via Line Cable Interface Masts (LCIMs) – (CP1142)
- Blackwater Bog solar farm – New single bay 110 kV AIS station tailed into a new line bay at Shannonbridge 220/110 kV station via circa 3.5 km of UGC – (CP1143)
- Shannonbridge B, battery connection – Tail fed single bay 220 kV AIS station connecting to Shannonbridge 220 kV station via approx. 250m of underground cable – (CP1059)
- Coole Windfarm – New single bay AIS station, Lickny 110 kV Station, tailed into the existing Mullingar 110 kV Station via a 26km UGC – (CP1219)
- Pinewoods Windfarm – New AIS 110 kV 4-Bay C-Type station, called Garrintaggart, looped into the future Ballyragget – Coolnabacky 110 kV OHL via 2no. OHL's of approx. length 0.05km – (CP1220)
- Cushaling Windfarm – New AIS 110 kV 4-Bay C-Type station, called Philipstown, looped into the existing Cushaling – Portlaoise 110 kV OHL via 2no. UGC's approx. 1km long each – (CP1217)
- Aghaleague Solar farm – New Aghaleague 110 kV AIS single bay station to be tailed into the existing Garvagh 110 kV Station – (CP1174)
- Drumlins Park Windfarm – New AIS 110 kV 4-bay C-type station, Lislea 110 kV Station, looping into the existing Lisdrum – Shankill 110 kV circuit via two underground cables (0.7km in length) – (CP1229)
- Rhode ESS – Energy storage system to be connected via the distribution network to Derryiron 110 kV station – (CP1264)
- Knockranny Windfarm – New 110 kV single bay AIS station, Ferry View, tailed into the existing Knockranny 110 kV Station via UGC of approx. length 2km – (CP1237)
- Knockdrin Windfarm – New single bay AIS station, Knockdrin 110 kV Station, tailed into the existing Derryiron 110 kV Station via approximately 0.3 km of underground cable – (CP1231)

- Clonin North Solar Farm – New single bay AIS station, Laurencetown 110 kV station, tailed into the existing Derryiron 110 kV station via a 0.1 km of UGC – (CP1234)
- Clondardis Solar Farm – New AIS 110 kV 4-Bay C-Type station looping into the existing Mullingar – Lanesboro 110 kV OHL – (CP1262)

### Description

The driver for these projects is the integration of RES. These projects are needed to connect new generation and battery connections.

Storage projects are also driven by Security of Supply by:

- Improving competition and economic operation by removing operational constraints; and
- Providing the required flexibility for increased renewable generation.

## Reinforcement of the transmission and distribution networks in the Border, Midlands and West

### Projects

- Bracklone 110 kV New Station and Loop-in to Newbridge – Portlaoise 110 kV Circuit – New DSO demand connection (CP0644)
- Cashla – Flagford 220 kV Line Refurbishment (CP1119)
- Flagford – Sliabh Bawn 110 kV Thermal Uprate (0817)
- Lanesboro – Mullingar 110 kV Thermal Uprate (CP1000)
- Lanesboro – Sliabh Bawn 110 kV Thermal Uprate (CP1078)

### Description

The driver for these projects is Security of Supply and RES integration.

The DSO has requested the connection of a new 110 kV station close to Portarlington in Co. Laois. This project was previously on hold.

A Line Condition Assessment (LCA) and a Line Project Assessment Report (LPAR) have confirmed that Cashla – Flagford 220 kV needs to be refurbished. The main elements of refurbishment include tower painting, insulator and hardware replacement.

The continued operation of Cashla – Flagford 220 kV is essential for the system security and it is believed that this refurbishment should be carried out as per the scope of the LPAR to extend the assets life by 20 years.

The existing Flagford – Sliabh Bawn 110 kV, Lanesboro – Mullingar 110 kV and Lanesboro – Sliabh Bawn 110 kV circuits form part of the transmission network in the North West area which does not have the capacity to accommodate the expected future generation and therefore forms part of a heavily used and important area of the network. Thermal uprates of these circuits are planned to support the need for power-transfer capacity arising due to new RES generation.

## Reinforcement and Upgrade of the transmission network in Galway

### Projects

- Oldstreet, Tynagh and Cashla 400 kV and 220 kV Protection Upgrade (CP1153)
- Galway 110 kV Station Redevelopment (CP0871)
- Cashla – Salthill 110 kV Thermal Uprate (CP1168)
- Cashla – Galway 110 kV circuit 1 Thermal Uprate (CP1191)
- Cashla – Galway 110 kV circuit 2 Thermal Uprate (CP1275)
- Cashla – Galway 110 kV circuit 3 Thermal Uprate (CP1276)

### Description

The drivers for these projects are RES integration and Security of Supply.

Aged protection relays and teleprotection interfaces in Oldstreet 400 kV station and Cashla and Tynagh 220 kV stations have to be replaced. Standardisation of approach is included in the protection scheme for the Oldstreet transformer and an inclusion of dedicated auto-reclose supervision relays on both ends of Cashla – Tynagh 220 kV circuit. This is part of a new standard approach in auto-reclose supervision when overhead lines are combined with cabled sections. Those works will be covered under CP1153.

A significant amount of new renewable generation has been connected or is in the process of being connected to the transmission and distribution system along the western seaboard in Connacht, and specifically around the Galway area. This power needs to be transported to where it is needed.

Galway 110 kV station needs to be redeveloped to cater for power flows in excess of the rating of the busbar which are driven by the connection of new generation in the area.

A needs assessment of the transmission network in the Galway area confirmed that increased thermal capacity between Cashla and Galway stations is required to cater for an unplanned loss (single contingency) of one of the Cashla – Galway 110 kV circuits. The solution for the area is to uprate Cashla – Galway 110 kV circuits 1, 2 and 3 and Cashla – Salthill 110 kV circuit.

## Offshore project in Galway

### Project

- Skerd Rocks (CP1393)

### Description

The driver for this project is RES Integration.

In line with the CRU decision on Offshore Connection Policy (CRU2022/968[49]), applicable to Offshore Phase 1 projects, Offshore projects received capital approval in advance of the connection offers in order to prioritise and expedite the design review process through the use of Advanced Works Packages (AWP) to ensure the target Project Agreement dates of December 2024 is achieved. These AWPs will allow EirGrid to review the Phase 1 projects concepts designs in advance of the ORESS-1 auction.

Skerd Rocks Wind Farm is an offshore wind farm located off the coast of County Galway and is one of the six projects included in Phase 1 of the Offshore Delivery Programme.

The new customer station tailed to existing station in the network and their connections from the offshore platforms to the onshore stations will be reported in future TDPs when the connection offer process is completed.

## Reinforcement of the transmission network in Cavan

### Projects

- Arva and Connected Stations 110 kV Protection Upgrade (CP1152)
- Arva – Carrick-on-Shannon 110 kV line uprate (CP0841)

### Description

The driver for these projects is Security of Supply.

Arva, Gortawee, Navan, Ratrussan and Shankill 110 kV stations require replacement of aged protection relays and teleprotection interfaces in order to mitigate against suboptimal protection system performance. Protection system enhancement works are also required to ensure compliance with best practice in transmission system protection. Installation of a new busbar protection scheme in Gortawee station and the installation of new combined Current/Voltage transformers (CT/VT), on Shankill transformers, are also included in this project.

A study carried out in early 2019 to identify thermal constraints confirmed the need to uprate Arva – Carrick-on-Shannon 110 kV. This project is part of a suite of uprates being progressed in the North-West to aid in the delivery of future renewable generation and alleviate some of the constraints on existing connected generation.

The uprate of the Arva – Carrick-on-Shannon 110 kV circuit has been identified as an Associated Transmission Reinforcement (ATR) and is expected to release an important amount of Firm Access Quantity (FAQ) when completed.

49 https://www.cru.ie/publications/27340/

## Reinforcement of the transmission network in Sligo

### Projects

- Sligo, Srananagh 220-110 kV Protection Upgrade (CP1139)
- Sligo 110 kV Station – Srananagh 1 & 2 Bay Uprates (CP1156)

### Description

The driver for these projects is Security of Supply.

This project involves replacement of aged protection relays and teleprotection interfaces in Sligo 110 kV and Srananagh 220 kV stations to mitigate against suboptimal protection system performance.

The Sligo – Srananagh 1 & 2 110 kV circuits are currently limited by the bay conductors on the Srananagh 1 & 2 110 kV at Sligo 110 kV substation. It has been decided that the best solution to overcome this limitation is to progress with an uprate of these bays at Sligo 110 kV station. Overcoming this limitation will help to accommodate the expected future generation in the area and maintain compliance with the Transmission System Security and Planning Standards (TSSPS).

## Reinforcement of the transmission network in Offaly

### Projects

- Derryiron – Thornsbury 110 kV Thermal uprate (CP1199)
- Derryiron Busbar Uprate (CP1232)
- Derryiron Temporary Arrangement (CP1272)

### Description

The drivers for these projects are Security of Supply and RES Integration.

Planning studies indicate that the connection of new generation and the building of new infrastructure will increase the power flowing through the area. The Derryiron – Thornsbury 110 kV circuit is expected to accommodate a considerable amount of power flow, either in times of future high wind power, in the event of unforeseen loss of the 110 kV Cushaling – Mount Lucas circuit or due the connection of Moanvane windfarm into Mount Lucas 110 kV station. Therefore, the circuits Derryiron – Thornsbury needs to be uprated.

Derryiron busbar uprate is also driven by RES Integration. An increase in power transfer through the 110 kV busbar at the Derryiron station is expected due to some planned connections to this station that are driving the need for this project. The project involves a busbar uprate and extension to the busbar at Derryiron and installing a sectionaliser circuit breaker.

The temporary arrangement at Derryiron 110 kV station is driven by Security of Supply, as it is required to reduce the impact of severe outages at Derryiron to keep critical circuits in operation during the planned works to uprate and extend the existing busbar of this station. The arrangement consists in a bypass that will work by temporarily tying the Rhode and Kinnegad circuits together so that they can electrically feed each other while disconnected from the main busbar. The connection, known as flyover, will consist of a conductor spanning the length of the busbar, supported by two steel-frame structures (approx. 11.7m tall) at each end and one intermediate wooden pole.

Both circuits will be connected to this temporary flyover conductor and disconnected from the existing busbar. The arrangement will be a pre-requisite for the connection of 3 customer renewable projects (CP1234, CP1231 and CP1236) and a station upgrade project (CP1232).

## Reinforcement of the transmission network in Laois

### Projects

- Coolnabacky – Portlaoise 110 kV Line Uprate (CP0835)
- Newbridge – Portlaoise 110 kV Partial Thermal Uprate (CP1170)

### Description

The drivers for project CP0835 are Security of Supply and RES integration. This project is related to the Laois – Kilkenny Reinforcement Project (CP0585) which is required to address quality of supply and provide Security of Supply in the area. Please note that CP0585 is further described in the South-East, Mid-East and Dublin section below.

The need for reinforcement arises due to a shortage of transmission capacity. Studies have indicated overloading for an intact network, single contingency and maintenance trip conditions.

In addition, refurbishment works due to the condition of the circuit will be undertaken at the same time as the uprating works.

CP1170 is driven by Security of Supply, as the level of demand are expected to increase in the East while at the same time significant levels of new renewable generation are expected to connect in the Southwest and Midlands.

The Bracklone – Portlaoise and Bracklone – Newbridge 110 kV circuits will be created following completion of a separate capital project (CP0644) to loop the planned new Bracklone 110 kV DSO station into the existing Newbridge – Portlaoise 110 kV circuit. These circuits form an important part of the transmission network in the Midlands supplying local transmission stations, facilitating cross country power flows from the West to the East, and facilitating the connection of renewable generation in the Midlands.

### Reinforcement of the transmission network in Longford

#### Project

- Lanesboro 110 kV Station Redevelopment (CP0919)

#### Description

The drivers for these projects are RES integration and Security of Supply.

The need for these projects arises due to a shortage of transmission capacity. Lanesboro 110 kV station needs to be redeveloped to cater for increased power flows in excess of the rating of the existing busbar due to the planned connection of new generation.

The redevelopment of Lanesboro 110 kV station will also improve Security of Supply and increase operational flexibility as it will allow existing restrictions in outage planning to be removed. This is of particular relevance during the outage season.

### New OCGT generation connections in Border, Midlands and West

#### Projects

- Castlelost FlexGen (CP1255)
- Cuilleen Power (CP1259)

#### Description

The drivers for these projects are Security of Supply.

Castlelost FlexGen is a 275 MW generation facility at Rochfortbridge, Co. Westmeath which will be 5 x 55 MW OCGT units connecting via a new 4 Bay C-Type 220 kV GIS Station looped into the Maynooth – Shannonbridge 220 kV circuit.

Greener Ideas Limited is for a 100 MW generation facility at Monksland, Athlone, Co. Roscommon which will be gas fired reciprocating engines connecting via a new single bay 110 kV AIS Station tailed to Athlone 110 kV Station via 1.5 km of UGC.

### Other approved projects

In addition to the network reinforcement projects described above, there are also other projects in the Border, Midlands and West, namely:

- Flagford – Louth 220 kV Line Refurbishment (CP0867);
- Louth – Ratrussan 110 kV No. 1 Line Uprate (CP0905);
- Flagford 220/110 kV Station – Circuit Breaker Replacement (CP1031);
- Cashla 220/110 kV Station – Circuit Breaker Replacement (CP1032); and
- N6 Line Diversions (CP1035).

## 5.2.1 Summary of projects in the Border, Midlands and West

There are 40 projects in the Border, Midlands and West region. These projects are listed in Table 5-2 below.

## Table 5-2: Projects in the Border, Midlands and West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 1 | CP0816 | North Connacht 110 kV Project | New build capacity | – | | ■ | |
| 2 | CP0466 | North South 400 kV Interconnector | New build capacity | 137[50] | ■ | ■ | ■ |
| 3 | CP0835 | Coolnabacky – Portlaoise 110 kV Line Uprate | Uprate/ modify | 8 | ■ | ■ | |
| 4 | CP0839 | Moy 110 kV Station – Reconfiguration and Busbar Uprate52 | Uprate/ modify | – | ■ | ■ | |
| 5 | CP0867 | Flagford – Louth 220 kV Line Refurbishment | Refurbish/ replace | 110 | ■ | | |
| 6 | CP0905 | Louth – Ratrussan 110 kV No. 1 Line Uprate | Uprate/ modify | 39 | ■ | | |
| 7 | CP0871 | Galway 110 kV Station Redevelopment Project | Uprate/ modify | – | ■ | ■ | |
| 8 | CP0919 | Lanesboro 110 kV Station Redevelopment Project | Uprate/ modify | – | | ■ | |
| 9 | CP1031 | Flagford 220 kV Station Sprecher & Schuh CB Replacement | Refurbish/ replace | – | ■ | | |
| 10 | CP1032 | Cashla 220 kV Station Sprecher & Schuh CB Replacement | Refurbish/ replace | – | ■ | | |
| 11 | CP1048 | Power Flow Control Scheme | New build capacity | – | | ■ | |

50 The total length is 137 km, 103 km in Ireland and 34 km in Northern Ireland.
51 According to the latest publication of the NDP, the energization date of CP0466 is now 2027. This Clarification is made in order to align with TDP NI.
52 ATR completed.

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | ■ | | | | Mayo, Roscommon | 5 | ■ | TSO | 12/09/2018 | 15/03/2023 | 30/06/2026 |
| ■ | ■ | | ■ | | Meath, Cavan, Monaghan, Armagh, Tyrone | 5 | | TSO | 21/09/2016 | 28/03/2023 | 22/12/2025[51] |
| | ■ | | | ■ | Laois, Laois | 5 | | TSO | 30/05/2018 | 30/03/2024 | 30/11/2025 |
| | ■ | | | ■ | Mayo | 6 | ■ | TSO | 30/09/2014 | 07/10/2015 | 30/11/2023 |
| | | | | ■ | Roscommon, Leitrim, Longford, Cavan, Meath, Louth | 6 | | TSO | 20/04/2015 | 30/04/2020 | 30/11/2025 |
| | | | | ■ | Louth, Monaghan, Cavan | 6 | | TSO | 25/05/2016 | 29/08/2022 | 30/09/2024 |
| | ■ | | | ■ | Galway | 6 | ■ | TSO | 21/06/2017 | 21/12/2018 | 30/11/2024 |
| | ■ | | | | Longford | 6 | ■ | TSO | 28/12/2017 | 30/06/2020 | 30/11/2029 |
| | | | | ■ | Roscommon | 6 | | TSO | 30/06/2018 | 11/07/2019 | 20/11/2026 |
| | | | | ■ | Galway | 6 | | TSO | 30/06/2018 | 11/07/2019 | 30/11/2026 |
| | ■ | ■ | | | Longford | 4 | | TSO | 04/02/2021 | 29/09/2023 | 18/12/2024 |

## Table 5-2: Projects in the Border, Midlands and West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 12 | CP1061 | Shantallow 110 kV Station – Shantallow Solar Farm | New build connection | – | | ■ | |
| 13 | CP0644 | Bracklone 110 kV Station – DSO | New build connection | – | ■ | | |
| 14 | CP0841 | Arva-Carrick on Shannon 110 kV Line Uprate – Refurb | Uprate/ modify | 43 | ■ | ■ | |
| 15 | CP0848 | Castlebar – Cloon 110 kV Line Uprate-Refurb | Uprate/ modify | 57.3 | ■ | ■ | |
| 16 | CP1094 | Buffy 110 kV Station | New build connection | – | | ■ | |
| 17 | CP1060 | Loughteague 110 kV Solar Farm | New build connection | – | | ■ | |
| 18 | CP1073 | Oweninny 3 | New build connection | – | | ■ | |
| 19 | CP1126 | Mully Graffy Windfarm | New build connection | – | | ■ | |
| 20 | CP1127 | Lenalea Windfarm | New build connection | – | | ■ | |
| 21 | CP1139 | Sligo & Srananagh 220 & 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 22 | CP1152 | Arva and connected stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 23 | CP1153 | Oldstreet, Tynagh and Cashla 400 kV & 220 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 24 | CP1161 | Cathaleen's Fall and Connected Stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 25 | CP1158 | Clonfad Solar | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | ■ | | | Galway | 6 | | DEV | 11/07/2019 | 17/12/2021 | 12/08/2024 |
| | | ■ | | | Laois | 6 | | DSO | 19/03/2020 | 01/06/2022 | 01/04/2025 |
| ■ | ■ | | | | Cavan, Longford, Leitrim, Rosscommon | 6 | ■ | TSO | 21/05/2020 | 15/12/2021 | 30/11/2024 |
| | ■ | | | | Mayo, Galway | 5 | ■ | TSO | 16/09/2020 | 29/12/2023 | 30/11/2025 |
| | | ■ | | | Galway | 6 | | DEV | 10/02/2020 | 19/11/2020 | 30/03/2023 |
| | | ■ | | | Laois | 6 | | DEV | 03/06/2020 | 05/11/2021 | 31/03/2025 |
| | | ■ | | | Mayo | 3 | | DEV | 02/07/2020 | 30/04/2024 | 30/06/2026 |
| | | ■ | | | Donegal | 4 | | DEV | 06/08/2020 | 10/02/2023 | 28/06/2024 |
| | | ■ | | | Donegal | 4 | | DEV | 01/10/2020 | 05/10/2021 | 28/04/2023 |
| | | | | ■ | Sligo | 6 | | TSO | 01/10/2020 | 16/07/2021 | 30/11/2025 |
| | | | | ■ | Cavan | 6 | | TSO | 12/11/2020 | 01/09/2021 | 01/12/2025 |
| | | | | ■ | Galway | 6 | | TSO | 12/11/2020 | 05/08/2021 | 30/11/2024 |
| | | | | ■ | Donegal | 6 | | TSO | 04/12/2020 | 01/12/2021 | 30/11/2025 |
| | | ■ | | | Westmeath | 3 | | DEV | 19/01/2021 | 22/12/2022 | 30/06/2024 |

## Table 5-2: Projects in the Border, Midlands and West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 26 | CP1119 | Cashla Flagford 220 kV Line Refurbishment | Refurbish/ replace | 88 | ■ | | |
| 27 | CP1142 | Firlough 110 kV Station (Firlough WF) | New build connection | – | | ■ | |
| 28 | CP1156 | Sligo 110 kV Station – Srananagh 1 & 2 Bay uprates | Uprate/ modify | – | ■ | ■ | |
| 29 | CP1199 | Derryiron – Thornsberry 110 kV Circuit Uprate | Uprate/ modify | 19.67 | | ■ | |
| 30 | CP1143 | Blackwater Bog Solar 1 | New build connection | – | | ■ | |
| 31 | CP1000 | Lanesboro – Mullingar 110 kV line LCA | Uprate/ modify | 46 | ■ | | |
| 32 | CP1079 | Binbane – Cathaleen's Fall 110 kV circuit thermal capacity | Uprate/ modify | 34.3 | ■ | ■ | |
| 33 | CP1078 | Lanesboro – Sliabh Bawn Thermal Uprate | Uprate/ modify | 9.4 | ■ | | |
| 34 | CP0817 | Flagford – Sliabh Bawn 110 kV circuit uprate | Uprate/ modify | 21.2 | ■ | ■ | |
| 35 | CP0907 | Dalton 110 kV Busbar | Uprate/ modify | – | ■ | ■ | |
| 36 | CP1155 | Glenree – Moy 110 kV Line Uprate | Uprate/ modify | 13.86 | ■ | ■ | |
| 37 | CP1023 | Letterkenny Busbar Ratings Needs | New build capacity | – | ■ | ■ | |
| 38 | CP1170 | Newbridge – Portlaoise 110 kV Partial Thermal Uprate | Uprate/ modify | 19.8+2 | ■ | | |
| 39 | CP1168 | Cashla-Salthill 110 kV Thermal Uprate | Uprate/ modify | 9.4 | ■ | ■ | |
| 40 | CP1059 | Shannonbridge B ESS – New 220 kV transformer bay | New build connection | – | ■ | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Galway, Roscommon | 5 | | TSO | 26/02/2021 | 30/09/2023 | 30/11/2025 |
| | | ■ | | | Mayo | 3 | | DEV | 04/02/2021 | 30/04/2024 | 30/06/2026 |
| | ■ | | | | Sligo | 4 | | TSO | 18/06/2021 | 04/04/2022 | 30/11/2025 |
| | ■ | ■ | | | Offaly | 5 | | TSO | 19/11/2021 | 30/09/2023 | 30/11/2025 |
| | | ■ | | | Offaly | 3 | | DEV | 06/05/2021 | 31/12/2023 | 28/03/2025 |
| | ■ | | | | Longford, Westmeath | 5 | ■ | TSO | 29/01/2021 | 29/12/2023 | 30/11/2024 |
| | ■ | ■ | | | Donegal | 5 | ■ | TSO | 29/01/2021 | 30/03/2023 | 30/11/2023 |
| | ■ | | | | Longford, Roscommon | 5 | ■ | TSO | 18/02/2021 | 29/12/2023 | 30/11/2024 |
| | ■ | | | | Roscommon | 6 | ■ | TSO | 18/02/2021 | 02/06/2022 | 31/10/2024 |
| | ■ | | | | Mayo | 4 | ■ | TSO | 01/10/2021 | 30/06/2023 | 24/11/2026 |
| | ■ | | | | Sligo, Mayo | 5 | | TSO | 15/04/2021 | 30/09/2023 | 30/06/2025 |
| | ■ | | | | Donegal | 4 | | TSO | 17/06/2021 | 10/09/2024 | 30/10/2029 |
| ■ | ■ | | | | Newbridge, Portlaoise | 5 | | TSO | 05/08/2021 | 30/12/2023 | 30/11/2025 |
| ■ | ■ | | | | Galway | 5 | | TSO | 18/03/2021 | 29/12/2023 | 30/11/2025 |
| | | ■ | | | Offaly | 6 | | DEV | 28/05/2021 | 12/10/2022 | 01/07/2024 |

## Table 5-2: Projects in the Border, Midlands and West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 41 | CP1219 | Coole Wind Farm | New build connection | – | | ■ | |
| 42 | CP1220 | Garrintaggart 110 kV Station – Pinewoods Wind Farm | New build connection | – | | ■ | |
| 43 | CP1217 | Philipstown 110 kV Station (Cushaling Wind Farm) | New build connection | – | | ■ | |
| 44 | CP1174 | Aghaleague 110 kV Station | New build connection | – | | ■ | |
| 45 | CP1231 | Knockdrin 110 kV Station (Yellow River Wind Farm) | New build connection | – | | ■ | |
| 46 | CP1229 | Lislea 110 kV Station – Drumlins WF | New build connection | – | | ■ | |
| 47 | CP1255 | Castlelost FlexGen | New build connection | – | ■ | | |
| 48 | CP1259 | Cuilleen Power | New build connection | – | ■ | | |
| 49 | CP1264 | Rhode ESS | New build connection | – | ■ | ■ | |
| 50 | CP1191 | Galway Area Transmission Network Needs | Uprate/ modify | 13.8 | ■ | ■ | |
| 51 | CP1232 | Derryiron 110 kV Busbar Rating Needs | Uprate/ modify | – | ■ | ■ | |
| 52 | CP1237 | Ferry View 110 kV Station | New build connection | – | | ■ | |
| 53 | CP1275 | Cashla – Galway 110 kV circuit 2 Uprating (Part of CP1191) | Uprate/ modify | 11.3 | ■ | ■ | |
| 54 | CP1276 | Cashla – Galway 110 kV circuit 3 Uprating (Part of CP1191) | Uprate/ modify | 11.3 | ■ | ■ | |
| 55 | CP1234 | Laurencetown 110 kV Station | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | ■ | | | Westmeath | 4 | | DEV | 01/02/2022 | 01/11/2024 | 01/04/2025 |
| | | ■ | | | Laois | 4 | | DEV | 01/02/2022 | 01/09/2023 | 01/04/2025 |
| | | ■ | | | Offaly | 3 | | DEV | 03/02/2022 | 01/10/2023 | 01/07/2024 |
| | | ■ | | | Roscommon | 3 | | DEV | 02/03/2022 | 30/03/2024 | 31/10/2025 |
| | | ■ | | | Offaly | 3 | | DEV | 07/04/2022 | 30/09/2023 | 29/11/2024 |
| | | ■ | | | Monaghan | 3 | | DEV | 29/04/2022 | 22/12/2022 | 01/10/2024 |
| | | ■ | | | Westmeath | 3 | | DEV | 04/05/2022 | 03/10/2023 | 01/07/2024 |
| | | ■ | | | Roscommon | 3 | | DEV | 05/05/2022 | 03/10/2023 | 01/07/2024 |
| | | ■ | | | Offaly | 3 | | DEV | 23/06/2022 | 31/10/2023 | 31/01/2025 |
| ■ | ■ | | | | Galway | 3 | | TSO | 21/11/2022 | 30/12/2025 | 30/11/2029 |
| ■ | | | | | Galway | 3 | | TSO | 29/04/2022 | 29/09/2023 | 31/12/2025 |
| | | | ■ | | Offaly | 3 | | DEV | 07/07/2022 | 01/01/2024 | 02/12/2024 |
| ■ | ■ | | | | Westmeath | 3 | | TSO | 21/11/2022 | 31/12/2024 | 31/12/2029 |
| ■ | ■ | | | | Laois | 3 | | TSO | 21/11/2022 | 31/12/2024 | 31/12/2029 |
| | | | ■ | | Offaly | 3 | | DEV | 07/04/2022 | 31/10/2023 | 01/12/2024 |

| Table 5-2: Projects in the Border, Midlands and West | | | | | | | |
|---|---|---|---|---|---|---|---|
| | CP No. | Project title | Type | Km | Drivers | | |
| | | | | | Security of Supply | RES Integration | Market Integration |
| 56 | CP1262 | Shanonagh 110 kV Station | New build connection | – | | ■ | |
| 57 | CP1272 | Derryiron Temporary Bypass Project | Uprate/ Modify | – | ■ | ■ | |
| 58 | CP1393 | Offshore Phase 1 Project 1 | New build connection | – | | ■ | |
| 59 | CP0837 | Bellacorrick 110 kV Station T141 Uprate | Uprate/ Modify | – | ■ | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | ■ | | Roscommon | 3 | | DEV | 10/11/2022 | 29/02/2024 | 25/04/2025 |
| ■ | | | | | Offaly | 3 | | TSO | 12/10/2022 | 31/03/2023 | 30/06/2023 |
| | | ■ | | | Monaghan | 3 | | TSO | 15/12/2022 | 31/12/2024 | 30/06/2027 |
| | | ■ | | | Westmeath | 3 | | TSO | 10/12/2014 | 07/12/2018 | 01/06/2023 |

## 5.3 The South-West and Mid-West

| Summary of projects | |
|---|---|
| | |
| New Build | 16 |
| Uprate/Modify | 7 |
| Refurbish/Replace | 15 |
| **Total** | **38** |


### Active TDP projects by region

The South-West and Mid-West have a wide variety of generation sources dispersed around the region. These include wind, storage, hydro, gas, fuel oil, diesel, and coal burning power stations.

The existing transmission network is composed of 110 kV, 220 kV and 400 kV infrastructure. The high capacity 220 kV and 400 kV circuits facilitate high inter-regional power flows from the region.

The development of the transmission network in the area is characterised by the connection of high levels of wind generation in Co. Cork and Co. Kerry. These high levels of generation result in transmission network constraints as power is exported out of the area towards Moneypoint and Knockraha transmission stations. Generation levels in the area are set to increase in the coming years.

The level of generation is greater than the capacity of the network resulting in local constraints related to power-transfer needs. These large transfers of power create voltage support needs.

To cater for the high levels of generation, network reinforcement is needed to enable the efficient export of generation from the area.

In summary there are reinforcement needs due to:

- Local constraints related to power-transfer capacity and voltage support needs; and
- Asset condition.

The projects described in this section will enable the transmission network to accommodate more diverse power flows. They will also provide benefits to existing and future users of the transmission network and facilitate future regional load growth.

The TDP contains a list of the committed projects as at 21 December 2022. Indicative completion dates are included for these projects*.

We will continue to assess reinforcement needs in the South-West and Mid-West and to identify candidate solutions as part of the Shaping Our Electricity Future update, aiming to find new projects required in the area beyond those already progressing through the grid development process.

EirGrid is currently working on a joint project with the French TSO Réseau de Transport d'Électricité (RTE) called the Celtic Interconnector, that would land on the southern coast of Ireland with a connection point in Cork. This interconnector is deemed a Project of Common Interest (PCI) by the European Commission. PCIs are intended to help the EU achieve its energy policy and climate objectives: affordable, secure and sustainable energy for all citizens. See Appendix A, Irish Projects in European Plans, for more information.

The projects in the South-West and Mid-West are discussed in more detail below.

Figure 5-2 shows the location of projects in Steps 4 to 6 in the South-West and Mid-West.

*Figure 5-2 (a): Planned network developments in Steps 4 to 6 in the South-West and Mid-West*

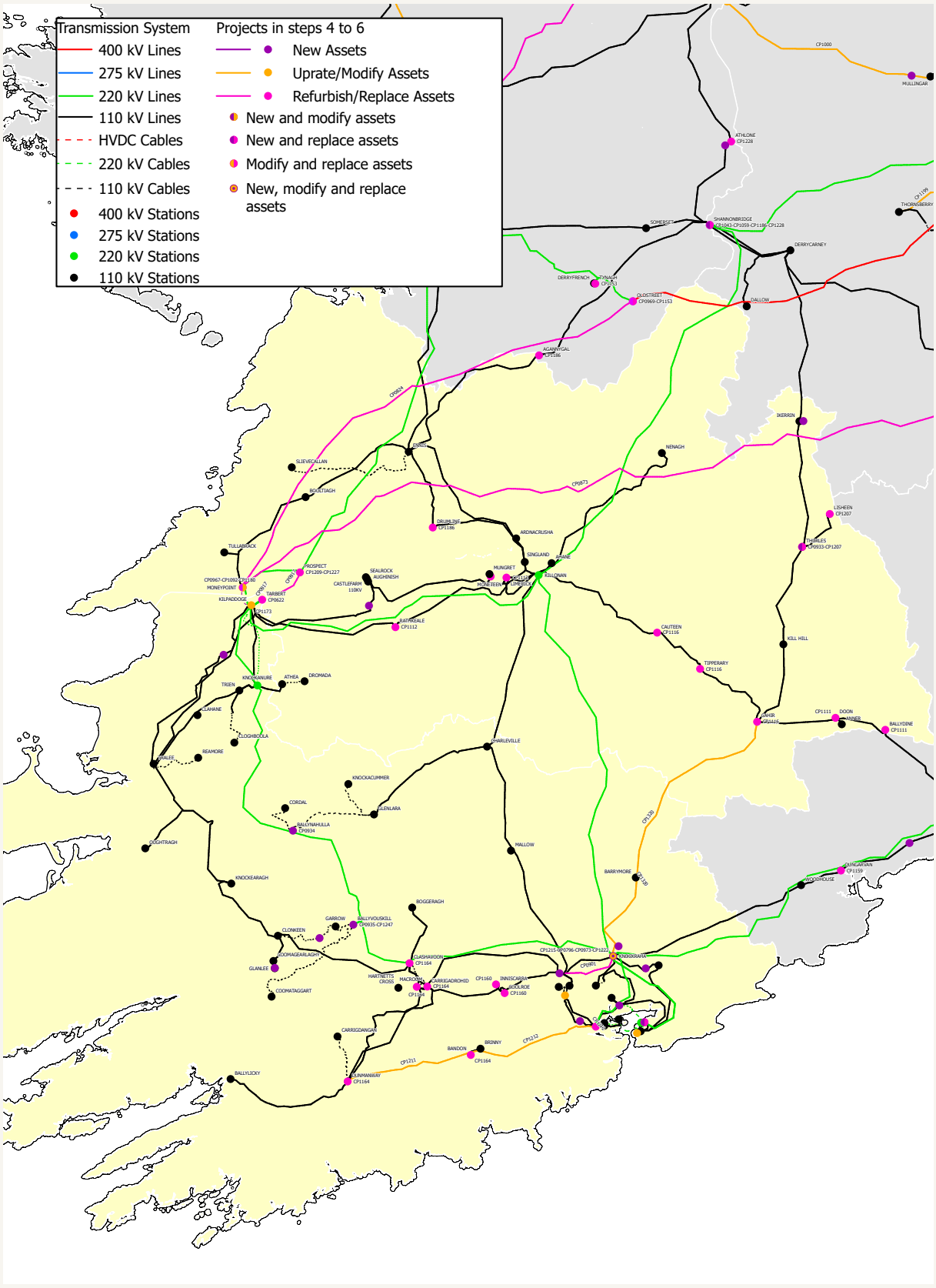
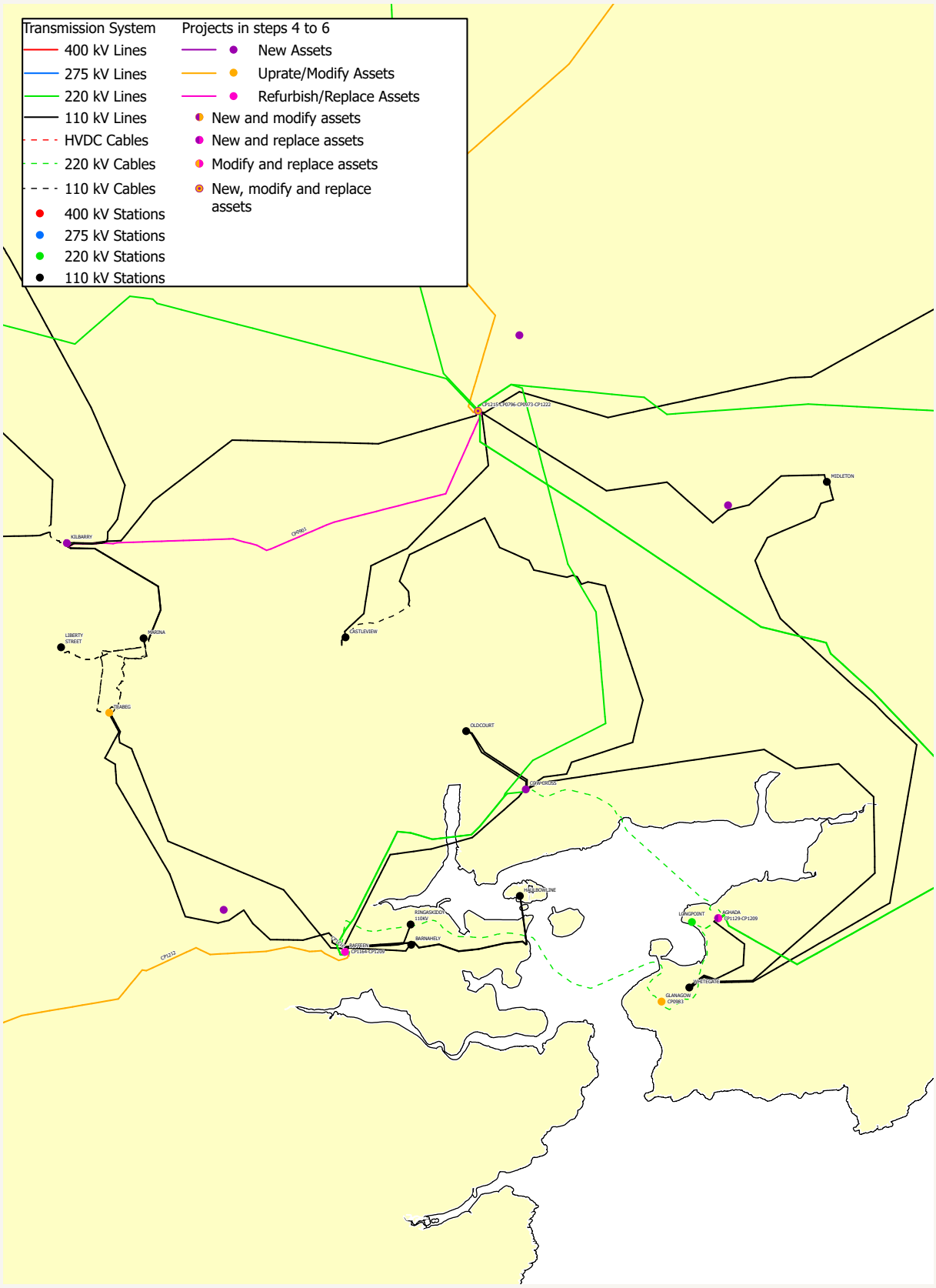


*Figure 5-2 (b): Planned network developments in Steps 4 to 6 in Cork*



## Reinforcement of the transmission network in North Kerry

### Project

- Tarbert 220/110 kV Station Refurbishment (CP0622)

### Description

The driver for this project is Security of Supply.

The need for reinforcement arises due to local constraints on the transmission network.

The existing Tarbert transmission station is being retained. However, due to the age and condition of the assets in Tarbert station, a project involving the refurbishment of the 220 kV assets is progressing.

## Reinforcement of the transmission network in Tipperary

### Projects

- Cahir and Connected Stations 110 kV Protection Upgrade (CP1111)
- Tipperary, Cahir and Connected Stations 110 kV Protection Upgrade (CP1116)
- Lisheen – Thurles 110 kV protection Upgrade (CP1207)

### Description

The driver for these projects is Security of Supply.

The three projects involve replacement of aged protection relays and teleprotection interfaces in Cahir, Ballydine and Doon 110 kV stations (CP1111), Cahir, Cauteen and Tipperary 110 kV stations (CP1116), and in Lisheen and Thurles 110 kV stations (CP1207).

At the Ballydine and Doon 110 kV stations, the installation of a bus zone protection system and the extension of the buildings is planned to make room for the new protection relay panels.

Installation of a new combined Current transformer/Voltage transformer (CT/VT) in Tipperary 110 kV station is the only significant deviation from relay installation and commissioning type work contained in CP1116.

Installation of new duplicate protection relays are included for both Lisheen and Thurles 110 kV stations. This is a particularly vulnerable circuit as there is no redundancy in the protection systems and one end has an end-of-life device. Failure of a single protection element at either end of this line will result in the circuit being forced out of service until urgent repair or replacement can be completed.

## Reinforcement of the transmission network between Tipperary and Cork

### Project

- Barrymore – Cahir – Knockraha 110 kV Line Uprate (CP1320)

### Description

The drivers for this project are Security of Supply and RES Integration.

The circuit under consideration is the Barrymore – Cahir – Knockraha 110 kV. With the planned development of two new interconnectors in the South of Ireland this circuit requires uprating to increase its capacity.

## Reinforcement of the transmission network in West Cork

### Projects

- Coolroe, Inniscarra and connected stations Protection Upgrade (CP1160)
- West Cork Protection Upgrade (CP1164)
- Bandon – Dunmanway 110 kV Line Uprate (CP1211)
- Bandon – Raffeen 110 kV Line Uprate (CP1212)
- Brown Boveri circuit breaker replacements (CP1209)
- New Ballyvouskill 220/110 kV Transformer (CP1247)

### Description

The drivers for these projects are Security of Supply and RES integration.

The Coolroe, Inniscarra and Macroom, and West Cork Protection Upgrades involve replacement of aged protection relays and teleprotection interfaces in order to mitigate against sub optimal protection system performance and the need for the grid to have its assets in a good condition.

The existing fibre optic network between Macroom and Inniscarra is planned to be utilised for differential protection and teleprotection. Installation of a new 110 kV busbar protection schemes in Inniscarra and Coolroe 110 kV stations are included in this project.

West Cork Protection upgrade also includes the installation of a new busbar protection scheme in Carrigadrohid station. Building extension works has also been include for Carrigadrohid as new protection cabinet may require more space than is available in the existing control room.

Due to the integration of significant levels of new renewable generation to the transmission and distribution system in the South-West and integration of interconnections, an increase in power flow is expected through Bandon – Dunmanway 110 kV and Bandon – Raffeen 110 kV circuits. These thermal uprates are necessary because in times of high wind power dispatches in the future, an unplanned loss of the Clashavoon – Knockraha 220 kV circuit could result in excessive power flows on the circuit Bandon – Dunmanway – Raffeen 110 kV exceeding its thermal rating, putting Security of Supply at risk.

Brown Boveri circuit breaker replacements project includes changes of circuit breaker in Aghada, Louth, Moneteen, Prospect and Raffeen stations. The circuit breakers are approximately 40 years old and while they have not reached their expected lifespan, due to poor reliability issues, the high costs with refurbishment and the criticality of these assets to the network, the changes are recommended. This project will also include the replacement and refurbishment of other equipment associated with each bay to ensure reliable performance of these critical assets for the future.

The need of the new Ballyvouskill 220/110 kV Transformer project is primarily driven by the planned connection of the RES. The transformers at Ballyvouskill station are at risk of overloading, as it has been identified that one of them will be overloaded beyond its emergency thermal rating due to an unplanned loss of the other one. The installation of a third 220/110 kV transformer at Ballyvouskill station will address the issue described above, ensuring Security of Supply and allowing the connection of renewables sources in the area.

## Reinforcement of the transmission network in the Cork City area

### Projects

- Knockraha 220 kV Station Upgrade (CP0796)
- Trabeg 110 kV Station (CP0741)
- Knockraha Short Circuit Rating Mitigation (CP0973)
- Cow Cross 110 kV Station (CP1132)
- Kilbarry 110 kV GIS Station (CP0949)
- Kilbarry – Knockraha 110 kV No.2 Line Refurbishment (CP0901)
- Knockraha 220 kV Transformer Replacement (CP1222)

### Description

The driver for these projects is Security of Supply. Together they will create and maintain the requisite levels of reliability and flexibility in the transmission network.

The need for the Knockraha 220/110 kV station upgrade project arises due to a number of local constraints on the transmission network. Studies have indicated the potential unacceptable loss of generation and voltage violations without this project.

Trabeg 110 kV station project considers an uprate of 2 x 110 kV AIS load transformers to accommodate an increased distribution demand in the area.

Knockraha Short Circuit Rating Mitigation project addresses safety and Security of Supply. It will strengthen the capability of the support structures for strung busbar and bay conductor equipment to withstand the mechanical forces created by short circuit currents flowing through busbar and bay conductor.

To improve the Security of Supply, the installation of a new distribution transformer at Cow Cross 110 kV is required to facilitate the additional load driven by the retirement of the Cobh 38 kV Station and to facilitate new demand connections.

A new 110 kV station near Kilbarry is being progressed to accommodate increased demand in the area and to improve the Security of Supply. This new station, in combination with the existing Kilbarry 110 kV station, will divide the load between them and improve Security of Supply for Cork city and the vicinity of North Cork.

The proposed refurbishment of the Kilbarry – Knockraha 110 kV focusses on operational and maintenance issues for existing equipment. The refurbishment works include replacement of insulators and hardware, reinforcement of shear blocks, replacement of wooden polesets, corrosion treatment of steel towers, and ancillary site works.

Knockraha 220 kV Transformer Replacement project will replace one of the two oldest transformers with a new modern design transformer. This replacement is due to noise complaints from resident living in close proximity to the station and to improve asset resilience at this critical 220 kV transmission station.

## Reinforcement of the transmission network between Ireland and France

### Project

- Knockraha Station Celtic Interconnector (CP1215)

### Description

The drivers for this project are Market Integration, Security of Supply and RES integration.

As part of the preparation of the connection of the Celtic Interconnector, works will be carried out at Knockraha station.

The Celtic Interconnector is a planned subsea HVDC link to allow the exchange of electricity between Ireland and France. Since 2011, EirGrid has been working with its French equivalent Réseau de Transport d'Electricité (RTE) to find the best way to develop the interconnector to benefit electricity customers and markets in Ireland, France and the EU.

The scope of this project involves three new 400/220 kV single phase transformers, a new 220 kV transformer bay, a new 400 kV transformer bay and the terminations within the Celtic Interconnector AC cable sealing end compound, adjacent to Knockraha 220 kV station.

There is no capital project number associated with the Interconnector itself. This is because the project is being delivered by Celtic Interconnector Designated Activity Company, CIDAC, which is a joint venture between EirGrid and RTÉ.

The project is jointly funded by both TSOs through cost sharing agreements with the supporting national regulatory authorities with additional EU grant funding.

## Reinforcement of the transmission network in Limerick

### Projects

- Killonan 220/110 kV Station Redevelopment (CP0624)
- Limerick and Connected Station 110 kV Protection Upgrade (CP1112)

### Description

The driver for these projects is Security of Supply.

The Killonan station is an important node on the network, as it is the main bulk supply point for the Mid-West region.

The project involves the replacement of the AIS station with a GIS station on an adjacent site. This is required because of the condition and age of the transmission equipment in the station.

Limerick, Moneteen and Rathkeale stations protection upgrades are required due to aged protection relays. Project works include 110 kV bus zone protection scheme installations at Rathkeale station, installation of measurement devices (CT/VT) at Limerick and Rathkeale and a new fibre connection between Limerick and Moneteen.

### New generation and battery connections in the South-West and Mid-West

#### Projects

- Drombeg 110 kV New Station and loop-in to Kilpaddoge – Tralee 110 kV circuit – Solar farm connection – (CP1062)
- Ballinknockane 110 kV New Station and loop-in to Aughinish – Kilpaddoge 110 kV circuit – Solar farm connection – (CP1069)
- Aghada BESS 02 – Connection of a battery storage to a bay in the existing Aghada 220 kV station via 220 kV underground cable – (CP1129)
- Moonatooreen solar farm – New single Bay AIS 110 kV station, Ballynabrannagh, to be tailed into the existing Knockraha 220/110 kV station by approximately 2.8 km of underground cable – (CP1128)
- Lysaghstown solar farm – New 110 kV AIS 4-Bay C-Type station, Lysaghstown, looped into the existing Midleton – Knockraha 110 kV OHL via 2no. UGC of approx. length 0.13km – (CP1224)
- Erkina Solar farm – New 4-bay C-type AIS 110 kV station, looped into the Shannonbridge – Ikerrin Tee – Thurles 110 kV circuit, via two underground cables (approximately 1.1km) – (CP1236)
- Knocknamork Wind and Solar Park – New single bay AIS station, Coomnaclohy 110 kV Station, tailed into the existing Ballyvouskill 220/110 kV Station via approximately 3.5 km of underground cable – (CP1246)
- Ballinrea Solar farm – New single bay AIS station, called Castletreasure 110 kV Station, tailed into the existing Raffeen 220/110 kV Station via approximately 4km of underground cable – (CP1245)
- Coumaclovane Solar Extension – Extension of the existing Glanlee Wind Farm making the existing connection a hybrid plant – (CP1240)

#### Description

The driver for these projects is the integration of RES. These projects are needed to connect new Windfarm, solar farm and battery connections.

Storage projects are also driven by Security of Supply, by:

- Improving competition and economic operation by removing operational constraints; and
- Providing the required flexibility for increased renewable generation

### Reinforcement of the transmission network in the South-West and Mid-West for reactive power support

#### Projects

- Ballynahulla 220/110 kV Station – New Statcom (CP0934)
- Ballyvouskill 220/110 kV Station – New Statcom (CP0935)
- Thurles 110 kV Station – New Statcom (CP0933)

#### Description

The drivers for these projects are RES integration and Security of Supply.

The need for reinforcement arises from changing generation patterns resulting in a need for additional voltage support in the south west region and around the Thurles area.

Both capacitive and inductive reactive support is required in the south west across two separate 220 kV stations; Ballynahulla and Ballyvouskill. The planned reactive support at Ballyvouskill and Ballynahulla makes up an overall solution for the South-West and the works at the two stations are required for the solution to perform adequately.

The need for additional reactive support in the Thurles area is due to the connection of distributed windfarms in the area and heavily loaded transmission lines during contingencies.

### Cable replacement in the South-West and Mid-West

#### Project

- Prospect – Tarbert Cable replacement (CP0917)

#### Description

The driver for this project is Security of Supply.

Prospect – Tarbert 220 kV circuit is partially overhead line and partially underground/ submarine cable. The cable has now reached end-of-life and requires replacement in the short term. The need to replace the existing Prospect Tarbert Fluid Filled 220 kV Cable is due to asset condition and age. It is also a requirement of EirGrid's cable maintenance policy to replace all Fluid Filled Cables from the system to remove the environmental risk of leaks.

### Other approved projects

In addition to the network reinforcement projects described above, there are also other projects in the South-West and Mid-West, namely:

- Moneypoint – Oldstreet 400 kV Line Refurbishment (CP0824);
- Dunstown – Moneypoint 400 kV Line Refurbishment (CP0873);
- Tarbert – Trien 110 kV No. 1 Line Refurbishment (CP0902); and
- Glanagow 220 kV Station – Point on Wave Controller (CP0983);

## 5.3.1 Summary of projects in the South-West and Mid-West

There are 37 projects in the South-West and Mid-West region. These are listed in Table 5-3 below.

## Table 5-3: Projects in the South-West and Mid-West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 1 | CP0622 | Tarbert 220 kV Station Upgrade | Refurbish/ replace | – | ■ | | |
| 2 | CP0824 | Moneypoint – Oldstreet 400 kV Line Refurbishment | Refurbish/ replace | 104 | ■ | | |
| 3 | CP0796 | Knockraha Station & installation of additional couplers | Uprate/ modify | – | ■ | | |
| 4 | CP0624 | Killonan 220 kV Station Refurbishment – Kilonan Station Works | Refurbish/ replace | – | ■ | | |
| 5 | CP0933 | Thurles 110 kV Station – Statcom | New build capacity | – | ■ | ■ | |
| 6 | CP0934 | Ballynahulla 220-110 kV Station – Statcom | New build capacity | – | ■ | ■ | |
| 7 | CP0935 | Ballyvouskill 220-110 kV Station – Statcom | New build capacity | – | ■ | ■ | |
| 8 | CP0873 | Dunstown – Moneypoint 400 kV Refurbishment | Refurbish/ replace | 209 | ■ | | |
| 9 | CP0902 | Tarbert – Trien 110 kV No. 1 Line Refurbishment | Refurbish/ replace | 21 | ■ | | |
| 10 | CP0973 | Knockraha Short Circuit Rating Mitigation | Uprate/ modify | – | ■ | | |
| 11 | CP0983 | Point on Wave Controller for Glanagow 220 kV Station | Uprate/ modify | – | ■ | | |
| 12 | CP0949 | Kilbarry 110 kV GIS Station | New build connection | – | ■ | | |
| 13 | CP1069 | Ballinknockane Solar farm | New build connection | – | | ■ | |
| 14 | CP1062 | Drombeg Solar 110 kV Station | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Kerry | 6 | | DSO | 29/05/2012 | 16/12/2014 | 30/11/2023 |
| | | | | ■ | Clare, Galway | 6 | | TSO | 17/09/2014 | 20/06/2018 | 30/11/2024 |
| | ■ | | | | Cork | 6 | ■ | TSO | 21/09/2016 | 30/09/2016 | 30/11/2025 |
| | | | | ■ | Limerick | 6 | | TSO | 30/09/2011 | 01/04/2019 | 16/11/2027 |
| | ■ | | | | Tipperary | 6 | ■ | TSO | 22/10/2015 | 19/10/2020 | 30/11/2023 |
| | ■ | | | | Kerry | 6 | | TSO | 22/10/2015 | 04/07/2019 | 29/09/2023 |
| | ■ | | | | Cork | 6 | ■ | TSO | 22/10/2015 | 04/07/2019 | 31/08/2023 |
| | | | | ■ | Kildare, Laois, Tipperary, Clare | 6 | | TSO | 20/06/2014 | 05/12/2019 | 30/11/2025 |
| | | | | ■ | Kerry | 6 | | TSO | 15/03/2016 | 27/09/2017 | 30/11/2024 |
| | | | | ■ | Cork | 6 | | TSO | 03/11/2016 | 21/06/2019 | 03/11/2025 |
| | ■ | | | | Cork | 6 | | TSO | 04/08/2016 | 23/05/2017 | 30/11/2023 |
| | | ■ | | | Cork | 6 | | DSO | 14/02/2017 | 04/03/2021 | 30/11/2024 |
| | | ■ | | | Limerick | 6 | | DEV | 16/05/2019 | 24/12/2020 | 01/10/2024 |
| | | ■ | | | Kerry | 6 | | DEV | 28/06/2019 | 17/12/2020 | 31/07/2024 |

## Table 5-3: Projects in the South-West and Mid-West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 15 | CP0901 | Kilbarry-Knockraha 110 kV No.2 Line Refurbishment | Refurbish/ replace | 12.5 | ■ | | |
| 16 | CP1116 | Tipperary, Cahir and Connected Stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 17 | CP0741 | Trabeg 110 kV Station – uprate 2x110 kV transformer bays and control room extension DSO | Uprate/ modify | – | ■ | | |
| 18 | CP1111 | Ballydine, Cahir and Connected Stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 19 | CP1112 | Limerick and Connected Stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 20 | CP1129 | Aghada BESS 02 | New build connection | – | ■ | ■ | |
| 21 | CP1132 | Cow Cross New 110 kV Transformer | New build capacity | – | ■ | | |
| 22 | CP1160 | Coolroe, Inniscarra & connected stations Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 23 | CP1164 | West Cork 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 24 | CP1207 | Lisheen – Thurles 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 25 | CP1128 | Ballynabrannagh 100 kV Station (Moonatooreen Solar) | New build connection | – | | ■ | |
| 26 | CP0917 | Prospect – Tarbert 220 kV Cable Replacement Project | Refurbish/ replace | 2.48 | ■ | | |
| 27 | CP1211 | Bandon Dunmanway 110 kV circuit thermal capacity | Uprate/ modify | 25.9 | ■ | ■ | ■ |
| 28 | CP1212 | Bandon Raffeen 110 kV circuit thermal capacity | Uprate/ modify | 27.2 | ■ | ■ | ■ |
| 29 | CP1224 | Lysaghtstown 110 kV Station | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Cork, Cork | 5 | | TSO | 13/05/2020 | 03/10/2022 | 30/11/2024 |
| | | | | ■ | Tipperary | 6 | | TSO | 13/05/2020 | 14/07/2021 | 30/05/2024 |
| | | ■ | | | Cork | 3 | | DSO | 03/06/2020 | 29/04/2021 | 01/05/2025 |
| | | | | ■ | Tipperary | 6 | | TSO | 21/05/2020 | 18/07/2021 | 30/11/2024 |
| | | | | ■ | Limerick | 4 | | TSO | 21/05/2020 | 29/09/2023 | 31/12/2025 |
| | | ■ | | | Cork | 6 | | DEV | 05/11/2020 | 17/12/2021 | 31/08/2023 |
| ■ | | ■ | | | Cork | 6 | | DSO | 02/09/2020 | 07/10/2021 | 28/08/2023 |
| | | | | ■ | Cork | 6 | | TSO | 04/12/2020 | 04/11/2021 | 30/11/2024 |
| | | | | ■ | Cork | 6 | | TSO | 04/02/2021 | 03/02/2022 | 30/11/2024 |
| | | | | ■ | Tipperary | 5 | | TSO | 04/11/2021 | 25/10/2022 | 30/11/2023 |
| | | ■ | | | Cork | 2 | | DEV | 04/11/2021 | 30/04/2024 | 30/06/2025 |
| | | | | ■ | Kerry | 4 | | TSO | 16/06/2021 | 29/09/2023 | 28/11/2025 |
| ■ | | | | | Cork | 3 | | TSO | 21/01/2022 | 30/09/2024 | 31/12/2026 |
| ■ | | | | | Cork | 3 | | TSO | 28/01/2022 | 31/12/2024 | 31/12/2027 |
| | | ■ | | | Cork | 3 | | TSO | 03/02/2022 | 30/01/2023 | 30/11/2023 |

## Table 5-3: Projects in the South-West and Mid-West

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 30 | CP1215 | Knockraha station Celtic IC Non contested works | New build connection | – | ■ | ■ | ■ |
| 31 | CP1209 | Brown Boveri Circuit Breaker Replacements | Refurbish/ replace | – | ■ | | |
| 32 | CP1236 | Timoney 110 kV Station | New build connection | – | | ■ | |
| 33 | CP1246 | Coomnaclohy 110 kV Station (Knocknamork Wind and Solar Park) | New build connection | – | | ■ | |
| 34 | CP1320 | Barrymore Cahir Knockraha 110 kV Line Uprate | Uprate/ modify | 63.5 | ■ | | |
| 35 | CP1245 | Castletreasure 110 kV Station | New build connection | – | | ■ | |
| 36 | CP1222 | Knockraha 220 kV Transformer Replacement | Refurbish/ replace | – | ■ | | |
| 37 | CP1247 | New Ballyvouskill 220-110 kV Transformer | New build capacity | – | ■ | ■ | |
| 38 | CP1240 | Coumaclovane Solar Extension | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | ■ | ■ | | Cork | 3 | | TSO | 23/02/2022 | 04/07/2023 | 31/12/2026 |
| | | | | ■ | Cork | 3 | | TSO | 31/03/2022 | 22/12/2023 | 01/12/2028 |
| | | ■ | | | Tipperary | 3 | | DEV | 07/07/2022 | 23/11/2023 | 19/11/2024 |
| | | ■ | | | Cork | 3 | | DEV | 07/07/2022 | 28/02/2024 | 01/12/2024 |
| ■ | ■ | | ■ | | Cork/ Tipperary | 3 | | TSO | 31/07/2022 | 31/12/2024 | 01/11/2028 |
| | | ■ | | | Cork | 3 | | DEV | 09/09/2022 | 29/03/2024 | 28/11/2025 |
| | | | | ■ | Cork | 3 | | TSO | 19/01/2022 | 15/12/2022 | 10/10/2025 |
| ■ | | ■ | | | Cork | 3 | | TSO | 10/05/2022 | 24/07/2023 | 01/12/2025 |
| | | ■ | | | Kerry | 3 | | DEV | 31/08/2022 | 31/05/2023 | 31/10/2023 |

## 5.4 The South-East, Mid-East and Dublin

| Summary of projects | |
|---|---|
| | |
| New Build | 49 |
| Uprate/Modify | 18 |
| Refurbish/Replace | 24 |
| Other | 5 |
| **Total** | **96** |


### Active TDP projects by region

The South-East, Mid-East and Dublin has a wide variety of generation sources dispersed around the region including pumped storage, gas burning power stations, hydro, solar, waste to energy, and the 500 MW East West Interconnector (EWIC).

The greater Dublin area is the major load centre on the Irish transmission network.

As demand grows in Dublin, there are transmission capacity constraints getting power into and around Dublin. To address potential issues, the SEM Committee oversees the Single Electricity Market provisions locational capacity through the Capacity Market Auctions report[53].

The existing regional transmission network is comprised of 110 kV, 220 kV and 400 kV infrastructure. The transmission network has to meet a number of diverse power flows that can vary depending on:

- The generation dispatch;
- Network demand;
- Interconnector flows; and
- Network topology.

The network must accommodate high density demand in the area, and local generation exports. Additionally, the network can be subject to high inter-regional power transfers from both north to south and south to north.

53 https://www.sem-o.com/documents/general-publications/T-4-2024-2025-Final-Capacity-Auction-Results-Report.pdf

The development of the transmission network in the area is characterised by the displacement of thermal generation in Dublin for wind generation resulting in power-transfer capacity and voltage support needs due to an increase in power flows in the region. This reason being is, in order to integrate higher RES, the energy that was supplied by the thermal plants in the Dublin area will be supplied by the onshore generation, coming from the West and South-West, and from the planned offshore wind generation connections in the Irish sea. The installation of offshore wind generation will at times reduce the impact of large transfers of power into the region from the West but creates other power-transfer capacity needs in Greater Dublin.

A third party is undertaking the development of an additional HVDC interconnector between Ireland and Great Britain, known as the Greenlink Interconnector. The connection point for the interconnector is in the south-east, by a new 220 kV GIS tailed station, Loughtown, which will connect into an existing bay in Great Island station. This interconnector is deemed a PCI by the European Commission. PCIs are intended to help the EU achieve its energy policy and climate objectives: affordable, secure and sustainable energy for all citizens. See Appendix A Irish Projects in European Plans for more information.

Network reinforcement will be required to cater for the power flows resulting from additional demand, generation and interconnection. This will enable the efficient transfer of power to the load centres of the eastern seaboard and the Dublin area.

In summary, there are reinforcement needs due to:

- Local constraints related to power-transfer capacity and voltage support needs;
- Asset condition; and
- Increase in RES connections, wind and solar farms.

The projects described in this section will enable the transmission network to accommodate more diverse power flows. They will also provide benefits to existing and future users of the transmission network and facilitate future regional load growth.

The TDP contains a list of the committed projects as at 21 December 2022. Indicative completion dates are included for these projects*.

We will continue to assess reinforcement needs in the South-East, Mid-East and Dublin and to identify candidate solutions as part of the Shaping Our Electricity Future update, aiming to find new projects required in the area beyond those already progressing through the grid development process.

The projects in the South-East, Mid-East and Dublin are discussed in more detail below.

Figure 5-3 shows the location of projects in Steps 4 to 6 in the South-East, Mid-East and Dublin.

*Figure 5-3 (a): Planned network developments in Steps 4 to 6 in the South-East, Mid-East and Dublin*

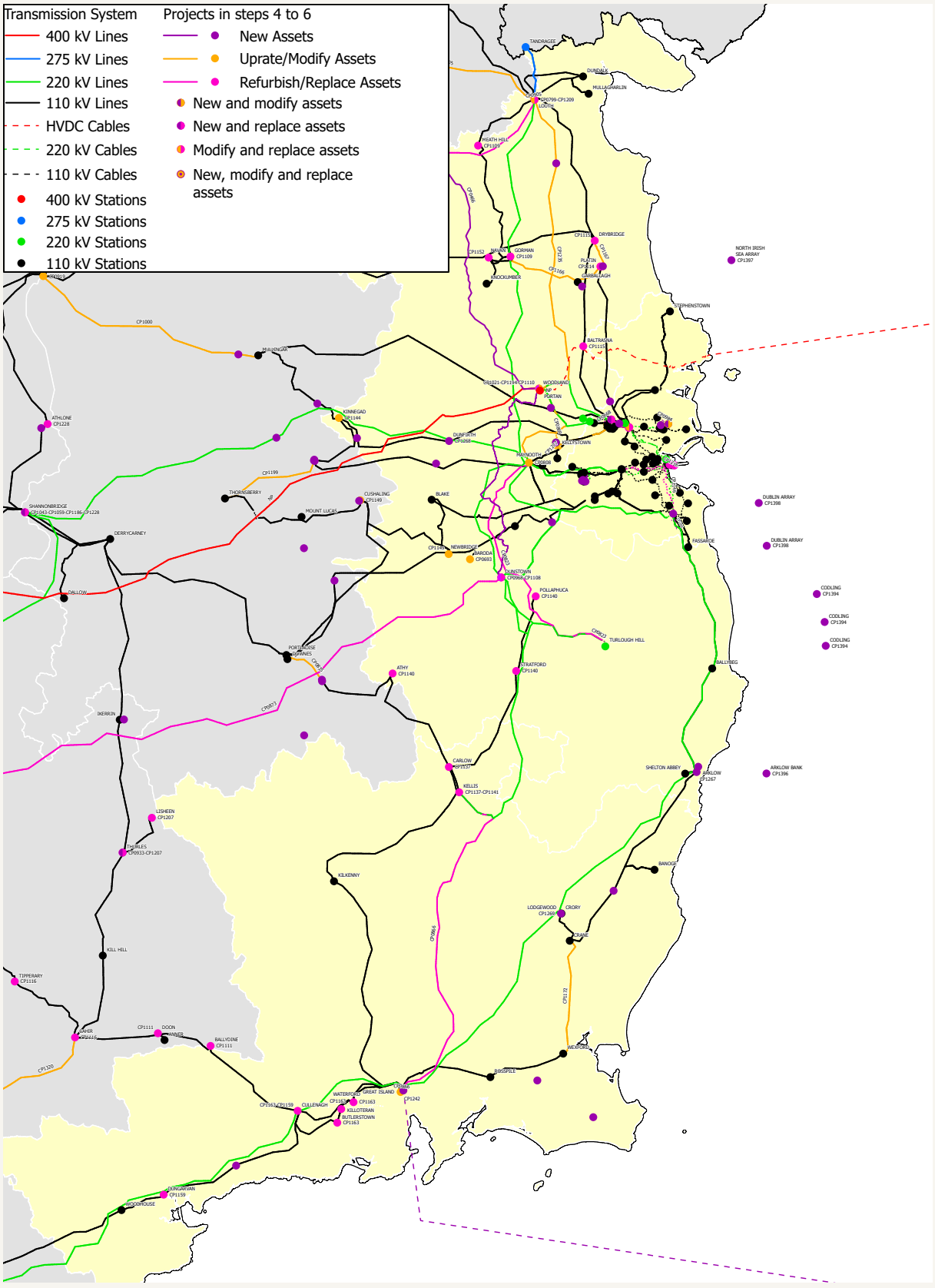
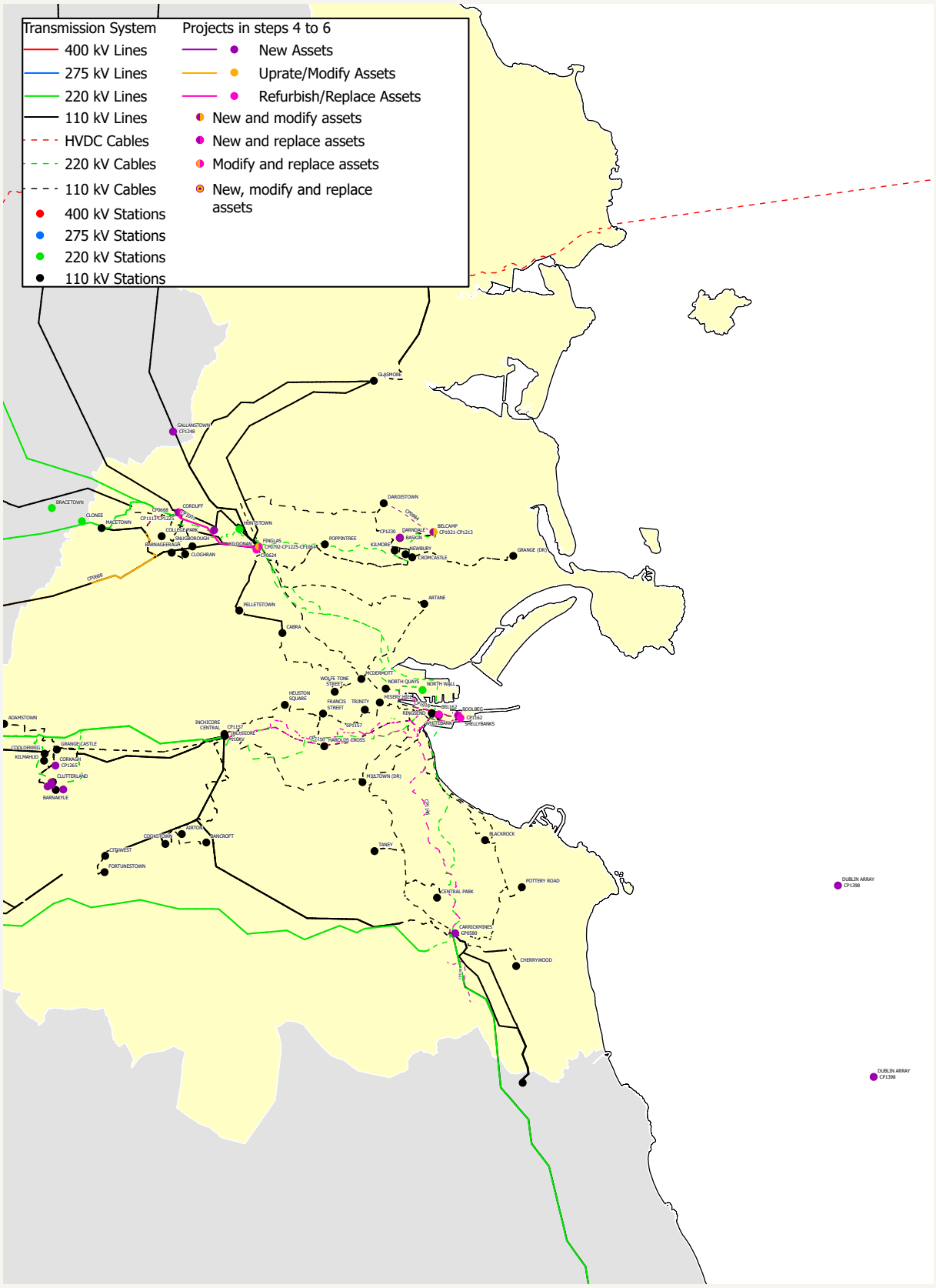


*Figure 5-3 (b): Planned network developments in Steps 4 to 6 in Dublin*



## Reinforcement of the transmission network between Ireland and Wales

### Project

- Greenlink Interconnector (CP1088)

### Description

The drivers for this project are market integration, Security of Supply and RES integration.

Greenlink Interconnector is a proposed subsea and underground electricity interconnector cable between the electricity grids in Ireland and Great Britain, with a nominal capacity of 500 MW. This committed project brings significant benefits on both sides of the Irish Sea, Ireland and Wales, for integration of low carbon energy sources. In Ireland, it provides a link to EU and Nordic electricity market via Great Britain.

In Ireland, the project will consist of construction of a new 220 kV GIS tailed station, Loughtown, which will connect via approx. 400m of underground cable into an existing bay at Great Island 220 kV GIS Station. The converter hall will be built beside the new Loughtown station.

The Greenlink Interconnection Development will offer significant economic benefits, by:

- Improving Security of Supply, by:
  - diversifying energy sources; and
  - providing additional import and export capacity in both countries;
- Supporting the integration of additional renewable energy;
- Supporting EirGrid in meeting the targets set in the Climate Action Plan;
- Enabling an integrated European grid through Great Britain, by:
  - doubling the interconnection capacity between Ireland and Great Britain; and
  - contributing to each country's interconnection targets;
- Promoting energy price competition; and
- Supporting regional investment and jobs.

## Reinforcement of the transmission network between Munster and Leinster

### Project

- Grid Link Option 3 Regional Option Solution, comprising:
  - Series Compensation on the existing 400 kV overhead lines that cross the country from Moneypoint in County Clare to Dunstown in County Kildare and Woodland in County Meath. The series compensation devices are planned for:
    - Moneypoint 400 kV Station Series Compensation (CP0967)[54]
    - Oldstreet 400 kV Station Series Compensation (CP0969)[55]
    - Dunstown 400 kV Stations Series Compensation (CP0968)
  - Cross-Shannon 400 kV Cable (CP0970)[56]

54 This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.
55 This project is located in the Border, Midlands and Mid-West. It is included here as it is part of the Regional Solution.
56 This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.

### Description

Facilitation of new generation together with existing generation and/or potential future interconnection in the south east introduces large regional electricity flows from the south towards the east coast of Ireland. These electricity flows cause three physical phenomena which must be addressed by the Grid Link project:

- Voltage collapse.
- Large phase angles.
- Thermal overloads.

For more information on the Regional Solution and the need for it please see the report prepared for the Government appointed Independent Expert Panel[57].

### Reinforcement of the transmission network in the Midlands and South-East including Kildare Project

- Laois – Kilkenny Reinforcement Project (CP0585), comprising:
  - A new 400/110 kV station at Coolnabacky near Portlaoise (looped into the existing Dunstown – Moneypoint 400 kV and Athy – Portlaoise 110 kV lines);
  - A new 110 kV circuit from this station to a new 110 kV station at Ballyragget, Co. Kilkenny; and
  - A 110 kV uprate to the existing Ballyragget – Kilkenny line which is currently operated at 38 kV[58]

### Description

This project is required to address quality of supply issues and provide Security of Supply in Kilkenny, Carlow, Kildare and Laois.

The need for reinforcement arises due to a shortage of transmission capacity and voltage support across the region. The studies indicated potential violations of voltage limits throughout the area under single contingency conditions and loss of load violations in Kilkenny under maintenance-trip conditions.

The installation of a capacitor in Kilkenny 110 kV station was a short-term measure to maintain supply standards to the area. The Laois – Kilkenny reinforcement addresses the medium to long term quality and Security of Supply concerns.

57 https://www.eirgridgroup.com/site-files/library/EirGrid/Grid-Link-Report-to-IEP.pdf
58 https://www.eirgridgroup.com/the-grid/projects/laois-kilkenny/the-project/

## Reinforcement of the transmission and distribution networks in the Greater Dublin Area

### Projects

- Carrickmines 220/110 kV Station GIS Development (CP0580)
- Finglas 110 kV Station Redevelopment (CP0646)
- Inchicore 220 kV Station Upgrade (CP0692)
- Finglas 220 kV Station Upgrade (CP0792)
- Castlebagot New 220/110 kV Station (CP0872)[59]
- Belcamp – Shellybanks New 220 kV Cable (CP0984)[60]
- Irishtown, Shellybanks & connected stations 220 kV Protection Upgrade (CP1162)
- Poolbeg 220 kV Station project (CP1190)
- Belcamp 220 kV Busbar extension (CP1213)
- Darndale 110 kV Station Phase 2 (CP1230)

### Description

The driver for these projects is Security of Supply.

The need for reinforcement arises due to local constraints on the transmission and distribution networks. There is a requirement for additional capacity at a number of locations in the Greater Dublin Area due to load growth. This is primarily at:

- The new Belcamp 220/110 kV station to the east of the existing Finglas 220/110 kV station; and
- The new Castlebagot (formerly West Dublin) 220/110 kV station between Inchicore and Maynooth 220/110 kV stations.

These needs were identified through co-ordinated TSO and DSO network studies. These studies indicated the overloading of a number of existing circuits and transformers under single contingency conditions.

Replacement of substation equipment works are progressing in Inchicore and Carrickmines 220/110 kV stations to address the condition and age of the assets. These stations are major bulk supply points in Dublin.

Inchicore and Finglas 220 kV stations also have their own specific needs. The need for these stations' upgrade projects arises due to a number of local constraints on the transmission network.

In the case of Inchicore, network studies have indicated that the capacity of some of the existing switchgear is close to being exceeded. While in Finglas 220 kV station, studies have indicated the potential for loss of load without this project.

The Belcamp – Shellybanks new 220 kV cable will provide a second 220 kV connection to the new Belcamp 220 kV station which lies to the east of Finglas 220/110 kV station.

Irishtown, Shellybank and connected 220 kV stations upgrade involves replacement of aged protection relays and/or teleprotection interfaces in Carrickmines, Irishtown, Poolbeg and Shellybanks 220 kV stations. This project does not include any additional protection scheme enhancement, as the teleprotection is over fibre and the circuits have already differential protection.

59 https://www.eirgridgroup.com/the-grid/projects/west-dublin/the-project/
60 This project also includes the fit-out of the 220 kV GIS station building built as part of CP0437.

Due to the specific needs that have been identified for Poolbeg 220 kV station which include refurbishment of the station from an asset age and condition perspective and the need to have connectivity for planned offshore, it has been concluded that to ensure continued safe and secure operation of the station, a new 220 kV GIS station should be built offline, and the circuits transferred over to the new station. Once the final circuit has been transferred to the new GIS building the existing AIS and GIS buildings can be fully decommissioned and demolished which will create space for future development.

The busbar construction at Belcamp and the planned use of the station has been changed, as it has been identified that Belcamp station will need to be expanded to accommodate all the expected future bay connections. This extension of the busbar will result in Belcamp 220 kV station having 18 line or transformer bays in an enhanced ring busbar configuration.

Darndale 110 kV Station phase 2 project is driven by Security of Supply. The project consists of three additional customer transformers connected to the spare bays at Darndale station. These new transformers are part of a connection offer of a large demand customer.

### Reinforcement of the transmission network in the Greater Dublin Area

#### Projects

- Corduff – Ryebrook 110 kV Line Uprate and Ryebrook 110 kV Station Busbar Uprate (CP0668)
- Maynooth 220 kV Station Reconfiguration (CP0808)
- Corduff 220 kV Station Deep Works (CP1113)
- Corduff – Finglas N0. 1 & 2 220 kV Line Refurbishment (1001)
- Corduff – Finglas 220 kV Protection Upgrade (CP1225)
- Carrickmines area 220 kV Ducts (CP1200)

#### Description

The driver for these projects is Security of Supply.

The need for Corduff – Ryebrook 110 kV line uprate and Ryebrook 110 kV busbar uprate projects arises due to local constraints on the transmission network. There is a requirement for additional capacity.

The capacity needs were identified by network studies which indicated overloading of the circuit under single contingency conditions.

The need for the Maynooth station project arises due to the condition and age of the assets, and local constraints. The project involves construction of new 220 kV and 110 kV busbars in a new GIS station. The new 220 kV and 110 kV busbars will be built in an enhanced ring configuration, and the short circuit rating of both busbars will be built to the current standard.

The need for deep reinforcements at Corduff 220 kV has been identified as a requirement of the connection of a new data centre facility. The current network in the area does not have the capacity to accommodate this new demand, as well as to allow planned maintenance of the 220/110 kV transformer at Corduff. The works at this station involves installation of new 220 kV coupler bay and its associated protection, new 220 kV transformer bay and its associated protection and a new 110 kV coupler bay with its associated protection.

Corduff – Finglas 220 kV line requires refurbishment to extend the life of the asset while ensuring Security of Supply. The main elements of refurbishment include tower painting, insulators and hardware replacement, labels and danger notices and repair/civil works to existing foundation shear blocks.

Corduff – Finglas 220 kV protection upgrade project is also driven by Security of Supply and involves replacement of aged protection relays and teleprotection interfaces in Finglas 220 kV station and Corduff 220 kV station.

In the course of discussions on offshore wind generation 220 kV cable connections to Carrickmines 220 kV station, EirGrid has been informed of the planned Glenamuck Distributor Road Scheme south of the existing Carrickmines 220 kV station. This new road scheme was identified as an opportunity to create underground access for cable circuits from the south to the nearby Carrickmines 220 kV station.

The installation of conduits for the 220 kV cables in the new road layout would avoid the future need to interfere with the new road scheme, thereby avoiding disruption and additional civil works costs. The new 220 kV underground cable opportunities provided by the ducts placed in the new road scheme will allow for future new transmission circuits that need to connect the Carrickmines substation to other parts of the network, or could be used for the connection of customers such as demand or generation, or new bulk supply points for distribution demand.

### New and modified demand connections in the South-East, Mid-East and Dublin Projects

- Kellystown 220 kV New Station and loop-in to Maynooth – Woodland 220 kV circuit – Demand customer connection – (CP1029)
- Baroda 110 kV Station – Two new 110 kV DSO transformer bays – (CP0693)
- Oldbridge 110 kV Station AWP – New Enhanced Ring 110 kV GIS substation and loop-in to the existing Drybridge Platin 110 kV overhead line – (CP1090)
- Grangecastle South – new 110 kV enhanced ring GIS Station, Aungierstown, connected to the Castlebaggot 220/110 kV station via two separate underground cables (CP1102)
- Kishoge – New Kishoge 110 kV C-Type GIS station, looping into the Aungierstown – Castlebagot 110 kV circuit via two underground cable circuits each approximately 1.7 km – (CP1175)
- Kilcarbery – New Kilcarbery 110 kV C-Type GIS station, looping into the Castlebaggot – Barnakyle 110 kV circuit via two underground cable circuits of approximately 0.25km (CP1188)
- Corduff – Platin 110 kV Line Conflict – Alteration of the circuit to facilitate construction of a large new demand on lands between Huntstown power station and Finglas 220 kV station in North Dublin – (CP1181)
- Corkagh 110 kV station – Transfer of load of a large demand customer from Kilmahud to Corkagh. The project includes 3 new 60 MVA transformers to be installed at customer facility and connected to the existing 3 spare bays at Corkagh 110 kV station – (CP1265)
- Belcamp BSP Transfer – Transfer the Newbury 110 kV station, currently supplied from Finglas station, to be fed from the new Belcamp 220/110 kV station – (CP1241)

### Description

The driver for these projects is Security of Supply.

The need for reinforcement arises due to the requirement for new and modified demand connections. These are the shallow connections for a number of DSO connections and directly connected large scale transmission demand customers.

### Reinforcement of the transmission network in South-East, Mid-East and Dublin Project

- East Meath – North Dublin Reinforcement (CP1021)
- Kildare – Meath Grid Upgrade (CP0966)
- Louth – Woodland 220 kV Line Uprate (CP1235)
- Replacement Woodland and Dunstown Station (CP1197)

### Description

The drivers for these projects are Security of Supply, Market Integration and RES Integration.

The East Meath North Dublin Grid Upgrade project is a proposed electricity transmission development that will help transfer electricity from the Woodland 400 kV to a new 400 kV GIS busbar at Belcamp. That new 400 kV GIS busbar at Belcamp will be connected to the planned 220 kV GIS busbar extension being progressed under CP1213.

Kildare – Meath Grid Upgrade is also driven by Market Integration. The project consists of a suite of transmission network reinforcements centred on strengthening the network between the existing Dunstown 400 kV substation in County Kildare and the Woodland 400 kV substation in County Meath via a high voltage 400 kV underground cable. The project is essential to enable further development of renewable energy generation in line with Government policy to meet the 2030 targets. The project requires the installation of shunt reactors at each end of cable, one dynamic reactive support device and bays to be constructed on the 400 kV busbars in Woodland and Dunstown stations.

The need for Louth – Woodland 220 kV line uprate, involves an increase in network capacity between the existing Louth and Woodland 220 kV stations to facilitate power flows between Ireland and Northern Ireland and to integrate offshore renewable generation off the east coast.

Interconnection to other jurisdictions is essential to meet the Government's renewable energy target of 80% of electricity demand from renewable generation by 2030. This project is important for the integration of offshore renewable energy, as significant levels of new offshore wind generation off the east coast plan to connect to the transmission system in the coming years.

The circuit breakers to be replaced at Woodland and Dunstown have known reliability issues and two major failures in the past decade. Based on a 45-year life expectancy, they have reached the end of their life. Due to the criticality of these assets to the network, it is recommended by both TAO and TSO that these circuit breakers be removed from the system and replaced with new assets. This project will also include the replacement and refurbishment of assets associated with each bay to ensure reliable performance of these critical assets for the future.

## Reinforcement of the transmission network in Louth

### Projects

- Louth 275/220/110 kV Station Refurbishment – 110 kV Busbar Re-configuration and New Couplers (CP0799)
- Drybridge and Connected Stations 220-110 kV Protection Upgrade (CP1115)

### Description

The driver for these projects is Security of Supply.

There are two areas of need for the project:

- The need for network reinforcement; and
- The need for refurbishment works due to the condition of the 220 kV and 110 kV assets.

The need for reinforcement arises due to:

- A shortage of transmission capacity; and
- Possible overload of the 110 kV busbar and some circuit breakers.

In addition, the station works also involve refurbishment works due to the condition of the assets and replacement of strung bay conductors with tubular conductor to accommodate mechanical forces from short circuit currents. These works will be undertaken at the same time as the uprating works.

The Baltrasna, Drybridge and Gorman 110 kV stations project includes the replacement of older protection relays and teleprotection interfaces, as well as protection system upgrade work to ensure compliance with transmission system protection best practice.

The project also caters for connection of two new solar PV connections at Deenes and Garballagh. Critical components of the project scope include the installation of the 110 kV bus zone protection scheme at Baltrasna station and the installation of new current and voltage transformers at Drybridge bays T141 and T142.

## Reinforcement of the transmission network in Meath

### Projects

- Gorman and Connected Station 220-110 kV Protection Upgrade (CP1109)
- Woodland Station 400-220 kV Protection Upgrade (CP1110)
- Platin and Connected Stations 220-110 kV Protection Upgrade (CP1114)
- Woodland 400 kV Station Redevelopment (CP1194)
- Gorman – Platin 110 kV Line Uprate (CP1166)
- Drybridge – Platin 110 kV Line Uprate (CP1167)
- Kinnegad 110 kV station, Derryiron 110 kV bay conductor uprate (CP1144)
- Blundelstown DSO Project (CP1243)

### Description

The driver for the protection upgrade projects is Security of Supply and involve replacement of aged protection relays and teleprotection interfaces in order to mitigate sub-optimal performance of the protection system. These protection system upgrade works are also necessary to ensure compliance with transmission system protection best practices.

Gorman 220 kV, Navan and Meath Hill 110 kV stations project includes the installation of CT/VT units at Navan station.

Woodland station project includes the replacement of protection relays at Woodland 400 kV station.

The Platin and Gorman 110 kV protection upgrade project includes the installation of the Platin 110 kV busbar area protection scheme and extension work to its building, to make room for the new protection relay panels.

The redevelopment of Woodland station is driven by Security of Supply. Woodland is one of the most important stations on the transmission system. It has several major 400 kV and 220 kV circuits connected and several grid infrastructure developments are planned to connect in the coming years.

At times of high-power flow through Woodland 400 kV station, there is potential for a significant Security of Supply issue to arise from single contingencies, such as unexpected loss of a single circuit or piece of equipment, resulting in voltage collapse of the transmission system. To address these issues, this project has received approval for an in-situ reconfiguration of the existing 400 kV AIS double busbar to ring busbar configuration.

Gorman – Platin 110 kV line uprate is necessary as the circuit will not be adequate for the connection of the large new demand. The uprate will also help to accommodate large power flows along the Gorman – Platin 110 kV circuit in the event of an unexpected loss of the Corduff – Platin 110 kV line while the Drybridge – Oldbridge 110 kV line is on outage or vice versa.

The uprate of Drybridge – Platin 110 kV will help to accommodate increased power flows that can occur with the maintenance and trip combination of the Corduff – Platin 110 kV line along with either the Gorman – Platin 110 kV circuit or the Gorman 220/110 kV transformer.

Kinnegad 110 kV station uprate is driven by Security of Supply and RES integration. This uprate was part of wider site related connection equipment work being carried out to allow for the connection a new windfarm at Cloncreen, Co. Offaly. The uprate of the bay conductor equipment at Kinnegad, in the Derryiron 110 kV bay, will allow the connection of the windfarm and the circulation of large power flow along Derryiron – Kinnegad 110 kV circuit in case the loss of the Derryiron – Timahoe North 110 kV circuit.

Blundelstown DSO Project is driven by Security of Supply. This project involves the connection of two new transformers to the transmission system at the new Blundelstown 110 kV station. The new transformers will facilitate a demand increase for an existing DSO large customer. The scope of this project also includes a busbar extension and space provision to an 8-bay enhanced ring station at Blundelstown 110 kV station.

## Reinforcement and Line Diversion of the transmission network in Kildare

### Projects

- New 400 kV Strategic Spare Transformer (CP1092)
- Dunstown Station 400-220 kV Protection Upgrade (CP1108)
- Customer 110 kV Line Diversion (CP1277)

### Description

The driver for these projects is Security of Supply.

During 2019, problems arose with the two existing 400 kV/220 kV transformers at Moneypoint 400 kV Station, these included a major failure of transformer T4201 and the placing of an operational restriction on transformer T4202. These incidents coincided with a significant number of scheduled outages at Moneypoint which were required to facilitate transfer to the new GIS Station. The financial impact on Dispatch Balancing Costs (DBC) and Wind Constraints as result of these outages and restrictions has been significant due the increase in cost of running more expensive generation, predominantly Tarbert Power Station. The new 400 kV transformer will be custom built, capable of being transported and installed, if required, in any of the 400 kV/220 kV stations in Ireland.

The needs for a protection relay replacement at Dunstown station are based on the age profile of existing devices, to mitigate against sub optimal protection system performance and to support the anticipated high power-transfer capacity of onshore windfarms in the western region of the island. This project involves replacement of 8 x protection relays in Dunstown 400 kV station.

A large customer has requested a significant alteration to the existing Maynooth – Ryebrook and Dunfirth – Rinawade 110 kV double circuit lines to facilitate future developments at their facilities. A Circuit Alteration Request (CAR) was submitted by ESB Networks to EirGrid. As TSO, EirGrid has assessed the impact of this CAR and will progress the project forward thorough its six-step grid development framework.

## Reinforcement of the transmission network in Carlow

### Projects

- Carlow, Kellis 110 kV Protection Upgrade (CP1137)
- Athy, Carlow and Connected 110 kV Stations Protection Upgrade (CP1140)
- Kellis Station 220-110 kV Protection Upgrade (CP1141)

### Description

The driver for these projects is Security of Supply.

The three projects mentioned involve replacement of aged protection relays and teleprotection interfaces. Kellis station is part of the 220 kV circuit from Great Island to Dunstown, and the refurbishment of the stations in the Carlow network will support increased power flows from Great Island due to the connection of the Greenlink Interconnector in Co. Wexford.

The Protection Upgrade at Carlow and Kellis stations includes the installation of a new 110 kV bus bar protection scheme and a new combined Current transformer/Voltage transformer (CT/VT) at Carlow 110 kV stations. It is also possible that the control room at Carlow 110 kV station may not have adequate space for new relay cabinets, so provision has been made to extend the control room if required. This project also includes wrapping of optical fibre on the Carlow – Kellis 110 kV No. 1 circuit to allow teleprotection and differential protection on both Carlow – Kellis 110 kV circuits.

The second project in the list shown above, CP1140, involves replacement of aged protection relays in Athy, Carlow, Pollaphuca and Stratford 110 kV stations. This project includes the installation of a new duplicate distance relay in Athy, new Current and Voltage transformers in Carlow station on the Pollaphuca/Stratford bay and also in Pollaphuca station on the Carlow/ Stratford bay.

The protection upgrade at Kellis 220/110 kV station is driven by the age profile of the existing devices.

## Reinforcement of the transmission network in Wexford

### Projects

- Crane – Wexford 110 kV Thermal Uprate (CP1172)
- Great Island 220/110 kV Transformer Uprates (CP1242)

### Description

The drivers for this project are Security of Supply and RES Integration.

The existing Crane – Wexford 110 kV circuit is a key component in the transmission of this power, supplying local transmission stations, facilitating power flows through the South-East in either direction, i.e. towards the East/Dublin or South/Cork, and also facilitating the connection of renewable generation in County Wexford.

Increased RES generation introduces large power flows at times of high renewable generation output. Under contingency conditions, system analysis indicates that power flows along the Crane – Wexford 110 kV circuit exceeding the thermal rating of the circuit can occur due to an unplanned loss of either Great Island – Lodgewood 220 kV circuit or Great Island – Rosspile 110 kV circuit, which is in breach of the TSSPS. Increasing the capacity of Crane – Wexford 110 kV will help to cater for the expected increase in power flow for this area.

The transformer uprates at Great Island project involves the replacement of two transformers. Additionally, an asset condition need has been identified regarding both transformers which are near the end of their service lives and show deteriorating condition.

The two 220/110 kV transformers at Great Island station have a rating of 125 MVA and they have a low 30-minute overload capability of 110% and 130% respectively. The network capacity need concerns the transfer of power between the 220 kV and 110 kV busbars at Great Island station. The unplanned loss of the Cullenagh – Great Island 220 kV circuit in scenarios when interconnectors are exporting power in high renewables cases or importing power in low renewables cases can cause power flows on each of the 220/110 kV transformers at Great Island in excess of their respective overload capabilities.

### Reinforcement of the transmission network in Waterford

#### Projects

- Cullenagh and Connected stations Protection Upgrade (CP1159)
- Butlerstown, Killoteran and Waterford 110 kV Protection Upgrade (CP1163)

#### Description

The driver for these projects is Security of Supply.

This project involves replacement of aged protection relays and teleprotection interface in: Cullenagh 220 kV station and Ballydine, Butlerstown and Dungarvan 110 kV stations for CP1159; and replacement in Cullenagh 220 kV station, Butlertown, Killoteran and Waterford 110 kV stations.

Protection system enhancement works are also required in both projects to ensure compliance with best practice in transmission system protection.

The existing power line carrier teleprotection on the Cullenagh – Dungarvan 110 kV line will be transferred to fibre based teleprotection interfaces utilising the existing fibre network between these stations.

Installation of a new bus-bar protection scheme in Killoteran station is also included in CP1163.

### Reinforcement of the transmission network in Kerry

#### Project

- Glencloosagh Phase 1 – Rotating Stabiliser (CP1173)

#### Description

The driver for this project is Security of Supply.

Glencloosagh Phase 1 – Rotating stabiliser project is driven by Security of Supply; this will allow the customer to connect their 8 MVA stabiliser to the transmission system in Co. Kerry. The method of connection will be a new single bay 220 kV AIS station at the Customer's Facility with a tailed connection into Kilpaddoge 220/110 kV Station via UGC.

## New generation and battery connections in the South-East, Mid-East and Dublin Projects

- Oriel Offshore Windfarm – New 220 kV GIS Station looping into the existing Louth – Woodland 220 kV (CP0749)
- Tullabeg 110 kV New Station and loop-in to Banoge – Crane 110 kV circuit – Solar farm connection – (CP1068)
- Timahoe North 110 kV New Station and loop-in to Derryiron – Maynooth 110 kV circuit – Solar Farm Connection – (CP1041)
- Woodhouse 110 kV Station – New 110 kV transformer bay – Knocknamona Windfarm Connection – (CP1052)
- Harristown 110 kV New Station and loop-in to Kinnegad – Dunfirth Tee – Rinawade 110 kV circuit – Solar Farm Connection – (CP1055)
- Blundelstown 110 kV New Station and loop-in to Corduff – Mullingar 110 kV circuit – Solar Farm Connection – (CP1020)
- Poolbeg BESS & FlexGen – Direct connection, under-the-fence, via a ganged transformer arrangement cabled into an existing AIS bay in Poolbeg 220 kV Station – (CP1105)
- Gaskinstown Solar Farm – New 4 Bay C-Type 110 kV AIS Station, Deenes, connected by UGC and looped into the existing Baltrasna – Drybridge 110 kV – (CP1136)
- Rathnaskilloge Solar Farm – New 110 kV GIS station, Rathnaskilloge, to be looped into the existing Cullenagh – Dungarvan 110 kV circuit – (CP1145)
- Moanvane Windfarm – New single bay 110 kV AIS station called Bogtown, to be connected into a new bay in Mount Lucas 110 kV Station via approximately 10 km of UGC – (CP1201)
- Harlockstown Solar Farm – To be connected to the new Gallanstown 110 kV station. Gallanstown station is looped into the Corduff – Platin 110 kV circuit – (CP1248)
- Porterstown Battery Storage Phase 2 – To be connected via an over the fence into an existing transformer at Kilteel 110 kV – (CP1249)
- North Arklow Solar plus storage facility – new AIS single bay 110 kV station with a tailed connection to Arklow 220/110 kV Station via UGC – (CP1244)
- Tracystown Solar Park – New C-type bay AIS station, Dennistown 110 kV station, tailed into the existing Wexford 110 kV station via approximately 9.8 km of UGC – (CP1260)
- Grahormick Solar Facility – New single bay AIS station, Grahormick 110 kV station, tailed via a new 8.5 km UGC into the new Dennistown 110 kV station, which in turn is tailed into the existing Wexford 110 kV station – (CP1261)
- The Dell Solar – New build connection via the DSO Crory 20 kV network from the Lodgewood 110 kV busbar. A new 110 kV 31.5 MVA transformer is required to facilitate this connection – (CP1269)
- Ballymanus Wind Farm – Connection via DSO Network into the existing Arklow 220 kV GIS station via a terminal remote unit and a 110 kV DSO transformer bay – (CP1267)
- Dysart Solar Farm – Connection via DSO Network into the existing Dunfirth 110 kV via 1.3 km UCG. Dunfirth transformers will be uprated and there will be associated protection upgrades – (CP1268)

### Description

The driver for these projects is the integration of RES. These projects are needed to connect new wind farm, solar farm and battery connections.

Storage projects are also driven by Security of Supply, by:

- Improving competition and economic operation by removing operational constraints; and
- Providing the required flexibility for increased renewable generation.

### Offshore projects in Wicklow and Dublin

#### Projects

- Codling Wind Park (CP1394)
- Arklow Bank Wind Park (CP1396)
- North Irish Sea Array (CP1397)
- Dublin Array (CP1398)

#### Description

The driver for these projects is RES Integration.

In line with the CRU decision on Offshore Connection Policy (CRU2022/968[61]), applicable to Offshore Phase 1 projects, Offshore projects received capital approval in advance of the connection offers in order to prioritise and expedite the design review process through the use of Advanced Work Packages (AWP) to ensure the target Project Agreement dates of December 2024 are achieved. These AWPs will allow EirGrid to review the Phase 1 projects concepts designs in advance of the ORESS-1 auction.

Codling Wind Park and Arklow Bank are proposed developments of offshore wind farms located off the coast of County Wicklow. North Irish Sea Array and Dublin Array are proposed developments of offshore wind farms located off the coast of County Dublin.

The new customer stations tailed to existing station in the network and their connections from the offshore platforms to the onshore stations will be reported in future TDPs when connection offers are completed.

### Cable replacement in Dublin

#### Projects

- Carrickmines – Poolbeg 220 kV Cable Replacement (CP1146)
- Inchicore – Poolbeg #1 220 kV Cable Replacement (CP1157)
- Inchicore – Poolbeg #2 220 kV Cable Replacement (CP1150)
- North Wall – Poolbeg 220 kV Cable Replacement (CP1216)
- Finglas – North Wall 220 kV Cable Replacement (CP1100)

#### Description

The driver for these projects is Security of Supply.

Carrickmines – Poolbeg 220 kV, Inchicore – Poolbeg 220 kV Circuit No. 1 and Inchicore – Poolbeg 220 kV Circuit No. 2 have approximately 14.5 km, 12.5 km and 11.3 km long lines, respectively, and are low pressure Self-Contained Fluid (SCFF) cable circuit. The need to replace the existing cables of these circuits is due to their condition and age, and also a requirement of EirGrid's Cable Maintenance Policy to replace all Fluid Filled cables on the transmission system.

61 https://www.cru.ie/publications/27340/

This strategy has been communicated to the regulator within PR4 and PR5 submissions. The uprating of these circuits to 570 MVA summer is required in the context of Shaping our Electricity Future.

North Wall – Poolbeg 220 kV and Finglas – North Wall 220 kV circuits are approximately 4.6 km and 11.9 km in length respectively and they are High Pressure Fluid Filled (HPFF) cable circuits in their entirety which means that the cables are contained within a steel pipe and surrounded by insulating fluid. As is the case with other cable replacements described above, the need to replace the existing cables of these circuits it is due to their condition and age, but it is also a requirement of EirGrid's Cable Maintenance Policy to replace all Fluid Filled cables on the network.

### New generation connections in Dublin Projects

- Corduff FlexGen – Connection of a generation facility into Corduff 220/110 kV station – (CP1103)
- Irishtown FlexGen-BESS – Connection of two facilities; one OCGT and one BESS, via an under the fence connection to a new bay in the existing Irishtown 220 kV GIS station (CP1117)
- Mooretown 220 kV Station – Increase the MIC at the Huntstown site. Connection Method would be via a new GIS 220 kV 8-bay enhanced ring station, Mooretown 220 kV Station, looped into the existing Finglas–Huntstown B 220 kV Circuit and Corduff–Huntstown A 220 kV Circuit, while also forming two new 220 kV circuits Huntstown A – Mooretown and Huntstown B – Mooretown (CP1183)
- P481 Greener Ideas Profile Park – Generation facilities to be connected via a new single bay 110 kV AIS Station tailed to Barnakyle 110 kV via approx. 0.5km of UGC Circuit (CP1256)

### Other approved projects

In addition to the network reinforcement projects described above, there are also other projects in the South-East, Mid-East and Dublin, namely:

- Finglas 220/110 kV Station – Pantograph replacement (CP1064);
- Oldstreet – Woodland 400 kV Line Refurbishment (CP0825);
- Maynooth – Woodland 220 kV Line Uprate (CP0869);
- Maynooth – Turlough Hill 220 kV Line Refurbishment (CP0823);
- Great Island – Kellis 220 kV Line Refurbishment (CP0866);
- Maynooth – Turlough Hill 220 kV Circuit Power Line Carrier (PLC) Replacement (CP1022);
- Belcamp Land Acquisition – requirement to accommodate potential future grid development (CP1154)
- Kilshane Land Acquisition – requirement to accommodate a thermal generation plan or other network assets adjacent or proximate to Fingal station (CP1185);
- Physical security of transmission stations, Dublin region (CP1122) – Design and installation of lighting system, video surveillance at entrances gates in Carrickmines, Dunstown and Woodland; and anti-climb features at Dunstown station entrance; and
- Finglas Land Acquisition – requirement to accommodate a thermal generation plan or other network assets adjacent or proximate to Fingal station (CP1045)

## 5.4.1 Summary of projects in the South-East, Mid-East and Dublin

There are 62 projects in the South-East, Mid-East and Dublin region. These are listed in Table 5-4 below.

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 1 | CP0668 | Corduff – Ryebrook 110 kV Line Uprate | Uprate/ modify | 14 | ■ | | |
| 2 | CP0646 | Finglas 110 kV Station Redevelopment | Refurbish/ replace | – | ■ | | |
| 3 | CP0580 | Carrickmines 220 kV GIS Development | New build capacity | – | ■ | | |
| 4 | CP0792 | Finglas 220 kV Reconfiguration Project | Uprate/ modify | – | ■ | | |
| 5 | CP0585 | Laois-Kilkenny (Coolnabacky) 400 kV Station – New Station & Associated Lines & Station Works | New build capacity | 30+ 22[62] | ■ | | |
| 6 | CP0825 | Oldstreet – Woodland 400 kV Line Refurbishment | Refurbish/ replace | 126 | ■ | | |
| 7 | CP0692 | Inchicore 220 kV GIS Station Upgrade | Uprate/ modify | – | ■ | | |
| 8 | CP0869 | Maynooth – Woodland 220 kV Line Uprate | Uprate/ modify | 22 | ■ | | |
| 9 | CP0872 | West Dublin New 220-220 kV Station (Castlebagot 220 kV Station) | New build connection | – | ■ | | |
| 10 | CP0808 | Maynooth 220 kV Station Reconfiguration | Uprate/ modify | – | ■ | | |
| 11 | CP0984 | Belcamp – Shellybanks 220 kV New Cable | New build capacity | 10 | ■ | | |
| 12 | CP0968 | Dunstown 400 kV Series Capacitor | New build capacity | – | ■ | ■ | |
| 13 | CP0823 | Maynooth – Turlough Hill 220 kV Line Refurbishment | Refurbish/ replace | 53 | ■ | | |

62 30 km is the length of the proposed new 110 kV circuit between the proposed new Coolnabacky 400/110 kV station near Portlaoise and the proposed new 110 kV station at Ballyragget. 22 km is the length of the proposed 110 kV uprate to the existing Ballyragget – Kilkenny line which is currently operated at 38 kV.

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | ■ | | | | Dublin, Kildare | 6 | | TSO | 29/04/2011 | 10/05/2013 | 30/11/2023 |
| | ■ | | | ■ | Dublin | 6 | | TSO | 28/08/2009 | 24/08/2012 | 01/12/2023 |
| | ■ | | | ■ | Dublin | 6 | | TSO | 22/03/2012 | 14/02/2012 | 01/12/2023 |
| | ■ | | | ■ | Dublin | 6 | | TSO | 22/04/2015 | 11/03/2018 | 17/11/2023 |
| | ■ | | | | Laois, Kilkenny | 6 | | TSO | 16/04/2008 | 17/06/2016 | 30/06/2025 |
| | | | | ■ | Galway, Tipperary, Offaly, Kildare, Meath | 6 | | TSO | 25/03/2013 | 19/03/2015 | 29/12/2023 |
| | ■ | | | ■ | Dublin | 6 | | TSO | 21/09/2016 | 20/03/2019 | 30/11/2026 |
| | ■ | | | ■ | Kildare, Dublin | 6 | | TSO | 15/08/2019 | 17/12/2020 | 30/11/2024 |
| | ■ | ■ | | | Dublin | 6 | | TSO | 07/07/2014 | 17/05/2017 | 31/10/2023 |
| | ■ | | | ■ | Kildare | 5 | | TSO | 16/03/2021 | 29/12/2023 | 30/11/2027 |
| | ■ | | | | Dublin | 6 | | TSO | 01/07/2016 | 15/07/2020 | 31/07/2024 |
| ■ | ■ | | | | Kildare | 5 | ■ | TSO | 15/06/2016 | 13/06/2023 | 31/12/2025 |
| | | | | ■ | Kildare, Wicklow | 5 | | TSO | 30/06/2017 | 29/12/2023 | 01/11/2026 |

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 14 | CP0866 | Great Island – Kellis 220 kV Line Refurbishment | Refurbish/ replace | 70 | ■ | | |
| 15 | CP0967 | Moneypoint 400 kV Series Capacitor[63] | New build capacity | – | ■ | ■ | |
| 16 | CP0970 | Cross-Shannon 400 kV Cable[64] | New build capacity | 6 | ■ | ■ | |
| 17 | CP0969 | Oldstreet-Woodland 400 kV Series Compensation[65] | New build capacity | – | ■ | ■ | |
| 18 | CP1020 | Blundelstown 110 kV Station (South Meath Solar Farm) | New build connection | – | | ■ | |
| 19 | CP1022 | Maynooth – Turlough Hill PLC Replacement | Refurbish/ replace | 53 | ■ | | |
| 20 | CP1041 | Timahoe North Solar Farm | New build connection | – | | ■ | |
| 21 | CP1052 | Knocknamona Wind Farm | New build connection | – | | ■ | |
| 22 | CP1055 | Harristown Solar Farm | New build connection | – | | ■ | |
| 23 | CP0799 | Louth 220 kV Station Refurbishment | Uprate/ modify | – | ■ | | |
| 24 | CP1029 | Capital Project 1029 | New build connection | – | ■ | | |
| 25 | CP0693 | Baroda 110 kV Station – 2 x 110 kV transformer bays DSO | Uprate/ modify | – | ■ | | |
| 26 | CP1068 | Tullabeg Solar 110 kV Station | New build connection | – | | ■ | |

63 This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.
64 This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.
65 This project is located in the Border, Midlands and West. It is included here as it is part of the Regional Solution.

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Wexford, Carlow | 5 | | TSO | 16/11/2022 | 30/06/2025 | 30/11/2029 |
| ■ | ■ | | | | Clare | 4 | ■ | TSO | 31/08/2015 | 01/12/2023 | 31/12/2025 |
| ■ | ■ | | | | Clare, Kerry | 4 | ■ | TSO | 21/09/2016 | 28/02/2023 | 30/11/2025 |
| ■ | ■ | | | | Galway | 4 | ■ | TSO | 15/06/2016 | 01/12/2023 | 31/12/2025 |
| | | ■ | | | Meath | 6 | | DEV | 26/01/2018 | 11/09/2020 | 04/05/2023 |
| | | | | ■ | Kildare, Wicklow | 6 | | TSO | 22/06/2018 | 06/12/2019 | 29/12/2023 |
| | | ■ | | | Kildare | 3 | | DEV | 06/11/2018 | 21/10/2021 | 24/04/2024 |
| | | ■ | | | Waterford | 3 | | DEV | 22/10/2018 | 17/12/2020 | 18/12/2023 |
| | | ■ | | | Meath | 6 | | DEV | 20/12/2018 | 19/11/2020 | 01/12/2025 |
| | ■ | | | ■ | Louth | 6 | | TSO | 25/09/2013 | 12/03/2020 | 28/02/2029 |
| | | ■ | | | Kildare | 6 | | DEV | 15/05/2019 | 31/10/2019 | 27/01/2023 |
| | | ■ | | | Kildare | 4 | | DSO | 14/06/2019 | 10/01/2020 | 30/03/2025 |
| | | ■ | | | Wexford | 6 | | DEV | 05/09/2019 | 01/04/2021 | 23/10/2023 |

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 27 | CP1064 | Finglas Pantograph Replacement Project | Refurbish/ replace | – | ■ | | |
| 28 | CP1090 | Rathmullan 110 kV Station | New build connection | – | ■ | | |
| 29 | CP1088 | Greenlink Interconnector | New build connection | – | ■ | ■ | ■ |
| 30 | CP1117 | Irishtown FlexGen – BESS | New build connection | – | ■ | | |
| 31 | CP1115 | Drybridge and Connected Stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 32 | CP1108 | Dunstown Station 400 – 220 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 33 | CP1105 | Poolbeg BESS | New build connection | – | ■ | ■ | |
| 34 | CP1110 | Woodland Station 400 – 220 kV Protection Upgrade | Uprate/ modify | – | ■ | | |
| 35 | CP1103 | Corduff FlexGen | New build connection | – | ■ | | |
| 36 | CP1113 | Corduff 220 kV Station Deep Works | New build capacity | – | ■ | | |
| 37 | CP0749 | Oriel Offshore Windfarm | New build connection | – | | ■ | |
| 38 | CP1092 | New 400 kV Strategic Spare Transformer | New build capacity | – | ■ | | |
| 39 | CP1102 | Grangecastle South | New build connection | – | ■ | | |
| 40 | CP1109 | Gorman and Connected Stations 220 – 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 41 | CP1114 | Platin and Connected Stations 220 – 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Dublin | 6 | | TSO | 20/12/2019 | 12/11/2020 | 02/02/2024 |
| | | ■ | | | Meath | 6 | | DEV | 27/11/2020 | 18/06/2021 | 02/07/2023 |
| ■ | | ■ | ■ | | Wexford | 6 | | DEV | 20/02/2020 | 22/06/2022 | 09/04/2024 |
| | | ■ | | | Dublin | 6 | | DEV | 25/06/2020 | 22/04/2022 | 31/08/2023 |
| | | | | ■ | Louth | 6 | | TSO | 13/05/2020 | 16/04/2021 | 30/11/2023 |
| | | | | ■ | Kildare | 6 | | TSO | 18/05/2020 | 19/03/2021 | 30/11/2023 |
| | | ■ | | | Dublin | 3 | | DEV | 16/04/2020 | 22/04/2022 | 29/06/2023 |
| | | | | ■ | Meath | 6 | | TSO | 18/05/2020 | 19/03/2021 | 30/11/2023 |
| | | ■ | | | Dublin | 3 | | DEV | 02/04/2020 | 26/07/2022 | 31/10/2023 |
| | ■ | ■ | | | Dublin | 6 | | TSO | 17/08/2020 | 02/06/2021 | 30/04/2024 |
| | | ■ | | | Louth | 4 | | DEV | 27/03/2020 | 31/12/2024 | 30/06/2027 |
| ■ | ■ | ■ | | | Kildare | 6 | | TSO | 29/01/2020 | 15/12/2022 | 27/06/2025 |
| | | ■ | | | Dublin | 3 | | DEV | 13/05/2020 | 08/10/2021 | 24/02/2023 |
| | | | | ■ | Meath | 6 | | TSO | 13/05/2020 | 25/06/2021 | 30/11/2023 |
| | | | | ■ | Meath | 6 | | TSO | 13/05/2020 | 18/08/2021 | 30/11/2023 |

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 42 | CP1136 | Deenes 110 kV Station – Gaskinstown Solar Farm | New build connection | – | ■ | | |
| 43 | CP1137 | Carlow, Kellis 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 44 | CP1140 | Athy, Carlow and connected stations 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 45 | CP1141 | Kellis Station 220 & 110 kV Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 46 | CP1154 | Belcamp Land Acquisition | Other | – | ■ | | |
| 47 | CP1159 | Cullenagh and Connected stations Protection Upgrade | Refurbish/ replace | – | ■ | | |
| 48 | CP1145 | Rathnaskilloge Solar Farm | New build connection | – | ■ | | |
| 49 | CP1162 | Irishtown, Shellybanks and connected stations 220 kV protection upgrade | Refurbish/ replace | – | | | |
| 50 | CP1173 | Glencloosagh Phase 1 – Rotating Stabiliser | Uprate/ modify | – | | | |
| 51 | CP1190 | Poolbeg 220 kV Station | New build connection | – | | | |
| 52 | CP1175 | Kishoge 110 kV Station | New build connection | – | | | |
| 53 | CP1188 | Kilcarbery | New build connection | – | | | |
| 54 | CP1201 | Bogtown 110 kV Station | New build connection | – | ■ | | |
| 55 | CP1163 | Butlerstown, Killoteran and Waterford 110 kV protection upgrade | Refurbish/ replace | – | | | |
| 56 | CP1194 | Woodland 400 kV Station Redevelopment | Uprate/ modify | – | | | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | ■ | | | Meath | 4 | | DEV | 19/11/2020 | 14/12/2022 | 07/05/2024 |
| | | | | ■ | Carlow | 6 | | TSO | 01/10/2020 | 01/09/2021 | 30/11/2023 |
| | | | | ■ | Carlow | 6 | | TSO | 01/10/2020 | 16/07/2021 | 30/11/2023 |
| | | | | ■ | Carlow | 6 | | TSO | 01/10/2020 | 01/09/2021 | 30/11/2024 |
| | | | | | Dublin | 4 | | TSO | 19/11/2020 | 29/09/2023 | |
| | | | | ■ | Waterford | 6 | | TSO | 04/12/2020 | 04/11/2021 | 30/11/2025 |
| | ■ | | | ■ | Waterford | 3 | | DEV | 07/01/2021 | 28/11/2022 | 29/09/2023 |
| | | | ■ | | Dublin | 6 | | TAO | 04/02/2021 | 04/11/2021 | 30/11/2026 |
| | | | | | Kerry | 3 | | TAO | 06/05/2021 | 31/10/2023 | 30/07/2025 |
| | ■ | | | | Dublin | 3 | | TSO | 16/12/2021 | 27/09/2024 | 20/07/2027 |
| | ■ | | | | Dublin | 6 | | DEV | 09/08/2021 | 08/05/2023 | 26/06/2024 |
| | ■ | | | | Dublin | 6 | | DEV | 08/07/2021 | 15/02/2023 | 01/10/2024 |
| | ■ | | | ■ | Offaly | 3 | | DEV | 07/10/2021 | 10/11/2022 | 11/10/2023 |
| | | | ■ | | Waterford | 6 | | TSO | 04/02/2021 | 04/11/2021 | 30/11/2024 |
| | | | | | Meath | 3 | | TSO | 21/03/2022 | 04/12/2023 | 30/11/2028 |

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 57 | CP1122 | Physical Security of Transmission Stations – Dublin Region | Other | – | | | |
| 58 | CP0966 | Kildare Meath Grid Upgrade | New build capacity | 50 | ■ | ■ | |
| 59 | CP1146 | Carrickmines – Poolbeg 220 kV Cable Replacement | Refurbish/ replace | 20 | | | |
| 60 | CP1157 | Inchicore – Poolbeg #1 220 kV Cable Replacement | Refurbish/ replace | 18 | | | |
| 61 | CP1150 | Inchicore – Poolbeg #2 220 kV Cable Replacement | Refurbish/ replace | 16 | | | |
| 62 | CP1045 | Finglas Land Acquisition | Other | – | | | |
| 63 | CP1213 | Belcamp 220 kV Busbar Extension | Uprate/ modify | – | | | |
| 64 | CP1172 | Crane – Wexford 110 kV Circuit Thermal Capacity | Uprate/ modify | 22.8 | ■ | | ■ |
| 65 | CP1166 | Gorman – Platin 110 kV line uprate | Uprate/ modify | 19.4 | | | ■ |
| 66 | CP1167 | Drybridge – Oldbridge – Platin 110 kV line uprate | Uprate/ modify | 5.3 | | | |
| 67 | CP1181 | Corduff Platin 110 kV Line Conflict | Other | – | | | |
| 68 | CP1144 | Kinnegad 110 kV station, Derryiron 110 kV bay conductor uprate | Uprate/ modify | – | | | |
| 69 | CP1216 | Poolbeg – North Wall 220 kV Cable Replacement | Refurbish/ replace | 4.6 | | | |
| 70 | CP1183 | Mooretown 220 kV Station | New build connection | – | | | |
| 71 | CP1235 | Louth – Woodland 220 kV Uprate | Uprate/ modify | 61.2 | ■ | | ■ |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | | Dublin | 5 | | TSO | 01/09/2020 | 29/12/2023 | 30/12/2025 |
| ■ | | | | ■ | Meath, Kildare, Dublin | 4 | | TSO | 24/03/2021 | 26/04/2024 | 24/09/2028 |
| | | | ■ | | Dublin | 3 | | TSO | 16/12/2021 | 18/12/2025 | 20/06/2029 |
| | | | ■ | | Dublin | 3 | | TSO | 20/12/2021 | 18/12/2025 | 31/12/2029 |
| | | | ■ | | Dublin | 3 | | TSO | 16/12/2021 | 18/12/2025 | 28/09/2029 |
| | | | | | Finglas | 3 | | TSO | 30/06/2021 | | |
| | ■ | | | | Belcamp | 3 | | TSO | 15/12/2021 | 07/12/2023 | 17/09/2027 |
| ■ | | | | ■ | Wexford | 5 | | TSO | 17/06/2021 | 30/09/2023 | 30/11/2025 |
| ■ | | | | | Rathmullan, Donore Road Drogheda | 5 | | TSO | 18/03/2021 | 30/09/2023 | 29/11/2024 |
| | ■ | | | | Louth | 5 | | TSO | 18/03/2021 | 30/09/2023 | 29/11/2024 |
| | | | | | Dublin, Meath | 6 | | TSO | 30/08/2021 | 06/05/2022 | 30/06/2023 |
| | | | | | Meath | 6 | | TSO | 22/01/2021 | 04/11/2021 | 29/11/2025 |
| | | | ■ | | Dublin | 3 | | TSO | 31/05/2022 | 19/09/2024 | 01/12/2028 |
| | ■ | | | | Dublin | 3 | | DEV | 06/04/2022 | 28/04/2023 | 01/12/2025 |
| | | ■ | | ■ | Louth, Meath | 3 | | TSO | 28/04/2022 | 02/06/2025 | 01/12/2029 |

## Table 5-4: Projects in the South-East, Mid-East and Dublin

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 72 | CP1256 | Greener Ideas Profile Park | New build connection | – | | | |
| 73 | CP1248 | Harlockstown Solar (Gallanstown Ext) | New build connection | – | ■ | | |
| 74 | CP1249 | Porterstown Battery Phase2 | New build connection | – | ■ | ■ | |
| 75 | CP1021 | East Meath – North Dublin Reinforcement | New build capacity | 45 | | ■ | ■ |
| 76 | CP1230 | Darndale Phase 2 – 3 110 kV customer connections in Darndale 110 kV station | New build connection | – | | | |
| 77 | CP1100 | Finglas – North Wall Cable Replacement | Refurbish/ replace | 11.9 | | | |
| 78 | CP1265 | Corkagh 110 kV Station Phase 2 | New build connection | – | | | |
| 79 | CP1243 | Blundelstown 110 kV Station – 2 New DSO Transformer Bays | New build connection | – | | | |
| 80 | CP1001 | Corduff – Finglas 1 & 2 220 kV line refurbishment | Refurbish/ replace | 3.7 | | | |
| 81 | CP1225 | Finglas Corduff 220 kV Protection Upgrade | Refurbish/ replace | – | | | |
| 82 | CP1244 | North Arklow Solar Plus Storage | New build connection | – | ■ | ■ | |
| 83 | CP1200 | Carrickmines Area 220 kV Cable Ducting | New build capacity | 2.5 | ■ | | ■ |
| 84 | CP1241 | Belcamp BSP Transfer | Other | – | | | |
| 85 | CP1260 | Tracystown Solar | New build connection | – | ■ | | |
| 86 | CP1261 | Grahormick Solar | New build connection | – | ■ | | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | ■ | | | | Dublin | 3 | | DEV | 05/05/2022 | 03/10/2023 | 01/07/2024 |
| | ■ | | | ■ | Meath | 3 | | DEV | 01/06/2022 | 24/02/2023 | 28/07/2023 |
| | ■ | | | ■ | Kildare | 3 | | DEV | 01/06/2022 | 03/07/2023 | 24/03/2025 |
| | | | | | Meath, Dublin | 3 | | TSO | 07/06/2022 | 30/06/2025 | 31/12/2029 |
| | ■ | | | | Dublin | 6 | | TSO | 17/06/2022 | 19/12/2022 | 22/12/2023 |
| ■ | | | ■ | | Dublin | 3 | | TSO | 28/06/2022 | 19/12/2024 | 30/06/2029 |
| | ■ | | | | Dublin | 3 | | TSO | 26/07/2022 | 31/10/2023 | 04/06/2024 |
| | ■ | | | | Meath | 3 | | DSO | 14/09/2022 | 03/07/2023 | 30/09/2025 |
| ■ | | | | | Dublin | 3 | | TSO | 10/11/2022 | 28/06/2024 | 01/12/2027 |
| | | | ■ | | Dublin | 3 | | TSO | 03/02/2022 | 13/12/2022 | 30/11/2026 |
| | ■ | | | ■ | Wicklow | 3 | | DEV | 06/10/2022 | 11/09/2023 | 30/09/2024 |
| | ■ | | | ■ | Dublin | 6 | | TSO | 30/09/2021 | 20/12/2022 | 31/03/2025 |
| | ■ | | | | Dublin | 3 | | DSO | 01/09/2022 | 20/03/2023 | 01/04/2025 |
| | ■ | | | ■ | Wexford | 3 | | DEV | 30/05/2022 | 28/02/2024 | 30/06/2025 |
| | ■ | | | ■ | Wexford | 3 | | DEV | 30/05/2022 | 01/02/2024 | 30/07/2025 |

| Table 5-4: Projects in the South-East, Mid-East and Dublin | | | | | | | |
|---|---|---|---|---|---|---|---|
| | CP No. | Project title | Type | Km | Drivers | | |
| | | | | | Security of Supply | RES Integration | Market Integration |
| 87 | CP1267 | Arklow 220 kV – DSO Ballymanus WF | New build connection | – | ■ | | |
| 88 | CP1268 | Dunfirth 110 kV – DSO Dysart PV | New build connection | – | ■ | | |
| 89 | CP1269 | Lodgewood 220 kV – DSO The Dell SF | New build connection | – | ■ | | |
| 90 | CP1197 | Dunstown Asset Replacements | Refurbish/ replace | – | ■ | | |
| 91 | CP1242 | Great Island 220-110 kV Transformer Upgrades | Uprate/ modify | – | ■ | ■ | |
| 92 | CP1277 | Customer 110 kV Line Diversion | Uprate/ modify | 10 | | | ■ |
| 93 | CP1394 | Codling Wind Park | New build connection | – | | ■ | |
| 94 | CP1396 | Arklow Bank Wind Park | New build connection | – | | ■ | |
| 95 | CP1397 | North Irish Sea Array | New build connection | – | | ■ | |
| 96 | CP1398 | Dublin Array | New build connection | – | | ■ | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | ■ | | | ■ | Wicklow | 3 | | DSO | 30/09/2022 | 30/10/2023 | 01/04/2025 |
| | ■ | | | ■ | Kildare | 3 | | DEV | 30/09/2022 | 30/10/2023 | 01/07/2024 |
| | ■ | | | ■ | Wexford | 3 | | DEV | 01/09/2022 | 30/10/2023 | 31/10/2024 |
| | | | | ■ | Meath, Kildare | 3 | | TSO | 31/12/2021 | 31/10/2023 | 01/12/2028 |
| | | | | ■ | Wexford | 3 | | TSO | 07/12/2022 | 31/03/2024 | 01/11/2028 |
| | | ■ | | | Kildare | 3 | | TAO | 30/11/2022 | 29/03/2024 | 28/11/2025 |
| | | ■ | | | Wicklow | 3 | | TSO | 15/12/2022 | 31/12/2024 | 30/06/2027 |
| | | ■ | | | Wicklow | 3 | | TSO | 15/12/2022 | 31/12/2024 | 30/06/2027 |
| | | ■ | | | Dublin | 3 | | TSO | 15/12/2022 | 31/12/2024 | 30/06/2027 |
| | | ■ | | | Wicklow, Dublin | 3 | | TSO | 15/12/2022 | 31/12/2024 | 30/06/2027 |

## 5.5 Projects at multiple locations

Previous to the data freeze date, there were six projects with elements at multiple locations around the country. Four of these projects have been completed and seven new multiple location projects have been added in this development plan. Indicative completion dates are included for these projects. They are listed in Table 5-5 below.

### Projects

- Paint Towers Nationwide (CP0857)
- Transformer Protection Upgrade (CP1096)
- Agannygal, Ennis and connected stations 110 kV Protection Upgrade (CP1186)
- Cashla and connected stations 220 kV & 110 kV Protection Upgrade (CP1227)
- Shannonbridge and connected stations 220 kV & 110 kV Protection Upgrade (CP1228)
- Newbridge – Cushaling 110 kV line, Stations bay conductors and lead-in conductor uprate (CP1149)
- Physical Security of Transmission Stations – South Region (CP1123)
- Physical Security of Transmission Stations – North Region (CP1124)
- Physical Security of Transmission Stations – Central Region (CP1125)

### Description

In recent years, the amount of renewable generation connected to medium voltage networks has increased significantly, resulting in 110 kV transformers at Sligo, Corderry, Dalton, Macroom, Ikerrin and Somerset becoming net exporter transformers.
As a result, the existing protection schemes in these stations are no longer suitable. Therefore, refurbishments of these stations are progressing through our six-step process for developing the grid and to support the needs for power-transfer capacity.

Protection upgrades are driven by Security of Supply. There are three more protection upgrades projects that involve the installation/ replacement of protection equipment based on the age profile of the devices and to mitigate against sub optimal protection system performance. Protection system enhancement works are also included in all of them to ensure compliance with the best practice in transmission system protection.

The works of Newbridge – Cushaling 110 kV are part of wider site related connection equipment works being carried out to allow for the connection of a new wind farm at Cloncreen, Co. Offaly, which would see the development of a new Kilcumber 110 kV substation connected to Cushaling 110 kV station. This project involves the uprating of the Newbridge 110 kV bay conductor, in Cushaling 110 kV station, the Cushaling 110 kV bay conductor, in Newbridge 110 kV station and the Cushaling 110 kV lead-in conductor, n Newbridge 110 kV station to achieve a better rating.

The physical security of transmission stations in the south, central and north regions are driven by Security of Supply. These projects are necessary to address a significant number of copper earth conductor thefts. Those thefts of earth conductors impose a risk to intruders of injury or death, TSO and TAO staff as well as safety and operational risks to the transmission system.

## Table 5-5 Planned projects at multiple locations

| | CP No. | Project title | Type | Km | Drivers | | |
|---|---|---|---|---|---|---|---|
| | | | | | Security of Supply | RES Integration | Market Integration |
| 1 | CP0857 | Paint towers nationwide | Refurbish/ replace | – | ■ | | |
| 2 | CP1096 | Transformer protection upgrade, 6 stations | Refurbish/ replace | – | ■ | | |
| 3 | CP1186 | Agannygal, Ennis and connected stations 110 kV protection upgrade | Refurbish/ replace | | ■ | | |
| 4 | CP1227 | Cashla and connected stations 220 kV & 110 kV protection upgrade | Refurbish/ replace | | ■ | | |
| 5 | CP1228 | Shannonbridge and connected stations 220 kV & 110 kV protection upgrade | Refurbish/ replace | | ■ | | |
| 6 | CP1149 | Newbridge – Cushaling 110 kV line, stations bay conductors and lead-in conductor uprate | Uprate/ modify | | ■ | ■ | |
| 7 | CP1123 | Physical security of transmission stations – South Region | Other | | ■ | | |
| 8 | CP1124 | Physical security of transmission stations – North Region | Other | | ■ | | |
| 9 | CP1125 | Physical security of transmission stations – Central Region | Other | | ■ | | |

| Needs | | | | | Location | Step | ATR | LED | GW3 (CA) | GW6 (PA) | Energisation |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inter-Regional PF | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties | | | | | | |
| | | | | ■ | Dublin, Wicklow, Louth, Cork, Kildare, Meath, Kilkenny, Offaly, Carlow | 6 | | TSO | 17/02/2014 | 24/11/2014 | 31/10/2026 |
| | | | | ■ | Sligo, Mayo, Leitrim, Tipperary, Galway | 6 | | TSO | 10/02/2020 | 02/10/2020 | 30/11/2023 |
| | | | | ■ | Offaly. Galway. Clare | 5 | | TSO | 05/08/2021 | 08/09/2022 | 31/12/2025 |
| | | | | ■ | Galway, Clare | 3 | | TSO | 02/02/2022 | 21/09/2022 | 30/11/2026 |
| | | | | ■ | Offaly, Roscommon, Tipperary | 3 | | TSO | 03/02/2022 | 26/09/2022 | 30/11/2026 |
| | ■ | ■ | | | Kildare, Offaly | 6 | | TSO | 22/01/2021 | 04/11/2021 | 30/11/2023 |
| | | | | | Wicklow, Wexford, Cork, Tipperary, Waterford | 5 | | TSO | 07/05/2021 | 29/12/2023 | 30/12/2025 |
| | | | | | Louth, Meath, Cavan, Roscommon, Monaghan | 5 | | TSO | 03/02/2022 | 29/12/2023 | 30/12/2025 |
| | | | | | Kildare, Carlow, Cork, Kilkenny, Limerick, Wicklow | 5 | | TSO | 14/07/2021 | 29/12/2023 | 30/12/2025 |

# 6. Projects in early stages of development

In Chapter 5 we outlined the committed projects as at the data freeze date, 21 December 2022. Committed projects are those projects that are in Steps 4-6 of our six-step process for developing the grid. Committed projects have received EirGrid capital approval which occurs at the end of Step 3.

## 6.1 Overview

In this chapter we outline the projects that are in the early stages of development, that is, in Steps 2-3 at the time of the data freeze date. As these projects progress and get EirGrid capital approval they will move into Steps 4-6.

The tables below show drivers, needs and locations. Although it is not usual for drivers and needs to change once established, in certain circumstances they may change as projects progress through the early stages of the framework and therefore the information in this chapter should not be considered definitive.

Additional projects will be included in future TDPs as the needs identified in the Tomorrow's Energy Scenarios System Needs Assessment and candidate reinforcements identified in Shaping Our Electricity Future are brought through our six-step process for developing the grid.

Network studies performed as part of Shaping Our Electricity Future have identified a number of additional reinforcements that are required to meet a target of 80% RES-E by 2030, including connection of 5 GW of offshore wind capacity. A total of 40 additional reinforcements were identified; some of these reinforcements are required to address the needs associated with offshore wind connections along the east coast and increased demand growth in Dublin. Subject to engagement and further detailed technical analysis, these reinforcements will be included as appropriate in future TDPs as they are brought through our six-step process.

## 6.2 The Border, Midlands and West

We have confirmed the need for further investment in this region. Table 6-2 shows the projects progressing the following investments through our six-step process for developing the grid:

**Table 6-1: Projects in early stages in Border, Midlands and West**

| | CP No. | Project title | km | Drivers | | | Needs | | | | | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Security of Supply | RES Integration | Market Integration | Inter-Regional Power Flow | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties |
| 1 | CP0982 | Flagford – Sligo 110 kV circuit thermal capacity | 50.5 | | ■ | | | ■ | | | | Sligo |
| 2 | CP1002 | Cushaling – Newbridge 110 kV Line Refurbishment | 24.6 | ■ | | | | | | | ■ | Offaly, Kildare |
| 3 | CP1003 | Cushaling – Portlaoise 110 kV Line Refurbishment | 42.1 | ■ | | | | | | | ■ | Offaly, Kildare, Laois |
| 4 | CP1233 | Donegal – Srananagh Corridor[66] | | ■ | ■ | | | | | | | Donegal, Sligo |

66 CP1233 scope relates to the original scope of the removed North West Project.

## 6.3 The South-West and Mid-West

We have confirmed the need for further investment in this region. Table 6-3 shows the project progressing the following investment through our six-step process for developing the grid.

**Table 6-2: Project in early stages in South-West and Mid-West**

| | CP No. | Project title | km | Drivers | | | Needs | | | | | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Security of Supply | RES Integration | Market Integration | Inter-Regional Power Flow | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties |
| 1 | CP1177 | Whitegate 110 kV Station Refurbishment | – | ■ | | | | | | | ■ | Cork |
| 2 | CP1223 | Bandon 110 kV Busbar Rating Needs | – | ■ | | | | | | | | Cork |

## 6.4 The South-East, Mid-East and Dublin

We have confirmed the need for further investment in this region. We are progressing the following investments through our six-step process for developing the grid:

**Table 6-3: Projects in early stages in South-West and Mid-West**

| | CP No. | Project title | km | Drivers | | | Needs | | | | | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Security of Supply | RES Integration | Market Integration | Inter-Regional Power Flow | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties |
| 1 | CP1390 | Maynooth – Rinawade 110V uprate | 7.1 | ■ | | | | | | | | Kildare |
| 2 | CP1196 | Arklow – Ballybeg – Carrickmines 110 kV capacity needs | 21.9 | ■ | | | | | | | | Wicklow, Dublin |
| 3 | CP1238 | Arklow 220 kV Station Refurbishment | – | ■ | | | | | | | | Wicklow |
| 4 | CP1391 | Maynooth – Timahoe 110 kV uprate | 19 | ■ | | | | | | | | Kildare |

## Table 6-3: Projects in early stages in South-West and Mid-West

| | CP No. | Project title | km | Drivers | | | Needs | | | | | Location |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Security of Supply | RES Integration | Market Integration | Inter-Regional Power Flow | Local Constraints | Connection | Inter-connection | Asset Condition | County/ counties |
| 5 | CP1403 | Rinawade – Dunfirth 110 kV uprate | 29 | ■ | | | | | | | | Kildare, Meath |
| 6 | CP1214 | North County Dublin Bulk Supply Point | – | ■ | | | | | | | | Dublin |
| 7 | CP1273 | Dublin Central Bulk Supply Points | – | ■ | | | | | | | | Dublin |
| 8 | CP1226 | South Dublin Reinforcement | 25 | ■ | | | | | | | | Dublin |
| 9 | CP1321 | Athy – Carlow 110 kV Thermal Uprate | 25 | ■ | | | | | | | | Kildare, Carlow |

# 7. Summary of environmental appraisal

This TDP which will form part of a Grid Implementation (IP) Plan will be subject to Strategic Environmental Assessment (SEA) including Appropriate Assessment (AA). EU Directive (2001/42/EC) on the assessment of the effects of certain plans and programmes on the environment, herein referred to as the 'SEA Directive', established the statutory requirement for SEA as part of the development of certain plans and programmes.

The enabling legislation is the European Communities (Environmental Assessment of Certain Plans and Programmes) Regulations 2004 (SI 435/2004), as amended in 2011 by SI 200/2011, and the Planning and Development (Strategic Environmental Assessment) Regulations 2004 as amended in 2011 (Irish SI 436/2004 and SI 201/2011).

It is EirGrid and SONI's commitment to provide for a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development.

The purpose of the SEA is to ensure the Grid Implementation Programme (IP) and accompanying TDP 2023 – 2032 is in line with committed Strategic Environmental Objectives (SEOs). These objectives will be set out in the Strategic Environmental Assessment (SEA) prepared for the Grid IP and integrated into the overall approach to grid development. A series of environmental, planning, social and technical policies and objectives also form a core element of the Grid IP and guide sustainable grid development.

The additional projects reported in this Transmission Development Plan, which consist of 51 new build projects, 21 refurbishment/ replacement projects, 31 uprate/modification projects and 7 classified as other types will be examined in the SEA and evaluated against the SEOs. Following the implementation of mitigation measures (where necessary) the SEOs will be achieved.

Each annual TDP subsequent to this TDP will include a formal Environmental Appraisal Report (EAR), which considers whether the subsequent TDP is in accordance with the SEA of the Grid IP. In short, the TDP is subject to appraisal to ensure its conformance with the provisions of the adopted SEA.

EirGrid has developed a Draft SEA Scoping Report and invited comments and observations on it from interested stakeholders in January 2023.

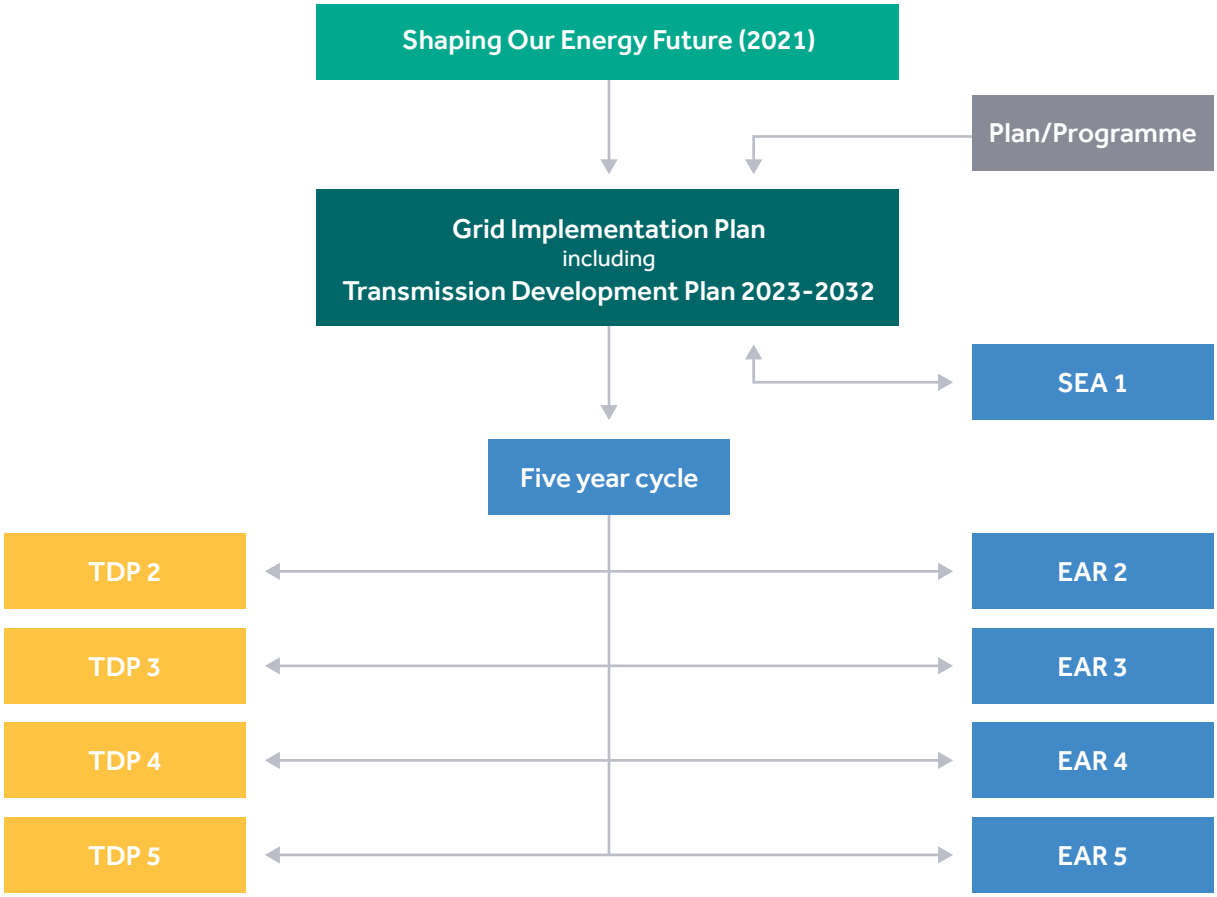



*Figure 7-1 Five year lifecycle of SEA and subsequent annual environmental appraisals*

# Appendix A:
# Irish projects in European Plans

The TYNDP process consists of four main stages, for which reports are drafted and consultations are managed by ENTSO-E. The TYNDP process is shown in Figure A-1 and further information can be found on the ENTSO-E website[67].

## How are Irish transmission projects included in ENTSO-E's TYNDP?

Scenarios are developed to describe how the future energy landscape is to function within the transmission system, defining potential future developments of the energy system that are used to gain insight on how these projects will benefit the transmission system.

During the Collection Projects stage, ENTSO-E invites operators and project promoters to propose projects requesting to be considered as PCI and included in ENTSO-E's TYNDP. The Identification of System Needs assesses the impact of the Scenarios on the transmission system, identifying network bottlenecks and additional investment needs through the outcomes provided by network power-flow, stability, and market analyses studies. In the Cost-Benefit Analysis, ENTSO-E reviews the benefits and costs of electricity transmission and storage projects from a pan-European perspective, before the European Commission includes them as PCI.

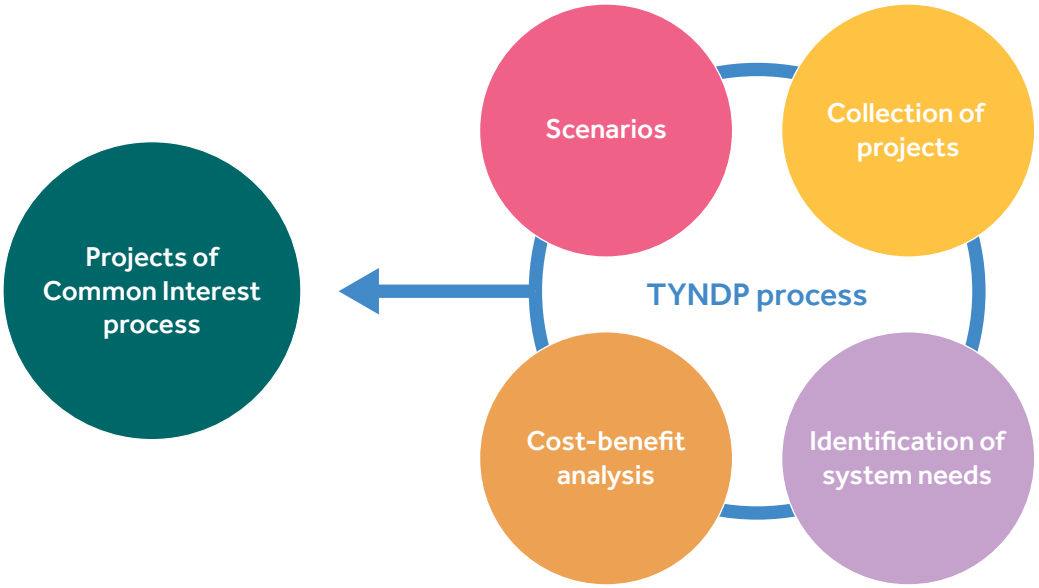



*Figure A-1: Overview of the assessment process inside the TYNDP and for identifying PCIs*

67 https://www.entsoe.eu/

The needs for reinforcement of the transmission network are first identified. Solutions to satisfy these needs are then identified and then assessed relative to each other, taking into consideration their respective costs and benefits to the system throughout the lifecycle of the project. When a solution has been chosen, it is included in the National Development Plan (NDP), which describes planned investments in the national transmission network. This includes construction of new infrastructure and replacement of existing infrastructure.

Projects that integrate at least two EU countries may come under European PCI status. These projects are intended to help the EU achieve climate and energy objectives.

Following the preliminary design, a technical project definition is created. This includes deciding a route and considering environmental and social constraints. Administrative permits are also required before a project can commence. Public consultation is required before a permit can be granted. Funding for transmission projects can come from public or private investors. Projects with PCI status are eligible for EU funding under the Connecting Europe Facility.

Following construction, a testing phase is required before the project can be commissioned. If any equipment is unavailable during construction or maintenance of a project, a planned outage must be coordinated with the relevant TOS(s). The final step in a transmission project is analysis of its impact on system operations and markets once operational. This can tell whether the benefits anticipated during planning have been realised.

## Context of TYNDP 2022

Considering the feedback received on the 2020 edition, for the first time in TYNDP 2022, ENTSO-E is collecting feedback from stakeholders on key proposed improvements in the draft Cost-Benefit Analysis Implementation Guidelines, including the inclusion of the Interlinked Model, a new methodology to assess hybrid interconnectors and the assessment of projects' commissioning years.

In October 2021, ENTSO-E invited promoters of transmission and storage infrastructure projects to submit their projects to the TYNDP 2022, ENTSO-E's pan-European network development plan. ENTSO-E performed a cost-benefit analysis on selected projects and released the draft TYNDP 2022 for public consultation between July and September 2022.

Last December ENTSO-E launched a consultation on its 4th ENTSO-E Guideline for the Cost Benefit Analysis of Grid Development Projects. The consultation was open to all interested stakeholders from 16 December 2022 until 1 February 2023.

The final TYNDP 2022 report is expected to be published in the first quarter of 2023.

## EirGrid projects in TYNDP 2022

Table A-1 below lists the projects we proposed to be in ENTSO-E's 2022.

| Table A-1: EirGrid projects in European TYNDP 2022 | | |
|---|---|---|
| **TYNDP No.** | **CP No.** | **Project title** |
| 107 | n/a[68] | Ireland – France Interconnector (Celtic Interconnector) |

## Third party projects in TYNDP 2022

Table A-2 below lists the Irish projects proposed by third parties to be in ENTSO-E's TYNDP 2022.

| Table A-2: Third party projects in European TYNDP 2020 | |
|---|---|
| **TYNDP No.** | **Project title** |
| 1025 | Silvermines Hydroelectric Power Station |

68 There is no capital project number associated with the Interconnector itself because the project is a joint venture between EirGrid and RTÉ (French operator).

## Irish Projects of Common Interest (PCIs)

The European Commission (EC) oversees the designation of Projects of Common Interest[69] (PCI). The PCI selection is a process separate from the TYNDP process. However, to be eligible for PCI status, inclusion in the last available TYNDP is an explicit condition. Table A-3 below lists the Irish PCIs on the fifth PCI list. The fifth list was published by the European Commission in November 2021[70]. The fifth list will be included in the next version of the TYNDP, TYNDP 2022. Three projects previously included as PCI have been removed from the list.

The TEN-E Regulation is currently being amended. The draft text includes provisions for Projects of Mutual Interest (PMIs) between EU member states and third countries. Three PCIs were removed in the published 5th list. These projects will be re-evaluated after the updated Regulation takes effect and may qualify as PMIs.

**Table A-3: Irish Projects of Common Interest in TYNDP 2022**

| PCI No. | TYNDP No. | Project title |
|---|---|---|
| 1.6 | 107 | Ireland – France Interconnector (Celtic Interconnector) |
| 2.29 | 1025 | Silvermines Hydroelectric Power Station |

## Irish e-Highway 2050 project

The e-Highway2050 project[71] is a study project funded by the EC aimed at building a Development Plan for the European transmission network from 2020 to 2050. The Development Plan supports the EU's overall policy objectives with regard to energy and decarbonising the European economy.

Table A-4 below lists the Irish project included in the e-Highway 2050 Plan. This e-Highway project is also identified as such in the fourth PCI list referred to above.

**Table A-4: Irish Projects in e-Highway 2050 Plan**

| PCI No. | TYNDP No. | Project title |
|---|---|---|
| 1.6 | 107 | Ireland – France Interconnector (Celtic Interconnector) |

69 https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest_en
70 https://energy.ec.europa.eu/system/files/2021-11/fifth_pci_list_19_november_2021_annex.pdf
71 https://docstore.entsoe.eu/major-projects/the-e-highway2050-project/Pages/default.aspx

## How are Irish and European Plans related?

It is worth highlighting how the Irish TDP and the European plans and designations are related. Figure A-1 below illustrates the relationship. All our capital projects, irrespective of size, are described in the TDP.

Only high voltage projects that involve a large increase in transmission capacity are included in European plans. Of those only a small number of large cross border projects which increase the import and/or export capability of ENTSO-E countries are designated Projects of Common Interest.

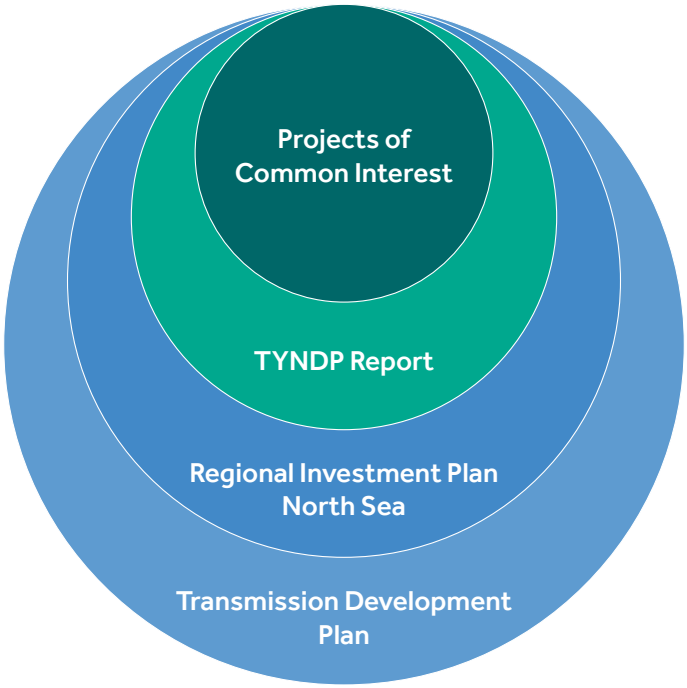



*Figure A-2: [Title]*

# Appendix B: Approach to grid development

As TSO, we are obliged to develop a safe, secure, reliable, economical, and efficient transmission network to meet all reasonable demands for electricity, in accordance with legal obligations.

## Development objectives and strategies

We plan the development of the transmission network taking account of the needs of the transmission system. The need for development is determined by assessing long-term future network performance against technical standards. These technical standards are embodied in the Transmission System Security and Planning Standards[72,73] (TSSPS). When it is established that changes on the network cannot be accommodated without violating the performance criteria outlined in the TSSPS, a range of issues are considered when selecting a transmission reinforcement strategy.

When assessing development options to address future potential network needs, we use our six-step process for developing the grid. Within our six-step process, we consider the impacts of each possible option on other potential development needs. Sometimes by making more effective use of the existing network, we can delay large investment or avoid the need for additional circuits.

In some cases, a proposed project may meet more than one development requirement, prove more economic and have less impact on the environment than multiple projects. Where possible, we seek to find single development projects to meet multiple network requirements.

Public planning and environmental considerations assist in the development of transmission infrastructure projects. An overview of the public planning and environmental considerations, as well as the TSSPS can be found below.

## The Transmission System Security and Planning Standards (TSSPS)

The requirement for network development is identified when the simulation of future conditions indicates that the TSSPS would be breached. These standards are in line with international standards.

The standards are deterministic[74] – as are those generally used throughout the world in transmission planning. They set out an objective standard which delivers an acceptable compromise between the cost of development and service delivered. Rather than conducting subjective benefit analysis in each case, it is preferable to plan to meet an objective standard and carry out analysis of the options available to meet the standard.

72 https://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Transmission-System-Security-and-Planning-Standards-TSSPS-Final-May-2016.pdf
73 Previously referred to as the Transmission Planning Criteria.
74 The deterministic methodology is often referred to as the N-1 criterion. The system must have sufficient capacity so that in the event of a probable system outage, there are no resulting system problems such as overloading, under-voltage, over-voltage or instability.

## Public planning and environmental considerations

### Overview

We have a team of experienced, professional planning and ecological consultants embedded in our Infrastructure Directorate. These consultants assist in the development of transmission infrastructure projects and in other aspects of network development from a planning and environmental perspective. This section provides an overview of the approach taken on individual projects, taking into account best practice and legal requirements. In addition, Section B.3.4 outlines our approach to Strategic Environmental Assessment (SEA) for Grid Implementation Plans. These plans are based on broader strategy approaches to grid development but include aspects of any relevant Transmission Development Plans. A Strategic Environmental Assessment will accompany this TDP to ensure that it is in accordance with the provisions of the Strategic Environmental Objectives detailed in the SEA for the Grid Implementation Plan.

### Public planning considerations

Statutory consent for transmission projects is sought on a project-by-project basis, as required under the Planning and Development Acts. At the outset, our public planning specialists determine whether permission is needed for a proposed development, or whether, under the current planning and development legislation, such works may comprise exempted development – that which does not require a prior grant of approval or permission.

These in particular might include line uprate projects, whereby the capacity or rating of electrical equipment is increased, refurbishment and maintenance works.

We undertake a process to confirm our consideration of the exempted status of such works. This process also involves Screening for Appropriate Assessment (AA), which is a statutory obligation under Article 42 of the European Communities[75] Regulations 2011-15. Where it is determined that planning permission is required, we engage with An Bord Pleanála (ABP) which determines if a proposed development falls within the scope of Section 182A of the Planning and Development Acts 2000 to 2014, which relates to Strategic Infrastructure Development (SID). If it does fall within Section 182A, an application for approval is made directly to the Strategic Infrastructure Division of ABP. If ABP determines that the proposal does not fall within Section 182A, it directs us to make an application for permission to the relevant Local Planning Authority (LPA).

75 Birds and Natural Habitats.

The decision-making authority (ABP or LPA) will determine whether the application for development is in accordance with the principles of proper planning and sustainable development. Considerations in this regard include:

- EU directives and governing statutory and strategic policy;
- Conformity with the provisions of key documents such as relevant development plans and Regional Planning Guidelines;
- Input from Prescribed Bodies, such as the:
  - Relevant LPA (if the decision-maker is ABP);
  - Department of Communications, Climate Action and Environment;
  - Department of Housing, Planning, Local Government; and
  - National Parks and Wildlife Service of the Department of Culture, Heritage and the Gaeltacht.
- Requirements to protect designated areas on account of their ecological, cultural, archaeological, visual, or other sensitivity and/or significance.

## Environmental considerations

The requirements for Environmental Impact Assessment (EIA) and Appropriate Assessment (AA) are transposed into Irish law in the Planning and Development Acts and associated regulations.

Where necessary, applications for statutory consent are accompanied by an Environmental Impact Assessment Report (EIAR) – the need for a statutory EIAR is informed by way of an EIA Screening report.

Similarly, screening for the need for AA for impacts on European sites, designated Special Conservations Areas (SAC) or Special Protection Areas (SPA), is routinely undertaken for all our grid projects.

### Environmental Impact Assessment (EIA)

Projects where EIA is mandatory are identified on Annex I of the EIA Directive (2014) and in Irish legislation under the Planning and Development Acts and relevant regulations. For transmission infrastructure, this includes transmission of electricity by overhead lines where:

- The voltage is 220 kV or more: and
- The circuit length is more than 15 km.

An EIAR may be required for sub-threshold development where likely significant impacts on the environment are identified by the relevant LPA or ABP.

The content and scope of the EIAR is defined by the EIA Directive (2014). However, detail varies between projects depending on local environmental sensitivities.

### Appropriate Assessment (AA)

In accordance with the provisions of Article 6 (3) of the EU Habitats Directive, any plan or project not directly connected to a Natura 2000 site (Special Area of Conservation (SAC) or Special Protection Area (SPA)), that is likely to have a significant effect on the site is subject to Appropriate Assessment (AA) of its implications on the site.

The requirements for AA are set out in:

- Article 6 (3) of the EU Habitats Directive (92/43/EEC);
- The European Communities (Birds and Natural Habitats) Regulations 2011-2015; and
- Part XAB of the Planning and Development Act.

Both the habitats and birds' directives have been fully transposed into Irish law. The provisions of Part XAB of the Planning and Development Act require, among other things, that an AA 'shall include a determination by the competent authority under Article 6.3 of the Habitats Directive as to whether or not a proposed development would adversely affect the integrity of a European site.'

The overall AA process is different from EIA as it is only focused on the conservation objectives of European sites. The process is made up of separate stages of assessment, the results of each stage determining the need for the next.

It should be noted that EirGrid has responsibility for screening projects that we wish to undertake. In accordance with Regulation 42(1) of the European Communities (Birds and Natural Habitats) Regulations 2011 as amended, EirGrid is required to screen for the need for AA of plans and projects it wishes to undertake or adopt to assess in view of best scientific knowledge and the conservation objectives of the site(s), if individually or in combination with other plans or projects is likely to have a significant effect on a European site(s).

## Strategic Environmental Assessment

Strategic Environmental Assessment (SEA) is a systematic process of predicting and evaluating the environmental effects of a proposed plan or programme in order to ensure that these effects are adequately addressed at the earliest stage. The EU Directive (2001/42/EC) on the Assessment of Effects of Certain Plans and Programmes on the Environment (more usually referred to as the SEA Directive) sets out the types of plans (such as sectoral plans, including energy) that may require formal SEA. To date EirGrid has prepared two SEAs for Grid Implementation Plans which set out the manner in which grid projects will be developed in line with the overarching Grid Development Strategy.

The purpose of the SEA is to ensure that environmental considerations form part of the preparation of plans and programmes before their completion. It aims to provide a high level of protection for the environment and to promote sustainable development.

The Grid Implementation Plans and associated SEA have a nominal five-year lifespan. Shortly, EirGrid will approve the 2023-2028 Grid IP and SEA statement. This Grid IP updates the environmental objectives set out in the previous Grid 25 IP 2017-2022 and 2011-2016 and sets out the manner in which grid projects will be developed over the next five years.

The documents can be found on our website[76].

76 https://www.eirgridgroup.com/about/in-the-community/environment/

## Six-step process for developing the grid

The TDP is a snapshot of the development of the transmission network at a particular point in time. These needs are presented in a manner consistent with our approach to developing the grid.

Our approach has six steps and helps to determine whether and how we develop the grid. The six steps are illustrated in the figure below.


*Figure B-1: Six-step process for our grid projects*

At each step in this process we make decisions that narrow our focus for the choices required in the next step.

## Step 1:
## How do we identify the future needs of the electricity grid?

We start to identify the future needs of the electricity grid by considering potential changes in the demand for electricity.

These changes are influenced by factors such as how and where electricity is generated and changes in demand for electricity.

We consider these changes by developing a set of scenarios, known as Tomorrow's Energy Scenarios[77], that explore the future of electricity.

Considering these scenarios helps us to plan and identify grid improvements that may be necessary. This in turn helps us to identify projects to meet potential future needs.

The scenarios respond to many factors including Government policy, stakeholder feedback, the economy and expected growth in electricity demand.

We review the scenarios to consider new trends, changes in the industry, and other factors.

The outcome of this work may propose a potential need to reinforce the grid, or a need for an asset refurbishment.

When we have identified and confirmed a need, we start a formal process of project development. At this point, the only decision that has been made is to confirm that there is a need for a grid development project.

## Step 2:
## What technologies can meet these needs?

In Step 2, we look at a range of technical options that can meet the need or needs we confirmed in Step 1.

As part of this process, we seek feedback from the public and stakeholders on a list of potential technical solutions, to understand which options are considered suitable.

From this feedback we produce a shortlist of options to consider in more detail.

In Step 2, options are assessed based on:

- Which technologies are available for use?
- Which option would be preferable – overhead lines or underground cables?
- What related upgrades will the existing network need as a result of new infrastructure?
- Which substations may need an upgrade?
- What does this mean for the lines connecting these substations?

At this point, we publish the options we think should go forward, and the ones we have ruled out. We ask the public for their views on these options, which are considered along with other factors.

We will then make a decision on the most appropriate technical solutions to bring forward to the next step.

77 https://www.eirgridgroup.com/customer-and-industry/tes/

## Step3:
## What's the best option and what area may be affected?

During this step, we study the potential benefits and impacts of the different options we could build, and where we could build them.

For our largest projects, we are likely to spend over a year at this step.

When we are considering where we may build a project, we start by looking at a study area. This is a broad area within a region, rather than a specific, detailed route.

During Step 3, we will ask for the public's views on a specific technology option and on the study area where we want to locate the project.

We may consider more than one technical option, such as developing a new or upgraded line, or upgrading or extending a substation.

Where there are choices like this, we will consult with the public. These issues could include environmental concerns, questions about land use, or other topics that could affect the technology options.

As part of this process, we will publish information about all the technologies and areas and give our opinion on their suitability. We will identify the best performing solution.

At the end of Step 3, we will base our decision on a detailed analysis of feedback and on economic, technical, social, deliverability and environmental factors.

## Step 4:
## Where exactly should we build?

Following consultation and engagement in Steps 1, 2 and 3, we have made some key decisions on the technology we will use, and roughly where the project will be built.

We will continue to examine and consider both an overhead line option and an underground cable option if a new line is needed.

In Step 4, we will assess the most appropriate place to build the project.

At this step, the public can significantly influence exactly where we build the project. During this step we work closely with local people – especially landowners who will be directly affected by a project.

We will engage with landowners and the wider community to understand which locations for new infrastructure are preferred by local people.

At this stage, our aim is to collaborate on an agreed route or site, once it is possible and practical.

We will consider all the information gathered in this step, including local knowledge. We will then decide on a preferred route or site to include in our planning application.

## Step 5:
## The planning process

Where a project requires planning permission, we will submit an application to the planning authority – either An Bord Pleanála or the Local Planning Authority.

We will publish a notice in the newspapers when we lodge this application. We will also continue to provide regular project updates.

Once we make an application to An Bord Pleanála, it may decide to hold an oral hearing. This will give those who submitted a written opinion a chance to share their views about the project.

Where possible, we will respond to submissions from those who are directly affected by our plans.

When the planning process ends, the planning authority will do one of the following:

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

## Step 6:
## Construction, energisation and benefit sharing

We continue to engage with the public and stakeholders throughout the construction phase of the project.

Though EirGrid plans the future of the electricity grid, it is ESB Networks that builds new grid infrastructure.

EirGrid and ESB Networks will work together to minimise any impact during construction.

EirGrid will continue to engage with the public on issues such as road access or planning the schedule of works.

We will also inform the wider community of the progress of the project, up to the final process of testing, energisation and completion.

When we build new transmission infrastructure in an area, we set up a Community Fund and establish Proximity Payments for the project. We make Proximity Payments when new transmission infrastructure is built within 200 m of homes in a rural location.

The Community Fund awards grants to local organisations and other good causes in a project area.

# Appendix C: References

## Our published documents

**EirGrid's Strategy 2020-2025**
September 2019

**Shaping Our Electricity Future**
November 2021

**Shaping Our Electricity Future**
July 2023

**Transmission Development Plan (TDP) 2021-2030**
August 2022

**Transmission System Security and Planning Standards (TSSPS)**
May 2016

**Ireland's Grid Development Strategy – Your Grid Your Tomorrow**
January 2017

**All-Island Ten Year Transmission Forecast Statement (TYTFS) 2020-2029**
October 2021

**All-Island Generation Capacity Statement (GCS) 2021-2030**
August 2020

**Grid Implementation Plan 2017-2022**
April 2019

**Grid Implementation Plan 2017-2022 – Strategic Environmental Assessment Statement**
April 2019

## ENTSO-E published documents

**Ten Year Network Development Plan (TYNDP) 2020**
July 2022

**Regional Investment Plan North Sea 2017**
January 2018

## National legislation

**Electricity Regulation Act**
1999

**Planning and Development Act**
2000 (as amended)

**Strategic Infrastructure Act**
2006

**Statutory Instrument No. 445 of 2000, European Communities (Internal Market in Electricity) Regulations**

**Statutory Instrument No. 60 of 2005, European Communities (Internal Market in Electricity) Regulations**

**Statutory Instrument No. 147 of 2011, European Communities (Renewable Energy) Regulations**

## European legislation

**Birds and Natural Habitats Regulations**
2011

**Cross-border Exchanges in Electricity Regulation (EC) No 714/2009**

**Environmental Impact Assessment Directive**

**Habitats Directive**

**Internal Market for Electricity Directive 2009/72/EC**

**Internal Market for Electricity Directive 2019/944/EC**

**Promotion of the Use of Energy from Renewable Resources Directive 2009/28/EC**

**Energy Efficiency Directive 2012/27/EC**

## CRU published documents

**TSO Licence granted to EirGrid**

**CER/15/296; Decision on TSO and TAO Transmission Revenue for 2016 to 2020**
December 2015

## Government published documents

**Climate Action Plan 2022**
December 2022

**Climate Action Plan 2021**
November 2021

**Climate Action Plan 2019**
June 2019

**Project Ireland 2040**
February 2018

**Energy White Paper**
2015

**Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure**
July 2012

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