



Transmission Development Plan

2021-2030



Delivering a cleaner energy future

Disclaimer

While all reasonable care has been taken to prepare this document, we can make no guarantee to the quality, accuracy and completeness of the information herein. We do not accept responsibility for any loss associated with the use of this information. Use of this document and the information it contains is at the user's own risk.

Information in this document does not amount to a recommendation as regards to any possible investment. Before taking a business decision based on the content of this document, we advise that interested parties seek separate and independent opinion in relation to the matters covered by this document.

Copyright Notice

All rights reserved. This entire publication is subject to the laws of copyright. This publication may not be reproduced or transmitted in any form or by any means, electronic or manual, including photocopying without the prior written permission of EirGrid plc.

©EirGrid Plc. 2022

The Oval, 160 Shelbourne Road,
Ballsbridge, Dublin 4,
D04 FW28, Ireland.



Transmission Development Plan 2021-2030

Executive Summary	1
Document structure	3
Abbreviations and glossary of terms	4
Abbreviations	4
Glossary of terms	5
1 Introduction	10
1.1 Statutory and licence requirements	10
1.2 Transmission Development Plan 2021	10
1.3 Process for developing the Transmission Development Plan	11
1.4 Context of the Plan	11
1.4.1 All-Island and European context	12
1.4.2 Tomorrow's Energy Scenarios	12
1.4.3 Grid Development Strategy	14
1.4.4 Capital expenditure	14
1.4.5 United Kingdom's referendum on EU membership	14
1.4.6 Climate Action Plan	14
1.4.7 Shaping Our Electricity Future	15
1.5 Regional view	16
2 Investment drivers and needs	19
2.1 Strategic context of transmission network investment	19
2.2 National and European energy policy	19
2.2.1 Security of supply	19
2.2.2 Competitiveness	20
2.2.3 Sustainability	20
2.3 Policy drivers of transmission network investment	20
2.3.1 Security of transmission network	20
2.3.2 Market integration	20
2.3.3 Renewable Energy Sources integration	21
2.4 Technical drivers for transmission network investment	21
2.4.1 Changes in demand, generation and interconnection	21
2.4.2 Changes in inter-regional power flows	22
2.4.3 Changes in asset condition	22
2.5 Network development needs	22
3 Changes to the Plan since 2020	25
3.1 Projects completed in 2020	25
3.2 Projects removed in 2020	26
3.3 Projects added in 2020	27
3.4 Projects on hold	28



4	Planned network developments	31
4.1	Overview of the Plan	31
4.2	Summary of projects in steps 4 to 6	31
4.2.1	Works outside scope of this Plan	32
4.3	Project delivery	33
5	Regional view	36
5.1	Overview	36
5.2	The Border, Midlands and West	37
5.2.1	Summary of projects in the Border, Midlands and West	45
5.3	The South-West and Mid-West	48
5.3.1	Summary of projects in the South-West and Mid-West	54
5.4	The South-East, Mid-East and Dublin	57
5.4.1	Summary of projects in the South-East, Mid-East and Dublin	66
5.5	Projects at multiple locations	72
6	Projects in early stages of development	74
6.1	Overview	74
6.2	The Border, Midlands and West	75
6.3	The South-West and Mid-West	77
6.4	The South-East, Mid-East and Dublin	78
6.4.1	Offshore wind farms	80
7	Summary of Environmental Appraisal Report	83
Appendix A: Irish projects in European Plans		85
	How are Irish transmission projects included in ENTSO-E's TYNDP?	85
	Technical criteria for inclusion in TYNDP 2020	85
	EirGrid projects in TYNDP 2020	86
	Third party projects in TYNDP 2020	86
	Irish Projects of Common Interest (PCIs)	86
	Irish e-Highway 2050 projects	87
	How are Irish and European Plans related?	87
Appendix B: Approach to grid development		89
	B.1 Development objectives and strategies	89
	B.2 The Transmission System Security and Planning Standards (TSSPS)	89
	B.3 Public planning and environmental considerations	89
	B.3.1 Overview	89
	B.3.2 Public planning considerations	90
	B.3.3 Environmental considerations	90
	B.3.4 Strategic Environmental Assessment	91
	B.4 Six-step process for developing the grid	92
	B.4.1 Step 1: How do we identify the future needs of the electricity grid?	92
	B.4.2 Step 2: What technologies can meet these needs?	93
	B.4.3 Step 3: What's the best option and what area may be affected?	93
	B.4.4 Step 4: Where exactly should we build?	93
	B.4.5 Step 5: The planning process	94
	B.4.6 Step 6: Construction, energisation and benefit sharing	94
Appendix C: References		95

Executive Summary

The Transmission Development Plan (TDP) 2021-2030 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. 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.

The TDP 2021-2030 succeeds the TDP 2020-2029. 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 Shaping Our Electricity Future are brought through our six-step process for developing the grid. Inherent in this is the government target to achieve at least 70% and up to 80% electricity from renewable energy sources (RES-E) by 2030.

Changes to the Plan since TDP 2020

There were 111 active projects in TDP 2020-2029. Since then:

- Fifteen projects that were active in TDP 2020 have been completed;
- Two projects that were active in TDP 2020 have been removed; and
- Fifty-one projects have been added to the Development Plan.

Thus, there are 145 active projects in this version of the TDP. The changes since TDP 2020 are described in greater detail in Chapter 3.

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; and
- Ensuring the long-term sustainability of electricity supply in the country.

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, complementary thermal generation and system services providers.

As demand or generation changes, or as the transmission network becomes more interconnected with neighbouring transmission networks¹, 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 ensure performance and reliability levels are upheld.

In addition, the condition of transmission network assets is a factor. The timely maintenance or replacement of assets is required to provide the necessary level of security of supply.

¹ 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 iteration of the Climate Action Plan was published in 2019² setting out an ambitious action 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 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 final Shaping Our Electricity Future 2030 roadmap which was published in November 2021.

The final 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.

The Shaping Our Electricity Future roadmap is a dynamic plan which will be updated biennially to reflect the best available information, including changes in climate and energy policy, and to report on progress against specific actions within the roadmap. The next iteration of the roadmap will include necessary changes for achieving the government's revised target of up to 80% RES-E by 2030, as detailed in the latest version of the Climate Action Plan³.

Updates to the Transmission Development Plan following Consultation

As a result of the consultation responses, we have recognised the need to give more granular data on projects. We have added some additional columns to the tables in Chapter 5 of this document that show whether projects are TSO or DSO led, and we are also providing information on whether projects are also ATRs.

In addition to this, we are also reviewing the process for creating the annual TDP and investigating what can be done to provide more timely information on project delivery and expected completion dates.

² <https://www.gov.ie/en/publication/ccb2e0-the-climate-action-plan-2019/>

³ <https://www.gov.ie/en/publication/6223e-climate-action-plan-2021/>

Document structure

This document contains:

- An Abbreviations and Glossary of Terms section;
- An Executive Summary;
- Six main sections; and
- Three appendices.

The structure of the document is as follows:

The **Abbreviations and Glossary of 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 2020: provides information on the changes to the Plan between TDP 2020 and TDP 2021.

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 2021.

Appendix A: Irish projects in European Plans

Appendix B: Approach to grid development

Appendix C: References

Abbreviations and glossary of terms

Abbreviations

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

Glossary of 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 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	<p>In the electrical power business, a distribution system operator is the licensed entity responsible for:</p> <ul style="list-style-type: none"> • 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)	<p>The estimated completion or energisation date of a project. The estimate is subject to the:</p> <ul style="list-style-type: none"> • Planning process where applicable; • Construction progress; and • Availability of transmission outages and commissioning. <p>ECDs may be liable to change.</p>
Gas Insulated Switchgear (GIS)	A compact form of switchgear where the conductors and circuit breakers are insulated by an inert gas (that is, typically SF ₆).
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: <ul style="list-style-type: none"> • 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 element).
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: <ul style="list-style-type: none"> • 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 2021, the first year of this Plan, may occur in early 2022. The winter peak figures take account of the impact of projected Demand-Side Management initiatives.

1. Introduction



1. Introduction

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

Electricity supply is essential, and a reliable electricity 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 planned for the next ten years. 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 Ireland⁴.

1.1 Statutory and licence requirements

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

- Regulation 8(6) of Statutory Instrument (SI) No. 445 of 2000⁵ as amended;
- Condition 8 of EirGrid's Transmission System Operator (TSO) Licence; and
- Article 51 of Directive (EU) 2019/944.

1.2 Transmission Development Plan 2021

TDP 2021 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.

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 01 January 2021. The previous TDP, TDP 2020 – 2029, had a freeze date of 01 January 2020. The freeze date aligns with the freeze date for other documents and processes⁶.

In this TDP we report 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 brochure⁷.

Our annual stakeholder engagement activities and plans, including project consultations and engagements, are detailed on our website⁸.

⁴ <https://www.soni.ltd.uk/media/documents/SONI-Transmission-Development-Plan-Northern-Ireland-2020-2029.pdf>

⁵ SI No. 445 of 2000, European Communities (Internal Market in Electricity) Regulations

⁶ All-Island Ten Year Transmission Forecast Statement (TYTFS) and Price Review Capex Reporting.

⁷ http://www.eirgridgroup.com/__uuid/7d658280-91a2-4dbb-b438-ef005a857761/EirGrid-Have-Your-Say_May-2017.pdf

⁸ <http://www.eirgridgroup.com/the-grid/stakeholder-engagement/>

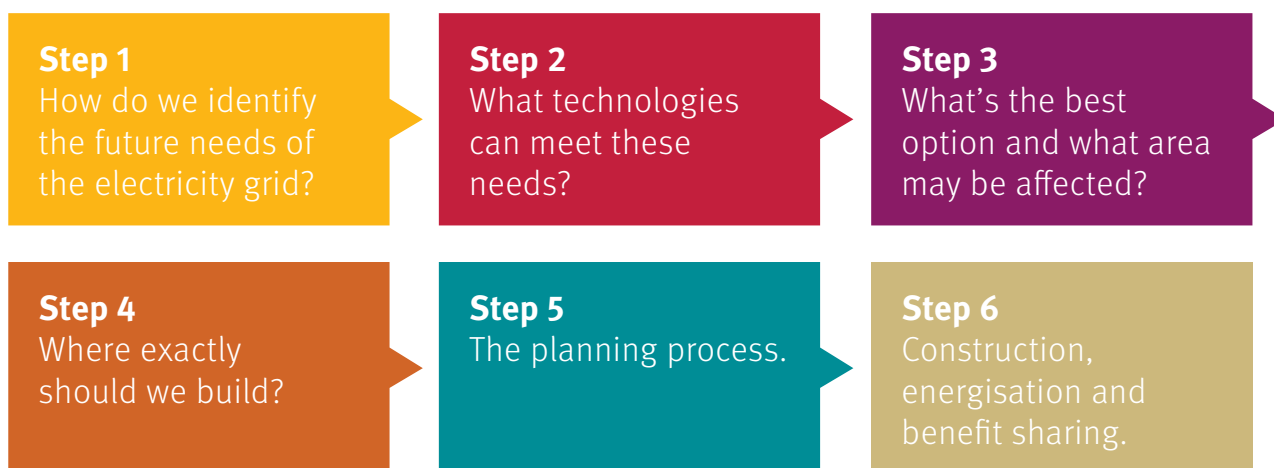


Figure 1-1: Our Framework for Grid Development

This TDP describes all committed projects that are in steps 4 to 6 of our six-step process on the freeze date of 01 January 2021. Committed projects have received EirGrid capital approval which occurs at the end of step 3. These projects are detailed in Chapter 5. 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.

It is important to note that in addition to the TDP we report on our transmission reinforcement projects in other publications and reports as follows:

Every quarter we publish Associated Transmission Reinforcement (ATR) status reports on our website⁹. ATRs are new or upgraded transmission infrastructure projects and are required so that connecting customers can get full access to the transmission system. They are a subset of the projects in the TDP. The ATR status reports include the estimated completion date (ECD) and their current place in the six-step process for the ATR projects.

In addition, 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 Utilities¹⁰ (CRU) as part of its decision paper CER/18/097 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 calendar year. The 2018, 2019 and 2020 reports can be found on our website¹¹.

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 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.

⁹ <http://www.eirgridgroup.com/customer-and-industry/general-customer-information/operational-constraints/>

¹⁰ Formerly the Commission for Energy Regulation (CER).

¹¹ <http://www.eirgridgroup.com/how-the-grid-works/tso-regulatory-publicatio/>

Considerations that shape the medium and long-term development of the transmission network are outlined below.

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). 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). 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.

As mentioned above, 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 coordinate 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.

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 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 Scenarios¹² (TES).

Our scenarios detail credible 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)¹³. The TES process occurs every two years.

¹² <http://www.eirgridgroup.com/customer-and-industry/energy-future/>

¹³ TES 2017 System Needs Assessment Report: <http://www.eirgridgroup.com/site-files/library/EirGrid/tes-2017-System-Needs-Assessment-Final.pdf>

TES 2019 System Needs Assessment Report: http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-TES-2019-System-Needs-Assessment-Report_Final.pdf

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.

The need and requirement for transmission services is continuously evolving. Therefore, in addition to needs identified in TES SNA, further system needs may be identified in the two year period between iterations of the Tomorrow's Energy Scenarios. Examples of changes that may arise that could result in further needs include plant closures, changes to the condition of network assets and new connections that arise 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.

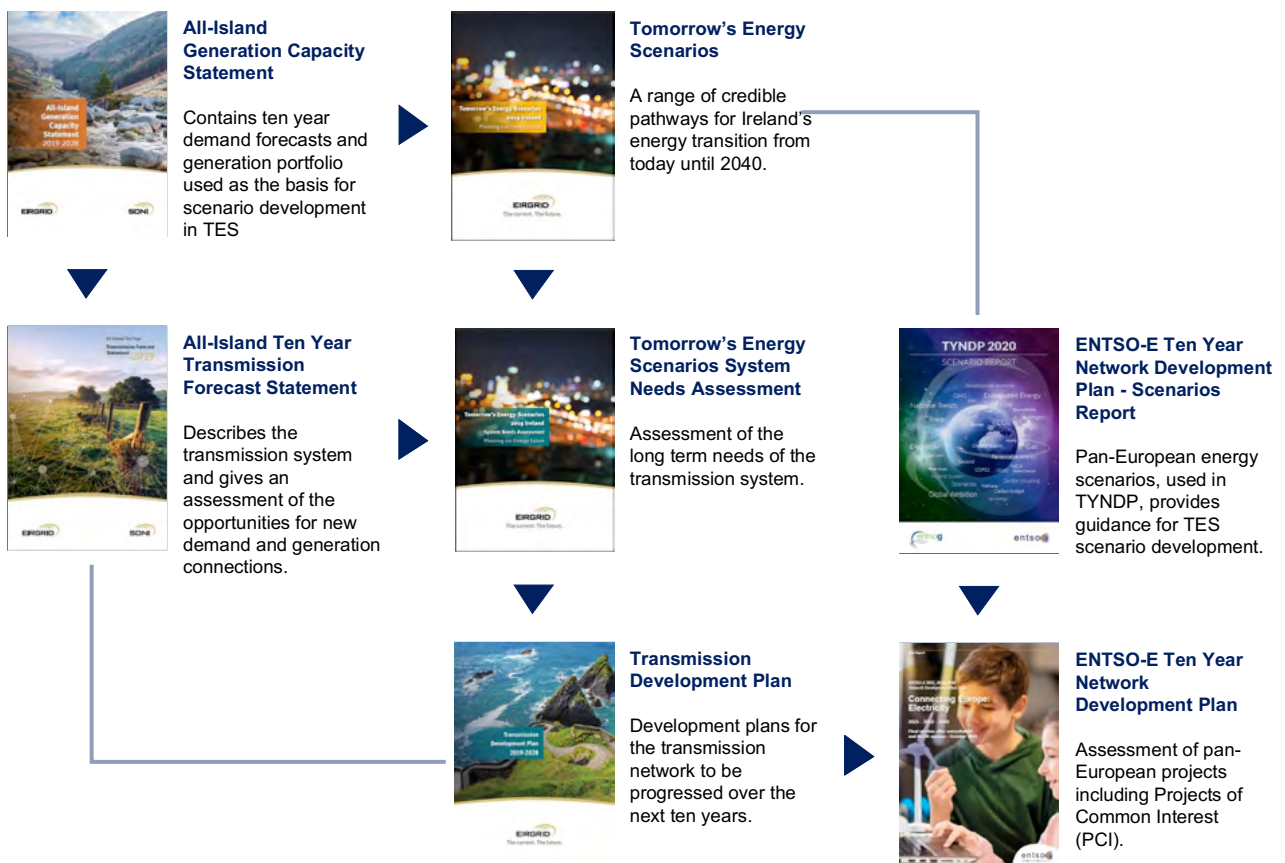


Figure 1-2: Links between the various planning documents

1.4.3 Grid Development Strategy

We published our grid development strategy in January 2017¹⁴. 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.

1.4.4 Capital expenditure

This Plan includes 145 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/20/159¹⁵.

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.

1.4.5 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 Ireland¹⁶ 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 01 January 2021, the SEM has in place less efficient cross-border trading arrangements with the GB electricity market.

The EU-UK Trade and Cooperation Agreement¹⁷ 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 2022 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.

1.4.6 Climate Action Plan

In November 2021, the Irish Government launched its Climate Action Plan 2021. The revised plan reflects increased ambitions for the decarbonisation of Ireland's economy including a revised target of up to 80% of electricity demand to be met by renewable sources (RES-E) by 2030. This supersedes a target of at least 70% RES-E provided in the 2019 version of the climate action plan. EirGrid will continue to monitor changes in climate and energy policy and update our development plans to suit. 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

¹⁴ <http://www.eirgridgroup.com/the-grid/irelands-strategy/>

¹⁵ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20152-TSO-and-TAO-Transmission-Revenue-2021-20252.pdf>

¹⁶ <https://www.gov.ie/en/publication/06ofdf-northern-ireland/#the-protocol-and-the-all-island-economy>

¹⁷ https://ec.europa.eu/info/reasons-united-kingdom/eu-uk-trade-and-cooperation-agreement_en

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 2020-2025¹⁸ 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 by 2030.

The TDP contains a list of the committed projects as at 01 January 2021. 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. The data freeze date in this TDP predates the publication of the Climate Action Plan 2021, the committed projects reported in this TDP have been developed to reach the target of 70% RES-E. The next TDP 2022 will consider the target up to 80% RES-E.

1.4.7 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 programme 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 report¹⁹, 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 roadmap²⁰ which was published in November 2021.

The final 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. 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 which will be updated biennially to reflect the best available information including changes in climate and energy policy, and to report on progress against specific actions within the roadmap. The next iteration of the roadmap will include necessary changes for achieving the government's revised target of up to 80% RES-E by 2030, as detailed in the latest version of the Climate Action Plan.

¹⁸ <http://www.eirgridgroup.com/about/strategy-2025/>

¹⁹ <https://www.eirgridgroup.com/site-files/library/EirGrid/Full-Technical-Report-on-Shaping-Our-Electricity-Future.pdf>

²⁰ https://www.eirgridgroup.com/site-files/library/EirGrid/Shaping_Our_Electricity_Future_Roadmap.pdf

1.5 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 Tipperary²¹;
6. South-East: Waterford, Wexford, Kilkenny and Carlow;
7. Mid-East: Wicklow, Kildare, Meath and Louth²²;
8. Dublin.

²¹ Formerly Tipperary was split into North Tipperary, which was in the Mid-West region, and South Tipperary which was in the South-East region.

²² Formerly Louth was in the Border region.

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.



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

Projects are described by region in Chapter 5 “Regional view”.

2. Investment drivers and needs



2. Investment drivers and needs

The Irish Government's Energy White Paper²³ released in December 2015 set out Ireland's energy future and continues to be valid. The Climate Action Plan published in November 2021 reflects more recent national and European policy developments. A legally binding target of at least 70% RES-E is detailed in Ireland's National Energy and Climate Plan 2021-2030²⁴, which is Ireland's contribution to the European Union's effort-sharing approach of the Clean Energy Package. The NECP is due for revision in 2023 and is expected to be updated to reflect a target of up to 80% RES-E in line with the latest version of the Climate Action Plan.

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 enabling economic activity and economic growth.

The Irish electricity industry and its development take direction from a number of broad national and European²⁵ 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.

As the TSO for Ireland, we have 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.

²³ <https://www.gov.ie/en/publication/550df-the-white-paper-irelands-transition-to-a-low-carbon-energy-future-2015-2030/>

²⁴ <https://www.gov.ie/en/publication/0015c-irelands-national-energy-climate-plan-2021-2030/>

²⁵ https://ec.europa.eu/energy/topics/energy-strategy/clean-energy-all-europeans_en

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 to 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 November 2021, the Irish Government launched its Climate Action Plan 2021. 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. This supersedes a target of at least 70% RES-E provided in the 2019 version of the Climate Action Plan. 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 we 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, where it is generated, 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 has 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 windfarms 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 forms of renewable energy will be further developed, e.g. offshore windfarms, solar, biomass, wave and tidal. This is reflected in the Climate Action Plan 2021 which sets ambitious targets for deployment of renewables including at least 5 GW of offshore wind 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 and the connection of new demand 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 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 highvoltage 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) 2021-2030, which is available on the EirGrid website²⁶, details expected changes in demand, generation and interconnection. The changes are summarised at the system-level. It should be noted that, post the data freeze date, a number of units for the 22/23, 23/24 and 24/25 capacity years have submitted their termination notices²⁷.

Our annual All-Island Ten Year Transmission Forecast Statement (TYTFS) 2020-2029, which is available on the EirGrid website²⁸, describes the expected changes in demand, generation and interconnection at the individual station level.

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).

TES 2019 sets out three credible scenarios for how the power system may transform over the next 20 years to 2040. The scenarios outline potential changes in demand, generation and interconnection out to 2040.

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

Transmission network assets have a finite lifespan. The useful life of transmission assets are 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

²⁶ <https://www.eirgridgroup.com/site-files/library/EirGrid/208281-All-Island-Generation-Capacity-Statement-LR13A.pdf>

²⁷ <https://www.sem-o.com/publications/general-publications/index.xml?market=1511172710-0>

²⁸ <https://www.eirgridgroup.com/site-files/library/EirGrid/All-Island-Ten-Year-Transmission-Forecast-Statement-2020.pdf>

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.

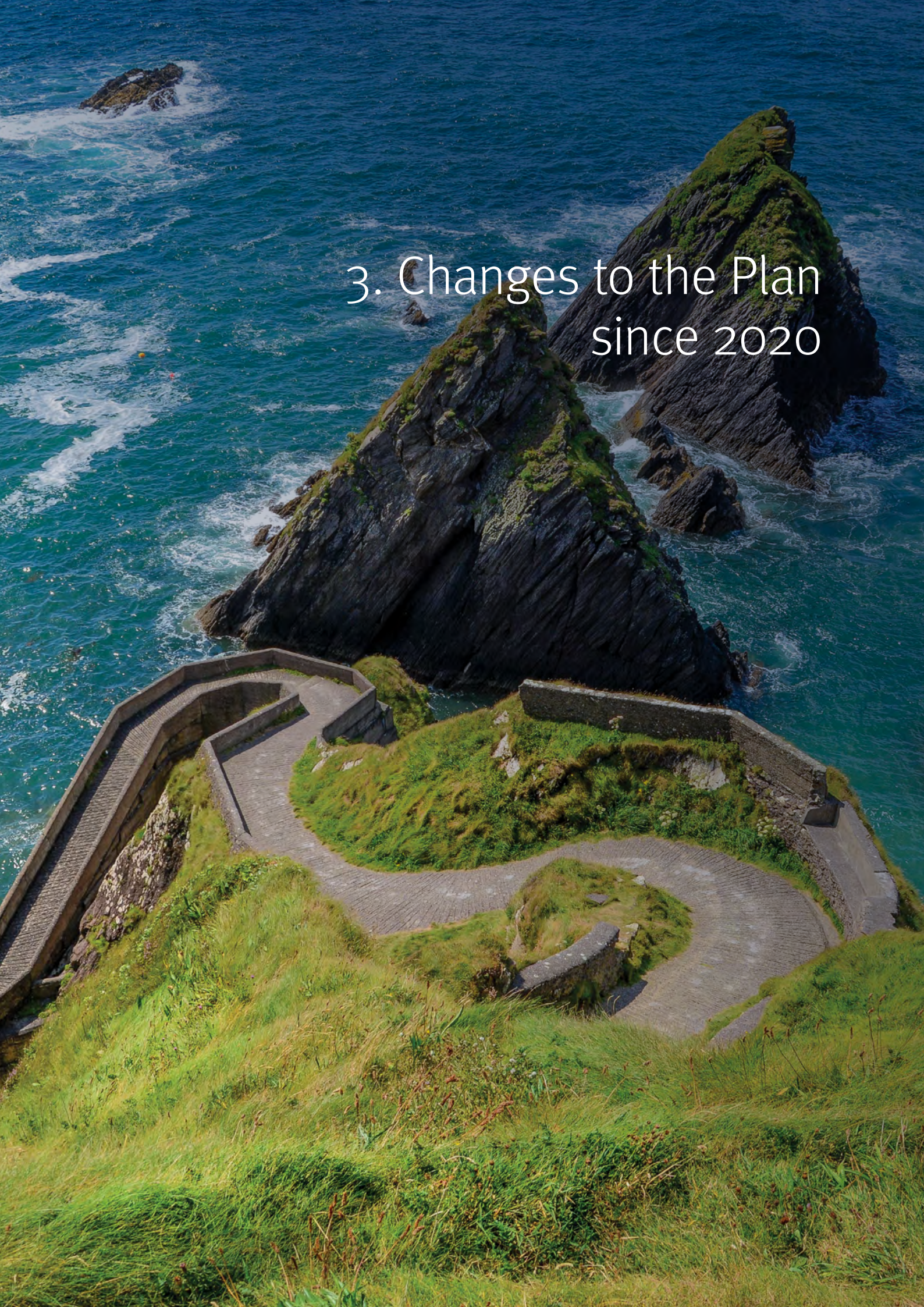
The primary measure of network development needs is assessed by comparing transmission network performance with the required performance levels set out in the Transmission System Security and Planning Standards (TSSPS).

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 2020



3. Changes to the Plan since 2020

TDP 2021-2030 has a data freeze date of 01 January 2021 while TDP 2020-2029 had a freeze date of 01 January 2020.

There were 111 active projects in TDP 2020-2029²⁹. Since then:

- Fifteen active projects in TDP 2020 have been completed, three of these projects were added to on-going projects in 2019 and completed in 2020. These are noted in Section 3.1 below;
- Two active projects have been removed, this is noted in Section 3.2 below;
- Fifty-one projects have been added, this is noted in section 3.3 below; and
- There are four projects on hold in this TDP, two of these were added in TDP 2020 and are now on hold and two other projects have been carried over from prior years. These projects are noted in Section 3.4 below.

Thus, there are 145 active projects in this Development Plan. These are identified by region in Chapter 5.

3.1 Projects completed in 2020

Fifteen projects were energised and/or completed in 2020:

- Two new 110kV circuits totalling 57km of new circuits connected to the transmission system;
- Four projects facilitating the connection of 221 MW MEC of TSO/DSO renewable generation;
- Three demand customer connections with a total of 364 MVA MIC;
- Completion of the final works and energisation across the multi-year phases of the Moneypoint 400/220/110 kV projects;
- Completion of a new 220 kV transmission station at Belcamp, North County Dublin;
- Completion of two ATR projects, both located in the West of Ireland. The completion of these ATRs alleviates constraints and strengthens the transmission network in this area; and
- Diversion of two overhead circuit sections and one underground cable to facilitate third party customer construction requests.

The completed projects are listed in Table 3-1.

²⁹ <https://www.eirgridgroup.com/site-files/library/EirGrid/Transmission-Development-Plan-2020-2029.pdf>

Table 3-1: Projects completed in 2020

No.	CP No.	Project Title
1	CPo437	Dublin North Fringe (Belcamp) 220 kV Project - New 220 kV station
2	CPo688	Moneypoint - New 400/220/110 kV GIS development
3	CPo501	Clashavoon-Dunmanway 110 kV Line - New 110 kV Line
4	CPo197	Cushaling (Mountlucas)-Thornsberry 110 kV Line - New 110 kV Line
5	CPo942	Corderry - Srananagh 110 kV Line Uprate
6	CPo996	Clashavoon - Clonkeen 110 kV Line & N22 Diversion
7	CP1056	Ryebrook 110 kV Temporary Connection ³⁰
8	CPo930	Carrigdangan (Barnadivane) Windfarm Shallow Works
9	CP1013	Darndale 110 kV Station
10	CP1034	Athea 110 kV Shallow Works
11	CP1054	Kinnegad - Mullingar 110 kV Line Diversion
12	CP1057	Derrycarney 110 kV Station ³¹
13	CP1044	Finglas - Shellybanks 220 kV Cable Diversion
14	CPo865	Cashla - Salthill 110 kV Line Uprate
15	CP1075	Kelwin Power Plant Phase ³²

More information on the completed projects is detailed in our Investment Planning and Delivery Report³³ and Annual Electricity Transmission Performance Report³⁴.

For a full evaluation of delivery and performance of the annual Transmission Capital programme readers are directed to our website³⁵ for the 2020, 2019 and 2018 reports.

The reports are in line with the CRU Reporting and Incentives decisions for Price Review 4 (2016-2020), CER/18/087³⁶, and Price Review 5 (2021-2025), CRU/20/154³⁷.

3.2 Projects removed in 2020

Two projects have been removed: Protection Replacement Project - Phase 1 (CP1082) and The North West Project (CPo800). Protection Replacement Project - Phase 1 (CP1082) has been removed as the project scope has been consolidated within the scope of the Knockraha 220 kV Station Upgrade (CPo796).

The North West Project (CPo800) has been cancelled and also removed from the PCI list after the data freeze. This project called for a new 220 kV overhead line circuit between Srananagh 220 kV substation and a new 220 kV busbar and transformers at Clogher 110 kV substation in Donegal.

The need for new network development in the north west, between Srananagh substation and substations in county Donegal, remains and has been identified in Shaping Our Electricity Future. However, the scope of the plausible scale of solutions has changed to include additional technologies, and to include investigation of connection to a number of substations in Donegal. Consequently, a new project will be started to replace CPo800 and reported in future TDPs.

³⁰ CP1056 was added to on ongoing projects 2019 and completed in 2020.

³¹ CP1057 was added to on ongoing projects 2019 and completed in 2020.

³² CP1075 was added to on ongoing projects 2019 and completed in 2020.

³³ https://www.esbnetworks.ie/docs/default-source/default-document-library/investment-planning-and-delivery-report-2020.pdf?sfvrsn=f923589a_19

³⁴ https://www.esbnetworks.ie/docs/default-source/publications/annual-electricity-transmission-performance-report-2020.pdf?sfvrsn=1547347_41

³⁵ <http://www.eirgridgroup.com/how-the-grid-works/tso-regulatory-publicatio/>

³⁶ <https://www.cru.ie/wp-content/uploads/2018/05/CRU18087-Reporting-and-Incentives-under-Price-Review-4-Decision-Paper.pdf>

³⁷ <https://www.cru.ie/wp-content/uploads/2020/12/CRU20154-PR5-Regulatory-Framework-Incentives-and-Reporting-1.pdf>

Table 3-2: Projects removed in 2020

No.	CP No.	Project Title
1	CP1082	Protection Replacement Project - Phase 1 ³⁸
2	CPo800 ³⁹	The North West Project

3.3 Projects added in 2020

51 projects have received capital approval and were added to ongoing projects in 2020, these include 28 new customer connection projects, 19 asset condition driven projects and five system reinforcement projects. They are listed in Table 3-3. All of them continue to be active in TDP 2021.

One project that was on hold in TDP 2020 has been re-activated. The project is identified in the table below using footnotes.

Table 3-3: Projects added in 2020

No.	CP No.	Project Name
1	CP0901	Kilbarry - Knockraha 110kV No. 2 Line Refurbishment
2	CPo841	Arva - Carrick-on-Shannon 110 kV line uprate
3	CP1096	Transformer protection upgrade, 6 Stations
4	CP1101	Mullagharlin 110 kV Station - 2 New DSO Transformer Bays
5	CPo848	Castlebar-Cloon 110 kV Thermal Uprate
6	CP1090	Oldbridge 110 KV Station
7	CP1093	Barnageeragh 110 kV Station
8	CP1094	Buffy 110 kV Station
9	CP1087	Porterstown Battery Storage
10	CP1084	Lishdrumdoagh 110 kV Battery Storage
11	CP1088	Greenlink Interconnector
12	CP1117	Irishtown FlexGen-BESS
13	CP1115	Drybridge and Connected Stations 220 - 110kV Protection Upgrade
14	CP1108	Dunstown Station 400 - 220kV Protection Upgrade
15	CP1105	Poolbeg BESS and FlexGen
16	CP1110	Woodland Station 400 - 220kV Protection Upgrade
17	CP1103	Corduff FlexGen
18	CP1116	Tipperary, Cahir and Connected Stations 110kV Protection Upgrade
19	CP1113	Barnageeragh Deep Reinforcements
20	CPo741	Trabeg 110 kV Station ⁴⁰
21	CPo749	Oriel Offshore Windfarm
22	CP1047	Oweninny Power 2
23	CP1060	Loughteague
24	CP1073	Oweninny Power 3
25	CP1092	New 400 kV Strategic Spare Transformer
26	CP1099	Lisheen 3 Windfarm
27	CP1102	Grangecastle South
28	CP1109	Gorman and Connected Stations 220-110kV Protection Upgrade
29	CP1111	Cahir and Connected Stations 110kV Protection Upgrade
30	CP1112	Limerick and Connected Stations 110kV Protection Upgrade

³⁸ CP1082 was added in 2020 and removed in 2021.

³⁹ CPo800 has been removed after the data freeze date 2021.

⁴⁰ CPo741 reported as On Hold in TDP 2020 and added in TDP 2021.

No.	CP No.	Project Name
31	CP1114	Platin and Connected Stations 220 - 110kV Protection Upgrade
32	CP1120	Kilcumber 110 kV Station
33	CP1126	Mully Graffy Windfarm ⁴¹
34	CP1127	Lenalea Windfarm ⁴²
35	CP1129	Aghada BESS 02
36	CP1130	Cloghan Wind Farm
37	CP1131	Gillinstown Solar
38	CP1132	Cow Cross New 110 kV Station
39	CP1135	Golagh Windfarm Modification
40	CP1136	Gaskinstown Solar Farm
41	CP1137	Carlow, Kellis 110 kV Protection Upgrade
42	CP1139	Sligo, Srananagh 220 - 110kV Protection upgrade
43	CP1140	Athy, Carlow and connected stations 110 kV Protection Upgrade
44	CP1141	Kellis Station 220 - 110 kV Protection Upgrade
45	CP1151	Ballyadam 110/MV 2x31.5MVA Station Developemnt
46	CP1152	Arva and Connected Stations 110 kV Protection Upgrade
47	CP1153	Oldstreet, Tynagh & Cashla 400 kV and 220 kV Protection Upgrade
48	CP1154	Belcamp Land Acquisition
49	CP1159	Cullenagh & connected stations protection upgrade
50	CP1160	Coolroe, Inniscarra & connected stations protection upgrade.
51	CP1161	Cathaleen's Fall and connected stations 110 kV protection upgrade

3.4 Projects on hold

As of 01 January 2021, 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.

One project that was on hold in TDP 2020 have been reactivated:

- CP0741 - Trabeg 110 kV Station - uprate 2 x 110kV transformer bays and control room extension DSO.

⁴¹ CP1079 must to be completed prior to connect CP1126.

⁴² CP1079 must to be completed prior to connect CP1127.

Nine projects that were on hold in TDP 2020 have been removed:

- CPo404 – Mullagharlin 110 kV Station – New 110 kV DSO Transformer Bay;
- CPo645 - Portlaoise 110 kV station - 2 new 110 kV trafo bays DSO;
- CPo707 - Barrymore 110 kV Station Extension and Loop-in;
- CPo743 – Cow Cross 110 kV Station – New 110 kV Bay;
- CPo836 – Rhode Biomass (Shallow connection) Derryron 110 kV station;
- CPo879 – Letterkenny 110 kV Station – Gate 3 DSO Wind Generation;
- CPo908 – Castletownmoor 110 kV Station Shallow Works;
- CPo976 – Portlaoise 110 kV Station Shallow Works; and
- CPo999 – Cauteen 110 kV Permanent Shallow Works.

Table 3-4: Projects on hold

No.	CP No.	Project Title
1	CPo837	Bellacorrick 110kV Station T141 Uprate
2	CPo977	Glanagow Raffeen 220kV Cable Diversion
3	CP1035	N6 Line Diversions ⁴³
4	CP1107	North Wall 4 & 5 ⁴⁴

⁴³ CP1035 was New in 2020 and now On Hold.

⁴⁴ CP1107 was New in 2020 and now On Hold.



4. Planned network developments

4. Planned network developments

4.1 Overview of the Plan

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.

The TDP includes 145 projects that are active and in progress. These projects are categorised as one of the following: New Build; Uprate/ Modify; Refurbish/ Replace related projects; 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.

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	13	11	28	-	52
Uprate/ Modify	14	12	18	-	44
Refurbish/ Replace	13	14	15	4	46
Other	-	-	1	2	3
Total	40	37	62	6	145

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 the figure are subject to environmental assessment as appropriate in accordance with the relevant planning requirements. For those projects not yet in the planning process, the lines shown on the map are indicative only and do not represent a preferred line route. A full list of projects and their corresponding steps of development is given in Chapter 5.

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.



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.

Project Estimated Completion Dates (ECDs) in the TDP are forecasts based on the best project information available at the time of the data freeze, 01 January 2021. Certainty with regard to completion dates increases as a project moves through the six steps.

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 therefore greater 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.

A Multi-Year Delivery Programme (MYDP) has been developed as a single source of information for project completion dates. The MYDP is a ten-year plan detailing the delivery of all projects in the capital programme in Ireland. The MYDP ensures a realistic delivery pipeline for the programme of projects in the next five years by taking current project step, outage availability and project readiness into consideration, thereby improving the certainty regarding completion dates.

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 busbar uprate 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 have a higher level of risk.

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. The MYDP identifies an optimum programme by aligning projects with similar outage requirements and by prioritising projects according to our prioritisation processes. This programme risk review may drive changes to the way projects are sequenced and the timing of project delivery in a region. More information on transmission outages can be found on the EirGrid website⁴⁵.

EirGrid's Shaping Our Electricity Future Roadmap identifies optimal delivery of 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. Starting in 2021, EirGrid and ESB Networks will develop and implement an end-to-end TSO/TAO joint approach to optimise delivery of grid infrastructure projects. This initiative is expected to deliver improvements through a range of measure such as a process of early engagement by EirGrid and ESB Networks with initial focus on complex projects assessed as high risk from a deliverability perspective.

⁴⁵ <https://www.eirgridgroup.com/customer-and-industry/general-customer-information/outage-information/transmission-outages/>

In the project tables in Chapter 5 both the current Estimated Completion Date (ECD) and the ECD that was in TDP 2020 are included. Some of the more common reasons for changes in ECD 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.

We regularly review the network development programme which may result in project delivery changes for the reasons cited above. In such cases we endeavour to communicate with and mitigate impacts on customers.

The COVID-19 pandemic and related work restrictions were on-going in 2020 and in 2021. No new assumptions or adjustments have been applied to the 2021 project completion dates and they remain correct as at 01 January 2021. The situation is being actively assessed by TAO and TSO in consultation with CRU. Where necessary, project completion dates will be updated in TDP 2022.

5. Regional view



5. Regional view

5.1 Overview

This chapter details the committed projects as of the data freeze date, 01 January 2021. 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.

This chapter describes the projects including their drivers, needs, location, estimated completion date (ECD), 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	40
South-West and Mid-West	37
South-East, Mid-East and Dublin	62
Projects at multiple locations ⁴⁶	6
Total	145

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

5.2 The Border, Midlands and West

Summary of projects	
Project category	No. of projects
New Build	13
Uprate/ Modify	14
Refurbish/ Replace	13
Total	40
Regional description	
<p>The Border, Midlands and West has a wide variety of generation sources. These are dispersed around the region and include wind, hydro, 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.</p> <p>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 110 kV grid, 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.</p> <p>The existing transmission network allows limited power flows between Northern Ireland and Ireland via the existing 275 kV Tandragee-Louth interconnector.</p> <p>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.</p> <p>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.</p> <p>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 have 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 ESN 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.</p> <p>This process will seek to minimize the requirement for outages during construction where possible. EirGrid and ESN will continue to work closely to deliver the outage programme and in turn the grid delivery programme as effectively and efficiently as possible.</p> <p>In summary there are reinforcement needs due to:</p> <ul style="list-style-type: none"> • Local constraints related to power-transfer capacity and voltage support needs; • Asset condition; and • Further market integration with Northern Ireland. <p>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.</p> <p>The TDP contains a list of the committed projects as at 01 January 2021.</p> <p>We will continue to assess reinforcement needs in the North-West through our System Needs Assessment report and to identify candidate solutions as part of the Shaping Our Electricity Future project, aiming to find new projects required in the area beyond those already progressing through the grid development process.</p> <p>As needs and projects progress through the six-step process they will be included in the TDP.</p>	

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.

**Transmission System: 400 kV, 275 kV, 220 kV and 110 kV
Indicating Developments in Step 4 to Step 6 as of 01 January 2021**

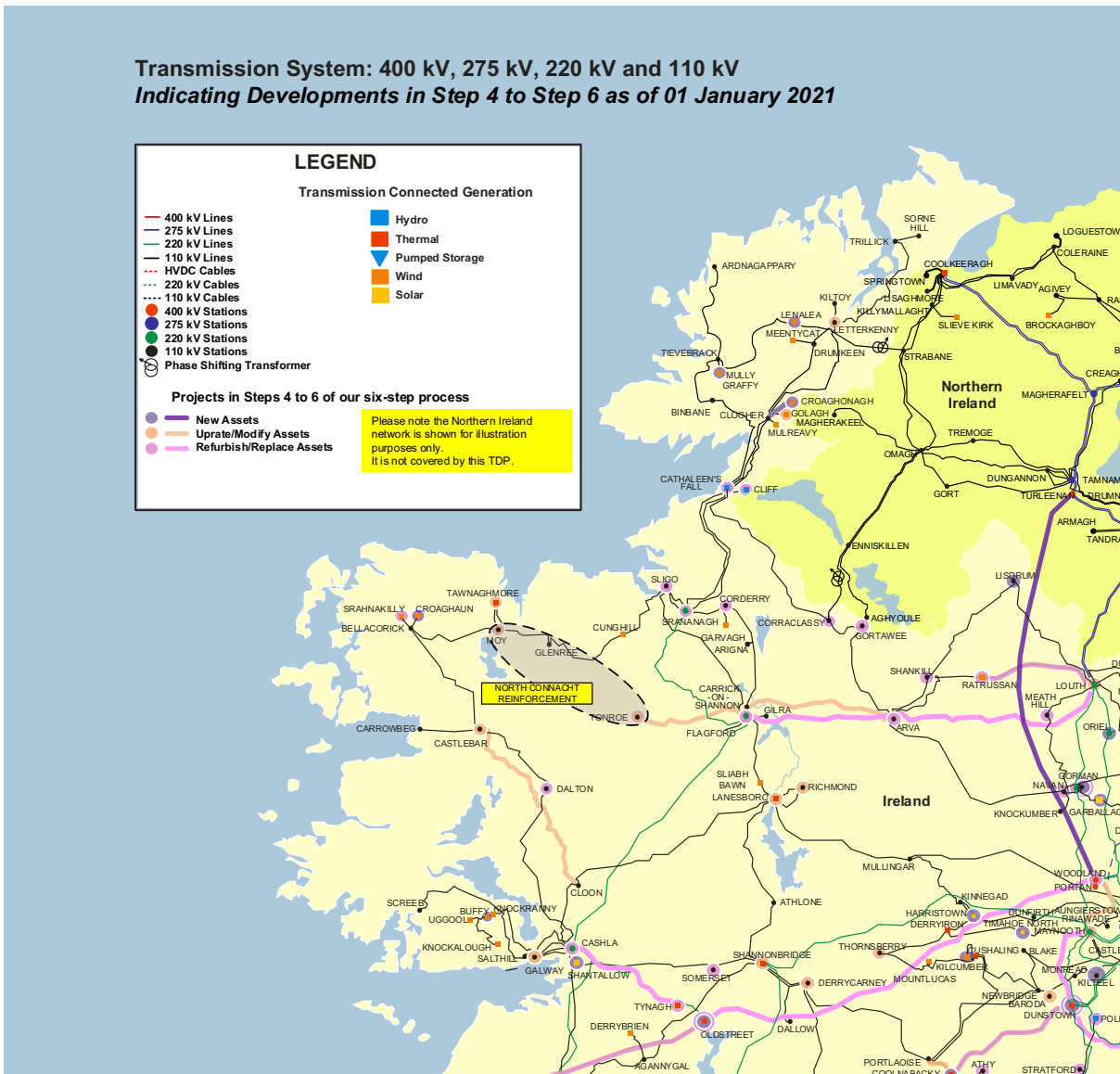


Figure 5-1: Planned network developments in Steps 4 to 6 in the Border, Midlands and West

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 Ireland⁴⁷

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.

⁴⁷ <http://www.eirgridgroup.com/the-grid/projects/north-south/the-project/>

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 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.

Reinforcement of the transmission and distribution network in Donegal

Project

- Letterkenny 110 kV Station – Two New Couplers and Relocation of 110 kV Bay (CP0740)
- Cathaleen’s Fall and Connected Stations 110 kV Protection Upgrade (CP1161)

Description

The driver for this project is security of supply.

The DSO requested that the Trillick 110 kV bay in Letterkenny be relocated to another section of the Letterkenny busbar in order to improve the security of supply to the 38 kV distribution network in Donegal.

New couplers will also be installed. These will improve security of supply and increase operational flexibility. This is of particular relevance during the outage season, which is when maintenance and construction works are scheduled.

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.

Reinforcement of the transmission network within and out of Mayo

Project

- 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)

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 technical studies on the project and are engaging with landowners, communities and stakeholders in the region. In line with our grid development strategy, we have selected an underground cable corridor for the North Connacht project as the best option for the new Moy – Tonroe 110 kV circuit⁴⁸.

For the most up to date information on the project please visit the project pages on the EirGrid website⁴⁹.

The drivers for Castlebar – Cloon 110 kV Thermal Uprate are Security of Supply and RES Integration. Castlebar – Cloon 110 kV circuit forms a part of the transmission network around the North Connacht area and therefore forms part of a heavily used and important area of the network. This reinforcement is planned to support the need for power-transfer capacity arising due to new RES generation.

The current network in the North-West does not have the capacity to accommodate the expected future generation and maintain compliance with the Transmission System Security and Planning Standards (TSSPS). 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 current connected generation.

Reinforcement of the transmission network in Mayo

Projects

- Castlebar 110 kV Station – Busbar Uprate, New Coupler and Refurbishment Works (CP0771)
- Moy 110 kV Station – Busbar Uprate, New Coupler and Refurbishment Works (CP0839)

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. This overload could occur primarily as a result of the planned connection of new generation.

In addition, the projects also involve refurbishment works due to the condition of the assets. Refurbishment works 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, which is when maintenance and construction works are scheduled.

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)
- Shannonbridge 220/110 kV Station – New 220 kV transformer bay – Battery connection, known as Shannonbridge A (CP1058)
- Tawnaghmore and Moy 110 kV Stations – Mayo Renewable Power Connection (CP0833)
- Croaghonagh 110 kV New Station and tail to Clogher 110 kV station – TSO Wind Farm Connection (CP1011)
- Oweninny Power 2 – Direct connection to an existing 110 kV transformer bay at Srahnakilly 110 kV AIS Station – (CP1047)
- Buffy 110 kV Station - New single bay 110 kV AIS station, connected into the existing Knockranny - (CP1094)
- Oweninny Power 3 Wind Farm - New single bay 110 kV AIS station, known as Croagh West 110 kV

⁴⁸ See EirGrid updated grid development strategy from January 2017 - Strategy Statement 2

⁴⁹ <http://www.eirgridgroup.com/the-grid/projects/north-connacht/the-project/>

- station, to be tailed into the existing Bellacorick 110 kV station - (CP1073)
- Kilcumber 110 kV Station - New single bay 110 kV AIS station, tailed into existing Cushaling 110 kV station - (CP1120)
- 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)
- Cloghan Windfarm – Direct connection (“Under the fence”) to a new 110 kV transformer bay at the existing Derrycarney - (CP1130)
- Golagh Windfarm Modification – Modification of the existing 15 MW Golagh Wind Farm to be a hybrid plant consisting of 12 MW and 3 MW Battery Energy Storage - (CP1135)
- Loughteague 110 kV Solar Farm – Direct connection (“Under the fence”) to a designated bay of the proposed Coolnabacky 440/110 kV - (CP1060)
- Lisdrumdoagh 110 kV Battery Storage – Connection will be the extension of the existing 110 kV busbar, the construction of a new transformer bay, the upgrading of the sectionalised bay in Lisdrum 110 kV Station and the construction of the Lisdrum – Lisdrumdoagh 110 kV cable route (150m) - (CP1084)

Description

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

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

Project

- Bracklone 110 kV New Station and Loop-in to Newbridge – Portlaoise 110 kV Circuit – New DSO demand connection (CP0644)

Description

The driver for this project is security of supply.

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

Reinforcement and Upgrade of the transmission network in Galway

Projects

- Galway 110 kV Station Redevelopment (CP0871)
- Oldstreet, Tynagh and Cashla 400 kV and 220 kV Protection Upgrade (CP1153)

Description

The drivers for these projects are RES integration and security of supply.

The need for reinforcement arises due to a shortage of transmission capacity. As a result of the planned connection of new generation, network studies have indicated future overloads in this region.

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.

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.

Reinforcement of the transmission network in Cavan

Project

- Arva and Connected Stations 110 kV Protection Upgrade (CP1152)
- Arva – Carrick-on-Shannon 110 kV line uprate (CPo841)

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.

Reinforcement of the transmission network in Sligo

Project

- Sligo, Srananagh 220-110 kV Protection Upgrade (CP1139)

Description

The driver for this project 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.

Reinforcement of the transmission network in Offaly

Projects

- Thornsberry 110 kV Station – Busbar Uprate (CPo724)

Description

The driver for this project is security of supply.

Planning studies indicate that the connection of new generation and the building of new infrastructure will increase the power flowing through the area. This could potentially overload the existing busbar in Thornsberry 110 kV station. Therefore, the busbar needs to be uprated.

Reinforcement of the transmission network in Laois

Project

- Coolnabacky - Portlaoise 110 kV Line Uprate (CPo835)

Description

The drivers for this project are security of supply and RES integration. This project is related to the Laois - Kilkenny Reinforcement Project (CPo585) which is required to address quality of supply and provide security of supply in the area. Please note that CPo585 is 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.

Reinforcement of the transmission network in Longford

Projects

- Lanesboro 110 kV Station Redevelopment (CP0919)
- Power Flow Control Scheme (CP1048)

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 power flows in excess of the rating of the existing busbar. The increased power flows arise 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, which is when maintenance and construction works are scheduled.

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.

The project has been rescoped and alternative circuits on which to deploy the Power Flow Controllers has been considered. The project consists of the installation of a power flow control device connected in series to one of the line options. 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 in our grid.

Due to this new scope, the project has returned to step 3 and we are currently evaluating on which line this new technology will be connected. Additional information of this project will be included in future TDPs.

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);
- Cloon – Lanesboro 110 kV Line Refurbishment (CP0903);
- Flagford – Sligo 110 kV Line Conflict (N4 Road Realignment) and Station End Works (CP0913);
- Cashla - Tynagh 220 kV Line Fibre Wrap (CP1019);
- 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			NEEDS				Location County / Counties	Step	ATR	LED	ECD - TDP 2020	ECD	
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection							Asset Condition
1	CPo816	North Connacht 110 kV Project	New Build Capacity	-	✓				✓				Mayo, Roscommon	4	✓	TSO	2024	2024
2	CPo724	Thornsberry 110 kV Station - Busbar Uprate	Uprate/Modify	-	✓				✓				Offaly	6	✓	TSO	2020	2021
3	CPo740	Letterkenny 110 kV Station – Two New Couplers and Relocation of 110 kV Bay	Uprate/Modify	-	✓				✓	✓			Donegal	6	✓	TSO	2021	2021
4	CPo466	North South 400 kV Interconnection Development	New Build Capacity	137 ⁵⁰	✓	✓	✓	✓	✓		✓		Meath, Cavan, Monaghan, Armagh, Tyrone	5		TSO	2025	2025
5	CPo833	Tawnaghmore and Moy 110 kV Stations - Mayo Renewable Power Connection	Uprate/Modify	-	✓						✓		Mayo	6		TSO	2020	2021
6	CPo835	Coolnaback - Portlaoise 110 kV Line Uprate	Uprate/Modify	8	✓	✓			✓			✓	Laois, Laois	5		TSO	2022	2023
7	CPo839	Moy 110 kV Station - Reconfiguration and Busbar Uprate	Uprate/Modify	-	✓	✓			✓			✓	Mayo	6	✓	TSO	2020	2021
8	CPo771	Castlebar 110 kV Station - Busbar Uprate	Uprate/Modify	-	✓	✓			✓			✓	Mayo	6	✓	TSO	2021	2022
9	CPo867	Flagford - Louth 220 kV Refurbishment Project	Refurbish/Replace	110	✓							✓	Roscommon, Leitrim, Longford, Cavan, Meath, Louth	6		TSO	2021	2024
10	CPo905	Louth – Ratrussan 110 kV No. 1 Line Uprate	Refurbish/Replace	39	✓							✓	Louth, Monaghan, Cavan	6		TSO	2022	2022

⁵⁰ The total length is 137 km, 103 km in Ireland and 34 km in Northern Ireland.

	CP No.	Project Title	Type	Km	DRIVERS			NEEDS					Location County / Counties	Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition						
11	CP0871	Galway 110 kV Station Redevelopment	Uprate/Modify	-	✓	✓			✓			✓	Galway	6	✓	TSO	2023	2024
12	CP0903	Cloon – Lanesboro 110 kV Line Refurbishment	Refurbish/Replace	65	✓							✓	Galway, Roscommon, Longford	6		TSO	2021	2021
13	CP1019	Cashla - Tynagh 220 kV Line Fibre Wrap	Refurbish/Replace	40	✓							✓	Galway	6		TSO	2020	2021
14	CP0919	Lanesboro 110 kV Station Redevelopment	Uprate/Modify	-		✓			✓				Longford	6	✓	TSO	2024	2024
15	CP1031	Flagford 220 - 110 kV Station – Circuit Breaker Replacement	Refurbish/Replace	-	✓							✓	Roscommon	6		TSO	2022	2022
16	CP1032	Cashla 220 - 110 kV Station – Circuit Breaker Replacement	Refurbish/Replace	-	✓							✓	Galway	6		TSO	2022	2022
17	CP1035	N6 Line Diversions	Refurbish/Replace	-	✓				✓				Galway	4		TSO	2022	2022
18	CP1048	Power Flow Control Scheme	Uprate/Modify	-		✓			✓				Longford	4		TSO	2023	2024
19	CP0913	Flagford – Sligo 110 kV Line Conflict (N4 Road Re-alignment) and Station End Works	Refurbish/Replace	-	✓				✓				Roscommon, Sligo	6	✓	DEV	2020	2021
20	CP1058	Shannonbridge 220 - 110 kV Station – New 220 kV transformer bay – Battery connection, known as Shannonbridge A	Uprate/Modify	-	✓					✓			Offaly	6		DEV	2021	2021
21	CP1061	Shantallow 110 kV New Station and loop-in to Cashla – Shannonbridge – Somerset Tee 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Galway	3		DEV	2021	2022
22	CP0644	Bracklone 110 kV New Station and Loop-in to Newbridge – Portlaoise 110 kV Circuit – New DSO demand connection	New Build Connection	-	✓					✓			Laois	6		DSO	2023	2023

	CP No.	Project Title	Type	Km	DRIVERS			NEEDS					Location County / Counties	Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition						
23	CP1011	Croaghonagh 110 kV New Station and tail to Clogher 110 kV station – TSO Wind Farm Connection	New Build Connection	-	✓					✓			Donegal	6		DEV	2021	2021
24	CP0841	Arva-Carrick on Shannon 110 kV Line Uprate	Uprate/Modify	43	✓	✓		✓	✓				Cavan, Longford, Leitrim, Roscommon	4	✓	TSO	n/a	2023
25	CP0848	Castlebar – Cloon 110 kV Thermal Uprate	Uprate/Modify	57.3	✓	✓			✓				Mayo, Galway	4	✓	TSO	n/a	2024
26	CP1094	Buffy 110kV Station	New Build Connection	-		✓				✓			Galway	6		DEV	n/a	2021
27	CP1084	Lisdrumdoagh 110 kV Battery Storage	New Build Connection	-	✓	✓				✓			Monaghan	6		DEV	n/a	2021
28	CP1047	Oweninny Power 2	Refurbish/Replace	22.3	✓					✓	✓		Mayo	6		DEV	n/a	2022
29	CP1060	Loughteague	New Build Connection	-		✓				✓			Laois	6		DEV	n/a	2023
30	CP1073	Oweninny Power 3 Windfarm	New Build Connection	-		✓				✓			Mayo	3		DEV	n/a	2024
31	CP1120	Kilcumber 110 kV Station	New Build Connection	-		✓				✓			Offaly	6		DEV	n/a	2022
32	CP1126	Mully Graffy Windfarm	New Build Connection	-		✓				✓			Donegal	4		DEV	n/a	2022
33	CP1127	Lenalea Windfarm	New Build Connection	-		✓				✓			Donegal	4		DEV	n/a	2022
34	CP1130	Cloghan Windfarm	Uprate/Modify	-		✓				✓			Offaly	3		DEV	n/a	2022
35	CP1135	Golagh Windfarm Modification	Uprate/Modify	-	✓	✓				✓			Donegal	4		DEV	n/a	2022
36	CP1139	Sligo, Srananagh 220 - 110 kV Protection Upgrade	Refurbish/Replace	-	✓						✓		Sligo	5		TSO	n/a	2022

	CP No.	Project Title	Type	Km	DRIVERS			NEEDS					Location County / Counties	Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition						
37	CP1151	Ballyadam 110/MV 2x31.5MVA Station Development	New Build Connection	-	✓					✓			Cork	5		DSO	n/a	2024
38	CP1152	Arva and connected stations 110 kV Protection Upgrade	Refurbish/Replace	-	✓						✓		Cavan	5		TSO	n/a	2023
39	CP1153	Oldstreet, Tynagh and Cashla 400 kV & 220 kV Protection Upgrade	Refurbish/Replace	-	✓						✓		Galway	5		TSO	n/a	2023
40	CP1161	Cathaleen's Fall and Connected Stations 110 kV Protection Upgrade	Refurbish/Replace	-	✓						✓		Donegal	5		TSO	n/a	2025

5.3 The South-West and Mid-West

Summary of projects	
Project category	No. of projects
New Build	11
Uprate/ Modify	12
Refurbish/ Replace	14
Total	37
Regional description	
<p>The South-West and Mid-West has a wide variety of generation sources dispersed around the region. These include: wind, hydro, gas, and coal burning power stations. It is expected that the Moneypoint coal-burning power station will close over the period of the plan.</p> <p>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.</p> <p>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 the Moneypoint and Knockraha transmission stations. Generation levels in the area are set to increase in the coming years.</p> <p>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.</p> <p>To cater for the high levels of generation, network reinforcement is needed to enable the efficient export of generation from the area.</p> <p>In summary there are reinforcement needs due to:</p> <ul style="list-style-type: none"> • Local constraints related to power-transfer capacity and voltage support needs; and • Asset condition. <p>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.</p> <p>The TDP contains a list of the committed projects as at 01 January 2021.</p> <p>Additional projects will be included in future TDPs as the needs identified in the Tomorrow's Energy Scenarios System Needs Assessment and the candidate solutions proposed in Shaping Our Electricity Future 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.</p> <p>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.</p>	

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: Planned network developments in Steps 4 to 6 in the South-West and Mid-West

Reinforcement of the 220 kV transmission network out of Kerry and West Cork towards the North and East

Projects

- Kilpaddoge - Knockanure and Ballyvouskill - Clashavoon 220 kV Line Upgrades and Kilpaddoge - Tarbert 220 kV Line Refurbishment (CP0763)
- Ballynahulla - Ballyvouskill and Ballynahulla - Knockanure 220 kV – Line Upgrades (CP0883)

Description

The driver for the line upgrade projects is RES integration and the driver for the line refurbishment is security of supply.

The need for refurbishment arises due to asset condition. The need for upgrading arises due to the connection of large amounts of wind generation in Kerry, west Cork and west Limerick. This results in higher power flows on the transmission network. Studies have indicated overloading of these circuits under single contingency and maintenance-trip conditions.

These projects are part of an overall strategy to increase the capacity for the potentially large power flows out of the area. The power will flow north towards Moneypoint and east towards Knockraha transmission stations and onwards to the large demand centres of Cork and Dublin.

Reinforcement of the transmission network in North Kerry

Projects

- Kilpaddoge 220/ 110 kV Station – New Station to the West of Tarbert 220/ 110 kV Station (CPo647)
- Tarbert 220/ 110 kV Station Refurbishment (CPo622)

Description

The driver for these projects is security of supply.

The need for reinforcement arises due to local constraints on the transmission network. The physical capacity of Tarbert 220/ 110 kV station is close to being reached. The new Kilpaddoge station will replace many of the functions of the existing Tarbert station.

The new Kilpaddoge station is necessary to allow for the essential expansion of transmission connections in north Kerry. 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 across the Shannon Estuary between North Kerry and Clare

Project

- Moneypoint – Kilpaddoge - Knockanure 220 kV Project (CPo726)⁵¹

Description

The drivers for this project are RES integration and security of supply.

The need for reinforcement arises due to the connection of large amounts of wind generation in Kerry, west Cork and west Limerick. This results in higher power flows on the transmission network. Studies have indicated overloading of circuits in the area under single contingency and maintenance-trip conditions.

The project will relieve constraints and allow for the increased power flows in the Mid-West and South-West that arise from the connection of renewable and conventional generation.

These projects are part of an overall strategy to increase the capacity for the potentially large power flows out of the area. The power will flow north towards Moneypoint and east towards Knockraha transmission stations and onwards to the large demand centres of Cork and Dublin.

Reinforcement of the transmission network in Clare

Projects

- Moneypoint 400/220/110 kV Station - New 400/220 kV 500 MVA transformer to replace an existing transformer (CP1091)

Description

The drivers for this project are security of supply and RES integration.

The need for reinforcement arises due to a shortage of transmission capacity and the need for voltage support in the area.

These needs were identified through network studies. These indicated potential overloading of circuits and violations of voltage limits in the Clare area under single contingency and maintenance-trip conditions.

The preferred solution to address voltage violations in the area is a new 220/ 110 kV transformer in Moneypoint 400 kV station. The new transformer and the recent uprate of the Ennis – Booltiagh –

⁵¹ Moneypoint – Kilpaddoge cable section has been completed.

Tullabrack T – Moneypoint 110 kV circuit help address the shortage of transmission capacity in the area. Thus, facilitating renewable generation in west Clare.

Transmission equipment in Moneypoint transmission station needs to be replaced because of the condition of the assets.

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)

Description

The driver for these projects is Security of Supply.

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

At the 110 kV Ballydine and Doon 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) on Tipperary 110 kV station is the only significant deviation from relay installation and commissioning type work contained in CP1116.

Reinforcement of the transmission network in West Cork

Projects

- Clashavoon - Macroom No. 2 New 110 kV Circuit and Increased Transformer Capacity in Clashavoon (CPo829)
- Coolroe, Inniscarra and connected station Protection Upgrade (CP116o)

Description

The drivers for these projects are security of supply and RES integration.

The need for the new Clashavoon - Macroom 110 kV second circuit, and increased transformer capacity in Clashavoon 220 kV station arises due to a shortage of transmission capacity in the area. Studies have indicated overloading of existing circuits and of a transformer in the area under maintenance-trip conditions. The new Clashavoon - Macroom 110 kV circuits will provide other routes into the west Cork area. This will secure supplies to the area and enable export of excess generation.

The Coolroe, Inniscarra and Macroom Protection Upgrade involves 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.

Reinforcement of the transmission network in the Cork City area

Projects

- Aghada 220/ 110 kV Station Upgrade (CPo794)
- Knockraha 220 kV Station Upgrade (CPo796)
- Trabeg 110 kV Station (CPo741)
- Knockraha Short Circuit Rating Mitigation (CPo973)
- Cow Cross 110 kV Station (CP1132)

- New 110 kV Station near Kilbarry (CP0949)
- Kilbarry – Knockraha 110 kV No.2 Line Refurbishment (CP0901)

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 Aghada and Knockraha 220/ 110 kV station upgrade projects 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 these projects. In addition, without these projects, potential overloading of equipment within Aghada station and of circuits in the Cork and Waterford area have been identified.

The Aghada project also involves refurbishment works due to the condition and age of assets in the station.

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 also 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.

Reinforcement of the transmission network in Limerick

Project

- 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 forms the main bulk supply point for the Mid-West region and is an important node on the network.

The project involves the redevelopment of the entire station. 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 220/110 kV Station – Battery connection, known as Aghada Battery Storage (CP1085)
- Clahane 110 kV Station - Banemore solar farm connection (CP1046)
- Lisheen 3 Wind Farm – Direct connection (“over the fence”) into Lisheen 110 kV station via 50 m of OHL and Dynamic Line Rating (DLR installed on the Lisheen – Thurles 110 kV line (CP1099)
- Aghada BESS 02 – Connection of a battery storage to a bay in the existing Aghada 220 kV station via 220 kV underground cable (CP1129)

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.

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

Projects

- Ballyvouskill 220/110 kV Station - Temporary 50 Mvar reactor (CP1077)
- Ballynahulla 220/ 110 kV Station – New Statcom (CP0934)
- Ballyvouskill 220/ 110 kV Station – New Statcom (CP0935)
- Knockanure 220/ 110 kV Station – New Reactor (CP0936)
- 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 due to a shortage of voltage support across the south west region and around the Thurles area. These needs were identified through network studies.

Both capacitive and inductive reactive support is required in the south west across three separate 220 kV stations; Knockanure, Ballynahulla and Ballyvouskill. The planned reactive support at Ballyvouskill, Ballynahulla and Knockanure makes up an overall solution for the South-West and the works at the three 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 distribution wind farms in the area and heavily loaded transmission lines during contingencies.

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);
- Tarbert - Tralee No. 1 Line Refurbishment (CP0864);
- Dunstown - Moneypoint 400 kV Line Refurbishment (CP0873);
- Tarbert – Trien 110 kV No. 1 Line Refurbishment (CP0902);
- Knockraha – Raffeen 220 kV Line Refurbishment (CP0868);
- Glanagow 220 kV Station - Point on Wave Controller (CP0983); and
- Kilbarry Line Conflicts (CP1037).

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			NEEDS					Location	Step	ATR	LED	ECD - TDP 2020	ECD	
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties						
1	CPo622	Tarbert 220 - 110 kV Station Refurbishment	Refurbish/ Replace	-	✓								Kerry	6		DSO	2022	2022
2	CPo763	Kilpaddoge – Knockanure and Ballyvouskil - Clashavoon 220 kV Line Uprates and Kilpaddoge - Tarbert 220 kV Line Refurbishment	Uprate/ Modify	37		✓		✓	✓				Cork, Kerry	6		TSO	2020	2021
3	CPo647	Kilpaddoge 220 - 110 kV New Station	New Build Capacity	-	✓				✓				Kerry	6		TSO	2020	2021
4	CPo824	Moneypoint - Oldstreet 400 kV Line Refurbishment	Refurbish/ Replace	104	✓							✓	Clare, Galway	6		TSO	2021	2021
5	CPo794	Aghada 220 - 110 kV Station Upgrade	Uprate/ Modify	-	✓				✓			✓	Cork	6		TSO	2021	2021
6	CPo796	Knockraha 220 kV Station Upgrade	Uprate/ Modify	-	✓				✓				Cork	6	✓	TSO	2021	2021
7	CPo624	Killonan 220 - 110 kV Station Redevelopment	Refurbish/ Replace	-	✓							✓	Limerick	6		TSO	2027	2027
8	CPo726	Moneypoint to Knockanure 220 kV Project	New Build Capacity	26		✓		✓	✓				Clare, Kerry	6	✓	TSO	2020	2021
9	CPo829	Clashavoon - Macroom No. 2 New 110 kV Circuit and Increased Transformer Capacity in Clashavoon 220 - 110 kV Station	New Build Capacity	6		✓			✓				Cork, Cork	6		TSO	2021	2021
10	CPo883	Ballynahulla - Ballyvouskill and Ballynahulla - Knockanure 220 kV Line Uprates (formerly part of CPo763)	Uprate/ Modify	66		✓		✓	✓				Cork, Kerry	6	✓	TSO	2021	2021
11	CPo864	Tarbert - Tralee No. 1 110 kV Line Refurbishment	Refurbish/ Replace	42	✓							✓	Kerry, Kerry	6		TSO	2020	2021

	CP No.	Project Title	Type	km	DRIVERS			NEEDS					Location	Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties					
12	CP0933	Thurles 110 kV Station – New Statcom	New Build Capacity	-	✓	✓			✓				Tipperary	6	✓	TSO	2022	2022
13	CP0934	Ballynahulla 110 kV Station – New Statcom	New Build Capacity	-	✓	✓			✓				Kerry	6		TSO	2021	2022
14	CP0935	Ballyvouskill 110 kV Station – New Statcom	New Build Capacity	-	✓	✓			✓				Cork	6	✓	TSO	2021	2022
15	CP0936	Knockanure 110 kV Station – New Reactor	New Build Capacity	-	✓	✓			✓				Kerry	6		TSO	2020	2021
16	CP0873	Dunstown - Moneypoint 400 kV Line Refurbishment	Refurbish/ Replace	209	✓							✓	Kildare, Laois, Tipperary, Clare	6		TSO	2023	2023
17	CP0902	Tarbert – Trien 110 kV No. 1 Line Refurbishment	Refurbish/ Replace	21	✓							✓	Kerry	6		TSO	2020	2022
18	CP0973	Knockraha Short Circuit Rating Mitigation	Uprate/ Modify	-	✓							✓	Cork	6		TSO	2022	2023
19	CP0868	Knockraha – Raffeen 220 kV Line Refurbishment	Refurbish/ Replace	19	✓							✓	Cork	6		TSO	2020	2021
20	CP0983	Glanagow 220 kV Station - Point on Wave Controller	Uprate/ Modify	-	✓				✓				Cork	6		TSO	2022	2022
21	CP0949	New 110 kV Station near Kilbarry	New Build Connection	-	✓					✓			Cork	6		DSO	2023	2023
22	CP1037	Kilbarry Line Conflicts	Refurbish/ Replace	-	✓				✓				Cork	6		DSO	2020	2021
23	CP1046	Clahane 110 kV Station - Banemore solar farm connection	Uprate/ Modify	-		✓				✓			Kerry	3		DEV	2022	2022
24	CP1077	Ballyvouskill 220 -110 kV Station - Temporary 50 Mvar reactor	New Build Capacity	-	✓	✓			✓				Cork	6	✓	TSO	2020	2021
25	CP1069	Ballinknockane 110 kV New Station and loop-in to Aughinish – Kilpaddoge 110 kV circuit - Solar farm connection	New Build Connection	-		✓				✓			Limerick	6		DEV	2021	2023

	CP No.	Project Title	Type	km	DRIVERS			NEEDS					Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties						
26	CP1062	Drombeg 110 kV New Station and loop-in to Kilpad-doge – Tralee 110 kV circuit - Solar farm connection	New Build Connection	-		✓					✓			Kerry	6		DEV	2021	2021
27	CP1085	Aghada 220 -110 kV Station – Battery connection, known as Aghada Battery Storage	Uprate/Modify	-	✓						✓			Cork	6		DEV	2021	2021
28	CP1091	Moneypoint 400/220/110 kV Station - New 400/220 kV 500 MVA transformer to replace an existing transformer	Refurbish/Replace	-	✓							✓		Clare	6	✓	TSO	2021	2021
29	CP0901	Kilbarry-Knockraha 110 kV No.2 Line Refurbishment	Refurbish/Replace	12.5	✓							✓		Cork, Cork	5		TSO	n/a	2023
30	CP1116	Tipperary, Cahir and Connected Stations 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓		Tipperary	6		TSO	n/a	2022
31	CP0741	Trabeg 110 kV Station	Uprate/Modify	-	✓						✓			Cork	6		DSO	n/a	2022
32	CP1099	Lisheen 3 Windfarm	Uprate/Modify	-		✓					✓			Tipperary	3		DEV	n/a	2022
33	CP1111	Cahir and Connected Stations 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓		Tipperary	6		TSO	n/a	2023
34	CP1112	Limerick and Connected Stations 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓		Limerick	5		TSO	n/a	2023
35	CP1129	Aghada BESS 02	Uprate/Modify	-	✓						✓			Cork	3		DEV	n/a	2023
36	CP1132	Cow Cross 110 kV Station	Uprate/Modify	-	✓			✓		✓				Cork	6		DSO	n/a	2022
37	CP1160	Coolroe, Inniscarra & connected stations Protection Upgrade	Refurbish/Replace	-	✓							✓		Cork	5		TSO	n/a	2025

5.4 The South-East, Mid-East and Dublin

Summary of projects	
Project category	No. of projects
New Build	28
Uprate/ Modify	18
Refurbish/ Replace	15
Other	1
Total	62
Regional description	
<p>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; and the 500 MW East West Interconnector (EWIC).</p> <p>The greater Dublin area is the major load centre on the Irish transmission network.</p> <p>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 report⁵². This report includes further details with respect to the final qualification decisions expected to deliver a minimum amount of generation in Ireland and the Greater Dublin area to ensure security of supply.</p> <p>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:</p> <ul style="list-style-type: none"> • The generation dispatch; • Network demand; • Interconnector flows; and • Network topology. <p>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.</p> <p>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 is because in order to supply the high demand from large energy users, the energy that was supplied by the thermal plants will be supplied by the onshore wind generation, coming from the West and South-West, and the planned offshore wind generation connections in the Irish sea. The installation of offshore wind generation reduces the occurrences of large transfer of power into the region from the West but creates other power-transfer capacity needs in Greater Dublin.</p> <p>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 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.</p> <p>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.</p> <p>In summary there are reinforcement needs due to:</p> <ul style="list-style-type: none"> • Local constraints related to power-transfer capacity and voltage support needs; and • Asset condition. <p>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.</p> <p>The TDP contains a list of the committed projects as at 01 January 2021.</p> <p>Additional projects will be included in future TDPs as the needs identified in the Tomorrow's Energy Scenarios System Needs Assessment and candidate solution proposed in Shaping Our Electricity Future 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.</p>	

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.

⁵² <https://www.sem-o.com/documents/general-publications/T-4-2024-2025-Final-Capacity-Auction-Results-Report.pdf>



Figure 5-3: Planned network developments in Steps 4 to 6 in the South-East, Mid-East and 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 existing 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.

The Greenlink Interconnector project will facilitate the connection of an interconnector facility to the Transmission System at Great Island, Co. Wexford linking to Pembrokeshire in Wales. The existing electricity networks will be connected by two High Voltage Direct Current (HVDC) cables under the Irish Sea and their respective converter stations located in Ireland and Wales.

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;
- 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

- Regional 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)⁵³
 - Oldstreet 400 kV Station Series Compensation (CP0969)⁵⁴
 - Dunstown 400 kV Stations Series Compensation (CP0968)
 - Cross-Shannon 400 kV Cable (CP0970)⁵⁵
 - Great Island - Kilkenny 110 kV Line Uprate (CP0945)
 - Wexford 110 kV Station - Busbar Uprate (CP0972)

Description

There is a significant amount of existing, new and contracted conventional and renewable generation connected or seeking to connect in the south and south west.

As a result, the main flow of electricity in the southern half of the Irish network is from the south and south-west towards the demand centres on the east coast.

There is a risk to the security of supply in the south - eastern area of the country. This is largely caused by heavy power flows through the network.

Network studies indicate the existing network cannot manage such large power flows. Numerous contingency scenarios result in widespread voltage violations and voltage collapse.

Large changes in system voltage phase angle can also prevent automatic reclosing of lines. This has a serious impact on circuit availability and system reliability, hence reducing security of supply.

There are also some overloads of transmission circuits. Thus, the network between Munster and Leinster needs to be strengthened.

⁵³ This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.

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

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

For more information on the Regional Solution and the need for it please see the report prepared for the Government appointed Independent Expert Panel⁵⁶.

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 Coolnaback 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 kV⁵⁷.

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. These needs were identified through network studies. These 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.

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)⁵⁸
- Belcamp - Shellybanks New 220 kV Cable (CP0984)⁵⁹

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.

⁵⁶ <http://www.eirgridgroup.com/site-files/library/EirGrid/Grid-Link-Report-to-IEP.pdf>

⁵⁷ <http://www.eirgridgroup.com/the-grid/projects/laois-kilkenny/the-project/>

⁵⁸ <http://www.eirgridgroup.com/the-grid/projects/west-dublin/the-project/>

⁵⁹ This project also includes the fit-out of the 220 kV GIS station building built as part of CP0437.

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.

Reinforcement of the transmission network in the Greater Dublin Area

Projects

- Corduff - Ryebrook 110 kV Line Uprate and Ryebrook 110 kV Station Busbar Uprate (CPo668)
- Maynooth 220 kV Station Reconfiguration (CPo8o8)
- Barnageeragh Deep Reinforcements (CP1113)

Description

The driver for these projects is security of supply.

The need for the line uprates project 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 refurbishment of the 220 kV and 110 kV busbars, reconfiguration of both the 220 kV and 110 kV busbars to an enhanced ring configuration, and an increase in the short circuit rating of both busbars.

The need for deep reinforcements in Barnageeragh has been identified as a requirement of the connection and energisation of a new data centre facility. The current network in the area does not have the capacity to accommodate this new demand and also allow planned maintenance of the 220/110 kV transformer at Corduff.

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 (CP1o29)
- Bracetown 220 kV New Station and tail to Clonee 220 kV station – Demand customer connection (CP1o49)
- Baroda 110 kV Station - Two new 110 kV DSO transformer bays (CPo693)
- Wexford 110 kV Station – New 110 kV Bay for DSO Transformer and New Coupler (CPo486)
- Great Island 220/ 110 kV Station – New 110 kV Transformer Bay for DSO Connection to Knockmullen (New Ross) (CPo894)
- Cruiserath 220 kV New Station and two circuits to Corduff 220/110 kV station - Permanent Connection for Demand Customer (CP1oo9)
- Snugborough 110 kV Station – Demand Connection Phase 2 (CP1o14)
- Corduff 220/110 kV Station – Two New DSO 110 kV Transformer Bays (CP1o25)
- Oldbridge 110 kV Station AWP – new Enhanced Ring 110 kV GIS substation and loop-in to the existing Drybridge Platin 110 kV overhead line (CP1o9o)

- Barnageeragh 110 kV Station – New 110 kV Barnageeragh station connected by new underground cables to Cloghran 110 kV station and to Snugborough 110 kV station (CP1093)
- Grangecastle South – new 110 kV enhanced ring GIS Station, Aungierston, connected to the Castlebaggot 220/110 kV station via two separate underground cables (CP1102)

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 Louth

Project

- Louth 275/220/110 kV Station Refurbishment – 110 kV Busbar Re-configuration and New Couplers (CP0799)
- Mullagharlin 110 kV Station (CP1101)
- 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.

Two new 110/38 kV transformers are required at the Mullagharlin station to facilitate new demand connections in the distribution network. Limited remote works will also be required at Dundalk 110 kV station.

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)

Description

The driver for these projects is Security of Supply and involves 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 stations 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.

Reinforcement of the transmission network in Kildare

Projects

- New 400 kV Strategic Spare Transformer (CP1092)
- Dunstown Station 400-220 kV Protection Upgrade (CP1108)

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 all 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.

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) on T₁₄₁ and T₁₄₂ in 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 110kV 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 Waterford

Projects

- Cullenagh and Connected stations Protection Upgrade (CP1159)

Description

The driver for this project 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. Protection system enhancement works are also required 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.

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)
- Causestown 110 kV New Station and tail to Gorman 220/110 kV station – Battery connection, known as Gorman Energy Storage (CP1083)
- Tullabeg 110 kV New Station and loop-in to Banoge – Crane 110 kV circuit - Solar farm connection (CP1068)
- Rosspile 110 kV New Station and loop-in to Great Island – Wexford 110 kV circuit – Solar Farm Connection (CP1040)
- Timahoe North 110 kV New Station and loop-in to Derryron – Maynooth 110 kV circuit – Solar Farm Connection (CP1041)
- Gallanstown 110 kV New Station and loop-in to Corduff – Platin 110 kV circuit – Solar Farm Connection (CP1051)
- Woodhouse 110 kV Station – New 110 kV transformer bay – Knocknamona Wind Farm 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)
- Porterstown Battery Storage – New single bay 110 kV tailed station, Porterstown, to be connected to a new bay in the existing Killeel 110 kV station (CP1087)
- Poolbeg BEES & FlexGen – Direct connection, under-the-fence, via a ganged transformer arrangement cabled into an existing AIS bay in Poolbeg 220 kV Station (CP1105)
- Gillinstown Solar – New 4 bay C-Type 110 kV GIS station known as Garballagh 110 kV station looping into the existing Gorman – Plating 110 kV (CP1131)
- 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)

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.

New OCGT generation connections in Dublin

Project

Corduff FlexGen (CP1103)

Irishtown FlexGen-BEES – 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)

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 (CPo825);
- Maynooth - Woodland 220 kV Line Refurbishment (CPo869);
- Maynooth - Turlough Hill 220 kV Line Refurbishment (CPo823);
- Great Island - Kellis 220 kV Line Refurbishment (CPo866);
- Maynooth - Turlough Hill 220 kV Circuit Power Line Carrier (PLC) Replacement (CP1022); and
- Belcamp Land Acquisition - requirement to accommodate potential future grid development (CP1154).

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			NEEDS				Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties					
1	CPo668	Corduff - Ryebrook 110 kV Line Uprate and Ryebrook 110 kV Station Busbar Uprate	Uprate/Modify	14	✓				✓				Dublin, Kildare	6		TSO	2020	2022
2	CPo486	Wexford 110 kV Station - New 110 kV Transformer Bay and New Coupler	Uprate/Modify	-	✓				✓	✓			Wexford	6	✓	TSO	2020	2021
3	CPo646	Finglas 110 kV Station Redevelopment	Refurbish/Replace	-	✓				✓			✓	Dublin	6		TSO	2021	2023
4	CPo580	Carrickmines 220 - 110 kV Station GIS Development	New Build Capacity	-	✓				✓			✓	Dublin	6		TSO	2020	TBC
5	CPo792	Finglas 220 kV Station Upgrade	Uprate/Modify	-	✓				✓			✓	Dublin	6		TSO	2023	2023
6	CPo585	Laois-Kilkenny Reinforcement Project	New Build Capacity	30+ 22 ⁶⁰	✓				✓				Laois, Kilkenny	6		TSO	2023	2025
7	CPo825	Oldstreet - Woodland 400 kV Line Refurbishment	Refurbish/Replace	126	✓							✓	Galway, Tipperary, Offaly, Kildare, Meath	6	✓	TSO	2020	2022
8	CPo692	Inchicore 220 kV Station Upgrade	Uprate/Modify	-	✓				✓			✓	Dublin	6		TSO	2025	2025
9	CPo894	Great Island 220 - 110 kV Station - New 110 kV Bay for 110 - 38 kV DSO Transformer	Uprate/Modify	-	✓					✓			Wexford	6	✓	TSO	2020	2021
10	CPo869	Maynooth - Woodland 220 kV Line Refurbishment and Uprate	Refurbish/Replace	22	✓				✓			✓	Kildare, Dublin	6		TSO	2023	2022

⁶⁰ 30 km is the length of the proposed new 110 kV circuit between the proposed new Coolnaback 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.

	CP No.	Project Title	Type	km	DRIVERS			NEEDS				Location	Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition					
11	CPo872	Castlebagot 220/ 110 kV New Station	New Build Connection	-	✓			✓	✓			Dublin	6		TSO	2020	2021
12	CPo808	Maynooth 220 kV Station Reconfiguration	Uprate/Modify	-	✓			✓			✓	Kildare	5	✓	TSO	2027	2027
13	CPo945	Great Island - Kilkenny 110 kV Uprate	Uprate/Modify	49	✓	✓		✓	✓			Wexford, Kilkenny	6	✓	TSO	2021	2021
14	CPo984	Belcamp - Shellybanks 220 kV New Cable	New Build Capacity	10	✓			✓				Dublin	6		TSO	2022	2022
15	CPo968	Dunstown 400 kV Station Series Compensation	New Build Capacity	-	✓	✓		✓	✓			Kildare	4	✓	TSO	2022	2025
16	CPo972	Wexford 110 kV Station - Busbar Uprate	Uprate/Modify	-	✓	✓		✓	✓			Wexford	6	✓	TSO	2020	2021
17	CPo823	Maynooth - Turlough Hill 220 kV Line Refurbishment	Refurbish/Replace	53	✓						✓	Kildare, Wicklow	6		TSO	2022	2023
18	CPo866	Great Island - Kellis 220 kV Line Refurbishment	Refurbish/Replace	70	✓						✓	Wexford, Carlow	5		TSO	2022	2023
19	CP1009	Cruiserath 220 kV New Station and two circuits to Corduff 220/110 kV station - Permanent Connection for Demand Customer	New Build Connection	-	✓					✓		Dublin	6		DEV	2021	2022
20	CPo967	Moneypoint 400 kV Station Series Compensation ⁶¹	New Build Capacity	-	✓	✓		✓	✓			Clare	4	✓	TSO	2022	2025
21	CPo970	Cross-Shannon 400 kV Cable ⁶²	New Build Capacity	6	✓	✓		✓	✓			Clare, Kerry	4	✓	TSO	2022	2023
22	CPo969	Oldstreet 400 kV Station Series Compensation ⁶³	New Build Capacity	-	✓	✓		✓	✓			Galway	4	✓	TSO	2022	2025

⁶¹ This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.

⁶² This project is located in the South-West and Mid-West. It is included here as it is part of the Regional Solution.

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

	CP No.	Project Title	Type	km	DRIVERS			NEEDS				Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties					
23	CP1014	Snugborough 110 kV Station – Demand Connection Phase 2	Uprate/Modify	-	✓					✓			Dublin	6		DEV	2020	2021
24	CP1020	Blundelstown 110 kV New Station and loop-in to Corduff – Mullingar 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Meath	6		DEV	2021	2022
25	CP1022	Maynooth - Turlough Hill 220 kV Circuit Power Line Carrier (PLC) Replacement	Refurbish/Replace	53	✓							✓	Kildare, Wicklow	6		TSO	2020	2021
26	CP1025	Corduff 220 - 110 kV Station – Two New DSO Transformers for Demand	Uprate/Modify	-	✓					✓			Dublin	6		DSO	2020	2021
27	CP1040	Rosspile 110 kV New Station and loop-in to Great Island – Wexford 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Wexford	5		DEV	2022	2022
28	CP1041	Timahoe North 110 kV New Station and loop-in to Derryron – Maynooth 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Kildare	5		DEV	2022	2023
29	CP1051	Gallanstown 110 kV New Station and loop-in to Corduff – Platin 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Dublin	6		DEV	2021	2022
30	CP1052	Woodhouse 110 kV Station – New 110 kV transformer bay – Knocknamona Wind Farm Connection	Uprate/Modify	-		✓				✓			Waterford	5		DEV	2021	2022
31	CP1055	Harristown 110 kV New Station and loop-in to Kinnegad – Dunfirth Tee – Rinawade 110 kV circuit – Solar farm connection	New Build Connection	-		✓				✓			Meath	5		DEV	2022	2023
32	CP0799	Louth 220 kV Station Upgrade	Uprate/Modify	-	✓				✓			✓	Louth	5		TSO	2028	2028
33	CP1029	Kellystown 220 kV New Station and loop-in to Maynooth – Woodland 220 kV circuit – Demand customer connection	New Build Connection	-	✓					✓			Kildare	6		DEV	2021	2021
34	CP1049	Bracetown 220 kV New Station and tail to Clonee 220 kV station – Demand customer connection	New Build Connection	-	✓					✓			Meath	6		DEV	2021	2021

	CP No.	Project Title	Type	km	DRIVERS			NEEDS				Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties					
35	CP0693	Baroda 110 kV Station - Two new 110 kV DSO transformer bays	Uprate/Modify	-	✓					✓			Kildare	6		DSO	2021	2022
36	CP1068	Tullabeg 110 kV New Station and loop-in to Banoge – Crane 110 kV circuit - Solar farm connection	New Build Connection	-		✓				✓			Wexford	6		DEV	2021	2021
37	CP1083	Causestown 110 kV New Station and tail to Gorman 220 - 110 kV station – Battery connection, known as Gorman Energy Storage	New Build Connection	-	✓					✓			Meath	6		DEV	2021	2021
38	CP1064	Finglas 220 - 110 kV Station - Pantograph replacement	Refurbish/Replace	-	✓							✓	Dublin	6		TSO	2024	2024
39	CP1101	Mullagharlin 110 kV Station	New Build Connection	-	✓					✓			Louth	6		DSO	n/a	2022
40	CP1090	Oldbridge 110 kV Station AWP	New Build Connection	-	✓					✓			Meath	6		DEV	n/a	2022
41	CP1093	Barnageeragh 110 kV Station	New Build Connection	-	✓					✓			Dublin	6		DEV	n/a	2022
42	CP1087	Porterstown Battery Storage	Uprate/Modify	-	✓	✓				✓			Meath	6		DEV	n/a	2021
43	CP1088	Greenlink Interconnector	New Build Connection	-	✓	✓	✓	✓		✓	✓		Wexford	6		DEV	n/a	2024
44	CP1117	Irishtown FlexGen and BESS	Uprate/Modify	-	✓					✓			Dublin	6		DEV	n/a	2023
45	CP1115	Drybridge and Connected Stations 220 - 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓	Louth	6		TSO	n/a	2022
46	CP1108	Dunstown Station 400 - 220 kV Protection Upgrade	Refurbish/Replace	-	✓							✓	Kildare	6		TSO	n/a	2022

	CP No.	Project Title	Type	km	DRIVERS			NEEDS					Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties						
47	CP1105	Poolbeg BESS and FlexGen	Uprate/Modify	-	✓	✓				✓			Dublin	3		DEV	n/a	2022	
48	CP1110	Woodland Station 400 - 220 kV Protection Upgrade	Uprate/Modify	-	✓							✓	Meath	6		TSO	n/a	2022	
49	CP1103	Corduff FlexGen	Uprate/Modify	-	✓					✓			Dublin	3		DEV	n/a	2022	
50	CP1113	Barnageeragh Deep Reinforcements	New Build Capacity	-	✓				✓	✓			Dublin	4		TSO	n/a	2023	
51	CP0749	Oriel Offshore Windfarm	New Build Connection	-		✓				✓			Louth	4		DEV	n/a	2025	
52	CP1092	New 400 kV Strategic Spare Transformer	New Build Capacity	-	✓			✓	✓	✓			Kildare	3		TSO	n/a	2023	
53	CP1102	Grangecastle South	New Build Connection	-	✓					✓			Dublin	3		DEV	n/a	2022	
54	CP1109	Gorman and Connected Stations 220 - 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓	Meath	6		TSO	n/a	2023	
55	CP1114	Platin and Connected Stations 220 - 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓	Meath	5		TSO	n/a	2023	
56	CP1131	Gillinstown Solar	New Build Connection	-		✓				✓			Meath	1		DEV	n/a	2022	
57	CP1136	Gaskinstown Solar Farm	New Build Connection	-	✓					✓			Meath	4		DEV	n/a	2023	
58	CP1137	Carlow, Kellis 110 kV Protection Upgrade	Refurbish/Replace	-	✓							✓	Carlow	5		TSO	n/a	2023	

	CP No.	Project Title	Type	km	DRIVERS				NEEDS				Location		Step	ATR	LED	ECD - TDP 2020	ECD
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties						
59	CP1140	Athy, Carlow and connected stations 110 kV Protection Upgrade	Refurbish/ Replace	-	✓								Carlow	6		TSO	n/a	2022	
60	CP1141	Kellis Station 220 - 110 kV Protection Upgrade	Refurbish/ Replace	-	✓							✓	Carlow	5		TSO	n/a	2022	
61	CP1154	Belcamp Land Acquisition	Other	-	✓								Dublin	3		TSO	n/a	2021	
62	CP1159	Cullenagh and Connected stations Protection Upgrade	Refurbish/ Replace	-	✓							✓	Waterford	5		TSO	n/a	2025	

5.5 Projects at multiple locations

Previous to the data freeze date, there were five projects each with elements at multiple locations around the country. A new multiple location project has been added in this development plan. They are listed in Table 5-5 below.

Project

- Transformer Protection Upgrade (1096)

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 this stations are progressing through our six-step process for developing the grid and support the needs for power-transfer capacity in Co. Mayo.

Table 5-5 Planned projects at multiple locations

	CP No.	Project Title	Type	km	DRIVERS			NEEDS				Step	ATR	LED	ECD - TDP 2020	ECD	
					Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection						Asset Condition
1	CP0857	Paint Towers Nationwide	Refurbish/ Replace	-	✓							✓	6		TSO	2021	2021
2	CP1016	220 kV Composite Poles Type Testing	Other	-	✓								5		TSO	2020	2021
3	CP1017	400 kV Voltage Uprate Trial	Other	-	✓								5		TSO	2021	2021
4	CP1036	Transformer Protection Upgrades at six transmission stations	Refurbish/ Replace	-	✓					✓			6		TSO	2021	2021
5	CP1053	220 kV Cable Sealing End Replacement at three transmission stations	Refurbish/ Replace	-	✓							✓	6		TSO	2020	2021
6	CP1096	Transformer Protect Upgrade	Refurbish/ Replace	-	✓							✓	6		TSO	n/a	2023

6. Projects in early stages of development



6. Projects in early stages of development

6.1 Overview

In Chapter 5 we outline the committed projects as at the data freeze date, 01 January 2021. 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.

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, locations, steps and identifies if the projects are an Associated Transmission Reinforcement (ATR). Although it is not usual for drivers and needs to change since they are established in the first step, in certain circumstances they may change as projects progress through the early stages of the framework and therefore this information 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.

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	Step	ATR
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition		
1	CP0982	Flagford – Sligo 110 kV circuit thermal capacity	50.5	✓			✓				Sligo	2	✓
2	CP1023	Letterkenny 110 kV busbar thermal capacity	-		✓		✓				Donegal	3	✓
3	CP1079	Binbane – Cathaleen’s Fall 110 kV circuit thermal capacity	34.3		✓		✓				Donegal	3	✓
4	CP0898	Cashla – Dalton 110 kV circuit thermal capacity	60.8		✓		✓				Mayo, Galway	2	✓
5	CP0899	Castlebar – Dalton 110 kV circuit thermal capacity	57.5		✓		✓				Mayo	2	✓
6	CP0817	Flagford – Sliabh Bawn 110 kV circuit thermal capacity	21.7		✓		✓				Roscommon	3	✓
7	CP1078	Lanesboro – Sliabh Bawn 110 kV circuit thermal capacity	9.1		✓		✓				Roscommon	3	✓
8	CP1000	Lanesboro – Mullingar 110 kV circuit thermal capacity	46.3		✓		✓				Longford, Westmeath	3	✓
9	CP0907	Dalton 110 kV busbar thermal capacity	-		✓		✓				Mayo	3	✓
10	CP1144	Kinnegad 110 kV station, Derryron 110 kV conductor uprate	-		✓		✓				Meath	3	X

	CP No.	Project Title	km	DRIVERS			NEEDS					Location	Step	ATR	
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties			
11	CP1149	Cushaling – Newbridge 110 kV line, Station bay conductors and lead-in conductor uprate	-		✓			✓					Kildare, Offaly	3	X
12	CP1168	Cashla – Salthill 110 kV thermal uprate	24.9	✓	✓			✓					Galway	3	X
13	CP1155	Glenree – Moy 110 kV thermal capacity	14		✓			✓					Mayo	3	X

The driver for these projects is RES integration. The connection of renewable generation in the west and north-west drives higher flows on the 110 kV network which are in excess of the rating of the existing assets. Thus, there is a need for reinforcement due to a shortage of thermal capacity.

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	Step	ATR	
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties			
1	CP0917	Prospect – Tarbert 220 kV Cable Replacement	10.2	✓								✓	Clare, Limerick	3	X

The driver for this project is security of supply. The need to replace the existing cable is due to age and condition of the asset.

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	Step	ATR	
			Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition			County / Counties
CP0966	Kildare-Meath Grid Upgrade	Not defined	✓	✓		✓	✓				Kildare, Meath	3	X
CP1021	East Meath/North Dublin Network Reinforcement	Not defined	✓	✓		✓	✓				Dublin	2	X
CP1166	Gorman – Platin 110 kV line uprate	19.7	✓					✓			Meath	1	X
CP1167	Drybridge – Oldbridge – Platin 110 kV line uprate	5.3	✓					✓			Meath	1	X
CP1170	Capacity Needs between Newbridge & Portlaoise Stations	-	✓	✓				✓			Kildare, Laois	1	X
CP1172	Crane – Wexford 110 kV Thermal uprate	21.3		✓				✓			Wexford	1	X

The system needs in the region are dynamic due to potential changes in the connected generation portfolio combined with the connection of new large-scale demand customers. These projects represent EirGrid’s response to this evolving situation and are described in further detail below.

Focus on Kildare-Meath Grid Upgrade

The Kildare-Meath Grid Upgrade is a proposed development that will help transfer electricity to the east of the country and distribute it within the network in Meath, Kildare and Dublin.

The project will help meet the growing demand for electricity in the east. This growth is due to increased economic activity and the planned connection of new large-scale demand customers in the region.

A significant number of Ireland's electricity generators are located in the south and south west. This is where many wind farms and some modern, conventional generators are located. This power needs to be transported to where it is needed.

The power is mainly transported cross-country on the two existing 400 kV lines from the Moneypoint station in Clare to the Dunstown substation in Kildare and Woodland substation in Meath.

Transporting large amounts of electricity on these 400 kV lines could cause problems that would affect the security of electricity supply throughout Ireland, particularly if one of the lines is lost unexpectedly.

To solve this emerging issue, we need to strengthen the electricity network between Dunstown and Woodland.

At the data freeze date, the project was in Step 3 of our six-step process for developing the grid and engaging with stakeholders. Find out more about our six-step process and how you can influence our plans in our Have Your Say brochure.

In Step 1 of the process we identified and confirmed the need for Capital Project 966. In Step 2 we identified a shortlist of best-performing technical solutions. This short list was out for public consultation between November 2018 and February 2019. Three technologies and four solution options were subsequently taken forward to Step 3 in April 2019. These are as follows:

1. Upvoltage existing 220 kV circuits to 400 kV to create new Dunstown – Woodland 400 kV Overhead Line;
2. New Dunstown – Woodland 400 kV Overhead Line;
3. New Dunstown – Woodland 220 kV Underground cable; and
4. New Dunstown – Woodland 400 kV Underground Cable.

In Step 3 we have been conducting further detailed investigation and evaluation of the shortlisted solutions. As part of Step 3, in 2020 we sought feedback on the information that we had gathered for the solutions to include in our evaluations. All of the solutions were evaluated against five criteria, namely, technical, economic, deliverability, environmental and socio-economic. A multi-criteria matrix was used to compare the options against each other.

After the data freeze date, in Spring 2021, option 4 above has been identified as the best performing option and brought this project forward to Step 4. This decision was made reviewing and considering the outcomes of the assessment including the consultation feedback from a multi-criteria perspective, and considering new information received on deliverability of the options since October 2020.

This new 400 kV underground cable has a lower risk in terms of the delivery timeline when compared to Option 1 and has lower impact on other maintenance and capital works on the existing transmission system.

For the most up to date information on the project, as the project progresses, please visit the project webpages⁶⁴.

⁶⁴ <http://www.eirgridgroup.com/the-grid/projects/capital-project-966/the-project/>

Focus on CP1021 East Meath/North Dublin Network Reinforcement

The East Meath to North Dublin Network Reinforcement (also known as Capital Project 1021) is a proposed development that will help remove a constraint to the transfer electricity in the east of the country, in between the east of Meath and the north of Dublin.

The project will help meet the growing demand for electricity in the east of Meath and north of Dublin. This growth is due to increased economic activity and the planned connection of new large-scale demand customers in the region.

This project is also driven in part by the need to reduce reliance on fossil fuelled generation in Dublin as this will be displaced by renewable or more efficient fossil fuelled generation elsewhere in the country.

This means the power produced elsewhere in the country is transported to where it is needed around Clonee, Corduff, Finglas, and Belcamp on transmission circuits. The existing circuits in the area between the Woodland substation and Clonee, Corduff, Finglas, and Belcamp substations, are forecasted to reach capacity as the balance of power generation and demand in the area changes.

To solve this emerging issue, we need to strengthen the electricity network between Woodland in east Meath, and the Corduff, Finglas and Belcamp substations in north Dublin.

At the data freeze date, the project was in Step 2 of our six-step process for developing the grid and engaging with stakeholders. Find out more about our six-step process and how you can influence our plans in our Have Your Say brochure.

In Step 1 of the process we identified and confirmed the need for CP1021. In Step 2 we identified a list of best-performing technical solutions. As part of Step 2, in 2020 we sought feedback on this list. Two technologies and seven solution options are proposed in the list. These are as follows:

1. Corduff – Woodland New 400 kV Overhead Line (OHL) Circuit;
2. Corduff – Woodland New 400 kV Underground Cable (UGC) Circuit;
3. Corduff – Woodland New 220 kV OHL Circuit;
4. Finglas – Woodland New 220 kV OHL Circuit;
5. Finglas – Woodland New 400 kV UGC Circuit;
6. Finglas – Woodland New 400 kV OHL Circuit; and
7. Belcamp – Woodland New 400 kV OHL Circuit.

The seven solution options were further analysed and then assessed in more depth using a multi-criteria comparison against the five criteria, namely, technical, economic, environmental, deliverability and socio-economic.

As part of Step 3, we will be seeking feedback on the information that we have gathered for the solutions to include in our evaluations. All of the solutions are being investigated against five criteria mentioned above, technical, economic, deliverability, environmental and socio-economic.

For the most up to date information on the project, as the project progresses, please visit the project webpages⁶⁵.

6.4.1 Offshore wind farms

The Government's Climate Action Plan 2021 sets a target of at least 5 GW of offshore wind capacity in Ireland by 2030. There are a number of offshore windfarms in the connections pipeline; these are predominantly located in the Irish Sea. EirGrid's East Coast Generation Opportunity Assessment report⁶⁶ provides information on the capacity available for new offshore generation on the east coast. It also provides information on assumed network reinforcements for varying amounts of offshore wind capacity at locations along the east coast. The report notes that a number of ongoing grid projects that are currently progressing through our six-step process for developing the grid and engaging with stakeholders will, in addition to meeting other network needs, also help to accommodate offshore wind projects.

⁶⁵ <http://www.eirgridgroup.com/the-grid/projects/cp1021/the-project/>

⁶⁶ <http://www.eirgridgroup.com/site-files/library/EirGrid/East-Coast-Generation-Opportunity-Assessment.pdf>

These ongoing grid projects include: the North South Interconnector (CPo466), Kildare-Meath Grid Upgrade (CPo966), East Meath/North Dublin Network Reinforcement (CP1021), Lanesboro 110 kV station busbar uprate (CPo919), Lanesboro – Sliabh Bawn 110 kV circuit uprate (CP1078), Gorman – Platin 110 kV line uprate (CP1166) and Drybridge – Oldbridge – Platin 110 kV line uprate (CP1167).

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 70% 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 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.

As mentioned, new versions of the network studies as part of Shaping Our Electricity Future will take into account the new target up to 80% RES-E that was published after the studies were completed.

7. Summary of Environmental Appraisal Report



7. Summary of Environmental Appraisal Report

An Environmental Appraisal Report (EAR) has been prepared as an accompanying document to this TDP. The purpose of the EAR is to ensure the TDP 2021-2030 is in line with committed Strategic Environmental Objectives (SEOs). These objectives are set out in the Strategic Environmental Assessment (SEA) prepared for the Grid Implementation Programme (IP) 2017-2022 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.

As outlined earlier, this TDP describes 145 committed projects. Fifty-one projects were added in 2020. Of these, one project was on hold in TDP 2020 and it has been re-activated in this TDP. Three projects that were added in 2019 were completed in TDP 2020. The changes since TDP 2020 are detailed in Chapter 3.

The additional projects consist of new build projects, refurbishment/ replacement projects and uprate/ modification projects. These projects are examined in the EAR and evaluated against the SEOs. Following the implementation of mitigation measures (where necessary) the SEOs will be achieved.

Therefore, we consider TDP 2021-2030 to be in accordance with the provisions of the Strategic Environmental Obligations as set out in the Grid IP 2017-2022 and associated SEA Environmental Reporting.

The background is a dark, almost black, space filled with a dense field of vertical lines of varying heights. Each line is topped with a small, glowing dot. The colors of these lines and dots are primarily cool tones: light blue, cyan, and purple. In the lower half of the image, the lines curve and flow downwards, creating a sense of movement and depth. These curved lines are interspersed with warmer colors, including magenta, pink, and a soft red. The overall effect is that of a digital landscape or a data visualization, with the word 'Appendices' floating in the upper right quadrant.

Appendices

Appendix A: Irish projects in European Plans

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

Licensed TSOs, who are members of ENTSO-E, and third-party promoters, can propose transmission projects to ENTSO-E for inclusion in ENTSO-E's TYNDP. The technical and administrative criteria for inclusion in the TYNDP are published by ENTSO-E. TYNDP 2020 criteria are available here⁶⁷.

Last October, ENTSO-E has been 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 will perform a cost-benefit analysis of selected projects and will release the draft TYNDP 2022 for public consultation in Q3 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. The new information will be included in future versions of the TDPs.

Technical criteria for inclusion in TYNDP 2020

The technical criteria and required information for inclusion of transmission projects in TYNDP 2020 are summarised below.

The main equipment needs to be:

- a high-voltage overhead transmission line designed for a transmission voltage of 110 kV or more in the case of direct cross-border infrastructure; or
- a high-voltage overhead transmission line designed for a transmission voltage of 220 kV or more in the case of internal infrastructure; or
- a high voltage underground/submarine transmission cable designed for a voltage of 110 kV or more.

The main equipment needs to be at least partially located in one of the countries represented within ENTSO-E.

The initial estimation of the net transfer capacity increase (NTC) expressed in MW needs to be provided to ENTSO-E, where:

- for the cross-border infrastructure: no minimum limit is imposed; or
- for the internal infrastructure: no minimum limit is imposed. If the impact on the NTC is under 100 MW, projects must be planned to ensure security of supply or load growth or to allow new generation connection.

All the project characteristics necessary to model the project in the network tool used by ENTSO-E in the assessment process needs to be provided to ENTSO-E.

The following information also needs to be provided to ENTSO-E:

- Date of commissioning and status of each investment item of the project; and
- Capital and operational expenditure of each investment item of the project.

This is a summary of the technical criteria and required information for inclusion of transmission projects in TYNDP 2020. All criteria and required information for inclusion in TYNDP 2020 can be found in the ENTSO-E document provided in the link above.

⁶⁷ https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2020/FINAL/entso-e_TYNDP2020_IoS_N_Main-Report_2108.pdf

EirGrid projects in TYNDP 2020

Table A-1 below lists the projects we proposed that are in ENTSO-E’s most recent TYNDP, TYNDP 2020⁶⁸.

Projects which have a CP No. in the table below have achieved EirGrid capital approval. Projects which are labelled “n/a” are currently conceptual and are under investigation.

Table A-1 EirGrid projects in European TYNDP 2020

TYNDP No.	CP No.	Project Title
81	CPo466	North South 400 kV Interconnection Development
82	CPo800	Renewable Integration Development Project (RIDP)
107	n/a	Ireland - France Interconnector (Celtic Interconnector)

Third party projects in TYNDP 2020

Table A-2 below lists the Irish projects proposed by third parties that are in ENTSO-E’s TYNDP 2020.

Table A-2 Third party projects in European TYNDP 2020

TYNDP No.	Project Title
286	Greenlink
349	Marex Organic Power Interconnector
1025	Silvermines Hydroelectric Power Station
1030	Marex Organic Power Energy Storage

Irish Projects of Common Interest (PCIs)

The European Commission (EC) oversees the designation of Projects of Common Interest⁶⁹ (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 fourth PCI list and identifies the projects that were not considered in the fifth list. The fourth list was published by the European Commission in October 2019 and is available on their website⁷⁰. The fifth list has been published in November 2021⁷¹ and 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 enters into force and possibly qualify as PMIs

68 https://eepublicdownloads.blob.core.windows.net/public-cdn-container/tyndp-documents/TYNDP2020/FINAL/entso-e_TYNDP2020_Main_Report_2108.pdf

69 https://energy.ec.europa.eu/topics/infrastructure/projects-common-interest_en

70 https://ec.europa.eu/energy/sites/ener/files/c_2019_7772_1_annex.pdf

71 https://ec.europa.eu/energy/sites/default/files/fifth_pci_list_19_november_2021_annex.pdf

Table A-3 Irish Projects of Common Interest in TYNDP 2020

PCI No.	TYNDP No.	Project Title
2.13.1	81	North South 400 kV Interconnection Development ⁷²
2.13.2	82	Renewable Integration Development Project (RIDP) ⁷³
1.6	107	Ireland - France Interconnector (Celtic Interconnector)
1.9.1	286	Greenlink ⁷⁴
2.29	1025	Silvermines Hydroelectric Power Station

Irish e-Highway 2050 projects

The e-Highway2050 project⁷⁵ 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 projects included in the e-Highway 2050 Plan. These e-Highway projects are 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
2.13.1	81	North South 400 kV Interconnection Development
1.6	107	Ireland - France Interconnector (Celtic Interconnector)

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.

⁷² The project has been removed from the PCI list. Not eligible for 5th List PCI status

⁷³ The project has been removed from the PCI list. Not eligible for 5th List PCI status

⁷⁴ The project has been removed from the PCI list. Not eligible for 5th List PCI status

⁷⁵ <https://www.entsoe.eu/>

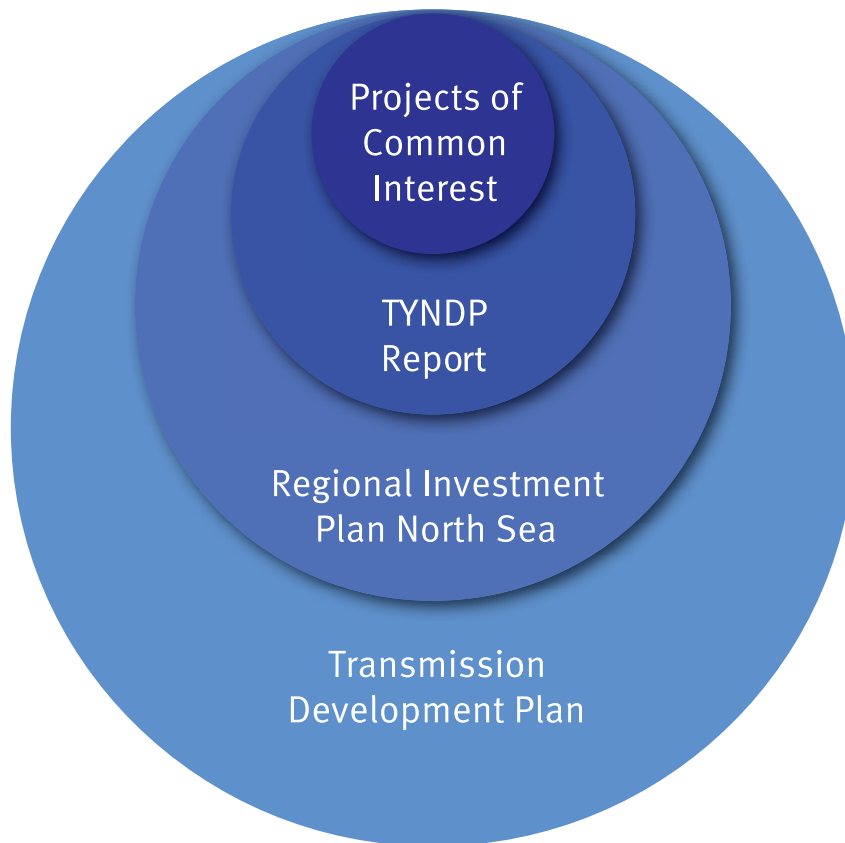


Figure A-1 Relationship between Irish and European Plans

Appendix B: Approach to grid development

B.1 Development objectives and strategies

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.

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^{76, 77} (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 and 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.

B.2 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 deterministic⁷⁸ – 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.

B.3 Public planning and environmental considerations

B.3.1 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. An Environmental Appraisal Report accompanies this TDP to ensure that it is

⁷⁶ <http://www.eirgridgroup.com/site-files/library/EirGrid/EirGrid-Transmission-System-Security-and-Planning-Standards-TSSPS-Final-May-2016.pdf>

⁷⁷ Previously referred to as the Transmission Planning Criteria.

⁷⁸ 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.

in accordance with the provisions of the Strategic Environmental Objectives detailed in the SEA for the Grid Implementation Plan 2017-2022. A summary of the results of this appraisal is presented in Section 7 of this report.

B.3.2 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 uprate, whereby the capacity or rating of electrical equipment is increased, refurbishment and maintenance works.

We currently 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 Communities⁷⁹ 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).

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.

B.3.3 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 Report (ER) or 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.

⁷⁹ Birds and Natural Habitats

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 EIS 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).

B.3.4 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. EirGrid has recently approved the 2017-2022 Grid IP and SEA statement. This Grid IP updates the environmental objectives set out in the previous Grid 25 IP 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 [here](#)⁸⁰.

B.4 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.

B.4.1 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 Scenarios⁸¹, 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.

⁸⁰ <http://www.eirgridgroup.com/about/in-the-community/environment/>

⁸¹ <http://www.eirgridgroup.com/customer-and-industry/energy-future/>

B.4.2 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.

B.4.3 Step 3: 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.

B.4.4 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.

B.4.5 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.

B.4.6 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 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

- I. EirGrid's Strategy 2020-2025, September 2019
- II. Shaping our electricity future, November 2021
- III. Transmission Development Plan (TDP) 2020-2029, October 2021
- IV. Transmission System Security and Planning Standards (TSSPS), May 2016
- V. Ireland's Grid Development Strategy – Your Grid, Your Tomorrow, January 2017
- VI. All-Island Ten Year Transmission Forecast Statement (TYTFS) 2020-2029, October 2021
- VII. All-Island Generation Capacity Statement (GCS) 2021-2030, August 2020
- VIII. Grid Implementation Plan 2017-2022, April 2019
- IX. Grid Implementation Plan 2017-2022 - Strategic Environmental Assessment Statement, April 2019

ENTSO-E published documents

- X. Ten Year Network Development Plan (TYNDP) 2018, November 2018
- XI. Regional Investment Plan North Sea 2017, January 2018

National Legislation

- XII. Electricity Regulation Act, 1999
- XIII. Planning and Development Act, 2000 (as amended)
- XIV. Strategic Infrastructure Act, 2006
- XV. Statutory Instrument No. 445 of 2000, European Communities (Internal Market in Electricity) Regulations
- XVI. Statutory Instrument No. 60 of 2005, European Communities (Internal Market in Electricity) Regulations
- XVII. Statutory Instrument No. 147 of 2011, European Communities (Renewable Energy) Regulations

European Legislation

- XVIII. Birds and Natural Habitats Regulations, 2011
- XIX. Cross-border Exchanges in Electricity Regulation (EC) No 714/ 2009
- XX. Environmental Impact Assessment Directive
- XXI. Habitats Directive
- XXII. Internal Market for Electricity Directive 2009/ 72/ EC
- XXIII. Internal Market for Electricity Directive 2019/ 944/ EC
- XXIV. Promotion of the Use of Energy from Renewable Resources Directive 2009/ 28/ EC
- XXV. Energy Efficiency Directive 2012/ 27/ EC

CRU published documents

- XXVI. TSO Licence granted to EirGrid
- XXVII. CER/ 15/ 296; Decision on TSO and TAO Transmission Revenue for 2016 to 2020, December 2015

Government published documents

- XXVIII. Climate Action Plan 2021, November 2021
- XXIX. Climate Action Plan 2019, June 2019
- XXX. Project Ireland 2040, February 2018
- XXXI. Energy White Paper, 2015
- XXXII. Government Policy Statement on the Strategic Importance of Transmission and Other Energy Infrastructure, July 2012



The Oval, 160 Shelbourne Road, Ballsbridge, Dublin D04 FW28 • Telephone: 01 677 1700 • www.eirgrid.ie



Printed on recycled paper