Grid Implementation Plan 2017-2022 For the Electricity Transmission System in Ireland

EIRGRID

The current. The future.

Foreword

EirGrid, as transmission system operator for Ireland, is delighted to publish our second Grid Implementation Plan. This plan sets out the manner in which the Irish transmission system is likely to be developed over the coming years. The plan focuses on our approach to project development and technology, the environment, consultation and engagement, human beings and society.

The Implementation Plan has been subject to Strategic Environmental Assessment and Appropriate Assessment to ensure a sustainable approach to grid development with due regard for the natural, human and built environment.

EirGrid operates and develops the national high voltage electricity grid in Ireland. Our task is to deliver a safe, secure and reliable supply of electricity – now, and in the future.

We undertake Strategic Environmental Assessments (SEA) of our Grid Implementation Plans every 5 years. This is to ensure that our approach to developing the Grid is sustainable and in line with best environmental practice. This is EirGrids second Grid implementation plan (IP) and covers the period 2017-2022. It is based on available information at the time of drafting the IP and SEA in 2017. We will continue to review our plans on a regular basis.

The IP was adopted by EirGrid in December 2018, following public consultation and brings together a range of factors that influence how we plan for and implement grid development. These include;

- Irelands Grid Development Strategy
- Policies and objectives that we follow to ensure sustainable Grid Development
- Project options from annual Transmission Development Plans (2016/2017)
- Mitigation and monitoring developed through the SEA process

The accompanying SEA Statement describes how environmental considerations and the views of stakeholders including the public have been taken into account in shaping the IP.
We are most grateful for the support of a dedicated external advisory group guided by the Environmental Protection Agency in developing the IP, and the EirGrid cross functional working group.

We remain fully committed to ensuring that our developments are carried out in an environmentally sensitive manner, promoting the principles of sustainable development while considering the needs of local communities and stakeholders.

Liam Ryan, Interim Director, Grid Development and Interconnection

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1.0 Introduction to this Implementation Plan

1.1 Functions of EirGrid and SONI – Transmission System Operators

EirGrid plc ("EirGrid") is the licensed electricity Transmission System Operator (TSO) in Ireland. By reference to Regulation 8(1)(a) of the European Communities (Internal Market in Energy) Regulations 2000 (SI 445/2000), EirGrid has the exclusive statutory functions:

> *"To operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, in all cases with a view to ensuring that all reasonable demands for electricity are met and having due regard for the environment".*

EirGrid develops, manages and operates the electricity transmission network (also called "the grid"), bringing power from where it is generated to where it is needed throughout Ireland (see Figure 1.1). The transmission network on the island of Ireland refers to the higher-capacity grid (also known as the Extra-High Voltage or EHV network). The grid is used to supply power directly to industry and businesses which use large amounts of electricity. It also powers the lower-voltage electricity distribution network, which supplies the electricity used in homes, businesses, schools, hospitals, and farms among others.

The transmission network in Ireland comprises substations and circuits at 400 kV (i.e. 400,000 Volts), 220 kV, and 110 kV (Figure 1.2). While operated by EirGrid, the network is owned by the Transmission Asset Owner (TAO), ESB Networks. EirGrid and ESB Networks have clearly defined functions in relation to the transmission network set out in an Infrastructure Agreement.

In Northern Ireland, the transmission network operates primarily at 275 kV and at 110 kV. An existing interconnector linking the Irish and Northern Irish systems extends between Tandragee and Louth substations and operates at 275 kV – this is the only part of the Irish system that operates at a voltage other than 400 kV, 220 kV or 110 kV. Other cross-border circuits exist on the western borders of Northern Ireland. These circuits operate at 110 kV.

The electricity transmission system in Northern Ireland is operated by SONI – System Operator for Northern Ireland, with the assets owned by Northern Ireland Electricity Networks (NIEN). The functions of SONI and NIE Networks are set out in a Transmission Infrastructure Agreement.

EirGrid and SONI are part of the EirGrid group of companies which also includes SEMO, the Single Electricity Market Operator which has responsibility for the operational arrangements of the all-island transmission system. SEMO is a joint venture between EirGrid PLC and SONI Limited.

Both EirGrid and SONI are regulated organisations. EirGrid is regulated by the Irish Commission for Regulation of Utilities (CRU - formally known as the Commission for Energy Regulation CER). SONI is regulated by the Utility Regulator Northern Ireland (URegNI).

At a European level, the energy market is evolving. The EU aims to fully integrate national energy markets in order to provide benefit for consumers and businesses, to increase competition, and to ensure security of supply. EirGrid as a member of the European Network of Transmission System Operators – ENTSO-E is contributing in the effort to achieve this aim.

The transmission system must meet certain standards, identified in Transmission System Security and Planning Standards[1] (TSSPS). This sets out what the grid needs to be able to do. Where the system is not capable of meeting those standards, reinforcement is often necessary.

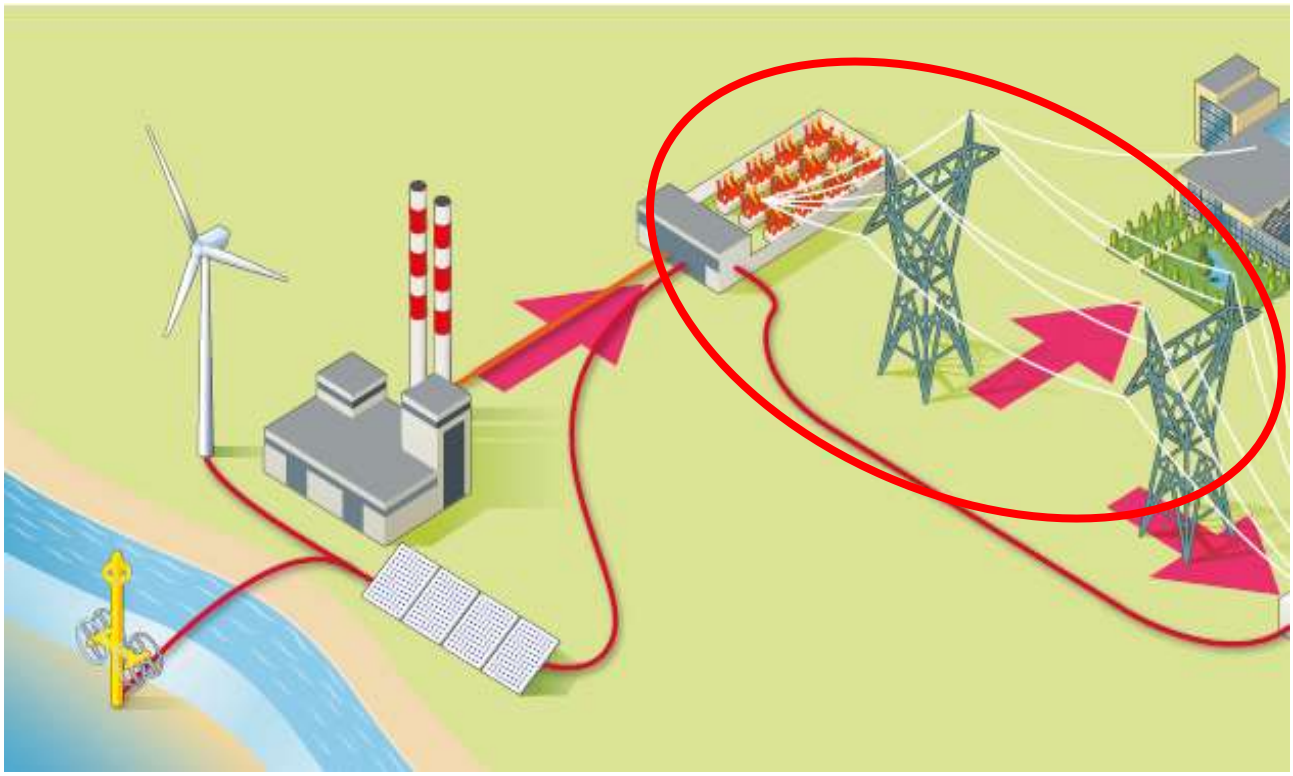


Figure 1.1: A Graphic of the Electricity Transmission Network (ringed in red)

[1] Formerly the Transmission Planning Criteria (TPC).

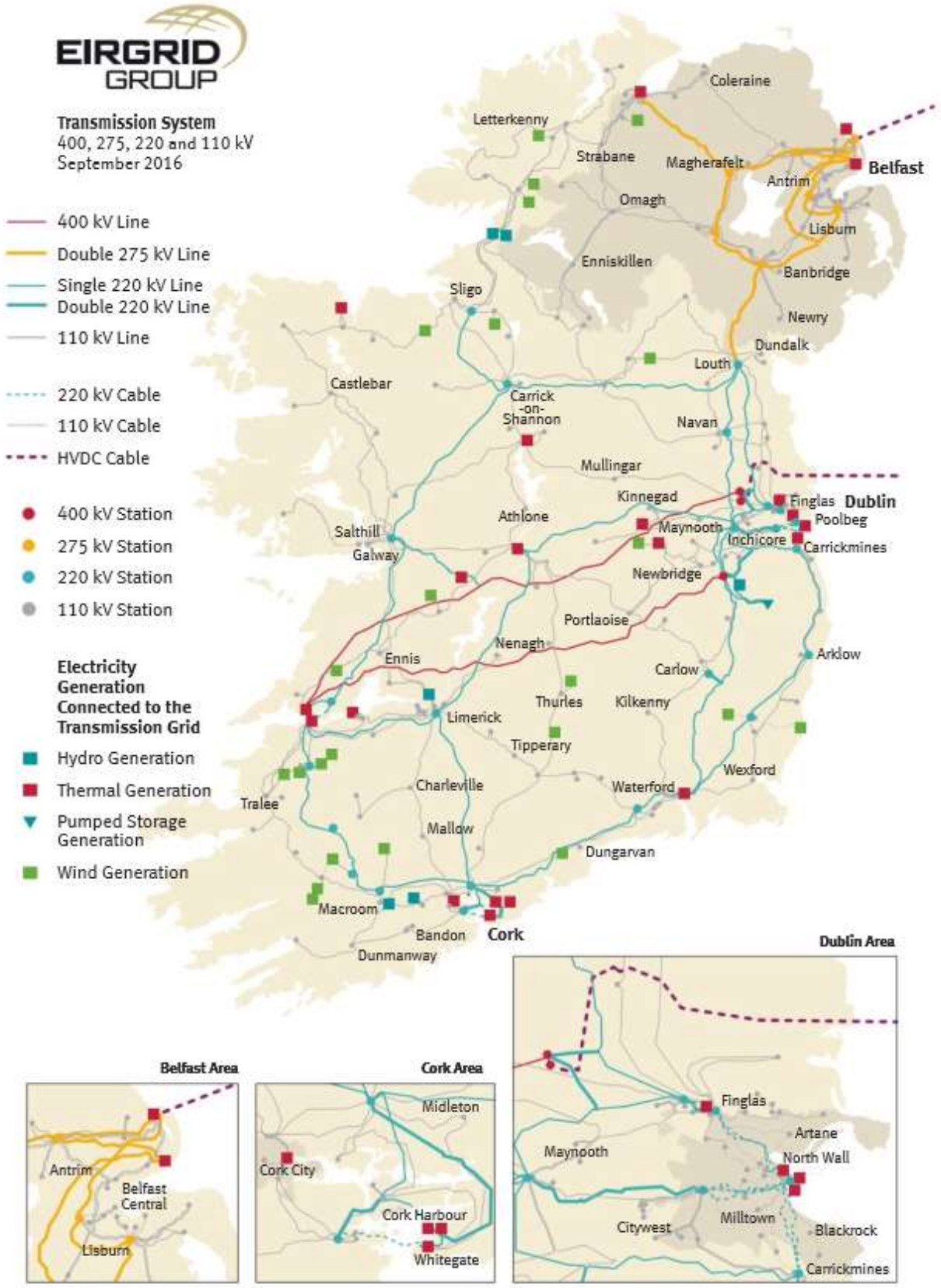


Figure 1.2: The All-Island Electricity Transmission Network

1.2 EirGrid's Grid Development Strategy and this Implementation Plan

As addressed in more detail in Chapter 2 of this Implementation Plan (IP), EirGrid published *Ireland's Grid Development Strategy – Your Grid, Your Tomorrow* in 2017. This *Strategy*, which replaced the *Grid 25*, Strategy (2008), was published following review and analysis of the feedback submitted as part of public consultation on EirGrid's draft grid development strategy (*Your Grid, Your Views, Your Tomorrow*). The *Strategy* reflects EirGrid's focus on facilitating greater public participation in decision-making during project development. It also reflects an updated economic context, and the testing and/or availability of new technologies which can and will increasingly be available for use on the transmission grid.

The *Strategy* takes account of the Government Energy White Paper, published in December 2015, the Government Action Plan for Jobs, and the IDA 2015-2019 Strategy which includes ambitious regional targets. These are outlined in Section 1.4 of this IP.

This IP is an overview of how the early stages of *Ireland's Grid Development Strategy* will be implemented. It identifies those parts of the transmission system that are likely to need development over the five year period (2017 - 2022), primarily as highlighted in *Ireland's Grid Development Strategy* – in particular in its Technical Appendix. The IP also sets out EirGrid's approach to the planning and development of the grid that will be undertaken in implementing the *Strategy*.

This IP has also had regard to the 2016 Transmission Development Plan (TDP). The TDP is a plan for the development of the Irish transmission network and interconnection over a ten year period, which EirGrid publishes annually in accordance with the terms of its licence[2]. The TDP presents specific projects that are identified as necessary for the operation of the transmission network and discusses future needs for the transmission network that may drive future potential projects. As part of the preparation of the TDP, EirGrid consults with SONI. In addition, the Commission for Regulation of Utilities (CRU) leads a public consultation on the draft TDP. Following the public consultation EirGrid updates the TDP prior to submitting it to the CRU for approval (accompanied by a report which sets out the feedback received). Details of the 2016 TDP (being the most recently adopted TDP) are set out at Part C of this IP.

This IP updates EirGrid's *Grid25 Implementation Programme 2011-2016*, published in April 2012. That IP was subject to full Strategic Environmental Assessment (SEA)[3] including Appropriate Assessment (AA). This IP is also subject to SEA and AA, and should be read with reference to the separate documents of the SEA process; Environmental Report and Natura Impact Statement.

[2] This is required by Regulation 8(6) of the European Communities (Internal Market in Electricity) Regulations 2000 (S.I. 445 of 2000) and submitted for approval to the Commission for Regulation of Utilities (CRU).

[3] "In accordance with EU Directive (2001/42/EC) Strategic Environmental Assessment (SEA) is a legal requirement for certain plans and programmes. An SEA of the IP is required to: *Provide for a high level of protection to the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans and programmes with a view to promoting sustainable development…."* (SEA Directive, Article 1)

Each annual TDP includes a formal Environmental Appraisal Report (EAR), which considers whether the TDP – deriving from the governing *Ireland's Grid Development Strategy* – is in accordance with the SEA of the Implementation Plan. In short, the TDP is subject to appraisal to ensure its conformance with the provisions of the adopted SEA.

Ireland's Grid Development Strategy, the IP, and the TDP each provide a different level of scale and detail - from the long term vision statements contained in the *Strategy*, to the objectives and policies to implement the *Strategy* set out in the IP, to the specific projects outlined in the TDP. This is set out graphically at Figure 1.3 below.

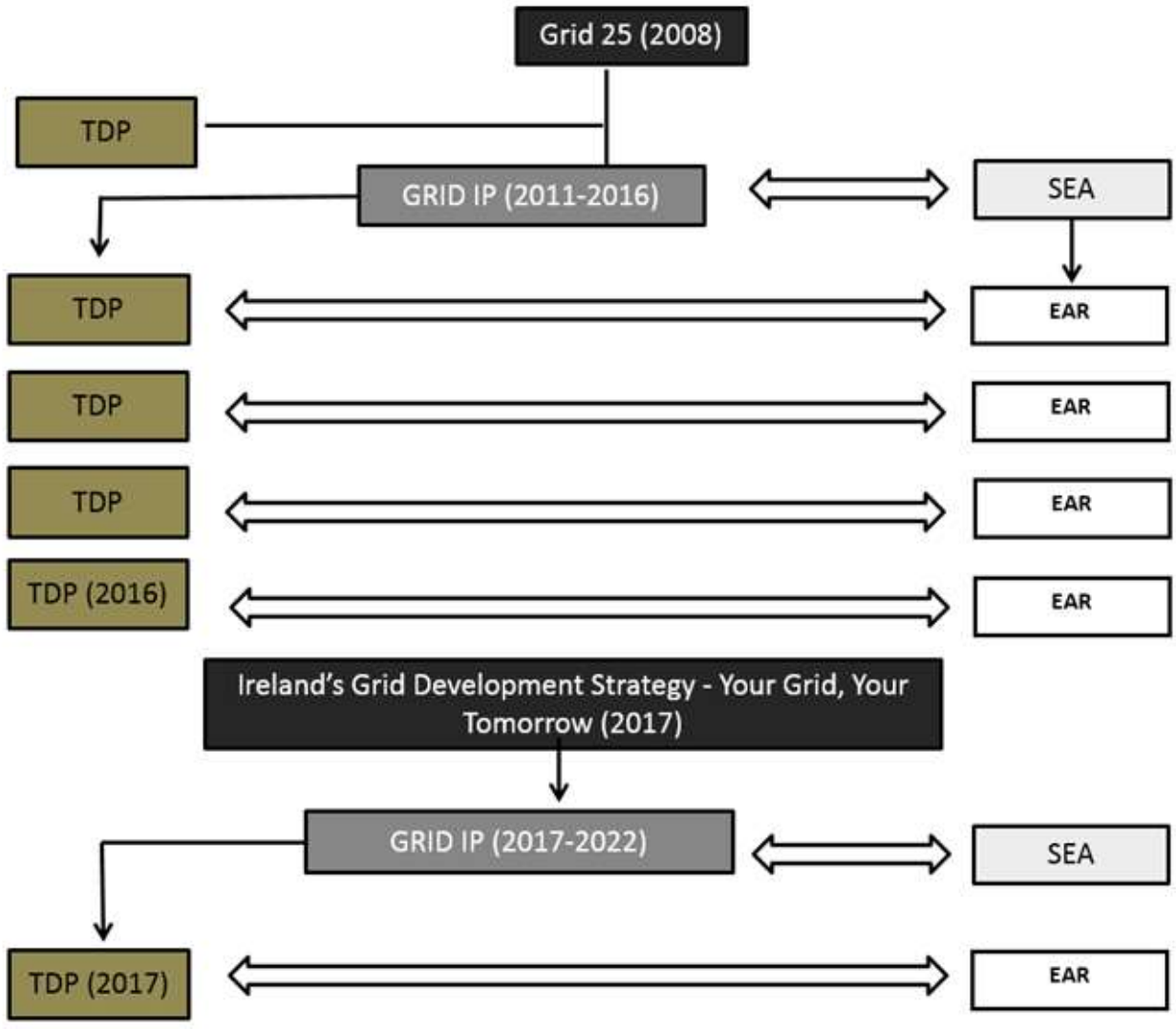


Figure 1.3: Relationship of the Grid Development Strategy with the 2017 Implementation Plan (subject to SEA), and subsequent Transmission Development Plans which are subject to an Environmental Appraisal Report

1.3 The Need for a Safe, Secure and Reliable Grid

A detailed outline *of Ireland's Grid Development Strategy* is provided in Chapter 2 of this IP. As a summary context, the *Strategy* addresses matters such as why EirGrid develops the electricity transmission network, the Government policy context that underpins this, and the importance of an efficient and economical grid network (Chapters 1-3 of the *Strategy*).

The *Strategy* states that:

> "*the way power moves around the grid changes and evolves over time. When these changes become significant, adjustments may be needed to the grid"* (p.7).

Reasons for grid development may stem from significant growth in demand, when new electricity generators are connected, or when existing generators close. There is an ongoing need to ensure fit-for-purpose grid infrastructure. This may involve the refurbishment, upgrading or replacement of existing infrastructure.

The *Strategy* notes that demand for electricity has changed significantly in recent years.. This is due to a number of reasons, including more efficient energy use, economic decline and subsequent growth between 2008 and 2013, demand from new high energy customers such as data centres, a general forecasted national population increase, and a focus on regional development.

The *Strategy* records that:

> *"The demand for electricity is now expected to grow on average by 2.0% every year until 2025"* (Technical report P.6).

The *Strategy* also notes the Government target which requires 40% of electricity demand to be met by renewable energy by 2020. It refers to EirGrid's All Island *Generation Capacity Statement 2016-2025* and concludes that:

> *"there will be between 3,800 and 4,100 MW* (megawatt) *of wind capacity needed to achieve the 40% target. To allow for this and to meet the 2020 target, we must add transmission capacity to the grid"* (p.10).

EirGrid is obliged to offer connections to new generators in line with CRU directions and approved processes.

Finally, the *Strategy* also references the trans-boundary context for transmission infrastructure, both in Northern Ireland and in Europe. This includes the need for further interconnection with Northern Ireland, and the promotion of further interconnection with other European countries, which is promoted in the 2015 Government White Paper. In this latter regard, the *Strategy* notes that the European Commission is considering 2030 targets for interconnection, guided by the need for all member states to reach at least 15% interconnection by 2030.

All these elements combine to reflect the statutory requirements of EirGrid as TSO to "*operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, in all cases with a view to ensuring that all reasonable demands for electricity are met and having due regard for the environment"*, as referenced in Section 1.1 above.

1.4 Strategic Policy and Planning Context

1.4.1 Energy and Electricity

Ireland's Grid Development Strategy, and this IP, are set into the strategic policy context of the Government Energy White Paper which was published in December 2015. This confirms the Government's approach to change to a low-carbon energy future. This change must also support the core policy goals of sustainability, security of supply and competitiveness. The White Paper restates Ireland's commitment to achieving 2020 targets, as also discussed in Section 1.3 above. It also outlines a vision and framework to guide Irish energy policy up to 2030, and sets goals of low and zero carbon energy systems by 2050 and 2100 respectively.

In respect of electricity transmission, the White Paper acknowledges that developing, maintaining, and upgrading the grid is essential to meeting these short, medium and longer-term objectives. It also recognises the need – and efforts made by EirGrid – to build trust with communities and other stakeholders, and in general to promote public participation and innovative "smart" activities in our shared energy future.

The White Paper has considerable regard to wider emerging EU policies which promote smart low-carbon economies centred on energy efficiency. These policies also acknowledge the role of sustainable development of the transmission grid to assist in delivering this.

Ireland's Grid Development Strategy acknowledges the clear linkage between energy policy and policies in respect of economics and employment. It notes that:-

> *"The economic benefits of developing grid infrastructure are spread throughout the economy. A modern grid can help reduce energy costs and provide a secure basis for businesses to invest and expand. As Ireland returns to economic growth, it is important to renew and expand the*

electricity transmission system. This will support job creation, economic development and regional competitiveness" (p.14).

The *Strategy* concludes that investing in a secure transmission grid will open up large areas of the country for investment, and will assist in facilitating further attraction of the high-tech power-dependent sector. In this regard, the *Strategy* is aligned with the IDA Regional Development Strategy, and the various Government Action Plan for Jobs, including the latest (2016) Action Plan.

The *Strategy* reflects strategic national and EU policy, which provides for encouragement, through interconnection and reinforcement of transmission networks, of the effective operation of the internal market; reinforcement of the security of energy supply; and contribution to sustainable development through improved connection of renewable energy sources.

1.4.2 Planning and Environment

The National Planning Framework (NPF), which forms part of Project Ireland 2040 has placed particular emphasis on energy under the theme of connectivity to shape the future growth and development of our country out to the year 2040. The NPF provides for the collaboration in the energy sector, driven by the single electricity market. The need for a new interconnector between the electricity grids of Northern Ireland and Ireland has been identified by the Irish Government and Northern Ireland Executive as a project of common interest. Ireland is also working with other countries such as France to explore potential for electricity interconnection and will continue to support relationships with our European neighbours to enhance our international connectivity.

In order to support the National Planning Framework, additional electrical grid strengthening will be required for parts of the border subject to the necessary planning consents to enhance energy security through further reductions in dependence on fossil fuels, moving towards wind, gas with carbon capture and sequestration, biomass and other renewable sources. Future enhancement of energy security and resilience to support a population of 8 million people will also be supported through progression of further north-south interconnection of electricity grids.

The NPF also identified the potential of the marine, particularly in the renewable energy sector. The development of offshore renewable energy is critically dependent on the development of enabling infrastructure, including grid facilities to bring the energy ashore and connect to major sources of energy demand. Given the potential for renewable generation off the western part of the country, this may necessitate reinforcing the existing transmission network in the west to facilitate the transfer of renewable energy generated to the major demand centres in the east.

These aims are supported by National Policy Objectives, namely

> ***National Policy Objective 42****: To support, within the context of the Offshore Renewable Energy Development Plan (OREDP) and its successors, the progressive development of Ireland's offshore renewable energy potential, including domestic and international grid connectivity enhancements.*
>
> ***National Policy Objective 47****: In co-operation with relevant Departments in Northern Ireland, strengthen all-island energy infrastructure and interconnection capacity, including distribution and transmission networks to enhance security of electricity supply.*

Furthermore, the NPF has set out the Transition to a Low Carbon and Climate Resilient Society as a National Strategic Outcome No. 8 and a priority of the National Development Plan 2018-2027. Within this it notes that the National Climate Policy Position establishes the national objective of achieving transition to a competitive, low carbon, climate-resilient and environmentally sustainable economy by 2050. This objective will shape investment choices over the coming decades in line with the National Mitigation Plan and the National Adaptation Framework. New energy systems and transmission grids will be necessary for a more distributed, renewables-focused energy generation system, harnessing both the considerable on-shore and off-shore potential from energy sources such as wind, wave and solar and connecting the richest sources of that energy to the major sources of demand.

1.4.3 Public Participation and Engagement

The United Nations Economic Commission for Europe (UNECE) *Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters*, commonly referred to as the 'Aarhus Convention', was signed in Aarhus, Denmark in June 1998 and came into force in October 2001. Ireland ratified the Convention in June 2012.

The Aarhus Convention sets down basic rules to promote the involvement of the public in environmental matters and to improve the enforcement of environmental law. The provisions of the Aarhus Convention are divided into three pillars as follows:

- **Access to Information**: the right of the public to request environmental information that is held by public bodies; these bodies are obliged to maintain this information;
- **Public Participation in Environmental Decision-Making**: the right of the public to participate in decision-making in environmental matters and for public authorities to enable the public to comment on proposals which affect the environment.
- **Access to Justice**: the right of the public to review procedures to challenge decisions relating to the environment, made by public bodies or private persons that have been made without regard to the other two pillars of the Convention.

The UNECE document, *The Aarhus Convention: An Implementation Guide* (2013) represents best practice in respect of how to consult with members of the public on major projects. Public participation and engagement is now at the heart of EirGrid's decision making when it comes to developing the grid (see also Chapters 7 & 9 of this IP). Chapter 5 of *Ireland's Grid Development Strategy* details the topic of *"Public Engagement"*, and discusses the evolution, and building blocks, of EirGrid's approach to public engagement. The strategy states in this regard that:

> *"In line with the Aarhus Convention, we encourage the public to take part early on in our decision-making. We have ensured, and will continue to ensure, that we integrate the principles of the Aarhus Convention into our processes. This will be done through public consultation and gathering of feedback throughout the grid development process"* (p.22).

This approach is consistent with the provisions of the Energy White Paper which acknowledges the need to build public acceptance when designing and implementing future energy policy.

1.5 Conclusion

This Implementation Plan (IP), and EirGrid's approach to, and undertaking of, transmission infrastructure development are governed by the prevailing strategic policy context in which it occurs. While this section discusses key strategic policy areas influencing key areas such as energy and electricity, planning and environment, and public engagement and participation, it will be the case that all projects identified in this IP, and in the various annual Transmission Development Plans (TDPs), will also occur within the prevailing National, Regional, and Local planning, environmental and other policy contexts, as well as in accordance with governing legislation and best practice guidance.

EirGrid does, and will continue to, provide expert input and influence into policy development in order to ensure the sustainable provision of grid infrastructure, as a balance of technical, environmental, social, economic and deliverability criteria. This is a practical expression of our statutory obligation:

> *"To operate and ensure the maintenance of and, if necessary, develop a safe, secure, reliable, economical and efficient electricity transmission system, and to explore and develop opportunities for interconnection of its system with other systems, in all cases with a view to ensuring that all reasonable demands for electricity are met and having due regard for the environment".*

2.0 The Strategy for Grid Development

2.1 Overview

Ireland's Grid Development Strategy was published in January 2017. This *Strategy* was published following review and analysis of the feedback submitted as part of a public consultation on EirGrid's draft grid development strategy entitled *Your Grid, Your Views, Your Tomorrow*.

The updated *Strategy* is an informed view of our energy needs in the coming years. It notes that:

> "*A strong electricity transmission infrastructure has two long-term benefits for the overall economy:*
> - *It provides power capacity to support new investment and jobs; and*
> - *It ensures competitiveness by having cost-effective power capacity.*
>
> *Our updated strategy provides enough capacity to meet demand forecasts in all regions"* (p.6).

2.2 Technology

Chapter 4 of the *Strategy* is entitled *Planning for the Future*, and addresses new and emerging technologies for grid development. It notes that technology and innovation are at the core of the *Strategy*, and that EirGrid continually reviews technological developments to assess their potential. The *Strategy* identifies the key advantages of new transmission technologies, but notes that such potential advantages must always be balanced against the need to ensure a reliable and secure electricity supply.

The *Strategy* discusses three categories of new technologies:

- Technologies at the research and development stage;
- Those at trial use stage; and
- Those that are ready to use now.

These are all summarised in Chapter 4 of the *Strategy*, and addressed in greater detail in the Technical Appendix of the strategy.

The *Strategy* also discusses EirGrid's approach to *Tomorrow's Energy Scenarios* (p.20) – the process by which EirGrid considers the range of possible ways that the grid may be used in the future. This planning allows EirGrid to efficiently develop the grid taking account of the uncertainties associated with how electricity will be generated and consumed in the future. The *Strategy* states in this regard that:-

> *"To cater for this, we are changing how we plan the grid. Our new approach involves developing a range of energy scenarios (possible situations or events that impact on energy). We will test whether the grid of today can support these scenarios or if further development of the grid is required….We will use these scenarios throughout our planning analysis to assess the future needs of the electricity system. We will also use them to test the practicality and merits of network reinforcement options, and propose solutions for any problems we uncover"* (p.20).

Development of these scenarios is informed by stakeholder opinions of what the future looks like and how they see things changing over time. The scenarios will be reviewed every two years, in order to factor in any new information available regarding trends and changes in the electricity industry and other relevant factors. This will ensure an overall sustainable, secure, robust and reliable transmission network can be developed now for the future.

At the time of preparation of this draft Implementation Plan (April 2018), EirGrid has published *Tomorrow's Energy Scenarios*. These are set out on www.eirgridgroup.com. Four draft scenarios are identified for the purposes of public consultation, deriving from EirGrid's own experience, and also following input from government departments and agencies, energy research groups and industry representatives. These are:-

- **Steady Evolution**: Renewable electricity generation maintains a steady pace of growth. This is due to steady improvements in the economy, and in the technologies which generate electricity;
- **Low Carbon Living:** The economy enjoys high economic growth. This encourages the creation and rollout of new technologies for low carbon electricity generation;
- **Slow Change:** The economy experiences very slow growth. Investment in new renewable generation is only in established, low risk technologies;
- **Consumer Action:** A strong economy leads to high levels of consumer spending ability. Electricity consumers enthusiastically limit their energy use and generate their own energy.

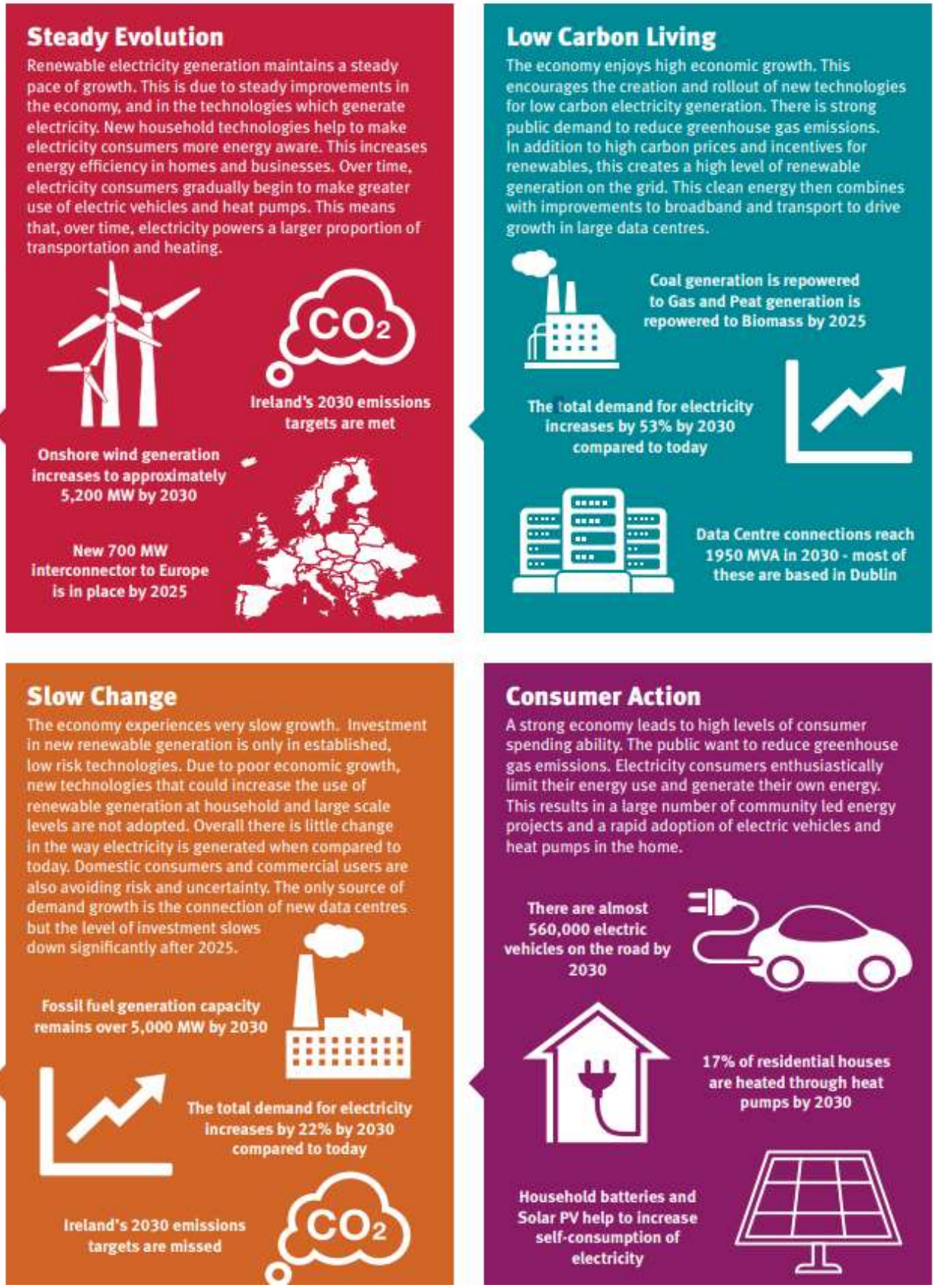


Figure 2.1: The four draft scenarios for public consultation on *Tomorrow's Energy Scenarios*

2.3 A Balanced Approach to Grid Development

In addition to the technical issues concerning grid development, but also of crucial importance, the *Strategy* acknowledges the need to achieve a balance between social, environmental and economic factors. It notes that an essential part of grid development is to understand how developing the transmission system might affect the environment, and that "*consideration of the environment is central to how we work"* (p.22).

Similarly, in respect of people and communities, Chapter 5 of the *Strategy* addresses *Public Engagement* and states that *"When we plan routes for new lines, we consider many factors. These include the need to protect the interests of individuals, households, businesses and communities. We aim to create as little disturbance as possible, but it's difficult to avoid private, business or community property"* (p.22). A response to this is in the provision of a Community Fund for new overhead lines and substations, and the introduction of Proximity Payments. Proximity Payments are made where a home is located within 200m or less of certain infrastructure that is newly built on a greenfield site. Specifically, payments are made for new overhead transmission lines and new rural transmission stations. These payments are not made in built up areas, nor where existing lines are uprated or refurbished.

Three main factors have influenced *Ireland's Grid Development Strategy*. These are:

- Feedback from our consultation process on major projects;
- Advances in technology; and
- Changes in the external economic environment.

On the basis of the need for a balanced and sustainable approach to grid development, the *Strategy* is underpinned by three strategy statements as follows (p.25):-

Figure 2.2: Strategy Statements of EirGrid's (2017) *Grid Development Strategy - Your Grid, Your Tomorrow*

The *Strategy* has been developed in light of these three strategy statements, as well as in reference to the updated drivers and available technologies set out in the accompanying Technical Report to the *Strategy*.

The original estimated cost of the delivery of *Grid25* in 2008 was €4bn. This estimate was scaled back in 2011 to €3.2bn, on account of falling expectations of future demand during this recessionary period, and through the use of new technologies.

The overall estimated costs in respect of the current *Strategy* have now been further revised downwards, to fall within the range of €2.6 to €2.9 bn. This also includes the cost for the southern element of the North South Interconnector, which was not included in the estimates for delivery of *Grid25*.

The potential reduction can be explained by a number of factors, including:

- The cost of circuit uprates is lower than anticipated in 2008. At the time of the launch of *Grid25*, it was standard practice to achieve higher ratings on overhead lines by using heavier conductors. This often requires a complete re-build of the line. Since that time, a lighter HTLS conductor has been developed, and is used for uprating lines wherever feasible. This conductor provides an increase in capacity of about 60%, without excessive increases in conductor weight. This negates the requirement to change the support structures (polesets or steel towers), thus significantly reducing the cost of uprates.
- A reduction in the scope, or in some cases a deferral, of a number of projects due to the lower forecast demand from that which informed *Grid25* in 2008.
- One of the key strategies set out above is to optimise the use of the transmission network to minimise the need for new infrastructure. The goal will be to avoid constructing new lines or cables where possible. This can be achieved by increasing the capacity of existing infrastructure or by using new technologies.

Figure 2.3 below, reproduced from Figure 4.1 of the Technical Report of the *Strategy*, compares the quantity of transmission circuits proposed in the *Grid25* Strategy with what is proposed in this updated *Strategy*. The Technical Report states in this regard as follows:-

> *"The impact of the successful implementation of new technologies can be seen as the proportion of circuits to be uprated or modified, as opposed to building new lines, has increased from 66% to 86%. Simultaneously the amount of new infrastructure has dramatically reduced due to the greater use of network optimisation. This equates to around a 73% reduction in the total length of new build. The high level of circuit uprating will be maintained, considerably reducing the need for new infrastructure".*

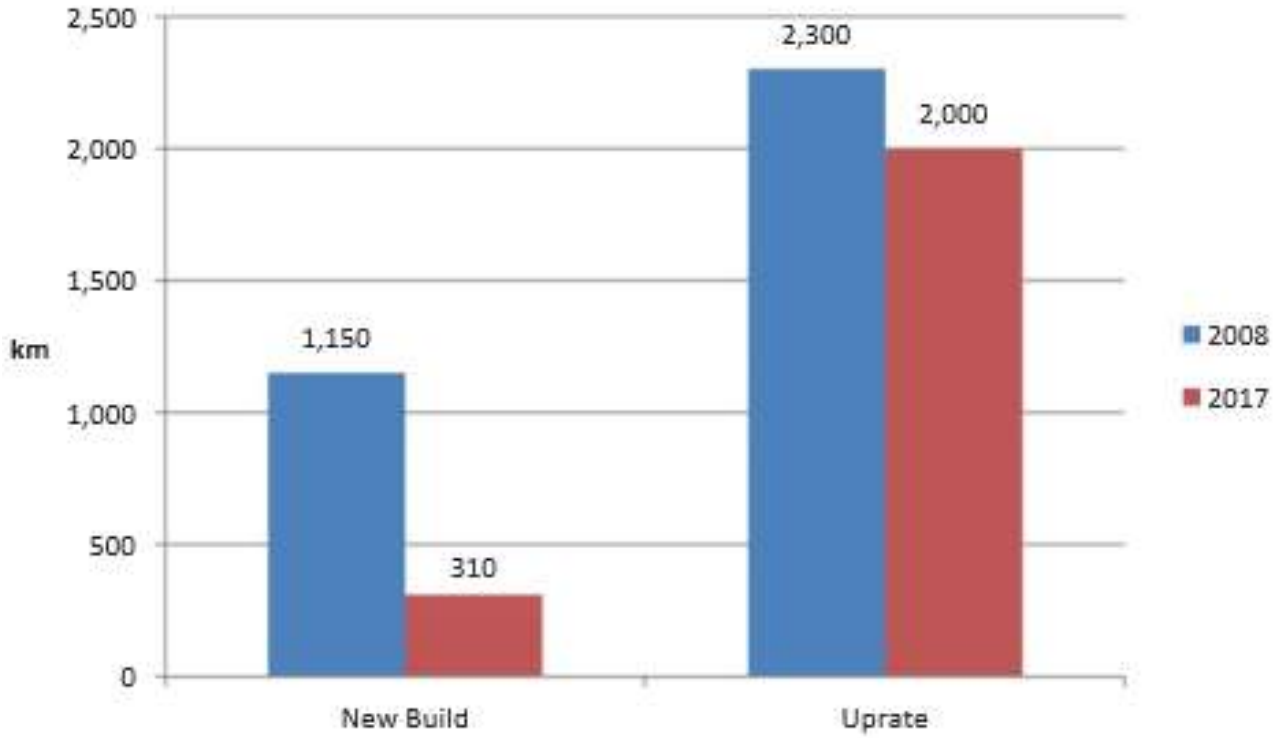


Figure 2.3: Comparison of length of uprate and new build circuits. (Figure 4.1 of the Technical Report of the Grid Development Strategy)

3.0 Strategy for Regional Grid Development

Chapter 6 of Ireland's *Grid Development Strategy* addresses *"Our Strategy for Grid Development"*. It outlines a number of major and other projects that will be progressed under the *Strategy*.

Figure 3.1 below, reproduced from Page 31 of the *Strategy*, sets out the broad distribution of planned capital investment in grid infrastructure across eight regions in Ireland (identified in Figure 3.2).

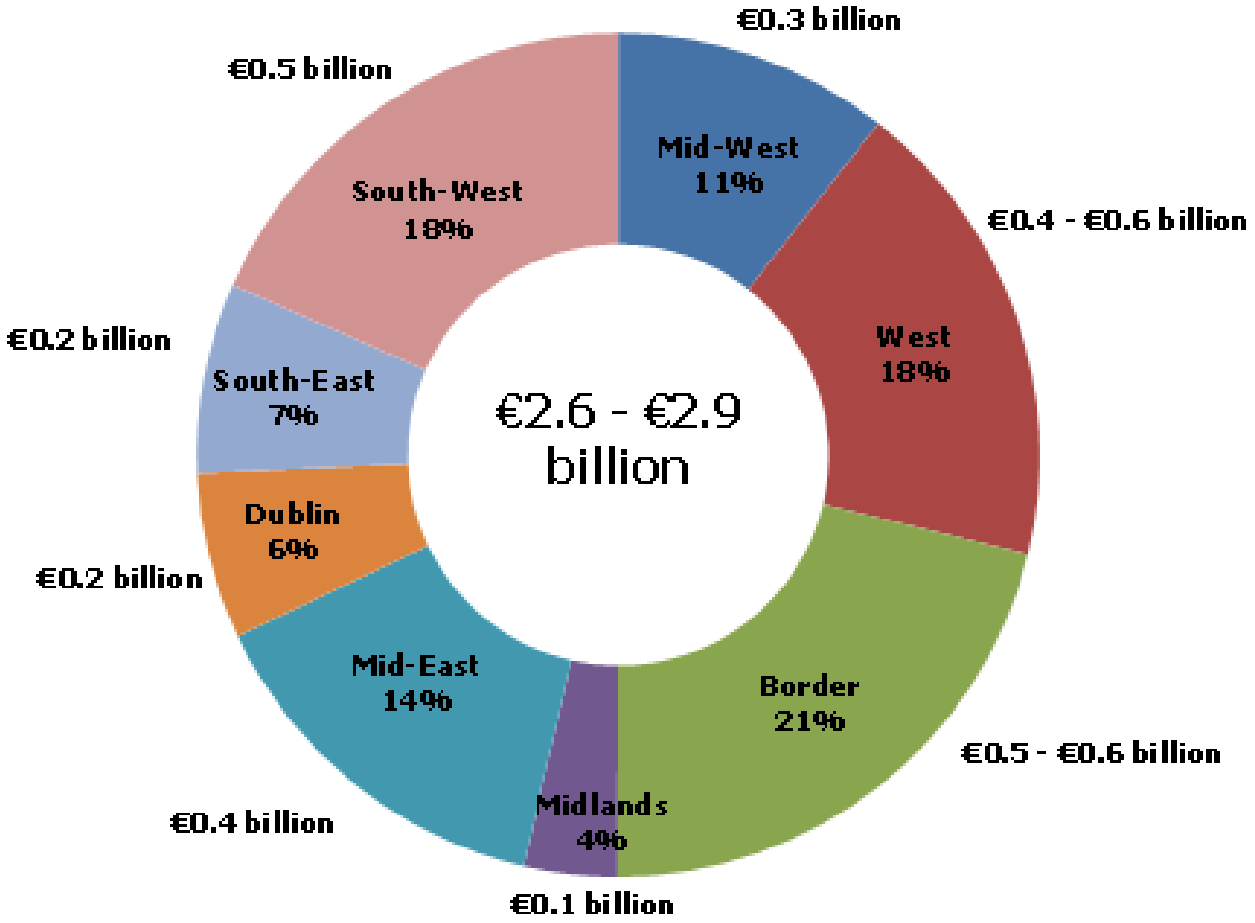


Figure 3.1: Regional Breakdown of Planned Investment in Grid Infrastructure. (extracted from Ireland's Grid Development Strategy)

Each region is summarised in the Technical Report of the *Strategy*, relevant parts of which are reproduced in this chapter. This includes a map identifying transmission circuits and substations, as well as planned major developments to the grid. It describes:

- the forecast regional generation and demand balance;

- the main regional demand centres, and the forecast demand and additional available capacity at the demand centres[4];
- the number of projects;
- circuit lengths; and
- total projected regional development cost[5].

Part C of this IP captures the key provisions of EirGrid's Transmission Development Plan (TDP) 2016, which provides details on projects that have already been commenced or completed. The TDP 2016 was the adopted TDP at the time of drafting this IP and is available at www.eirgridgroup.com.

While certain projects are identified in this IP, these will be separately subject to project level screening for Environmental Impact Assessment and Appropriate Assessment, in accordance with the governing legislation.

[4] Although capacity is shown at the demand centre, it is indicative of the available capacity for the surrounding general area.
[5] For projects within the grid development strategy only, for example new assets that physically connect generation to the transmission network are excluded.

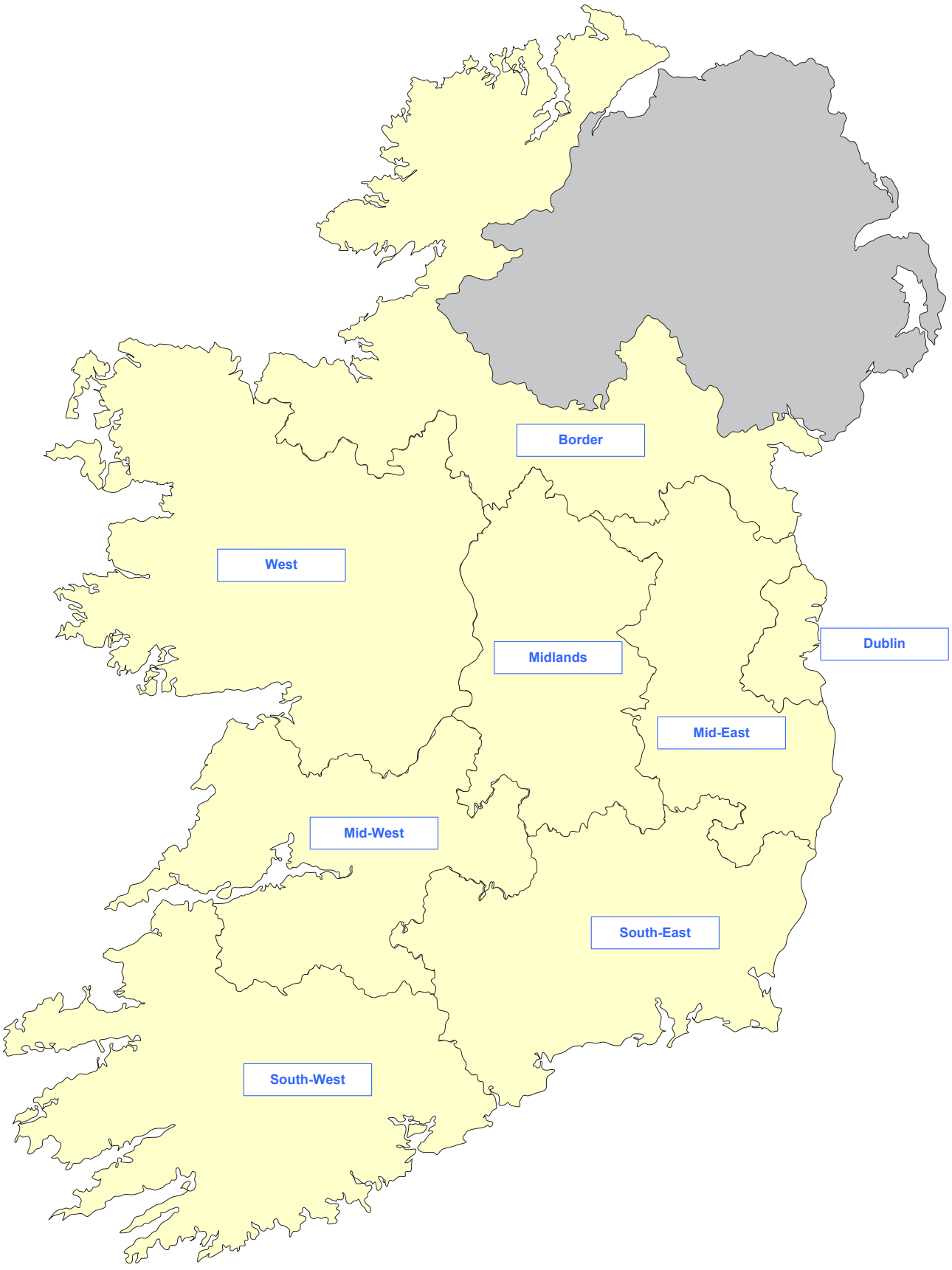
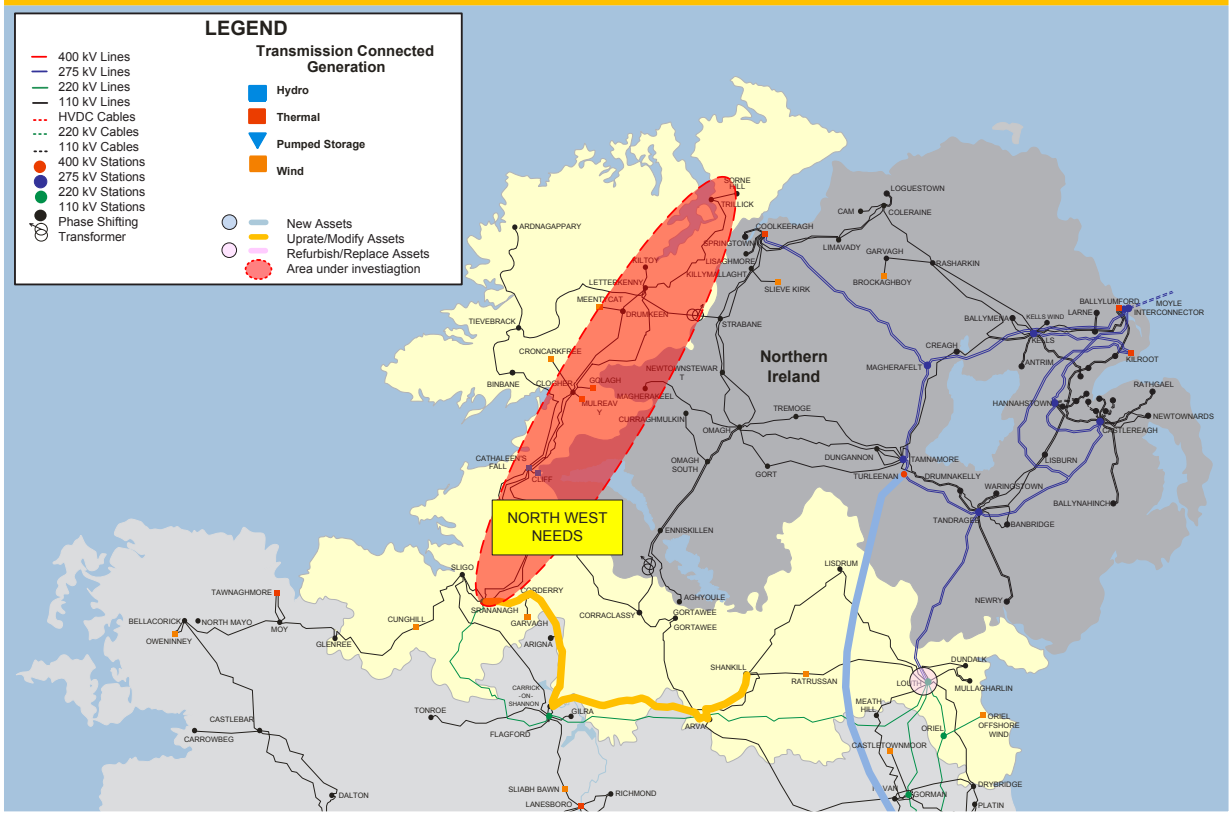


Figure 3.2: Planning Regions of the Grid Development Strategy (extracted from Figure 5-2 of the Technical Report)

BORDERREGION



Major Regional Projects

- North South Interconnector between Turleenan, Co. Tyrone, and Woodland, Co. Meath, substations

Other Notable Regional Projects

- Northwest Needs – reinforcement of the grid in the north-west is required. The solutions, technology and timing of this work are currently being reviewed
- Reconfiguration and refurbishment at Louth 275/220/110 kV substation
- Uprate of Arva – Shankill and Arva - Carrick on Shannon 110 kV circuits
- Uprate of Carrick on Shannon – Arigna T – Corderry and Corderry – Srananagh 110 kV circuits
- Reactive power support required to strengthen system voltage

Regional Description

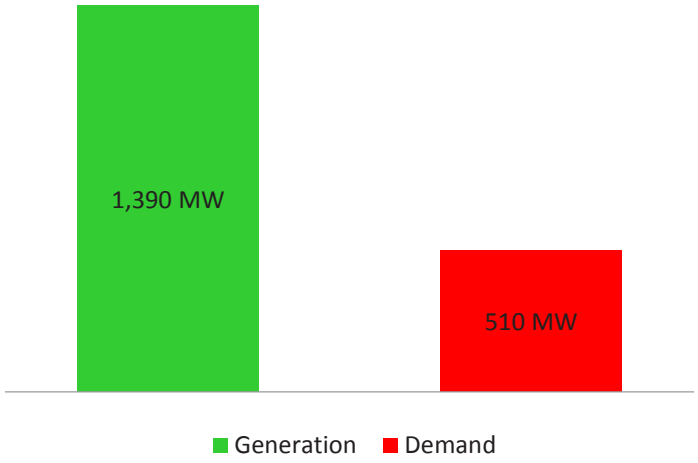
The Border region has significant renewable energy resources. There is an excess of generation in the area.

Demand in the region, including the main urban centres, is expected to grow up to 2025 and beyond. The existing transmission network is composed of both 110 kV and 220 kV circuits. The existing local transmission network facilitates limited inter area power flows between Northern Ireland and Ireland via the existing 275 kV Tandragee – Louth interconnector.

The major project in this region is the North South Interconnector project between Turleenan and Woodland substations. We are also investigating the need to reinforce the grid in the north-west.

BORDER REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[6]

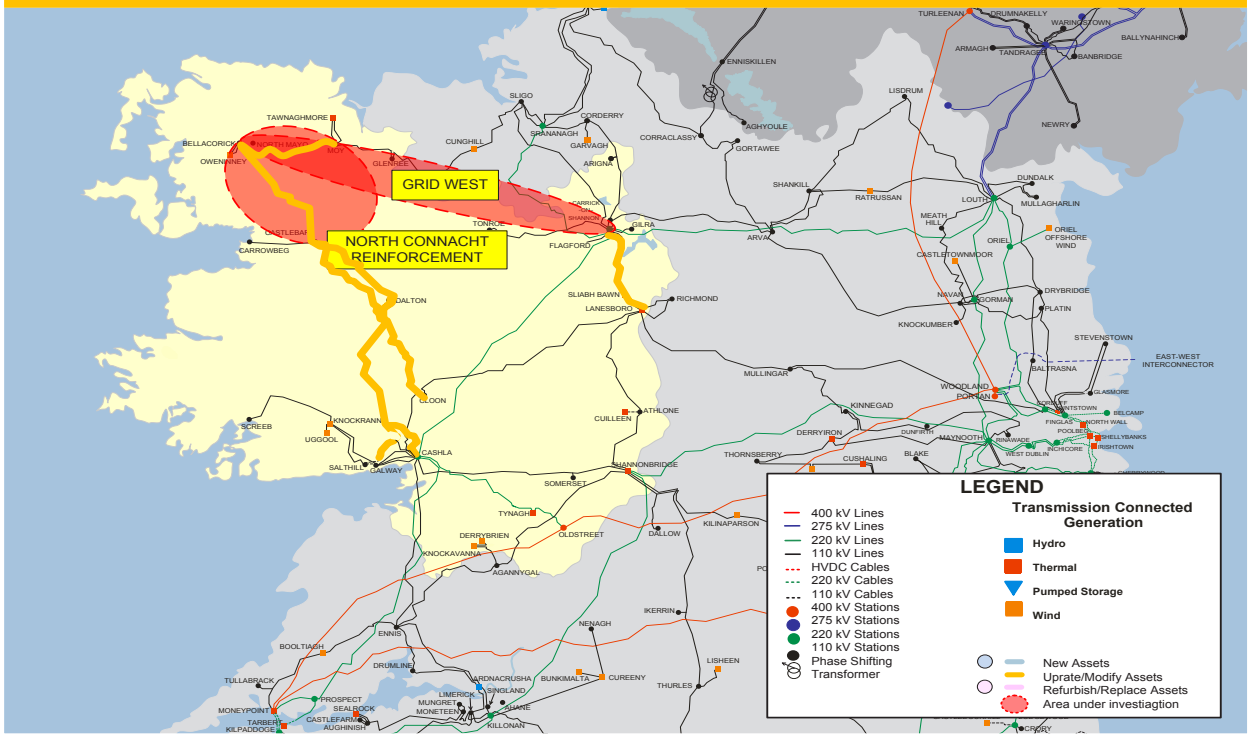
Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[7]
Drogheda[8]	***75***	***100***
Dundalk[9]	***73***	***40***
Letterkenny	***60***	***40***
Sligo	***54***	***50***

Summary of Development Projects[10]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*2*	*68*	€0.5-€0.6 billion
Uprate circuits	*17*	*565*	
New substations	*0*	*N/A*	

[6] Source: All Island Transmission Forecast Statement 2015.
[7] Available capacity in the network for increased demand.
[8] Transmission substation is Drybridge.
[9] Transmission substations are Dundalk and Mullagharlin.
[10] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

WESTREGION



Major Regional Projects

- The Grid West Project: New circuit from the Bellacorick area to Flagford transmission substation **CANCELLED**
- Series Compensation on the existing 400 kV overhead line at Oldstreet 400 kV substation (part of the Regional Solution, see the South-East region summary for more information)

Other Notable Regional Projects

- Reinforcement of the transmission network in the vicinity of Mayo and Sligo comprising the North Connacht 110 kV project. The reinforcement potentially includes the uprating of some 110 kV circuits in the area, for example Castlebar – Dalton – Cashla and Castlebar – Cloon 110 kV circuits.[11].
- Uprating of Cashla – Salthill 110 kV circuit
- Uprating of Flagford – Lanesboro 110 kV circuit
- Uprating of Bellacorick – Castlebar and Bellacorick Moy 110 kV circuits
- Reactive power support required to strengthen system voltage

Regional Description

The West region is particularly rich in renewable energy resources. These generation sources are dispersed across the region, but particularly concentrated along the western coastline. There is also a large conventional thermal generator located at Tynagh substation. The main demand centres are composed of a mix of residential, commercial and industrial demand, which is expected to grow up to 2025 and beyond.

The existing transmission network is predominantly lower capacity 110 kV with very little higher capacity

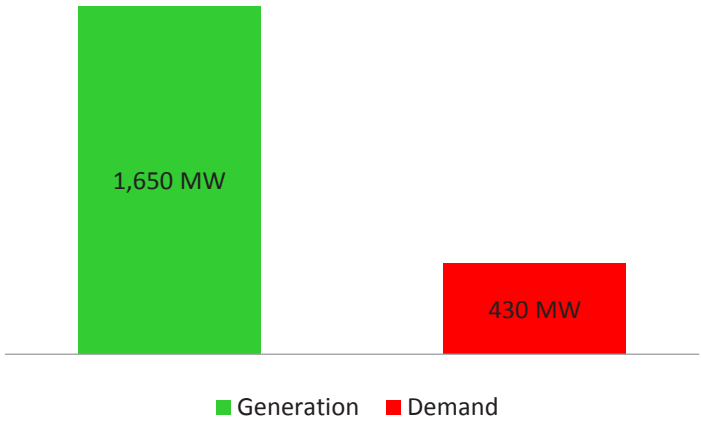
[11] Based on current information and commitments we have identified a need for the North Connacht Reinforcement, which comprises a new 110 kV circuit most likely extending from Moy substation, in addition to associated uprates of existing circuits.

220 kV and 400 kV transmission infrastructure. Developing the grid will enable the transmission system to safely accommodate more diverse power flows from surplus regional generation and also to facilitate future growth in electricity demand.

These developments will strengthen the network for all electricity users, and in doing so will improve the security and quality of supply. This is particularly important if the region is to attract high technology industries that depend on a reliable, high quality, electricity supply.

WEST REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[12]

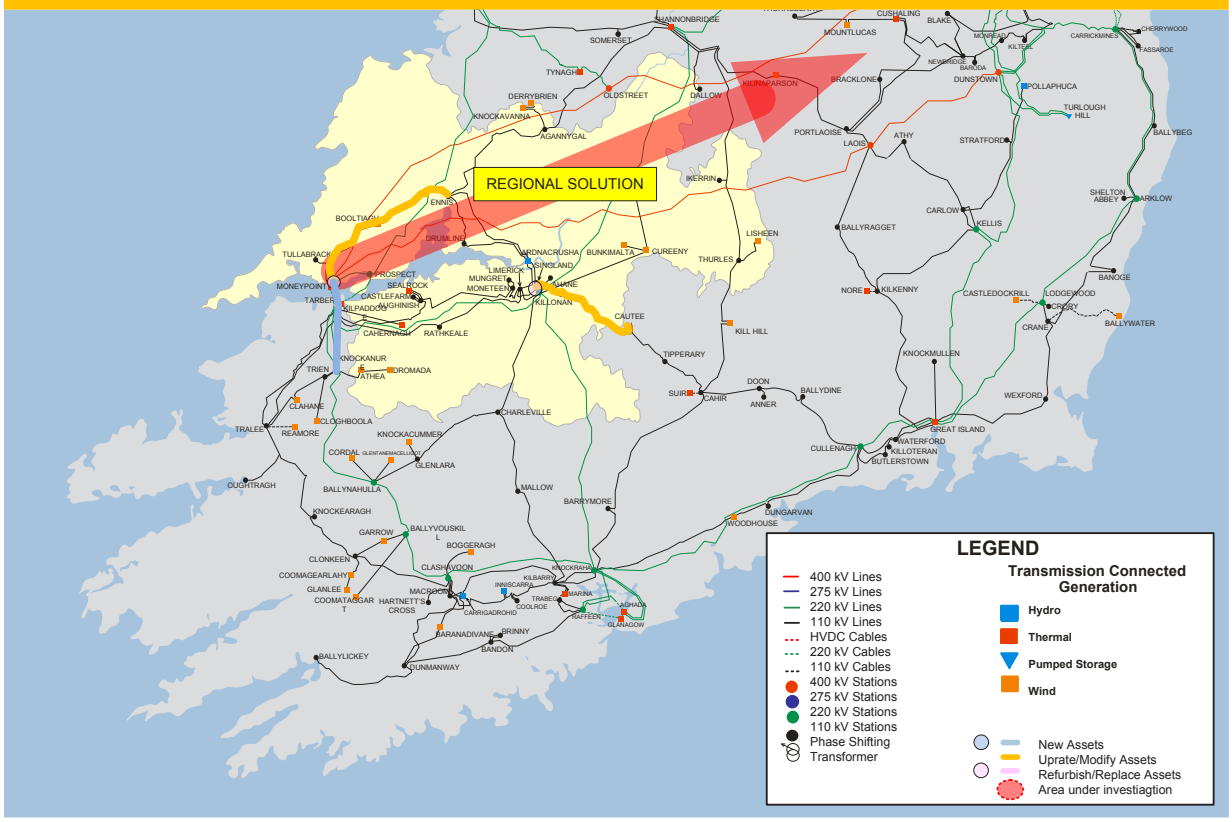
Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[13]
Castlebar	***26***	***10***
Galway	***71***	***60***

Summary of Development Projects[14]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*2*	*125*	€0.4-€0.6 billion
Uprate circuits	*8*	*236*	
New substations	*2*	*N/A*	

[12] Source: All Island Transmission Forecast Statement 2015.
[13] Available capacity in the network for increased demand.
[14] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

MIDWEST REGION



Major Regional Projects

- Moneypoint – North Kerry Project: New 220 kV cable from Moneypoint to Knockanure via Kilpaddoge
- New Kilpaddoge - Moneypoint 220 kV cable
- New Moneypoint 400/220/110 kV substation
- Series compensation on the existing 400 kV overhead line at Moneypoint 400 kV substation (part of the Regional Solution, see the South-East region summary for more information)
- A new 400 kV sub-sea cable, across the Shannon estuary from Moneypoint to Kilpaddoge (part of the Regional Solution, see the South-East region summary for more information)

Other Notable Regional Projects

- Uprating of Ennis – Booltiagh – Tullabrack T - Moneypoint 110 kV circuit
- Uprating of Cauteen - Killonan 110 kV circuit
- Redevelopment of Killonan 220/110 kV substation
- Reactive power support required to strengthen system voltage

Regional Description

The Mid-West region is particularly rich in renewable energy resources including wind energy and hydro generation on the Shannon. There is also a large conventional thermal generator located at Moneypoint substation. The main urban demand centres are composed of a mix of residential, commercial and industrial demand, which is expected to grow up to 2025 and beyond. The existing transmission network is composed of 110 kV, 220 kV and 400 kV infrastructure.

The region has considerably more generation than demand, and the existing infrastructure also

facilitates high inter-regional power flows from the southwest. The proposed Moneypoint – North Kerry investments will enable better use of the existing 400 kV circuits from Moneypoint to Dublin, circuits which originally were designed to facilitate the connection of large conventional generation at Moneypoint.

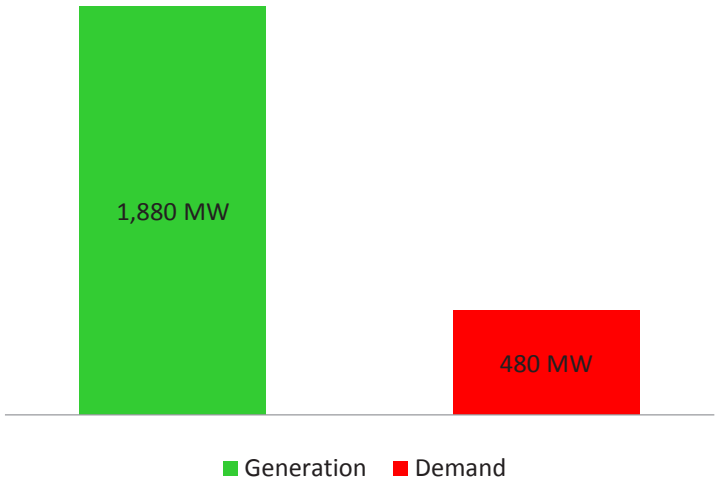
These 400 kV circuits will therefore become a more integral part of the backbone transmission network and will become more so due to our decision to implement the 'Regional Solution' for Grid Link which involves greater use of the existing 400 kV circuits.

These new projects will enable the transmission system to safely accommodate more diverse power flows from surplus regional generation and also to facilitate growth in electricity demand across the region.

These developments will strengthen the network for all electricity users, and in doing so will improve the security and quality of supply. This is particularly important if the region is to continue to attract high technology industries that depend on a reliable, high quality, electricity supply.

MIDWEST REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[15]

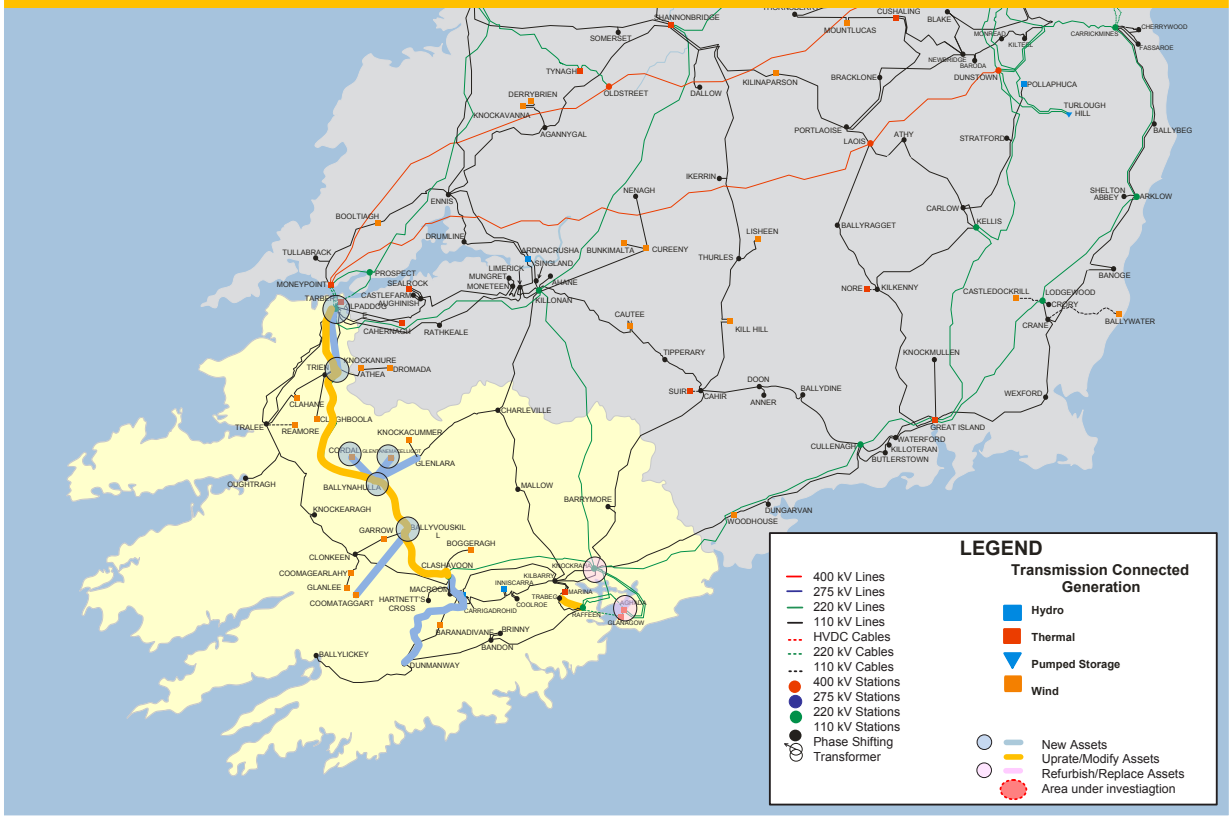
Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[16]
Ennis	***57***	***110***
Limerick	***77***	***100***

Summary of Development Projects[17]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*3*	*9*	€0.3 billion
Uprate circuits	*7*	*176*	
New substations	*0*	*N/A*	

[15] Source: All Island Transmission Forecast Statement 2015.
[16] Available capacity in the network for increased demand.
[17] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

SOUTHWEST REGION



Major Regional Projects

- New 220/110 kV substations at Knockanure, Ballyvouskill, Ballynahulla and Kilpaddoge (Complete)

Other Notable Regional Projects

- Uprating of Clashavoon – Knockanure and Kilpaddoge – Knockanure 220 kV circuits
- New Clashavoon – Dunmanway 110 kV circuit
- New Clashavoon – Macroom 110 kV circuit
- Uprating of Raffeen – Trabeg 110 kV circuit
- Reactive power support required to strengthen system voltage
- Reconfiguration and extension of Knockraha 220 kV substation
- Reconfiguration and refurbishment of Aghada 220 kV substation

Regional Description

The development of the transmission system in the South-West is characterised by the connection of high levels of renewable energy in Co. Cork and Co. Kerry. This results in transmission network constraints as power is transferred out of the region towards Moneypoint and Knockraha transmission substations.

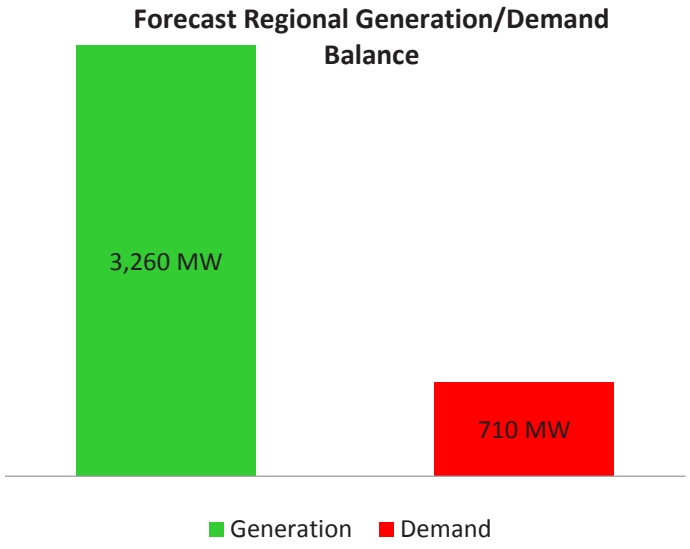
The region also has considerable amounts of conventional thermal generation at Tarbert substation, and around Cork with plants at Marina, Aghada and Whitegate. There is also hydro generation on the River Lee. The combined effect is that this region has a considerable surplus of generation. In addition, EirGrid and the French transmission system operator, RTÉ, are jointly investigating the development of a 700 MW HVDC interconnector between Ireland and France that could potentially connect along the

south coast.

The existing regional transmission network is comprised of 220 kV and 110 kV infrastructure.
The projects described above are required to safely and securely integrate large quantities of renewable energy onto the Irish transmission network. This is achieved by upgrading existing transmission circuits and substation equipment, and building new substations and circuits where necessary.

The main load centre in the region is Cork, which has attracted a number of pharmaceutical companies as well as other high technology industries. These grid development projects will enable the network to safely and securely accommodate more diverse power flows from local and remote generation and also facilitate future growth in electricity demand across this region.

SOUTHWEST REGION Summary Table



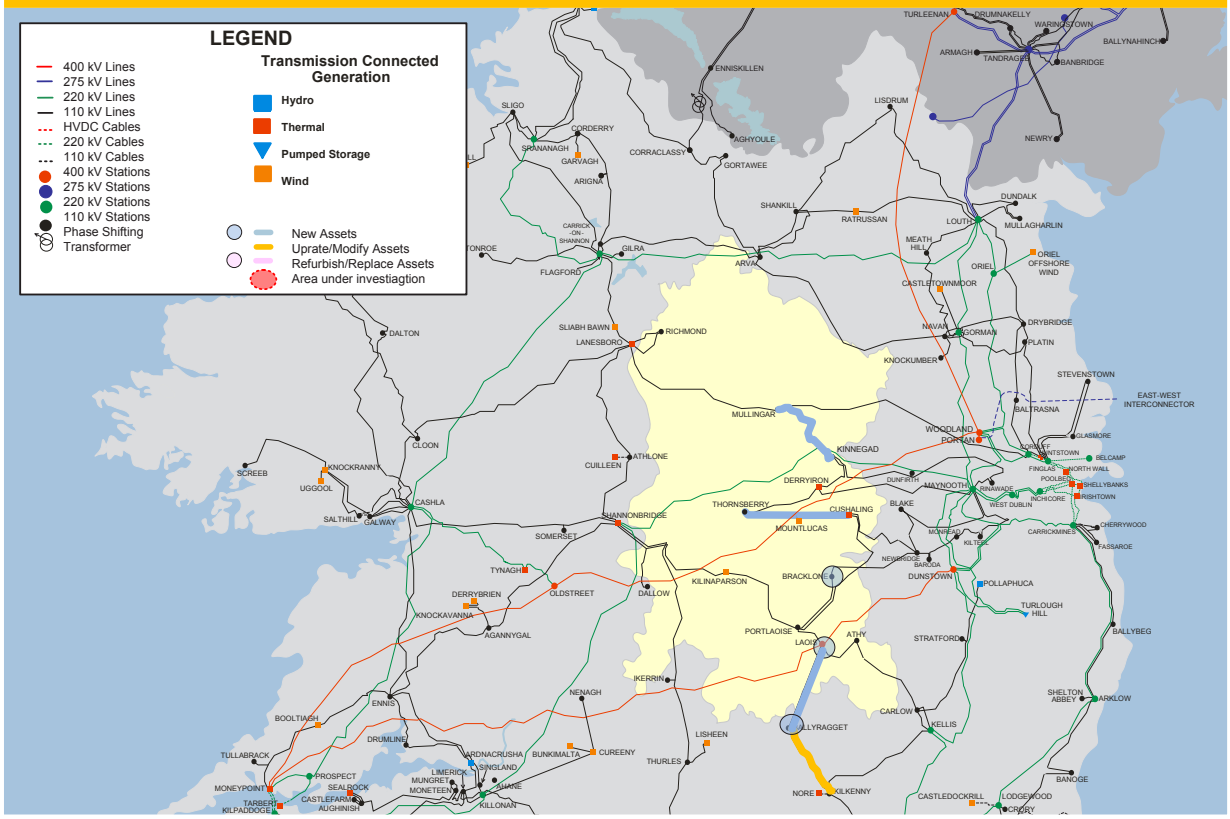
Main Regional Demand Centres[18]		
Location	***Forecast Demand (MW)***	***Additional Demand Capacity (MW)***[19]
Cork (Trabeg)	***77***	***90***
Tralee	***44***	***100***

Summary of Development Projects[20]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*2*	*32*	€0.5 billion
Uprate circuits	*15*	*345*	
New substations	*6*	*N/A*	

[18] Source: All Island Transmission Forecast Statement 2015.
[19] Available capacity in the network for increased demand.
[20] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

MIDLANDSREGION



Major Regional Projects

- New Laois Kilkenny Reinforcement Project: New 400/110 kV substation in Laois, with part new and uprated 110 kV substation/circuit to create new 110 kV circuit from Laois to Kilkenny via Ballyragget

Other Notable Regional Projects

- New Cushaling - Thornsberry 110 kV circuit
- New Kinnegad - Mullingar 110 kV circuit

Regional Description

The Midlands regional transmission network is required to transport power over considerable distances to a widely dispersed range of demand centres.

The region has dispersed generation, mainly composed of peat-burning power stations at Lanesboro, Shannonbridge and Cushaling stations, and renewable energy.

The existing Midlands transmission network is comprised of 400 kV, 220 kV and 110 kV infrastructure. The regional demand centres and generation sources are mainly served by the widely dispersed 110 kV meshed network, with the high capacity 400 kV and 220 kV circuits mainly transferring power through the region.

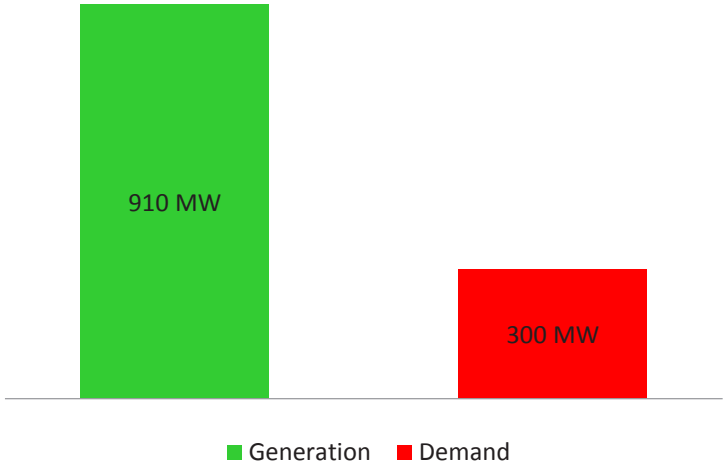
The Laois-Kilkenny Reinforcement Project is a major reinforcement to connect into an existing 400 kV circuit and create a new 400/110 kV substation and new 110 kV circuit capacity. This will strengthen the network in large parts of the Midlands and provide additional capacity for potential demand growth in the wider region, and in particular in Kildare, Laois and Kilkenny.

We are constructing two new 110 kV circuits in the region, namely Cushaling (Edenderry) – Thornsberry (Tullamore) and Kinnegad – Mullingar.

These projects will strengthen the region's transmission network by improving security and quality of supply and ensuring there is the potential for demand growth in a number of gateway towns including Mullingar and Tullamore.

MIDLANDS REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[21]

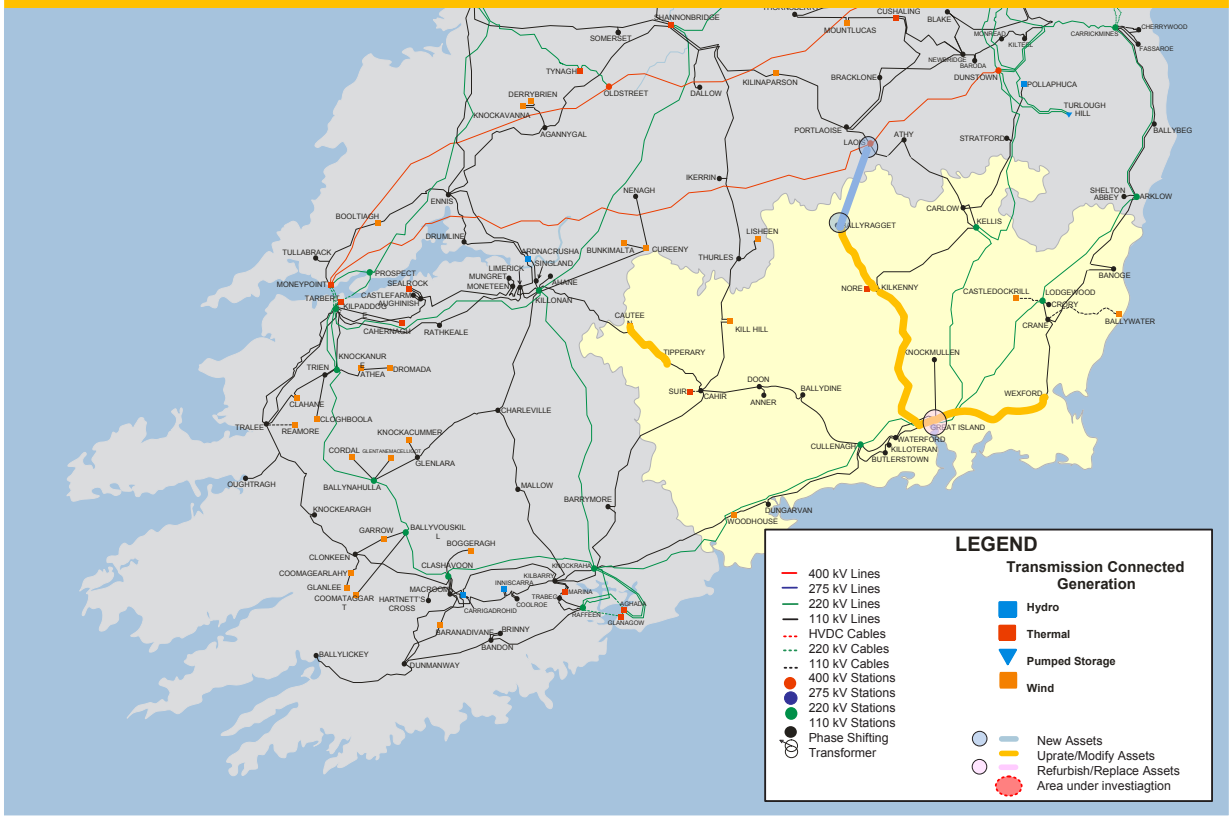
Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[22]
Athlone	***59***	***20***
Mullingar	***48***	***50***
Portlaoise	***37***	***80***
Tullamore[23]	***32***	***30***

Summary of Development Projects[24]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*2*	*27*	€0.1 billion
Uprate circuits	*3*	*92*	
New substations	*1*	*N/A*	

[21] Source: All Island Transmission Forecast Statement 2015.
[22] Available capacity in the network for increased demand.
[23] Transmission substation is Thornsberry.
[24] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

SOUTHEASTREGION



Major Regional Projects

- The Regional Solution: Increase transfer capacity from the south and southwest to the Dublin region. The Grid Link project has been replaced by the Regional Solution.

Other Notable Regional Projects

- Uprate of Great Island – Wexford and Great Island – Kilkenny 110 kV circuits (part of the Regional Solution)
- Redevelopment of Great Island 220/110 kV substation
- Uprating of Cauteen – Tipperary 110 kV circuit

Regional Description

The South-East region has renewable energy resources, and conventional generation located at Great Island substation. As a result, the region has a surplus of generation. The South-East also contains a number of possible landing locations for interconnectors.

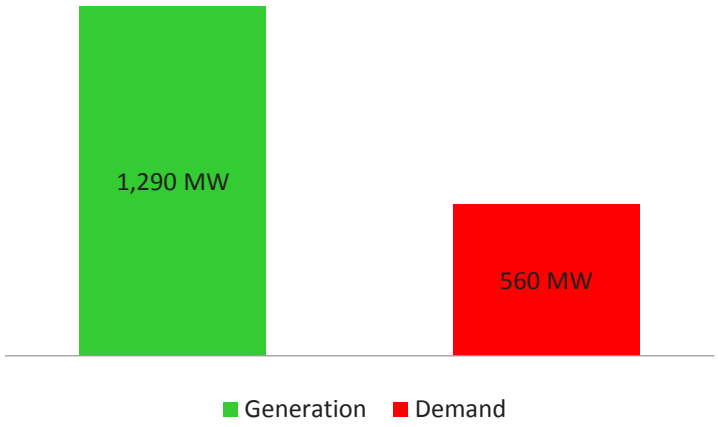
The main urban demand centres are composed of a mix of residential, commercial and industrial demand, which is expected to grow up to 2025 and beyond. The existing transmission network is composed of 110 kV and 220 kV infrastructure. The region has considerably more generation than demand and the existing infrastructure also facilitates high inter-regional power flows from the southwest. In addition, EirGrid and the French transmission system operator, RTÉ, are jointly investigating the development of a 700 MW HVDC interconnector between Ireland and France that could potentially connect along the south coast[25].

[25] Subsequent to publication of the *Strategy*, the Celtic Interconnector is confirmed as connecting to the grid in the East Cork area.

We recently investigated a number of options to increase network capacity between the southwest and southeast to the larger demand centres located on the eastern seaboard. The result is the Regional Solution which replaces the project formerly known as Grid Link. This will enable the transmission system in this region to safely accommodate more diverse power flows from local generation, inter-regional power flows and also to facilitate future growth in demand across the region.

SOUTHEASTREGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[26]

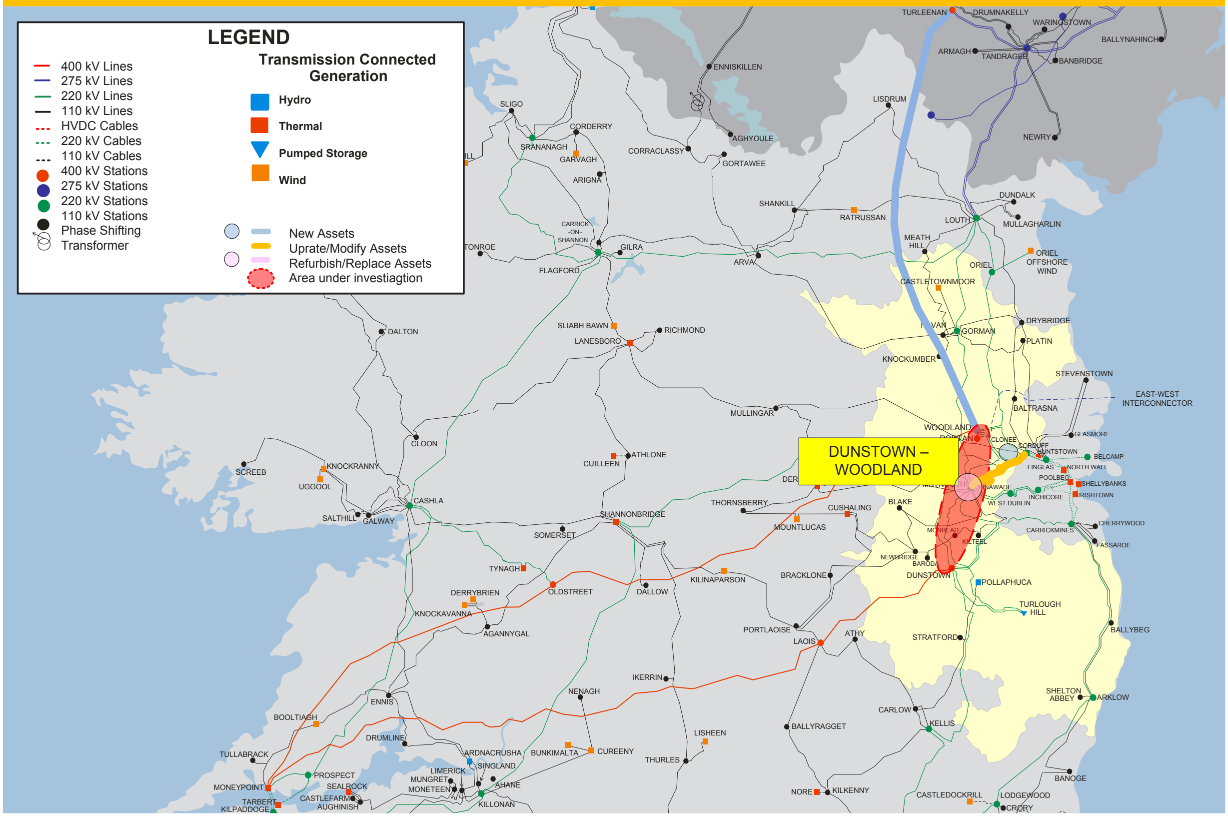
Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[27]
Cahir	***23***	***50***
Carlow	***51***	***70***
Kilkenny	***57***	***30***
Waterford	***45***	***110***
Wexford	***51***	***30***

Summary of Development Projects[28]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*0*	*0*	€0.2 billion
Uprate circuits	*17*	*425*	
New substations	*0*	*N/A*	

[26] Source: All Island Transmission Forecast Statement 2015.
[27] Available capacity in the network for increased demand.
[28] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

MIDEASTREGION



Major Regional Projects

- Series Compensation on the existing 400 kV overhead line at Dunstown 400 kV station (part of the Regional Solution, see the South-East region summary for more information)
- Reinforcement of the Greater Dublin Area between Dunstown and Woodland 400 kV substations
- New 220 kV substation near Clonee, Co. Meath

Other Notable Regional Projects

- Uprating of Maynooth – Ryebrook and Corduff – Ryebrook 110 kV circuits
- New 400/220 kV transformers at Dunstown and Woodland 400 kV substations
- Reconfiguration and major refurbishment of Maynooth 220/110 kV substation

Regional Description

The Mid-East region is part of the Greater Dublin Area and is a major load centre on the Irish transmission system. The main urban demand centres are composed of a mix of residential, commercial and industrial demand, which is expected to grow up to 2025 and beyond.

The 500 MW East West Interconnector is connected to the transmission system at Woodland via the 400 kV substation at Portan and a pump storage facility is located at Turlough Hill in Wicklow. The existing regional transmission network is comprised of 400 kV, 220 kV and 110 kV infrastructure.

The transmission network has to meet a number of diverse power flows that can vary depending on the generation dispatch, network demand, interconnector flows and network topology. The network can be subject to high inter-regional power transfers from both north to south and south to north.

We are currently investigating grid development options for connecting the Woodland and Dunstown

400 kV substations, to increase the capacity of the often congested and highly loaded Dublin transmission network. This will enable the transmission system to safely accommodate more diverse power flows and also facilitate future load growth in the area.

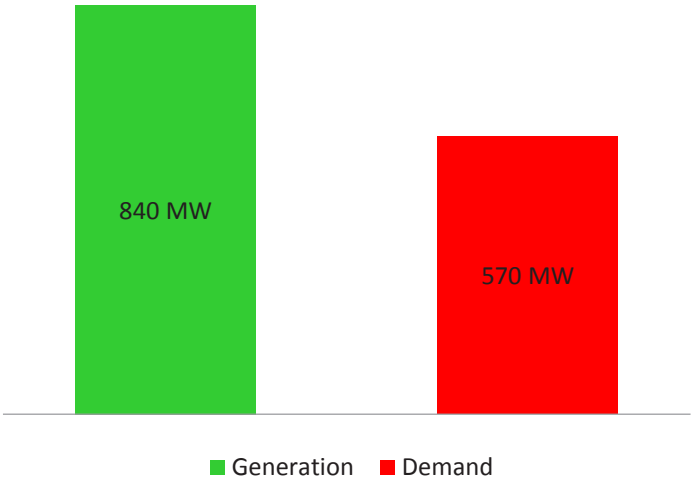
To facilitate increased and new demand existing 110 kV circuits need to be uprated and a new 220 kV substation is required near Clonee, Co. Meath.

These projects will strengthen the network for all electricity users, and in doing so will improve the security and quality of supply.

This is particularly important if the region is to continue to develop as an ICT hub and attract high technology industries that depend on a reliable, high quality, electricity supply.

MIDEAST REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres[29]

Location	*Forecast Demand (MW)*	*Additional Demand Capacity (MW)*[30]
Arklow	***23***	***60***
Naas[31]	***38***	***30***

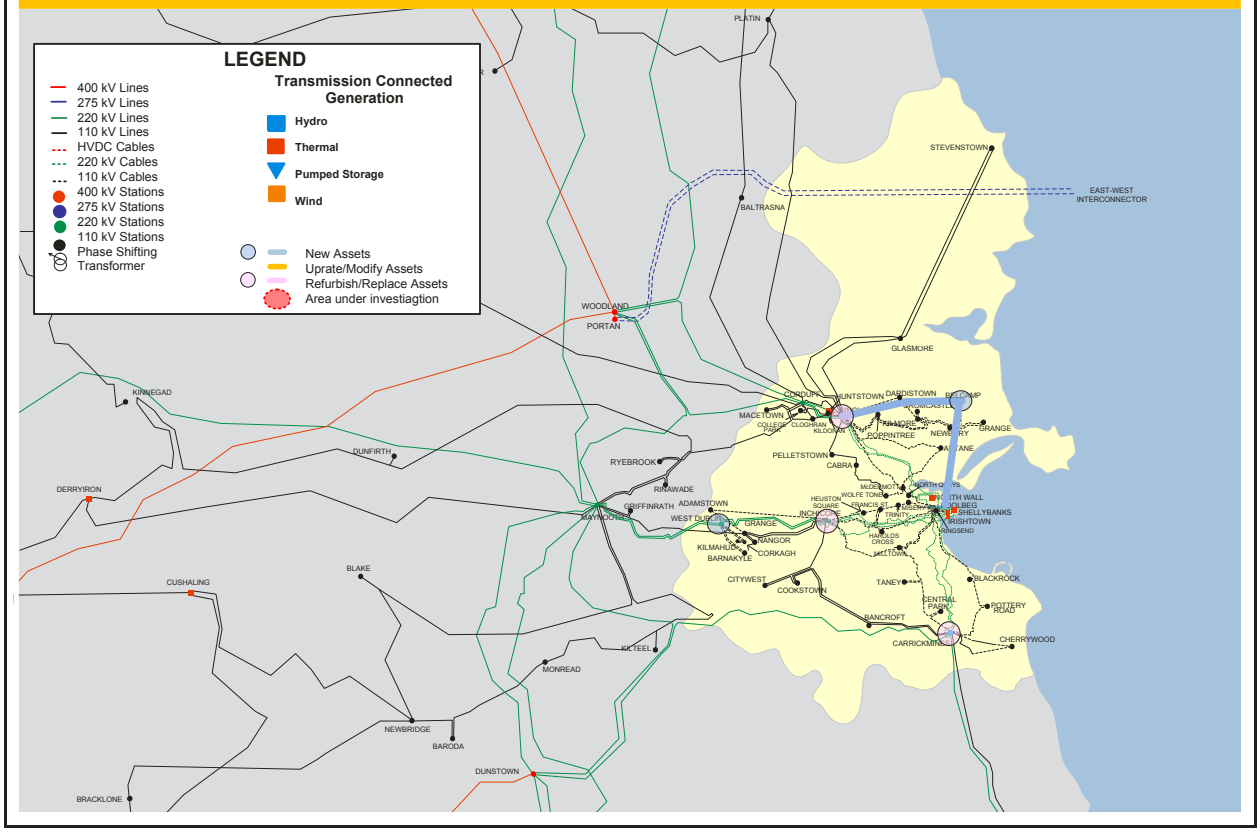
The generation figure in the forecast generation/demand balance includes the East West Interconnector (EWIC) as a 500 MW generation source. EWIC can be either a generation or demand source.

Summary of Development Projects[32]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*1*	*53*	€0.4 billion
Uprate circuits	*5*	*123*	
New substations	*1*	*N/A*	

[29] Source: All Island Transmission Forecast Statement 2015.
[30] Available capacity in the network for increased demand.
[31] Transmission substation is Kilteel.
[32] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

DUBLINREGION



Major Regional Projects

- New Belcamp 220/110 kV substation in North Dublin and circuits to connect to the existing 220 kV network
- New 220/110 kV substation in West Dublin and circuits to connect to the existing 220 kV network

Other Notable Regional Projects

- Reconfiguration and major refurbishment of Inchicore, Finglas and Carrickmines 220 kV substations
- Reactive power support required to strengthen system voltage

Regional Description

The Dublin region is the major load centre on the Irish transmission system. Approximately one third of total demand is located here. There are also considerable quantities of conventional generation connected to the transmission network in close proximity to the gas network and Dublin port area.

The existing transmission network in the Dublin region is comprised of 220 kV and 110 kV infrastructure. These are primarily fed from the existing 400 kV substations at the western edge of the Dublin area – Woodland in Co. Meath, and Dunstown in Co. Kildare.

The transmission network has to meet a number of diverse power flows that can vary depending on the generation dispatch, network demand, interconnector flows and network topology. As well as meeting the high density demand in the area and local generation exports, the network can be subject to high inter-regional power transfers from both north to south and south to north.
We are currently investigating grid development options for connecting the Woodland and Dunstown

400 kV substations, to increase the capacity of the often congested and highly loaded Dublin transmission network. This and other projects which support the network in the Greater Dublin Area are also detailed in the Mid-East region.

Under high renewable generation scenarios, where power is generated in remote locations and transferred across the transmission system over long distances to Dublin, there will be little local generation that, has in the past, supported and maintained the voltage level in the Dublin area. We are investigating a number of development options to resolve this issue.

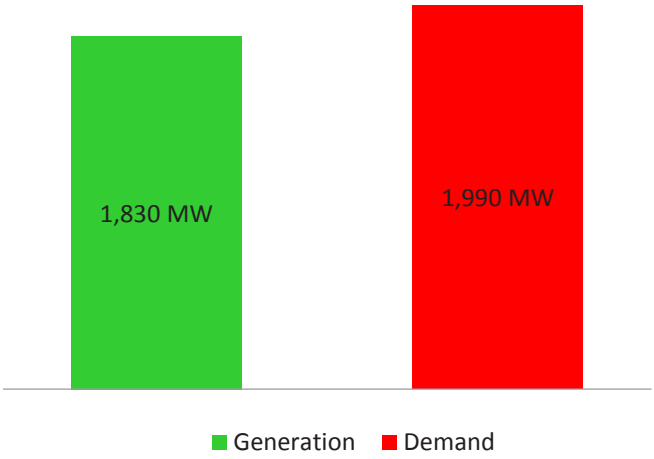
To meet Dublin demand growth it is necessary to install additional transformer capacity and increase circuit capacity to the north, south and west of the city, and into the city itself.

These projects will strengthen the network for all electricity users, and in doing so will improve the security and quality of supply.

This is particularly important if the region is to continue to develop as an ICT hub and attract high technology industries that depend on a reliable, high quality, electricity supply.

DUBLIN REGION Summary Table

Forecast Regional Generation/Demand Balance



Main Regional Demand Centres

Location	*Forecast Demand (MW)*[33]	*Additional Demand Capacity (MW)*[34, 35]
Carrickmines	***397***	***90***
Finglas	***480***	***90***
Inchicore	***360***	***90***

Summary of Development Projects[36]

Type of Projects	*No. of Projects*	*Project kilometres*	*Total Regional Cost*
New build circuits	*0*	*0*	€0.2 billion
Uprate circuits	*2*	*36*	
New substations	*2*	*N/A*	

[33] Source: All Island Transmission Forecast Statement 2015.
[34] Available capacity in the network for increased demand.
[35] Source: All Island Transmission Forecast Statement 2014.
[36] Anticipated at the time of publication of the updated strategy - subject to ongoing review.

Part B: Implementation

4.0 Our Approach to the Environment

4.1 Introduction

EirGrid has a statutory obligation to ensure that the operation, maintenance and development of the national transmission system has due regard for the environment.

What this means in practice is that all aspects of the environment are central to the decision making process when it comes to developing the grid. This is explicitly stated in *Ireland's Grid Development Strategy* which states in respect of *Protecting our Environment* that:-

> *"An essential part of our work is to understand how developing the transmission system might affect the environment. Consideration of the environment is central to how we work"* (p.22)

The Strategic Environmental Assessment (SEA) in respect of the *Grid25 Implementation Programme 2011-2016* (IP) identified a number of Environmental Mitigation Measures (EMMs) to prevent, reduce and, as much as possible, offset any significant adverse impacts on the environment of implementing the IP. A number of these comprised measures involving changes in organisational and working practices within EirGrid. These mitigation measures, status and update on progress of their implementation are presented in Table 4.1 below (also Table 4.1 SEA Environmental Report):

Table 4.1: Mitigation Measures, Status and Update on Progress of their Implementation

Code	Mitigation Measure	Status	Update on progress since previous plan
EMM1	Full Integration of Planning and Environmental Considerations in EirGrid's Transmission System Planning	Complete	The Project Development and Consultation Roadmap has now been replaced by a new Framework for Grid Development. The consideration of environmental issues is at the heart of this framework; in particular, there is a specific focus on the human and social environment.
EMM2	Preparation of Strategic Environmental Constraints Mapping	Rev 1: complete Rev 2: ongoing	As part of this draft Grid IP development and associated SEA an updated mapping system has been developed.
EMM3	Preparation of Evidence-based Environmental Guidelines	Rev 1: complete. However, these Studies are intended to be "living" documents, which can be updated as new information, surveys or literature is published.	Based on the content and conclusions of the ten complete EBES, EirGrid prepared three guideline documents setting out a standard approach to environmental assessment of transmission projects. These comprise: • *EMF and You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland (revised July 2014);* • *Cultural Heritage Guidelines for Electricity Transmission Projects (October 2015); and* • *Ecology Guidelines for Electricity Transmission Projects - A Standard Approach to Ecological Impact Assessment of High Voltage Transmission Projects (2011).*
EMM4	Consideration of the Broadest Possible Range of Alternatives in all Future Energy Transmission Strategies	Ongoing	New Grid Development Strategy published in 2017 which outlines the new approach to Grid Development. This is also reflected in EirGrid's strategy statement "*We will consider all practical technology options.*" In addition, EirGrid have developed a range of Energy Scenarios. These scenarios consider the range of possible ways that energy usage may change in the future. Scenario planning will allow EirGrid to efficiently develop the grid taking account of the uncertainties associated with the future demand for electricity and

			the future location and technology used to generate electricity.
EMM5	Preparation of TDP EAR	Ongoing	Three EARs have been prepared to accompany each TDP to ensure that it is in accordance with the SEA (currently comprising the Grid25 Implementation Programme (IP) 2011-2016). These will continue to be developed for future TDPs in the context of the new SEA when finalised.
EMM6	Ongoing Co-operation in preparation of Renewable Energy Generation Guidelines and Strategies	Ongoing	EirGrid is a member of the steering group for a number of such Guidelines and Strategies, including the development of the Methodology for Local Authority Renewable Energy Strategies.
EMM7	Integrating Offshore Grid connectivity requirements and environmental considerations in EirGrid's Strategic Environmental Framework (SEF)	Ongoing	The Offshore Renewable Energy Development Plan (OREDP) was published in early 2014. Guidance on EIS and NIS Preparation for Offshore Renewable Energy Projects has also been produced and was published in April 2017. EirGrid formed part of the Environmental Working Group (EWG) which inputted to the production of these Guidelines.
EMM8	Other measures integrated into the draft Grid IP	Ongoing	EirGrid has developed their EBES's and Guideline documents to inform future transmission project developments. As part of this cycle of the draft Grid IP EirGrid has developed a series of policies and objectives for future grid development.

4.2 Achievements since 2012

The development of EirGrid's major projects in accordance with its Project Development and Consultation Roadmap (see Chapter 7 of this IP) has ensured that environmental issues were considered at an early stage in project development.

The Project Development and Consultation Roadmap has now been updated by a new Framework for Grid Development. The consideration of environmental issues remains central to this new Framework as there is a specific focus on the human and social environment.

EirGrid's internal planning and environmental team is embedded into every grid development project, in order to ensure that environmental issues are at the forefront of decision-making. Early involvement of the team in projects allows potential environmental issues to be identified and avoided or managed in the course of project development.

Screening for Appropriate Assessment (AA) of a proposed development is an integral function of the EirGrid environmental team. Screening for AA is undertaken or managed by EirGrid's Senior Ecologist. This process is fundamental in determining the planning status of projects that normally fall under the category of exempted development.

In addition, during the pre-application process, the Senior Planner and Senior Ecologist liaise closely with Statutory and non-statutory planning and environmental agencies to discuss and address any issues regarding the planning and environmental aspects of a proposed development. EirGrid's Senior Planner and Senior Ecologist have acted as expert witnesses at a number of Oral Hearings conducted by An Bord Pleanála in respect of Strategic Infrastructure Development (SID) applications since 2012.

In accordance with Mitigation Measure EMM2 of the SEA for the *IP 2011-2016*, EirGrid commissioned GIS-based Strategic Environmental Constraints Mapping. This mapping is used as the basis for project-specific constraints mapping, and can be built upon with other datasets to create heat mapping, which informs EirGrid and its consultants of the environmental sensitivities of a study area.

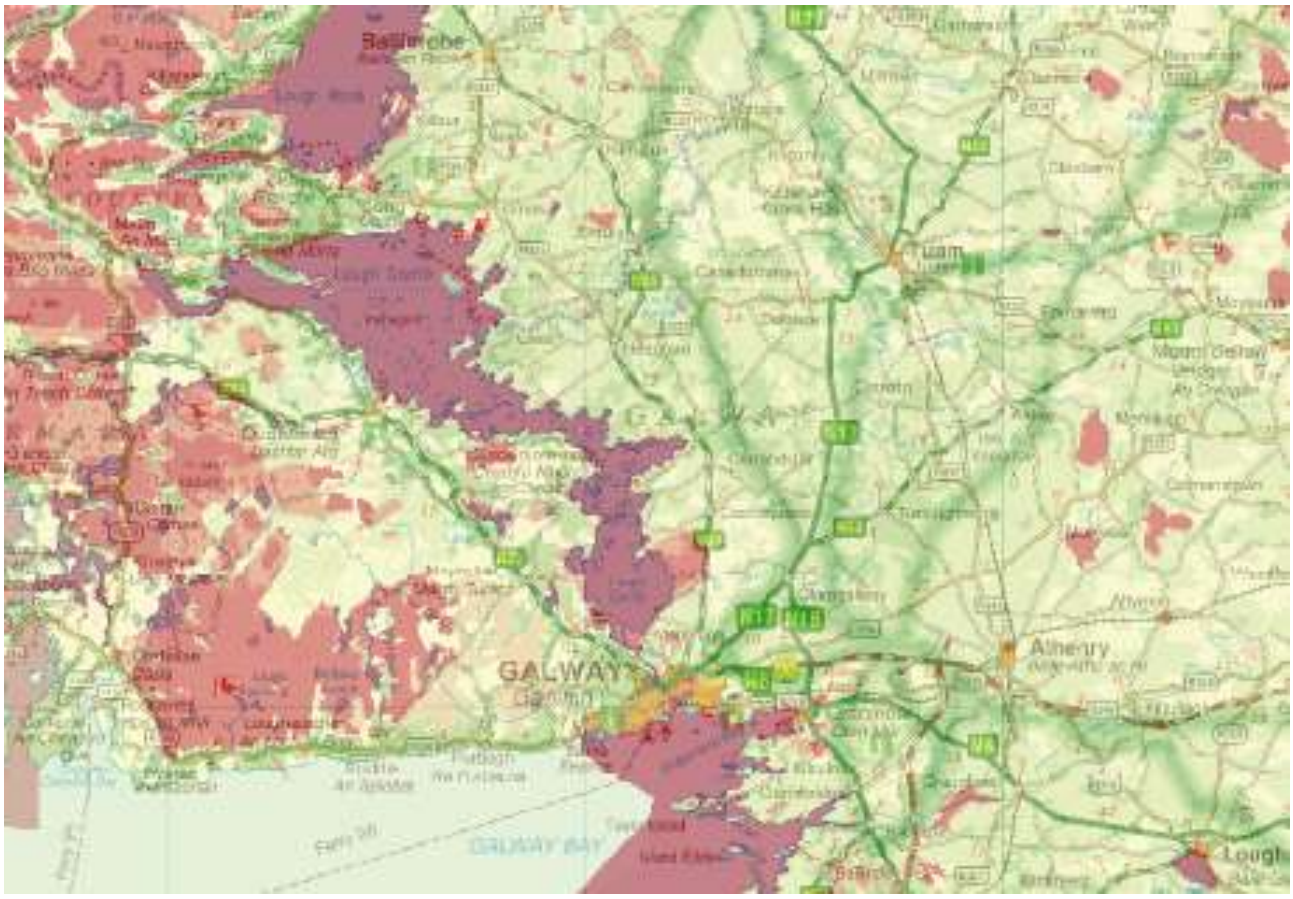


Figure 1: Extract from EirGrid Strategic Environmental Constraints Mapping

In accordance with Mitigation Measure EMM3 of the SEA for the *IP 2011-2016*, EirGrid commissioned a number of Evidence-Based Environmental Studies (EBES), which examine the *actual* effect of grid infrastructure upon a receiving environment in respect of a particular environmental topic. EirGrid (together with RPS Group) have completed the following EBES:

- **EBES 1: Electromagnetic Fields (EMF)** - Literature review of EMF and human health, and an evidence base of EMF measurements from the Irish Transmission System (ITS) (EirGrid, 2014);
- **EBES 2: Cultural Heritage** - Literature review and evidence based field study on the effects of high voltage electricity infrastructure on archaeological, architectural and cultural heritage in Ireland (EirGrid, 2015a);
- **EBES 3: Bats** - Literature review and evidence based field study on the effects of high voltage transmission lines on bats in Ireland (EirGrid, 2015b);
- **EBES 4: Habitats** - Literature review and evidence based field study on the effects of high voltage transmission lines on natural and semi-natural habitats in Ireland (EirGrid, 2016a);

- **EBES 5: Birds** - Literature review and evidence based field study on the effects of high voltage transmission lines on birds (EirGrid, 2016b);
- **EBES 6: Water Quality & Aquatic Ecology** - Literature review and evidence based field studies on the effects of high voltage transmission lines on water quality and aquatic ecology in Ireland (EirGrid, 2016c);
- **EBES 7: Soils & Geology** - Literature review and evidence based field study on the effects of high voltage transmission development on soils and geology (EirGrid, 2016d);
- **EBES 8: Noise** - Literature review and evidence based field study on the noise effects of high voltage transmission development (EirGrid, 2016e);
- **EBES 9: Settlement & Land Use** - Literature review and evidence based field study on the effects of high voltage transmission development on patterns of settlement and land use (EirGrid, 2016f); and
- **EBES 10: Landscape & Visual** - Literature review and evidence based study on the landscape and visual effects of high voltage electricity infrastructure in Ireland (EirGrid, 2016g).

Each separate Study had a generally similar methodology – to review relevant authoritative literature in respect of that Study topic, and to examine existing "on-the-ground" infrastructure in a representative range of standard, non-standard and worst-case Irish landscape types. These studies are intended to be periodically updated to take account of new information and / or developments in understanding arising from practice and research. The EBES are an important source of baseline information for the accompanying SEA and NIS. All of these studies can be accessed on www.eirgridgroup.com.

Also in accordance with Mitigation Measure EMM3 of the SEA for the *IP 2011-2016*, and based on the content and conclusions of the Evidence-Based Environmental Studies, EirGrid commissioned Guidelines to set out a standard approach to environmental assessment of transmission projects. These comprise:-

- *EMF and You: Information about Electric & Magnetic Fields and the electricity transmission system in Ireland (revised July 2014);*
- *Cultural Heritage Guidelines for Electricity Transmission Projects (October 2015);*

EirGrid is currently updating its existing *Ecology Guidelines for Electricity Transmission Projects*, published in 2011, against the provisions of the Evidence-Based Environmental Studies, current legislation, and best practice occurring in the interim.

In 2014, EirGrid undertook reviews of its approach to tourism, agriculture and equine in project development – these being topics consistently raised by stakeholders and the general public during engagement on grid development projects. These reviews outline EirGrid's approach to date on these topics, issues raised during public consultation, and a review of issues arising in respect of the topics. The reviews conclude with identification of a number of themes and associated commitments to delivering an enhanced approach to addressing these topics in the development of EirGrid's major grid development projects.

EirGrid has developed a specific environment space on its website. This allows for a clear external articulation of EirGrid's commitment to, and approach to, the protection of the environment in its grid development and other functions. It also ensures easy public access to the information on the environment that EirGrid has prepared or gathered over the last number of years, including its evidence-based studies and guidelines.

4.3 Challenges

Challenges exist in relation to the fulfilment of environmental statutory obligations. EirGrid are committed to ensuring continued compliance with governing law and practice particularly in relation to protected sites and habitats, appropriately mitigating against climate change, and avoiding and mitigating against adverse environmental impacts in topics such as biodiversity, cultural heritage, water, landscape, soils and noise.

4.4 Policies and Objectives

The following environmental policies and objectives developed for this IP will ensure appropriate protection of the environment in grid development: The detailed objectives and policies are needed to achieve the core strategy of the plan and they have been refined through the SEA process.

4.4.1 General

It is the policy of EirGrid:

ENVP1: To apply best environmental practice in the design and appraisal of transmission development projects.

ENVP2: To continue to develop EirGrid's approach to the protection of the environment in transmission planning and development, and fully integrate this approach throughout the procedures for transmission development and make this framework publically available.

It is the objective of EirGrid:

ENVO1: To ensure that transmission development projects follow the standard approach to environmental assessment of transmission projects set out in the EirGrid topic specific guidelines: *EMF & You*, *Cultural Heritage Guidelines, Ecology Guidelines.*

ENVO2: To continue to prepare and/or update EirGrid evidence-based environmental guidelines, particularly in the context of new or updated evidence-based environmental information.

ENVO3: To develop the environment space on the EirGrid website as a tool for sharing environmental information in respect of transmission development.

4.4.2 Biodiversity

It is the policy of EirGrid:

ENVP3: That any transmission development project, either individually or in combination with other projects, that has the potential to give rise to significant effect on the integrity of any European (Natura) site(s) shall be subject to Appropriate Assessment (AA) in accordance with Article 6 of the EU Habitats Directives.

ENVP4: To protect flora, fauna and habitats (terrestrial and aquatic) which have been identified in accordance with Articles 12 of the Habitats Directive, the Birds Directive, Wildlife Act 1976 (as amended), the Flora Protection Order (S.I. no. 84 of 1999),,the European Communities (Birds and Natural Habitats) Regulations 2011 and the Alien Species Regulation (EU) No 1143/2014. This protection will be afforded at the earliest opportunity in the project development process i.e. option selection.

ENVP5: To promote a pro-active good practice approach to tree and hedgerow management in grid development, with the aim of avoiding in the first instance and minimising the impact of transmission development on existing trees and hedgerows.

ENVP6: To protect and restore (where possible) habitats which function as wildlife corridors, in accordance with Article 10 of the EU Habitats Directive.

4.4.3 Climate Change

It is the policy of EirGrid:

ENVP7: To integrate measures to address climate change and climate change resilience into grid development, by way of effective mitigation and adaptation responses, in accordance with current guidance and best practice.

ENVP8 To support the Government's target of having 40% of electricity consumption generated from renewable energy sources by the year 2020.

It is the objective of EirGrid:

ENVO4: To assist towards meeting national and EU targets, in particular by means of having regard to EirGrid's Climate Change Adaptation Plan in undertaking grid development projects.

ENVO5: To mitigate the impacts of climate change through the implementation of policies and processes that reduce energy consumption, reduce energy loss/wastage, and facilitate the supply of energy from renewable sources.

4.4.4 Noise

It is the policy of EirGrid:

ENVP9: To facilitate new technologies on transmission infrastructure which minimise/mitigate significant noise emissions.

ENVP10: To seek to preserve and maintain noise quality in accordance with good practice and relevant legislation.

It is the objective of EirGrid:

ENVO6: To give careful consideration to the siting of transmission infrastructure so as to ensure that noise-sensitive receptors are avoided where possible and protected from potential noise emissions.

4.4.5 Landscape

It is the policy of EirGrid:

ENVP11: To have regard to the objectives and actions of the National Landscape Strategy in its transmission development projects.

ENVP12: To continue to protect and enhance landscapes and visual amenity through the sustainable planning and design of transmission infrastructure development.

ENVP13: To seek to avoid and reduce visual impact on residential receptors in the development of transmission projects.

It is the objective of EirGrid:

ENVO7: To have regard to any future National Landscape and/or Seascape Character Assessment in the development of its transmission projects.

4.4.6 Cultural Heritage

It is the policy of EirGrid:

ENVP14: To ensure that the special interest of protected structures, including their curtilages and settings, are avoided where possible/protected to the greatest extent possible when considering site or route options for transmission infrastructure development.

ENVP15: To protect known and unknown (potential) archaeological material in transmission infrastructure development, by avoidance or by best practice mitigation measures.

4.4.7 Water

It is the policy of EirGrid:

ENVP16: To have regard to the Guidelines for Planning Authorities on the Planning System and Flood Risk Management, and Technical Appendices, November 2009, published by the Department of the Environment, Community and Local Government as may be revised/updated when devising grid development projects, and in the preparation of grid development strategies and plans to ensure that there is no increase in flood risk as a result of transmission development, and to ensure any flood risk to the development is appropriately managed.

ENVP17: To protect the water environment, water quality and aquatic ecology in accordance with the EU Water Framework Directive, in the development of its transmission projects.

It is the objective of EirGrid:

ENVO8: That all grid development proposals, and in particular, substation developments, shall carry out, to an appropriate level of detail, a site-specific Flood Risk Assessment that shall demonstrate compliance with all current Guidelines, standards and best practice. The Flood Risk Assessment shall pay particular emphasis to residual flood risks, site-specific mitigation measures, flood-resilient design and construction, and any necessary management measures.

4.4.8 Air Quality

It is the policy of EirGrid:

ENVP18: To seek to preserve and maintain air quality in accordance with good practice and relevant legislation in the construction of its transmission projects.

4.4.9 Tourism

It is the policy of EirGrid:

ENVP19: To consider the potential impact upon tourism in the development of transmission projects and to protect tourism resources through the appropriate and sustainable planning and design of transmission infrastructure development..

It is the objective of EirGrid:

ENVO9: To identify the nature of tourism in a project area; to consider the cumulative / in combination impact on tourism of a project and to consider short term and long term impacts of grid development projects on tourism as appropriate.

4.4.10 Marine Environment

It is the policy of EirGrid:

ENVP20: To promote a pro-active good practice approach to marine management in grid development, with the aim of minimising the impact of transmission development on the marine environment.

ENVP21: To protect the marine environment, in accordance with any plans made under the EU Directive 2014/89/EU (Marine Spatial Planning).

4.4.11 Geology and Soils

ENVP22: To ensure that geological heritage features are protected to the greatest extent possible when considering site or route options for transmission infrastructure development.

4.5 Conclusion

The policies and objectives above are assessed against Strategic Environmental Objectives in **Chapter 11** of the SEA Environmental Report (ER). They are predicted to result in positive/neutral effects with no significant negative effects. **Chapter 12** of the ER details recommendations on how some aspects of the draft version of the IP could be improved. Recommended amendments or additions to the environmental policies and objectives are detailed (Table 12.1) and are reproduced in Part D. These recommendations have been taken into account in the finalisation of the IP. Note all policies and objectives have been screened out from the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening).

5.0 Our Approach to Technology

5.1 Introduction

As outlined in Chapter 2 of this IP, *Ireland's Grid Development Strategy* sets out three strategy statements, two of which directly relate to technology in transmission infrastructure development:

- We will consider all practical technology options.
- We will optimise the existing grid to minimise the need for new infrastructure

5.2 Achievements since 2012

Over the last number of years, EirGrid has undertaken a leading role in the introduction of new technologies to the Irish transmission system for the benefit of consumers.

The use of new technologies can bring a number of advantages, including enhanced operational performance, improved system reliability, shortened construction times and reduced impact on the environment. All of these have the potential to reduce system costs.

We have developed a world-leading initiative *"Delivering a Secure, Sustainable Electricity System"* (DS3 programme). The aim of the programme is to meet the challenges of operating the electricity system in a secure manner while achieving the 2020 renewable electricity targets. The programme is designed to ensure that we can securely operate the power system with increasing amounts of variable renewable generation over the coming years.

The capacity of transmission circuits can be increased by replacing existing conductors with higher capacity conductors known as High Temperature Low Sag (HTLS) conductors. We have introduced HTLS technology to the Irish transmission system over the last number of years. These first generation HTLS conductors have been used successfully by EirGrid and ESB Networks, achieving a 60% increase in capacity on approximately 600km of 110 kV and 220 kV overhead lines. Recently developed second generation HTLS conductors, using newer materials and which could double line capacity, are currently undergoing field trials.

We continued to examine the performance of underground cables and their technical impact on the network, noting their advantage in terms of the potential for reduced visual impact compared with overhead lines. However, this must be balanced against the potential impacts on sensitive environmental and ecological areas from what can be significant civil engineering works. We will continue to assess technological developments in this area to ensure the full capability of this technology is available for use on the Irish grid.

The transmission grid in Ireland, similar to other European and international grids, uses high voltage alternating current (HVAC). Where power is to be transferred over long distances it may be cost effective and technically possible to do so using high voltage direct current (HVDC). Over the last number of years we have continued to examine the performance of HVDC and its technical impact on the network.

We have investigated series compensation, which changes the electrical performance of a circuit on which it is installed. This technology can provide significant benefit by increasing the practical transfer capability of the system – essentially getting more power through the existing transmission network.

Demand Side Management and Response has been used in Ireland for many years, primarily at industrial level. It works by customers reducing their electricity consumption on request. This helps us to operate the grid more securely. We have developed initiatives such as *Power Off and Save*, and have contributed to the RealValue Project which demonstrates advantages such initiatives can have for domestic consumers.

We are also investigating the use of modular power flow control technologies that may enable us to make better use of the existing transmission network.

In most cases overhead line technology remains the most reliable and least expensive option for developing new circuits. We are actively considering new pylon designs in order to minimise adverse landscape and visual impacts, see Figure 5.1 and 5.2 for some examples (Figure 3-4 of Technical report of *Irelands Grid Development Strategy*). The goal is to use less visually intrusive pylons, particularly in sensitive areas.

Over the last number of years, we have learned that the level of uncertainty over the future usage of the grid is increasing. To cater for this, we are changing how we plan the grid. Our new approach involves developing a range of energy scenarios (possible situations or events that impact on energy).

We have asked key policy makers, industry experts, and stakeholders how they see the energy landscape changing over time. The final scenarios have now been published, and will be reviewed every two years. We will use these scenarios throughout our planning analysis to assess the future needs of the electricity system, and to test the practicality and merits of different options for grid development.

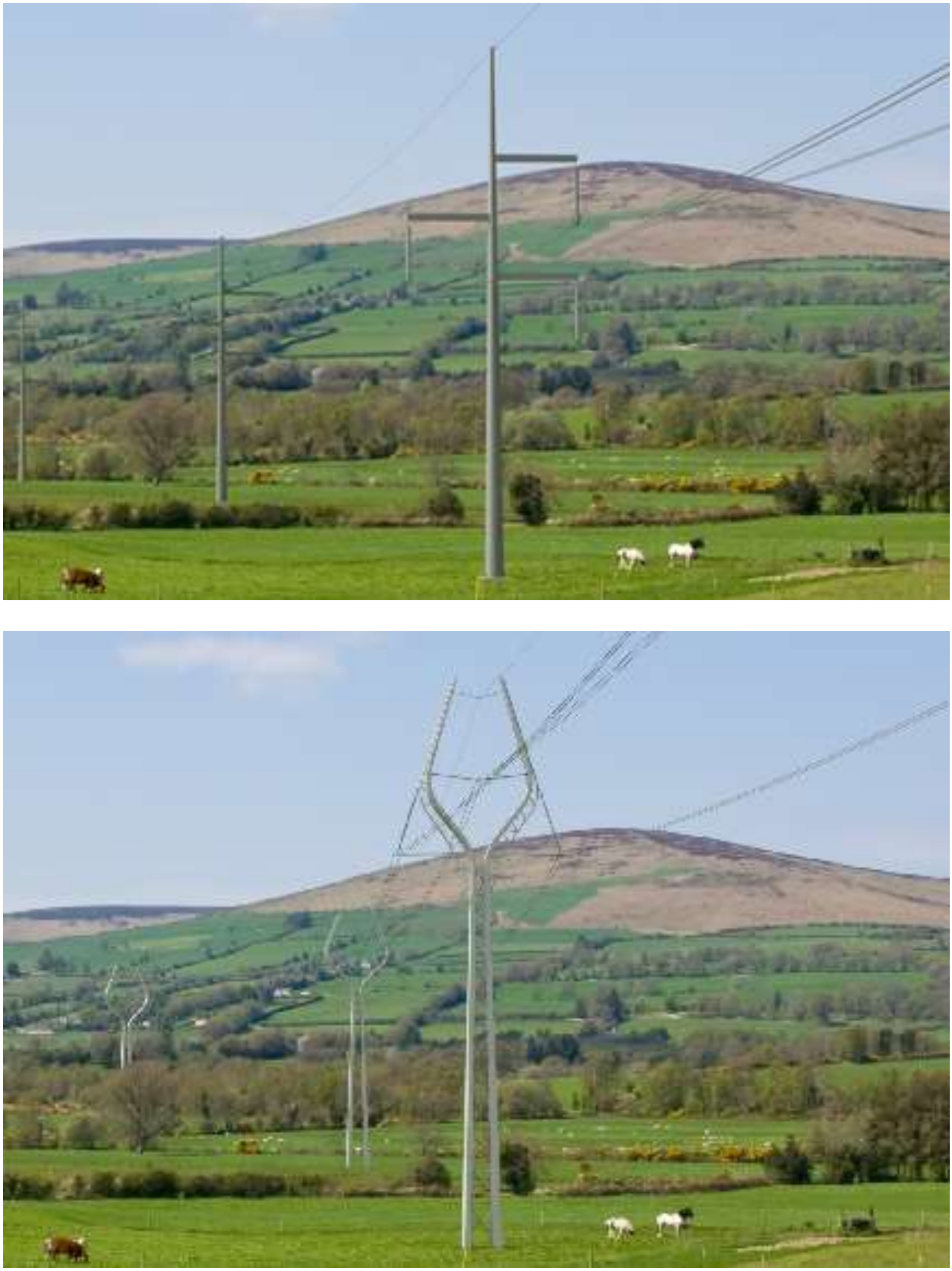


Figure 5.1: Examples of new pylon designs

5.3 Challenges

EirGrid has a statutory obligation to maintain and develop a safe, secure and reliable electricity transmission grid. This must be based upon proven technologies. While EirGrid is investing in innovation and exploring new technologies, it must ensure that power continues to flow from where it is generated to where it is required in an economical and efficient manner.

It is in this context that, in most cases in Ireland, Europe, and across the world, overhead line Alternating Current (AC) technology remains the most reliable and least expensive option for developing new circuits. However, given their inherent greater visual impact, in comparison with potential underground solutions, there remains a challenge in terms of public acceptability of overhead line transmission infrastructure.

5.4 Policies and Objectives

It is the policy of EirGrid:

TP1: To promote and facilitate the sustainable development of a high-quality transmission grid to serve the existing and future needs of the country, in accordance with *Ireland's Grid Development Strategy,* legislative requirements, relevant guidance and best practice.

TP2: To consider all practical technology alternatives and their associated environmental effects in the in the development of its projects, including maximising use of the existing transmission grid.

TP3: To continue to be proactive in the development of emerging or innovative technical solutions for the development of the transmission grid with regard to the environment.

It is the objective of EirGrid:

TO1: To provide opportunities for public participation as we develop technical innovation in transmission infrastructure, both in project-specific, and in non- project-specific contexts.

All of the Technology policies and objectives detailed above are assessed against Strategic Environmental Objectives in Chapter 11 of the SEA Environmental Report. By its very nature, the provision of new grid infrastructure could potentially have a significant negative effect on the receptors associated with the SEOs. The assessment reflects this with a combination of positive, neutral and some uncertain outcomes. Chapter 12 of the SEA Environmental report details recommendations on how some aspects of the draft version of the IP could be improved. Recommended amendments or additions to the technical policies and objectives are suggested (Table 12.1) and are reproduced in Part D of this report. These recommendations haven been taken into account in the finalisation of the IP. Note all policies and objectives have been screened out from

the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening).

6.0 Our Approach to Project Development

6.1 Introduction

As addressed in more detail in Chapter 4 and Part C of this IP, EirGrid undertakes grid development projects as part of its statutory role in maintaining, developing and operating the transmission grid.

A focus in the development of our projects is on matters of proper planning and sustainable development. This requires a careful balancing of the technical need and solutions for a project with appropriate and adequate opportunities for public participation in the project development process. It must also include significant emphasis and focus on the environmental impact of the project, primarily in reference to the EU Habitats Directive, but also in terms of social impact.

EirGrid has been proactive in developing clear structured processes for the planning and development of electricity transmission infrastructure. This includes the technical development of projects in collaboration with matters of planning, environment, public affairs, administrative, financial and corporate governance.

EirGrid's Programme Delivery Unit has overall oversight of project development. It includes experienced experts in the areas of ecology, public planning, wayleaving and landowner engagement. These experts are assigned to all EirGrid projects, to advise and assist project managers and their project teams with ensuring a consistent approach to the sustainable planning and development of all EirGrid projects.

EirGrid has established a new approach to developing grid projects in Ireland. This is a "beginning-to-end" process, from the identification of a need to develop the grid to the eventual construction and operation of a project. This approach integrates the technical development of a project with increased and enhanced engagement with stakeholders, communities and landowners.

6.2 Achievements since 2012

Since 2012, EirGrid has developed a number of internal policies and processes to govern the development of its projects. These have ensured consistency of approach, as well as expert environmental input into all stages of project delivery. EirGrid's senior planners and ecologist are embedded into every grid development project being undertaken, in order to ensure that planning and environmental issues are at the forefront of all strategy and decision-making.

Over the lifetime of the previous IP, the development of EirGrid's major transmission projects progressed in accordance with a Project Development and Consultation Roadmap. This ensured that the planning and development of our projects occurred in a consistent and transparent manner, with appropriate emphasis on planning, environmental, and community issues, as well as providing opportunities for public participation.

The Roadmap facilitated the development of a considerable number of projects over the life of the previous IP. It formed a useful tool in explaining to stakeholders – including planning authorities, statutory and non-statutory agencies, and the general public – at what point a project was in terms of evolution and development.

In 2014-2015, a comprehensive review of our approach to public consultation in developing the Grid identified the following themes:

- A need to develop a participative approach;
- Change our culture and processes; and
- Encourage leadership and advocacy.

Of particular note is the need to ensure that opportunities for public participation can occur at the outset of a grid development project when technical and other options are being considered.

As a consequence of this review, the Project Development and Consultation Roadmap has now been replaced by a new Framework for Grid Development. The new approach to developing the grid provides a six-step "end-to-end" structure for all our transmission projects. It ensures an appropriate balance between technical, economic, environmental, social and community considerations, with significant provision for stakeholder engagement at all stages. A general structure of this approach is set out in Figure 6.1 below.

A guide on how we develop the Grid and how the public can engage in this process is published on the EirGrid website: http://www.eirgridgroup.com/the-grid/have-your-say/

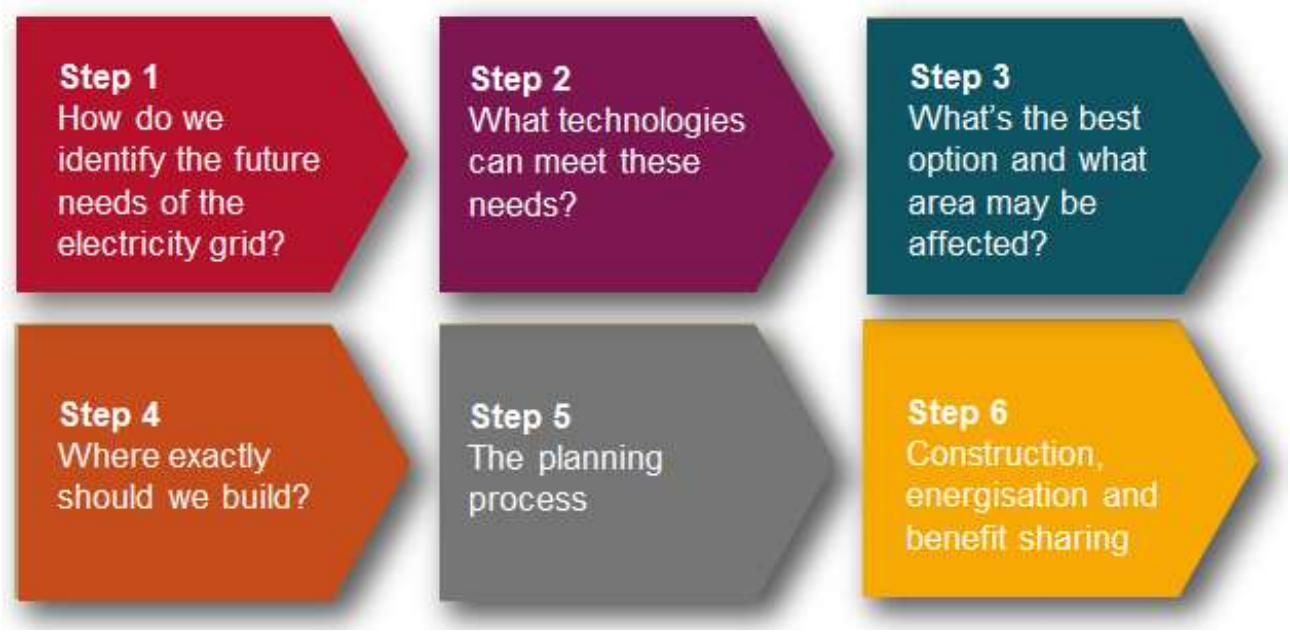


Figure 6.1: General structure of EirGrid's approach to developing the grid

Step 1: How do we identify the future needs of the electricity grid? – assess the existing system to identify and verify any issues or risks arising for the transmission grid that may result in a grid development project;

Step 2: What technologies can meet these needs? - developing a long list, and subsequent shortlist, of technology options to meet the identified need;

Step 3: What's the best option and what area may be affected? - identifying a preferred technology solution (and corresponding study area) from the shortlist of options. This includes identifying environmental and other constraints occurring in the study area. Depending on the results from the selection process, which utilises multi-criteria analysis, more than one option may be brought forward to step 4.

Step 4: Where exactly should we build? - identifying the specific nature, extent and location of a proposed development.

Step 5: The planning process – obtaining statutory consent for the proposed development, or confirming that the proposed development is exempted development not requiring consent;

Step 6: Construction, energisation and benefit sharing – building the project on the ground in liaison with ESB Networks (ESBN), and administering our community gain fund to affected communities.

6.3 Challenges

The progression of a managed transition to full implementation of this new approach will occur over the lifetime of this IP. This is a significant change for EirGrid, requiring the preparation, reviewing and updating of all current internal policies and processes relating to grid development, technical network planning, and external affairs, in order to ensure consistency with the approach.

It will also include the testing, or "piloting" of the new approach on projects (and associated updated policies and processes) against the six-step process, in order to ensure that the new approach is appropriate and fit-for-purpose. This is likely to result in further review and updates based on lessons learned.

All this must ensure an appropriate balance between the timely and cost efficient development of our transmission projects with providing a clear and transparent structure to our stakeholders to facilitate opportunities for public participation in the development of our projects.

Notwithstanding these challenges, EirGrid is convinced that this new approach offers the most appropriate and sustainable approach to the development of our transmission projects.

6.4 Policies and Objectives

The following policies and objectives have been adopted by EirGrid in order to ensure an appropriate and sustainable approach to the development of our transmission projects.

It is the policy of EirGrid:

PDP1: To have regard to EirGrid's approach to developing the grid, and any associated guidelines, policies and processes, to ensure the structured, consistent development of all its transmission projects.

PDP2: To promote sustainable grid development by balancing complex and/or competing technical, economic, environmental, social and deliverability goals and priorities in decision-making.

It is the objective of EirGrid:

PDO1: To undertake a timely and appropriate managed transition of our transmission projects to the new approach to grid development.

PDO2: To undertake periodic reviews, as appropriate, of the approach and associated guidelines, policies and processes, to ensure that the approach remains a suitable and sustainable structured approach to the development of transmission projects.

All of the Project Development policies and objectives detailed above are assessed against Strategic Environmental Objectives in Chapter 11 of the SEA Environmental Report, Tables 11.6 and 11.7. By its very nature the provision of development (new grid infrastructure) could potentially have a significant negative effect on the receptors associated with the SEOs. The assessment reflects this with a combination of positive, neutral and some potentially negative outcomes (in the absence of mitigation).

Chapter 12 of the SEA Environmental report details recommendations on how some aspects of the draft version of the IP could be improved. Some minor amendments to the Project Development policies and objectives were suggested (Table 12.1, 12.2) and are reproduced in Part D of this IP. These recommendations have been taken into account in the finalisation of the IP. Note all policies and objectives have been screened out from the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening).

7.0 Our Approach to Planning and Consenting of Projects

7.1 Introduction

Our grid developments occur within a planning and environmental context, where the focus is on matters of proper planning and sustainable development, and where public participation is of key importance, as is the environmental and ecological impact of our projects.

EirGrid's in-house Planning and Environmental team provides strategic advice to project teams regarding matters of planning and consenting of project.

Under the provisions of Section 182A of the Planning and Development Act 2001 (as amended), electricity transmission infrastructure development such as that being carried out by EirGrid generally comprises Strategic Infrastructure Development (SID). This requires an application for Statutory Approval to be made directly to An Bord Pleanála, following formal pre-application consultation with the Board.

In certain cases, An Bord Pleanála confirms that certain development is not SID for the purposes of statutory consenting, and directs EirGrid to seek Planning Permission from the relevant Planning Authority.

In addition to those developments which require statutory consent, EirGrid undertakes certain development which comprises exempted development – development which does not require a prior statutory consent. This is primarily in reference to Section 4(1)(g) of the Planning Act, which provides that the following is exempted development:-

> *"development consisting of the carrying out by any local authority or statutory undertaker of any works for the purpose of inspecting, repairing, renewing, altering or removing any sewers, mains, pipes, cables, overhead wires, or other apparatus, including the excavation of any street or other land for that purpose"*

EirGrid has developed an internal process for deciding whether certain development is exempted development. This requires, in part, a comprehensive Screening for Appropriate Assessment of the proposed development, undertaken or managed by EirGrid's Senior Ecologist. Where deemed necessary or appropriate, a statutory Declaration of Exempted Development, in accordance with Section 5 of the Planning and Development Act 2000 (as amended), is obtained from the relevant Planning Authority.

7.2 Achievements since 2012

Since April 2012, EirGrid has submitted 9 no. applications for statutory approval of major grid development projects to the Strategic Infrastructure Division (SID) of An Bord Pleanála. All were granted Approval, subject to various conditions.

A number of these Approved developments, and other previously Approved SID projects, were the subject of applications also to An Bord Pleanála for modifications to the original approved development. These are submitted in accordance with Section 146B of the Planning and Development Act (as amended). All such applications for modification of previously approved SID were confirmed by An Bord Pleanála.

In addition, a significant number of transmission infrastructure development projects were deemed by An Bord Pleanála not to comprise SID, and were subsequently submitted to the relevant Planning Authority. These were all subject to Grants of Permission by the Planning Authority; in a number of cases, the Decision of a Planning Authority to Grant Permission was appealed by a third party to An Bord Pleanála, who granted permission for the development.

A considerable number of grid development projects, primarily comprising upgrading and/or replacement of existing infrastructure, were deemed exempted development – either by way of EirGrid's internal process for Screening of Exempted Development, or by way of a formal application to the relevant Planning Authority for a Declaration of Exempted Development under Section 5 of the Planning and Development Act 2000 (as amended). In particular these "Section 5 Declarations" provide, to a certain extent, a supporting precedent for decision-making regarding the exempted development status of certain development.

A number of development proposals which received Grants of Approval for SID, as well as a development proposal that was the subject of Section 5 Declarations of exempted development, have been the subject of Judicial Review proceedings in the High Court. In these cases, the process of decision-making, Appropriate Assessment and Environmental Impact Assessment undertaken by An Bord Pleanála, but also including EirGrid's internal process of Screening for Appropriate Assessment, has been found to be robust.

These Judicial Review cases have established significant precedent for our approach to the planning and consenting (including Declaration of exempted development) of transmission infrastructure development.

7.3 Challenges

The planning and consenting of our transmission infrastructure projects will continue to be a key element of the overall grid development process undertaken by EirGrid.

The Irish planning system is one of the most open and transparent in Europe, and internationally, with considerable opportunity for public participation, facilitated formally by the Competent Decision-Making Authorities (An Bord Pleanála and/or the relevant Planning Authorities), but also informally by EirGrid (see Chapters 6 and 8). This requires our planning applications to be robust, informative, accessible, and easy to understand by all parties.

We must anticipate that there inevitably will continue to be opposition to our projects, by those who are directly or indirectly affected by, or have concerns regarding, our transmission infrastructure development proposals, although we will do our utmost to assuage such concerns during the project development process, and through appropriate consultation.

In this regard, in general (i.e. not just related to transmission infrastructure development projects) there has been a marked increase in decisions of An Bord Pleanála that are the subject of Judicial Review. Planning applications must be prepared in consideration of these changing circumstances, and in particular to facilitate public understanding, and opportunity for participation in the planning process.

7.4 Policies and Objectives

The following policies and objectives have been adopted by EirGrid in order to ensure an appropriate and sustainable approach to the planning and consenting of our transmission projects.

It is the policy of EirGrid:

PCP1: To comply with relevant legislation and have regard to guidelines in respect of planning and consenting of transmission infrastructure development projects, and make provision for any policies for the provision of transmission infrastructure set out in these documents. In particular, to have regard to the National Planning Framework and future Regional Spatial and Economic Strategies.

PCP2: To have regard to precedent arising from decisions of the Competent Authorities, and of the High Court in Judicial Review of decisions, relating to the planning and consenting of transmission infrastructure development projects, including matters of EIA and AA.

PCP3: To promote sustainable grid development by balancing complex and/or competing technical, economic and environmental goals and priorities in decision-making.

It is the objective of EirGrid:

PCP1: To prepare and/or update internal policies and processes related to the planning and consenting of transmission infrastructure development projects, including the existing internal process for Screening of Exempted Development.

The Planning and Consent policies and objectives detailed above are assessed against Strategic Environmental Objectives in Chapter 11 of the SEA Environmental Report. By its very nature the provision of new grid infrastructure could potentially have a significant negative effect on the receptors associated with the SEOs. There are potential positive and negative effects associated with the implementation of this objective as it may not always be possible to provide the least environmental impactful development on the balance with economic and technical goals. The assessment reflects this with a combination of positive, neutral and some potentially negative outcomes (in the absence of mitigation).

Chapter 12 of the SEA Environmental report details recommendations on how some aspects of the draft version of the IP could be improved. Some minor amendments to the Planning and Consents policies and objectives were suggested (Table 12.1, 12.2) and are reproduced in Part D of this IP. These recommendations have been taken into account in the finalisation of the IP. Note all policies and objectives have been screened out from the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening). .

8.0 Our approach to Consultation and Engagement

8.1 Introduction

As noted in Chapter 5 of this IP, *Ireland's Grid Development Strategy* is founded upon three strategy statements. The first of these puts consultation and engagement at the heart of decision making as follows:

Strategy Statement No. 1: *Inclusive consultation with local communities and stakeholders will be central to our approach.*

> *We acknowledge the sensitivities associated with major transmission infrastructure development. In response to feedback, we carried out thorough internal and external reviews of our consultation process. In December 2014 we published "Reviewing and Improving our Consultation Process". The task of reviewing and improving our consultation process is now complete. We have developed a new approach to engagement when developing the grid. Our new approach replaces the previous Roadmap. We are committed to continually improving public participation and community engagement as part of this process.*

8.2 Achievements since 2012

In the period 2011-2015, EirGrid pursued an ambitious programme of grid development. This was primarily focussed upon maintaining security and quality of supply and facilitating renewable generators onto the transmission grid to meet Government targets of 40% renewable generation by 2020.

A number of these grid development projects were extremely large, both in terms of linear length, and in terms of the voltage being proposed. These projects generated significant public concern and opposition; the Grid Link project alone generated approximately 38,000 submissions when various potential overhead line (OHL) corridor options were identified. One of the key issues raised was that the OHL technology had been decided as the best solution by EirGrid with no opportunity for public participation; it was felt that we were consulting with the public at an unduly late stage in the project development process, when major decisions on the project had, in fact, already been taken.

In January 2014, in response to these stated public concerns, EirGrid announced a number of *"Grid25 Initiatives"*. One of these was *"Review of our consultation process to enhance future public engagement"*.

The outcome of the review process was *"Reviewing and improving our public consultation process"* which was published in 2015. This captured the work of the review process and the results two independent external reviews which were also conducted.

The review set out 12 commitments for enhancing our public consultation and engagement. The 12 commitments are summarised below:

1. Clear Communication
2. Process for Consultation in Project Development
3. Consultation Toolkit
4. Improved Community Relationships
5. Demonstrate consideration of Social Impact
6. Consultation Handbook
7. Consistency of Information
8. Complaints Process
9. Support Policy Makers
10. Input from Representative Groups in EirGrid approach to Grid Development
11. Regional Discussion Forums
12. Independent EMF Monitoring & Compliance

Throughout 2015, EirGrid prepared a number of documents and processes to implement these commitments. Of particular note, these included:

- Creation of a Multi-Criteria Decision-Making Analysis (MCDA) process for use in our projects;
- Creation of a template methodology for Social Impact Assessment (SIA);
- Creation of an Engagement Handbook – confirming our commitments in respect of consultation;
- Creation of an Engagement Toolkit – the various methods we use when consulting;

Other documents and processes established under the commitments included:

- Setting up of a complaints process, EirGrid's Stakeholder Complaints Process is available here http://www.eirgridgroup.com/customer-and-industry/serving-our-customers : ;
- Setting up of regional fora, at which key issues were presented for discussion;
- Reconstituting the National Advisory Committee for advising on key strategic issues;
- Creating processes to ensure all external material is presented in clear, simple English, in accordance with guidelines from the National Adult Literacy Association (NALA);
- Appointment of Agricultural Liaison Officers (ALOs) and Community Liaison Officers (CLOs). These staff members are regionally based and are available to liaise with landowners on all agricultural and equine matters. They are also available to discuss grid development projects including siting of infrastructure, land access, payments where applicable, and to actively engage and consult with the public.

These various documents and processes that were developed during 2015 demonstrated the need for a "beginning-to-end" process for our grid development projects that integrated technical, environmental, social, stakeholder and other issues; this has led to the creation of a new Framework for Grid Development (refer to Chapter 6 of this IP).

Of particular relevance to this chapter, the objective of the approach is to consult with communities, landowners and other key stakeholders at the earliest opportunity in the development of a project. Public and stakeholder participation is core to our decision making, as set out in Strategy Statement No. 1.

The nature and extent of engagement will be dependent on the scale of the need identified. It will also be informed by EirGrid's Engagement Handbook and the Engagement Toolkit.

Feedback received during project engagement will be documented and will form a key element of the decision-making process.

At a national level, EirGrid will seek to engage with stakeholders including the Commission for Regulation of Utilities (CRU), the Department of Communications, Climate Action and Environment (DCCAE) and national interest groups. At a regional and/or local level, we will engage with stakeholders including public representatives, community groups, and customers.

At a local and county level EirGrid's Agricultural Liaison Officers (ALOs) and Community Liaison Officers (CLOs) are key to engaging locally, and in developing sustainable relationships with landowners and with communities. In addition, they will work closely with ESB Networks during the construction, energisation and benefit sharing phase of a project.

8.3 Challenges

There are a number of challenges that continue to face EirGrid in relation to consultation and engagement. These include ensuring that all consultation and engagement that is undertaken is done so in a meaningful and relevant way; ensuring that engagement with landowners and communities occurs as early as possible and in advance of decisions made regarding specific locations for potential projects; and ensuring all feedback received is appropriately considered in the decision making process.

8.4 Policies and Objectives

The following policies and objectives have been adopted by EirGrid in order to ensure an appropriate and sustainable approach to consultation and engagement in the development of our transmission projects.
It is the policy of EirGrid:

CEP1: To consult and engage with statutory and non-statutory stakeholders, including communities, landowners and the general public, at the earliest meaningful stage of a project's development.

CEP2: To recognise and develop the essential role that communities, landowners and other stakeholders play in transmission infrastructure development, and to engage with different stakeholders as appropriate at all stages of a grid development project.

CEP3: To ensure consultation and engagement feedback is appropriately considered in decision making and that this process is documented.

CEP4: To facilitate a formal complaints system and to resolve such complaints in a timely manner.

It is an objective of EirGrid:

CEO1: To engage with statutory and non-statutory stakeholders in a meaningful manner as set out in the EirGrid Engagement Handbook and Toolkit and via EirGrid's Agricultural Liaison Officers and Community Liaison Officers.

CEO2: To maintain and update as required EirGrid's Complaints procedure.

The Consultation policies and objectives detailed above are assessed against Strategic Environmental Objectives in Chapter 11 of the SEA Environmental Report. Overall, these policies and objectives score positively against the Strategic Environmental Objectives of the SEA.

Chapter 12 of the SEA Environmental report details recommendations on how some aspects of the draft version of the IP could be improved. Some minor amendments to the consultation policies and objectives were suggested (Table 12.1, 12.2) and are reproduced in Part D of this IP. These recommendations were taken into account in the finalisation of the IP. Note all policies and objectives have been screened from the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening).

9.0 Our Approach to Human Beings and Society

9.1 Introduction

Grid development occurs within a physical and social context - developing a 21st century transmission system as envisaged in *Ireland's Grid Development Strategy* will deliver social, economic and environmental benefits to every person in Ireland.

EirGrid recognises that grid infrastructure development can have an impact on the communities in which infrastructure is hosted, both positive and negative. It is therefore important this is viewed and appropriately analysed alongside technical, cost, environmental, social and deliverability considerations.

EirGrid also recognises that while it aims to create as little disturbance as possible to landowners, businesses and communities in the siting of new grid infrastructure this is not always possible and that a direct benefit to impacted communities is appropriate.

9.2 Achievements since 2012

EirGrid has always considered the potential impact on human beings in the context of Environmental Impact Assessment. This included consideration of the following typical issues that are identified in the EPA *Advice Notes on Current Practice* [2003]:

- *"Economic activity - will the development stimulate additional development and/or reduce economic activity, and if either, what type, how much and where?*
- *Social consideration - will development change patterns and types of activity and land-use?*
- *Land use - will there be severance, loss of rights of way or amenities, conflicts, or other changes likely to alter the character and use of the surroundings?*
- *Health and Safety – will there be risks of death, disease, discomfort or nuisance?"*

In 2015 EirGrid made a number of commitments on foot of a review of its consultation and engagement process (see Chapter 8 for further information). Commitment No. 5 of the Review stated:

> ***"Demonstrate Consideration of Social Impact:***
> *We recognise that the development of new lines, cables or substations can have an impact on communities. In order to achieve public acceptance, this impact must be assessed and considered more transparently in our decision-making. This will include having due regard to the perceptions and knowledge of local communities. EirGrid will explore methods to increase*

transparency of the consultation and decision-making process, including multi-criteria decision-making tools – and this will be shared with the general public and stakeholders".

The explicit consideration of social impact, in addition to the more general consideration of human beings, is now an integral element of decision making in relation to grid infrastructure development projects.

Social impact typically refers to the way in which issues such as cultural identity, place and community attachment, health and overall sense of social cohesion may be changed or affected by a project.

SIA is the tool used to address a range of tangible (measurable) considerations, but also intangible issues such as local knowledge, perceptions, vulnerabilities, language and beliefs for those individuals, community or network of communities that are most likely to be affected by a project.

EirGrid has developed a methodology for Social Impact Assessment (SIA) set into the context of its six-step Framework for Grid Development (see Chapter 6). This provides a consistent format in assessing the potential social impacts of grid development projects. This SIA methodology will facilitate the early identification of social concerns and issues, which will thereby inform the identification, avoidance or minimisation of potential adverse impacts of transmission infrastructure on receiving communities.

The SIA must refer to specific findings from the community engagement and/or public participation strands of project development outlined at Chapter 8, as well as to Environmental Impact Assessment and landscape and visual impact assessment studies outlined in Chapter 4, in order to understand issues that may affect local social and ecological assets, land use or recreational amenities.

In 2012, the Government issued a Policy Statement on *The Strategic Importance of Transmission and other Electricity Infrastructure*. This Policy Statement reinforced the need to protect the interests of individual, households, businesses and communities when developing grid infrastructure. In response, in 2015 EirGrid established community fund and proximity payment initiatives. These provide a direct benefit to those individuals and communities who are close to new transmission infrastructure; each time EirGrid builds new transmission infrastructure in an area, a Community Fund and Proximity Payments are set up for the project.

9.3 Challenges

SIA is not a mandatory requirement for project development in Ireland and there is currently no standardised approach. Neither is SIA a well-used tool in an Irish context.

EirGrid's SIA methodology and proposed approach is based on a review of international SIA models and best practice. However being at the forefront of SIA is therefore a challenge in terms of implementing new methods and practices in an Irish context.

9.4 Policies and Objectives

9.4.1 Society and the Community

It is the policy of EirGrid:

HBSP1: To consider and address social impact and the impact on human beings in the development of transmission infrastructure projects as appropriate.

It is the objective of EirGrid:

HBSO1: To examine the social impact of transmission infrastructure developments on the receiving environment as appropriate and in accordance with EirGrid's methodology for Social Impact Assessment.

HBSO2: To ensure that all grid development projects are screened for the requirement for a Social Impact Assessment, and where so required, that such Assessment will accompany an application for statutory consent.

HBSO3: To promote and deliver Community Funds and Proximity Payments for certain categories of transmission infrastructure projects, in accordance with established terms of reference.

The Social policies and objectives detailed above are assessed against Strategic Environmental Objectives in Chapter 11 of the SEA Environmental Report. The outcome of this assessment is overall very positive.

Chapter 12 of the SEA Environmental report details recommendations on how some aspects of the draft version of the IP could be improved. Some minor amendments to the Social policies and objectives were suggested (Table 12.1, 12.2) and are reproduced in Part D of this IP. These recommendations have been taken into account in the finalisation of the IP. Note all policies and objectives have been screened out from the need for Appropriate Assessment (see accompanying Natura Impact Statement, Chapter 5, AA Screening).

9.4.2 Human Health

It is the objective of EirGrid:

ENVO1: To ensure that transmission development projects follow the standard approach to environmental assessment of transmission projects set out in the EirGrid topic specific guidelines: EMF & You*, Power Lines and Your Health - Answering Your Questions* and any future EirGrid guideline documents.

Part C: Projects

10.0 Projects in the 2016 Transmission Development Plan

10.1 Introduction and Context

Under its statutory and license obligations (Regulation 8(6) of the European Communities (Internal Market in Electricity) Regulations, 2000), EirGrid is required annually to produce *"a plan (in these Regulations referred to as the "development plan") for the development of the transmission system in order to guarantee security of supply"*. The Transmission Development Plan (TDP) presents EirGrid's view of future transmission needs, and a plan to develop the network through specific projects to meet these needs, over a ten year period.

The approved TDP (CER, 2017)[37] at the time of compilation of the draft version of the IP covered the ten year period 2016-2026, and is publically available at http://www.eirgrid.ie/site-files/library/EirGrid/TDP-2016_Final_for_Publication.pdf.

As part of the preparation of the TDP 2016, EirGrid consulted with System Operator Northern Ireland (SONI) to ensure that all information in the TDP is accurate. Separately, public consultation on the draft TDP was managed by the Commission for Energy Regulation (now CRU). The TDP was updated by EirGrid in consideration of feedback received from the public consultation, and a report was provided to the then CER on the feedback received. The final version of the TDP was submitted to the then CER for approval.

In order to facilitate the comparison of network development projects year-on-year, and in the interest of routine reporting, data in the TDP are captured at a fixed point in time – the "data freeze date". In respect of the TDP 2016, the data contained therein was applicable as at the data freeze date of 31 March 2016.

In this context therefore, it is important to understand that any TDP is a "point-in-time" understanding of transmission network development. However, the long-term development of the network is under continuous review by EirGrid. The TDP 2016 is clear in acknowledging the possibility that changes will occur in the need for, scope of, project phase, and timing of transmission infrastructure development set out therein (Sections 1.5 and 1.6 of the TDP 2016).

It is also acknowledged that it is likely, given the continuously changing nature of electricity requirements, that new developments will emerge that could alter the project information as presented in any version of a TDP. These changes are identified in future studies and updated in future TDPs. The TDP 2016 therefore

[37] It should be noted that the TDP 2017 was approved by the CRU in August 2018 at a point in time when the consultation on the draft IP, SEA and NIS was out for public consultation. Information on how differences between the 2016 and 2017 TDP have been addressed is presented in Chapter 11.

summarises transmission projects and the changes that have occurred since the previous TDP 2015 (which was also subject to a data freeze date).

As noted in Section 1.2 of this IP, each TDP includes an Environmental Appraisal Report (EAR) which considers whether the annual TDP is consistent with the provisions of the governing Strategic Environmental Assessment (SEA). As such, while this IP, and accompanying SEA process, has regard to the current TDP 2016, subsequent TDPs over the next 5 years will be appraised against the provisions of the SEA.

Table 5.1 of the TDP 2016 identifies that there were 116 active transmission infrastructure projects at the time of the design freeze in March 2016, comprising:

Table 10.1: Active Transmission Infrastructure Projects	
Category	**No of Projects**
New Build	34
Uprate/Modify	60
Refurbish/Replace	20
Other	2
Total	116

It is clear from this that the vast majority (c.70%) of EirGrid's projects relate to the upgrading and ongoing use of the existing transmission infrastructure. This is consistent with the pillar of EirGrid's Grid Development Strategy, addressed at Section 2.3 above, which states that *"we will optimise the existing grid to minimise the need for new infrastructure"*.

Of the 116 projects, Table 5.2 of the TDP 2016 confirms that there are 69 projects in what is termed "Phase 2" – relating to the stages of design, routing/siting, pre-planning or planning application stage, and including public consultation and engagement. The other 47 projects are in what is termed "Phase 3" – relating to the post-consent (and post-EIA/AA) stages of detailed design, procurement, construction and energisation.

Table 10.2: Phases of Transmission Infrastructure Projects		
Phase 2	**Phase 3**	**Total**
69	47	116

Appendix B of the TDP 2016 addresses *"Changes Since TDP 2015"*. Of particular note is the Section *"Projects with a Change of Scope since TDP 2015"*, which includes the Grid Link project. As noted in Chapter 3 above, and at Page 96 of the TDP 2016, the Grid Link project has evolved into the Regional Solution comprising a number of separate though integrated projects primarily across the south and south-eastern regions. The TDP 2016 states (as per the status at the design freeze date of March 2016) that *"the projects that make up the Regional Solution are currently being progressed through the capital approval process"* (capital approval is formal internal investment approval by EirGrid's Board). At the time of publishing this IP, all projects of the Regional Solution have capital approval and are now in "Phase 2".

Also of note, Appendix B lists *"Projects on Hold"* at the design freeze date of March 2016; this included the North Connaught 110 kV Reinforcement Project. This project was on hold while the Grid West project – a 400 kV reinforcement - was a live project. The scale of the Grid West project derived from the volume of

renewable generation in the North Mayo area that was anticipated would require to be brought onto the transmission network.

In September 2017, EirGrid announced plans to replace the Grid West electricity transmission project with a smaller-scale development. This was due to lower than expected amounts of wind generation in the North Connacht region. As a consequence, since September 2017, the Grid West project, listed in Table C-2 of the TDP 2016 as a planned project in the Border, Midlands and West Planning Area, has now terminated.

The North Connaught project has now become a live project, comprising a new 110 kV circuit between the existing Moy substation near Ballina, Co. Mayo, and another existing substation (to be determined) in the West Region. It has not yet been determined if this circuit will be an overhead line or an underground cable (or a partial underground cable).

Finally of note, the Celtic (Ireland-France) Interconnector is listed in Table D-1 of Appendix D of the TDP 2016 as a project contained in the wider European Ten Year Network Development Plan (TYNDP) 2016. It is also listed in Table D-4 as an Irish Project of Common Interest (PCI), and in Table D-5 as an Irish Project in the e-Highway 2050 Plan. It is not, however, listed as a *"project"* in the TDP 2016, given that it has not yet received formal capital approval from the EirGrid Board, and given that it is still at a preliminary stage. Notwithstanding this status however, significant technical, environmental and other analysis has occurred on the Celtic Interconnector project, and while still not a Capital Approved project, the following conclusions have already been made for the project:

- It will primarily comprise a submarine circuit, approximately 500km in length, placed on or beneath the seabed between France and Ireland;
- It will comprise a High Voltage Direct Current (HVDC) underground cable circuit between the landfall point (where the submarine circuit comes onshore) and an on-land converter station;
- The converter station will convert the electricity from HVDC to High Voltage Alternating Current (HVAC), which is used on the transmission grid. The converter station does not need to be in close proximity to the connection point on the grid;
- There will be a HVAC land circuit between the converter station and the connection point (substation node) on the grid. This circuit can be underground cable or overhead line;
- Knockraha substation in East Cork and Great Island substation in West Wexford were initially identified as potential connection points for the Celtic Interconnector, based on their connectivity in the Irish transmission grid and their location along the south coast of Ireland. High-level analysis of the potential impact of the Celtic Interconnector on the grid has confirmed that the East Cork connection point can accommodate the additional power flows associated with the Celtic Interconnector significantly better than the connection point at West Wexford;
- Ten feasible landfall locations along the southern coast have been identified. While there are feasible options in both East Cork and West Wexford, from a wider land and marine perspective the East Cork locations perform better than the West Wexford locations;

- The two preferred marine routes are from the East Cork area to North Brittany in France.

Notwithstanding all this, it must be understood that no decision has been made yet to construct the project. It is anticipated that a decision in this regard could be made in early 2019.

The transmission infrastructure projects outlined below include the following:

- CP No. – Capital Project Number – each project is referenced with a Capital Project Number for co-ordination between EirGrid and the Transmission Asset Owner, ESB Networks;
- Project Title – these generally refer to the one or more substation nodes where the project is occurring, or between which a circuit extends;
- ECD – Expected Completion Date – these are estimates having regard to envisaged project design, planning and consents, and construction timelines, and while based on best available information, may be subject to ongoing change;
- Phase – as discussed above, these are generally the pre-planning/design phase (Phase 2), or the post-consent/construction phase (Phase 2).

The table nomenclature is that of the TDP 2016. In the interest of clarity, this nomenclature has not been altered for this Implementation Plan.

Note:
Since the drafting of the Grid IP and consultation on same, TDP 2017 was prepared and approved by CRU. http://www.eirgridgroup.com/site-files/library/EirGrid/TDP_2017_Final_for_Publication.pdf
Provision for these additions has been made in the overall approach to environmental assessment of annual Transmission Development Plans (See Fig 1.3). There were 117 active projects in TDP 2016 as detailed in this Grid IP. In TDP 2017, 19 of these projects were completed and 34 new projects added to the transmission development plan.
The TDP 2017-2027 therefore includes 131 projects in total over 60% of which relate to existing assets i.e. Uprate/Modify or Refurbish/Replace projects. Of the 34 new projects, 20 are uprate/modify or refurbishment of existing infrastructure, three relate to minor diversions to accommodate road projects, 10 new build projects are listed, 8 of which are within existing substation compounds.

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10.2 Projects in Multiple Planning Areas

There are eight projects that are in multiple Planning Areas; these projects are listed in Table 10.3 below.

Table: 10.3 Planned Projects that are in Multiple Planning Areas (8 Projects)

CPNo.	Project Title	Type	km	Drivers			Needs					Location		Phase	ECD
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County/ Counties	Planning Area/s		
CP0755	Cauteen - Killonan 110 kV Line Uprate	Uprate/ Modify	27.9		□			□				Tipperary South, Limerick	SE-ME-D, SW-MW	3	2017
CP0596	Kinnegad - Mullingar 110 kV New Circuit	New Build	27*	□				□				Meath, Westmeath	B-M-W, SE-ME-D	3	2016
CP0825	Oldstreet - Woodland 400 kV Line Refurbishment	Refurbish/ Replace	126.4	□							□	Galway, Tipperary, Offaly, Kildare, Meath	SE-ME-D, B-M-W	3	2017
CP0824	Moneypoint - Oldstreet 400 kV Line Refurbishment	Refurbish/ Replace	102.5	□							□	Clare, Galway	SW-MW, B-M-W	2	2019
CP0585	Laois-Kilkenny Reinforcement Project	New Build	30* + 22[38]	□				□				Laois, Kilkenny	SE-ME-D, B-M-W	2	2019
CP0466	North South 400 kV Interconnection Development TYNDP / 81)	New Build	106*	□	□	□	□	□		□		Meath, Cavan, Monaghan, Armagh, Tyrone	B-M-W, SE-ME-D	2	2019
CP0873	Dunstown - Moneypoint 400 kV Line Refurbishment	Refurbish/ Replace	208.5	□							□	Clare, Tipperary, Laois Kildare	SE-ME-D, SW-MW, B-M-W	2	2018
CP0867 (NEW)	Flagford - Louth 220 kV Refurbishment Project	Refurbish/ Replace	110.1	□							□	Roscommon, Leitrim, Longford, Cavan, Meath, Louth	B-M-W, SE-ME-D	2	2018

[38] 30 km accounts for the proposed new 110 kV circuit between the proposed new 400/110 kV station near Portlaoise and the proposed new 110 kV station at Ballyragget, while 22 km accounts for the proposed 110 kV uprate to the existing Ballyragget – Kilkenny line which is currently operated at 38 kV.

10.3 Projects in the Border, Midlands and West Planning Area

There are 39 projects in the Border, Midlands and West Planning Area; these projects are listed in Table 10.4 below.

Table 10.4 Planned Projects in the Border, Midlands and West Planning Area (39 Projects)

CPNo.	Project Title	Type	km	DRIVERS			NEEDS					Location	Phase	ECD
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties		
CP0197	Mount Lucas - Thornsberry New 110kV Line	New Build	30	□				□				Offaly, Offaly	3	2017
CP0697	Carrick-on-Shannon 110 kV Station - Busbar Uprate and Other Works	Uprate/ Modify	0	□	□			□			□	Roscommon	3	2016
CP0724	Thornsberry 110 kV Station - Busbar Uprate	Uprate/ Modify	0	□				□				Offaly	3	2017
CP0778	Castlebar 110 kV Station - Transmission Works Associated with Installation of New 38 kV GIS	Refurbish/ Replace	0	□					□			Mayo	3	2017
CP0737	Knockranny, Uggool/ Seacon New 110 kV Stations - New Wind Farm Connections	New Build	4.2*		□				□			Galway	2	2016
CP0603	Clogher and Mulreavy 110 kV New Stations - New Wind Farm Connections	New Build	7.7*		□				□			Donegal, Donegal	3	2016
CP0596	Kinnegad - Mullingar 110 kV New Circuit	New Build	27*	□				□				Meath, Westmeath	3	2016
CP0706	Cloon 110 kV Station - New 110 kV Bay	Uprate/ Modify	0	□					□			Galway	3	2018
CP0731	Bellacorick - Castlebar 110 kV Line Uprate	Uprate/ Modify	38	□	□			□			□	Mayo, Mayo	3	2016
CP0740	Letterkenny 110 kV Station - Relocation of 110 kV Bay and 2 New Couplers	Uprate/ Modify	0	□				□	□			Donegal	2	2018
CP0680	Castlebar 110 kV Station - Uprate transformer 110 kV Bay	Uprate/ Modify	0	□					□			Mayo	2	2018
CP0466	North South 400 kV Interconnection Development (YNDP/ 81)	New Build	106*	□	□	□	□	□		□		Meath, Cavan, Monaghan, Armagh, Tyrone	2	2019
CP0645	Portlaoise 110 kV Station - 2 New 110 kV Bays	Uprate/ Modify	0	□					□			Laois	2	2021
~~CP0721~~	~~The Grid West Project (gIP/ 115)~~	~~New Build~~	~~103-115*~~	-	~~□~~	-	-	~~□~~	~~□~~	-	-	~~Mayo, Sligo Roscommon~~	~~2~~	~~2020~~
CP0799	Louth 220 kV Station Upgrade	Uprate/ Modify	0	□				□			□	Louth	2	2020
CP0800	North West Project - RIDP Phase 1 - Reinforcement of the grid in the north-west (TYNDP/ 82)	New Build	83		□		□	□				Donegal, Leitrim, Sligo	2	2022
CP0819	Bellacorick - Moy 110 kV Li rate	Uprate/ Modify	27	□	□			□			□	Mayo, Mayo	2	2019

CP0833	Tawnaghmore and Moy 110 kV Stations - Mayo Renewable Power Connection	Uprate/ Modify	0		□				□			Mayo	3	2016
CP0834	Carrick-on-Shannon 110 kV Station - Uprate Four 110 kV Circuit Breakers	Uprate/ Modify	0	□							□	Leitrim	3	2017
CP0835	Coolnabacky - Portlaoise 110 kV Line Uprate	Uprate/ Modify	8.4	□	□			□			□	Laois, Laois	2	2018
CP0836	Derryiron 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Offaly	2	2017
CP0839	Moy 110 kV Station - Reconfiguration and Busbar Uprate	Uprate/ Modify	0	□	□			□			□	Mayo	2	2019
CP0771	Castlebar 110 kV Station - Busbar Uprate	Uprate/ Modify	0	□	□			□			□	Mayo	3	2017
CP0849	Cashla 110 kV Station - Uprate Two 110 kV Circuit Breakers	Uprate/ Modify	0		□			□				Galway	3	2016
CP0861	Sliabh Bawn 110 kV New Station - New Wind Farm Connection	New Build	1.2		□				□			Roscommon	2	2016
CP0837	Bellacorick 110 kV Station - Transformer Uprate	Uprate/ Modify	0		□				□			Mayo	2	2017
CP0878	Binbane 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Donegal	2	2017
CP0879	Letterkenny 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Donegal	2	2017
CP0881	Galway 110 kV Station - Uprate Two 110 kV Circuit Breakers	Uprate/ Modify	0		□			□				Galway	2	2016
CP0847	Arva - Shankill No.1 110 kV Line Uprate	Uprate/ Modify	18.6	□	□			□			□	Cavan, Cavan	2	2017
CP0850	Shranakilly 110 kV New Station - New Wind Farm Connections	New Build	0		□				□			Mayo	2	2017
CP0838	Dalton 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Mayo	2	2017
CP0870	Carrick-on-Shannon - Arigna T - Corderry 110 kV Line Uprate	Uprate/ Modify	35	□	□			□			□	Roscommon, Leitrim	2	2017
CP0882	Glenree 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Mayo	2	2017
CP0865	Cashla - Salthill 110 kV Line Uprate	Uprate/ Modify	9.4	□	□			□			□	Galway, Galway	2	2017
CP0644	Bracklone 110 kV New Station & Loop in	New Build	0	□					□			Laois	2	2021
CP0951 (NEW)	Garvagh 110 kV Station Redevelopment	Uprate/ Modify	minor		□				□			Leitrim	2	2017
CP0976 (NEW)	Portlaoise 110 kV Station – Uprate two DSO Transformers	Uprate/ Modify	0		□				□			Laois	2	2017
CP0867 (NEW)	Flagford - Louth 220 kV Refurbishment Project	Refurbish/ Replace	110.1	□							□	Roscommon, Leitrim, Longford, Cavan, Meath, Louth	2	2018

10.4 Projects in the South-West and Mid-West Planning Area

There are 38 projects in the South-West and Mid-West Planning Area; these projects are listed in Table 10.5 below.

Table 10.5 Planned Projects in the South-West and Mid-West Planning Area (38 Projects)

CPNo.	Project Title	Type	km	Drivers			Needs					Location		
				Security Of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-Connection	Asset Condition	County / Counties	Phase	ECD
CP0709	Dunmanway 110 kV Station - Busbar Uprate and New Coupler	Uprate/ Modify	0	□				□			□	Cork	3	2016
CP0399	Moneypoint - Kilpaddoge 220 kV New Cable (gIP/ 117)	New Build	10*	□	□		□	□				Clare, Kerry	3	2017
CP0500	Knockanure 220/ 110 kV New Station	New Build	1*		□			□	□			Kerry, Limerick	3	2016
CP0501	Clashavoon - Dunmanway 110 kV New Line	New Build	35*	□	□			□				Cork, Cork	3	2017
CP0622	Tarbert 220/110 kV Station Refurbishment	Refurbish/ Replace	0	□							□	Kerry	3	2020
CP0763	Kilpaddoge – Knockanure and Ballyvouskil - Clashavoon 220 kV Line Uprates and Kilpaddoge - Tarbert 220 kV Line Refurbishment	Uprate/ Modify	97.3		□		□	□				Cork, Kerry	3	2016
CP0647	Kilpaddoge 220/ 110 kV New Station	New Build	0	□				□			□	Kerry	3	2017
CP0650	Ballyvouskill 220/ 110 kV New Station	New Build	14*		□			□	□			Cork, Cork	3	2016
CP0651	Ballynahulla 220/ 110 kV New Station	New Build	10*		□			□	□			Kerry	3	2016
CP0041	Macroom 110 kV Station - New 110 kV Bay for Hartnett's Cross 110 kV New Station	Uprate/ Modify	0	□					□			Cork	2	2019
CP0743	Cow Cross 110 kV Station - New 110 kV Bay	Uprate/ Modify	0	□					□			Cork	2	2019
CP0597	Ennis - Booltiagh - Tullabrack T - Moneypoint 110 kV Line Uprate	Uprate/ Modify	50.2	□	□			□				Clare, Clare	2	2017
CP0688	Moneypoint 400/ 220/ 110 kV GIS Development	New Build	0	□	□			□			□	Clare	3	2017
CP0054	Ardnacrusha 110 kV Station Redevelopment	Refurbish/ Replace	0	□							□	Clare	3	2017
CP0824	Moneypoint - Oldstreet 400 kV Line Refurbishment	Refurbish/ Replace	102.5	□							□	Clare, Galway	2	2019
CP0794	Aghada 220/ 110 kV Station Upgrade	Uprate/ Modify	0	□				□			□	Cork	3	2016
CP0796	Knockraha 220 kV Station Upgrade	Uprate/ Modify	0	□				□				Cork	2	2018

CP0624	Killonan 220/ 110 kV Station Redevelopment	Refurbish/ Replace	0	□							□	Limerick	2	2020
CP0726	Moneypoint to Knockanure 220 kV Project (IP /117)	New Build	26*		□		□	□				Clare, Kerry	2	2018
CP0818	Cordal 110 kV New Station and Connection to Ballynahulla 220/ 110 kV New Station – New Wind Farm Connections	New Build	0	□	□				□			Kerry	2	2017
CP0830	Raffeen - Trabeg 110 kV No. 1 Line Uprate	Uprate/ Modify	10.4	□				□				Cork, Cork	3	2017
CP0829	Clashavoon - Macroom No. 2 New 110 kV Circuit and Increased Transformer Capacity in Clashavoon 220/ 110 kV Station	New Build	6		□			□				Cork, Cork	2	2018
CP0883	Ballynahulla - Ballyvouskill and Ballynahulla - Knockanure 220 kV Line Uprates (formerly part of CP0763)	Uprate/ Modify	1.2		□		□	□				Cork, Kerry	2	2017
CP0852	Clahane 110 kV Station - Reconfiguration works associated with Wind Farm Extension	Uprate/ Modify	0		□				□			Kerry	3	2016
CP0840	Ballynahulla 220 kV station - Second 220/ 110 kV Transformer	New Build	0	□	□			□	□			Kerry	2	2017
CP0925	Kilpaddoge 220 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Kerry	2	2017
CP0892	Aughinish 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Limerick	2	2017
CP0875	Charleville 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0		□				□			Cork	2	2017
CP0863	Midleton 110 kV Station - New 110 kV DSO Transformer Bay	Uprate/ Modify	0	□					□			Cork	2	2019
CP0864	Tarbert - Tralee No. 1 110 kV Line Refurbishment	Refurbish/ Replace	41.8	□							□	Kerry, Kerry	2	2017
CP0741	Trabeg 110 kV Station - Uprate 2 110 kV Transformer Bays	Uprate/ Modify	0	□					□			Cork	2	2020
CP0926 (NEW)	Slievecallan 110 kV Station – New Station	New Build	29.6		□				□			Clare	2	2017
CP0930 (NEW)	Barnadivane 110 kV Station – New Station	Uprate/ Modify	Minor		□				□			Cork	2	2017
CP0941 (NEW)	Moneypoint 110 kV Station – New 110V Transformer Bay	Uprate/ Modify	Minor		□				□			Clare	2	2017
CP0933 (NEW)	Thurles 110 kV Station – New Statcom	New Build	0	□	□			□				N Tipperary	2	2020
CP0934 (NEW)	Ballynahulla 110 kV Station – New Statcom	New Build	0	□	□			□				Kerry	2	2020
CP0935 (NEW)	Ballyvouskill 110 kV Station – New Statcom	New Build	0	□	□			□				Cork	2	2020
CP0936 (NEW)	Knockanure 110 kV Station – New Reactor	New Build	0	□	□			□				Kerry	2	2018

10.5 Projects in the South-East, Mid-East and Dublin Planning Area

There are 33 projects in the South-East, Mid-East and Dublin Planning Area; these projects are listed in Table 10.6 below.

Table 10.6 Planned Projects in the South-East, Mid-East and Dublin Planning Area (33 Projects)

CPNo.	Project Title	Type	km	DRIVERS			NEEDS					Location	Phase	ECD
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition	County / Counties		
CP0753	Waterford 110 kV Station - Uprate 110 kV Bay	Uprate/ Modify	0	□					□		□	Waterford	3	2016
CP0623	Great Island 220 kV Station Redevelopment	Refurbish/ Replace	0	□							□	Wexford	3	2016
CP0667	Inchicore - Maynooth No. 1 and No. 2 220 kV Line Uprate	Uprate/ Modify	38	□				□			□	Dublin, Kildare	3	2016
CP0683	Dunstown 400/ 220 kV Station - New 400/ 220 kV 500 MVA Transformer	New Build	0			□		□		□		Kildare	3	2016
CP0747	Maynooth - Ryebrook 110 kV Line Uprate	Uprate/ Modify	9	□				□				Kildare, Kildare	3	2016
CP0668	Corduff - Ryebrook 110 kV Line Uprate and Ryebrook 110 kV Station Busbar Uprate	Uprate/ Modify	8	□				□				Dublin, Kildare	3	2016
CP0798	Dunstown - Turlough Hill 220 kV Line Refurbishment	Refurbish/ Replace	25.2	□							□	Kildare, Wicklow	3	2016
CP0770	Poolbeg 220 kV Station - Fencing	Other	0	□							□	Dublin	2	2016
CP0779	Dungarvan 110 kV Station - Transmission Works Associated with Installation of New 38 kV GIS	Refurbish/ Replace	0	□					□			Waterford	3	2017
CP0486	Wexford 110 kV Station - New 110 kV Transformer Bay and New Coupler	Uprate/ Modify	0	□				□	□			Wexford	2	2020
CP0756	Cauteen - Tipperary 110 kV Line Uprate	Uprate/ Modify	13		□			□				Tipperary South, Tipperary South	3	2017
CP0755	Cauteen - Killonan 110 kV Line Uprate	Uprate/ Modify	27.9		□			□				Tipperary South, Limerick	3	2017

CP0729	Great Island 110 kV Station Redevelopment	Refurbish/ Replace	0	□							□	Wexford	2	2017
CP0789	Ryebrook 110 kV Station Redevelopment	Refurbish/ Replace	0	□					□			Kildare	3	2016
CP0490	Great Island 220/ 110 kV Station - New 110 kV DSO Transformer Bay for DSO Connection to Knockmullen (New Ross)	Uprate/ Modify	0	□					□			Wexford	2	2019
CP0646	Finglas 110 kV Station Redevelopment	Refurbish/ Replace	0	□				□			□	Dublin	3	2018
CP0760	Installation of 100 Mvar Reactive Support in Dublin Region	New Build	0	□				□				Dublin	2	2017
CP0580	Carrickmines 220/ 110 kV Station - New 4th 220/ 110 kV 250 MVA Transformer and GIS Development	New Build	0	□				□			□	Dublin	3	2017
CP0792	Finglas 220 kV Station Upgrade	Uprate/ Modify	0	□				□			□	Dublin	2	2018
CP0585	Laois-Kilkenny Reinforcement Project	New Build	30* + 22[39]	□				□				Laois, Kilkenny	2	2019
CP0825	Oldstreet - Woodland 400 kV Line Refurbishment	Refurbish/ Replace	126.4	□							□	Galway, Tipperary, Offaly, Kildare, Meath	3	2017
CP0437	Belcamp 220/ 110 kV Project - New 220/ 110 kV Station to the East of Finglas 220/110 kV Station	New Build	10*	□				□	□			Dublin	3	2017
CP0693	Baroda 110 kV Station - 2 New 110 kV Bays	Uprate/ Modify	0	□					□			Kildare	2	2020
CP0692	Inchicore 220 kV Station Upgrade	Uprate/ Modify	0	□				□			□	Dublin	2	2020
CP0859	Cloghran - Corduff 110 kV New Cable	New Build	2.5	□				□	□			Dublin, Dublin	3	2016
CP0862	Cloghran 110 kV Station - New Cable Bay and New Transformer Bay	Uprate/ Modify	0	□					□			Dublin	2	2016
CP0894	Great Island 220 kV Station - New DSO 110/ 38 kV Transformer	Uprate/ Modify	0	□					□			Wexford	2	2020
CP0872	West Dublin New 220/ 110 kV Station	New Build	0	□				□	□			Dublin	2	2019
CP0869	Maynooth - Woodland 220 kV Line Refurbishment	Refurbish/ Replace	22.3	□							□	Dublin, Dublin	2	2017
CP0914	Meath Hill 110 kV Station – Uprate 2 DSO Transformers	Uprate/ Modify	0		□				□			Meath	2	2016
CP0927 (NEW)	Clonee 220kV Station – New 220 kV Station to supply a demand load	New Build	1.4	□					□			Meath	2	2017
CP0928 (NEW)	Cloghran Phase 3, Cloghran 110 kV Station – 2 New Transformers and cables	Uprate/ Modify	0.7	□					□			Dublin	2	2016
CP0915 (NEW)	Cauteen 110 kV Station – Busbar expansion and station development	Uprate/ Modify	0		□				□			S Tipperary	2	2017

[39] 30 km accounts for the proposed new 110 kV circuit between the proposed new 400/110 kV station near Portlaoise and the proposed new 110 kV station at Ballyragget, while 22 km accounts for the proposed 110 kV uprate to the existing Ballyragget – Kilkenny line which is currently operated at 38 kV.

10.5 National Programmes

There are six national programmes each with elements at various locations around the country; they are listed in Table 10.7 below.

Table 10.7 Planned National Projects at various locations (6 Projects)

CPNo.	Project Title	Type	km	Drivers			Needs					Phase	ECD
				Security of Supply	RES Integration	Market Integration	Inter-Regional Power Flow	Local Constraints	Connection	Inter-connection	Asset Condition		
CP0752	HV Line Tower Painting - South	Refurbish/ Replace	0	_							_	3	2015
CP0788	Micafil Bushings Replacement	Refurbish/ Replace	0	_							_	3	2015
CP0786	Surge Arrestor Replacement - North	Refurbish/ Replace	0	_							_	3	2016
CP0322	Protection Upgrades at Various Stations	Refurbish/ Replace	0	_							_	3	2016
CP0857	Paint Towers Nationwide	Refurbish/ Replace	0	_							_	3	2016
CP0757	Remote Control for NCC Phase 3	Other	0	_								2	2016

11.0 Strategic Environmental Assessment of TDP 2016 (Project Assessment)

An examination of the possible environmental impacts of grid development projects within TDP2016 is part of the Strategic Environmental Assessment (SEA) as detailed in Chapter 11 (section 11.4) of the Environmental Report.

All projects are subject to a range of inherent mitigation derived from statutory and EirGrid in house processes and procedures that work to avoid in the first instance and mitigate potential environmental effects of development from the IP. These measures are set out in Part B Implementation of this report. The applicability of these processes and measures will be dependent on the nature and scale of each project.

The assessment of likely significant environmental effects (Chapter 11 of the SEA Environmental Report) has been undertaken with the assumption that these inherent mitigation measures will be implemented for projects detailed in this IP as it relates to TDP 2016 and for any projects included in future TDPs.

Figure 11.4 of the Environmental Report (reproduced overleaf) outlines the approach to project screening for the SEA project assessment. All projects outlined in the TDP 2016 were taken forward to initial screening for the requirement to undergo assessment under the SEA. Projects that have already gone through an approval process (e.g. planning process) are not assessed but are considered in the cumulative assessment as appropriate.

After a review of the draft Grid IP, 73 projects were deemed to have gone through the appropriate planning channels - being already constructed, under construction, planning consented or deemed exempt development. Since the development of the 2016 TDP, the Celtic Interconnector and the Regional Solution have progressed and were therefore included in this SEA project screening process. In addition, the cancellation of the Grid West project and its proposed substitution with the North Connacht 110kV Solution has been factored into the assessment.

46 (or 38%) of the projects were identified through the first iteration of screening for SEA. These projects comprise transmission development that will be subject to the planning and consenting process, or deemed as exempt development. These projects were subject to a second level project screening exercise, and from this, 5 projects where taken forward for detailed assessment of likely significant effects (SEA Environmental Report Tables 11.5-11.9).

These comprise 3 new-build projects, 1 existing line uprate, and 1 project with a number of elements:

- The North Connacht 110kV Solution – a new build project located in the west region (replacing Grid West 400kV project);
- North-West Project – a new build project located in the border region;
- Celtic Interconnector - a new build project located on the southeast coast connecting to the northwest coast of France;
- Regional Solution– a number of elements including new build, series compensation and uprates (replacing Grid Link 400kV project); and
- Coolnabacky - Portlaoise 110kV Line Uprate – an existing 110kv line uprate.

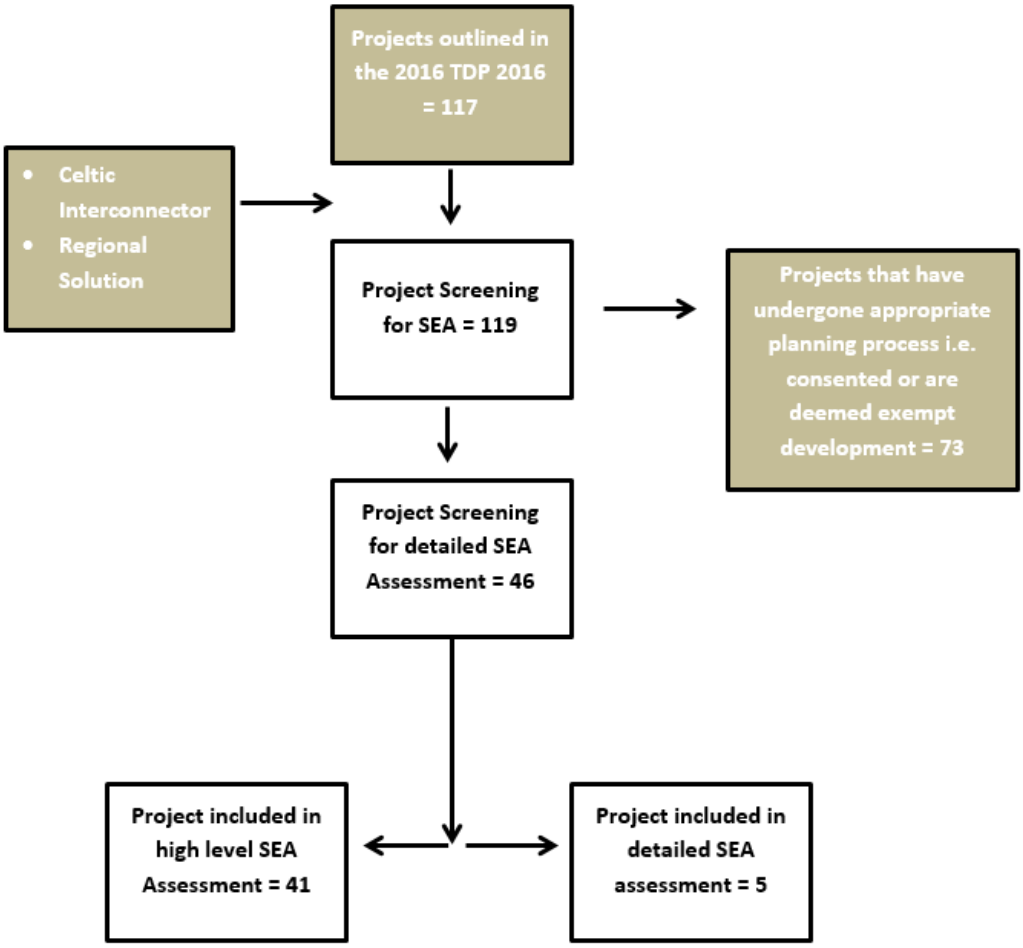

Figure 11.1: From the SEA Environmental Report: Figure 11.4: SEA Project Screening

An examination of all the other projects showed that the modifications to existing assets did not pose likely significant environmental impacts due to their relatively small scale or the nature of the individual developments (SEA Environmental Report Table 11.20). Cumulative and in combination impacts are assessed and presented in Table 11.25 of the SEA Environmental Report.

Note on TDP 2017

As outlined in the note related to TDP2017 in section 10, 117 active projects were listed TDP 2016 as detailed in this Grid IP. In TDP 2017, 34 new projects were added to the transmission project list. Of the 34 new projects, 20 are uprate/modify or refurbishment of existing infrastructure, three relate to minor diversions to accommodate road projects, 10 new build projects are listed, 8 of which are within existing substation compounds. Therefore the majority of these new additions to the TDP are modifications to existing assets and do not pose likely significant environmental impacts due to their relatively small scale or the nature of the individual developments (each project will be assessed as appropriate, relative to relevant planning requirements). The Celtic Interconnector and projects part of the Regional Solution are included in the new projects of TDP2017 and have been considered in the SEA as detailed above.

Therefore while this Grid IP has been based on the provisions of TDP2016, it can be considered that the environmental assessment and Appropriate Assessment adequately covers TDP 2017 as no additional projects of regional significance have been proposed that have not already been taken into consideration (such as the Celtic Interconnector and projects part of the Regional Solution).

12.0 Appropriate Assessment (AA)

An examination of the possible impacts of grid development projects detailed within TDP2016 on the Natura 2000 Network of European Sites is presented in the Natura Impact Statement that accompanies the SEA Environmental Report and the IP.

AA screening was undertaken for the projects contained within the draft Grid IP. The TDP 2016 outlines 117 projects which need to be undertaken in the lifetime of the draft Grid IP. This list was taken forward for initial screening. For the purpose of the plan level NIS, only those projects not already moving through the appropriate planning process are considered as projects for assessment under this IP. Projects that have gone through the necessary planning process or approval, as required are not included as they are being / have been assessed individually as projects. Although these projects are not assessed individually under the AA they are, where appropriate, considered as part of the in-combination assessment (see Section 8). After review of the TDP and in consultation with EirGrid, 73 projects were deemed to have gone through the appropriate planning channels, thereby excluding them from the plan level assessment. This ranges from projects already constructed, under construction, with planning consent or deemed exempt development. These are all considered approved projects in the screening table provided in Appendix C.

The remaining 46 projects in the draft Grid IP have not yet passed into the project consenting phase and have been included as part of the plan to be assessed for their potential to result in likely significant effects. This assessment is based on the identified effects pathways (see NIS Table 5.8). The complete list of projects and screening outcomes are included in Appendix C of the NIS.

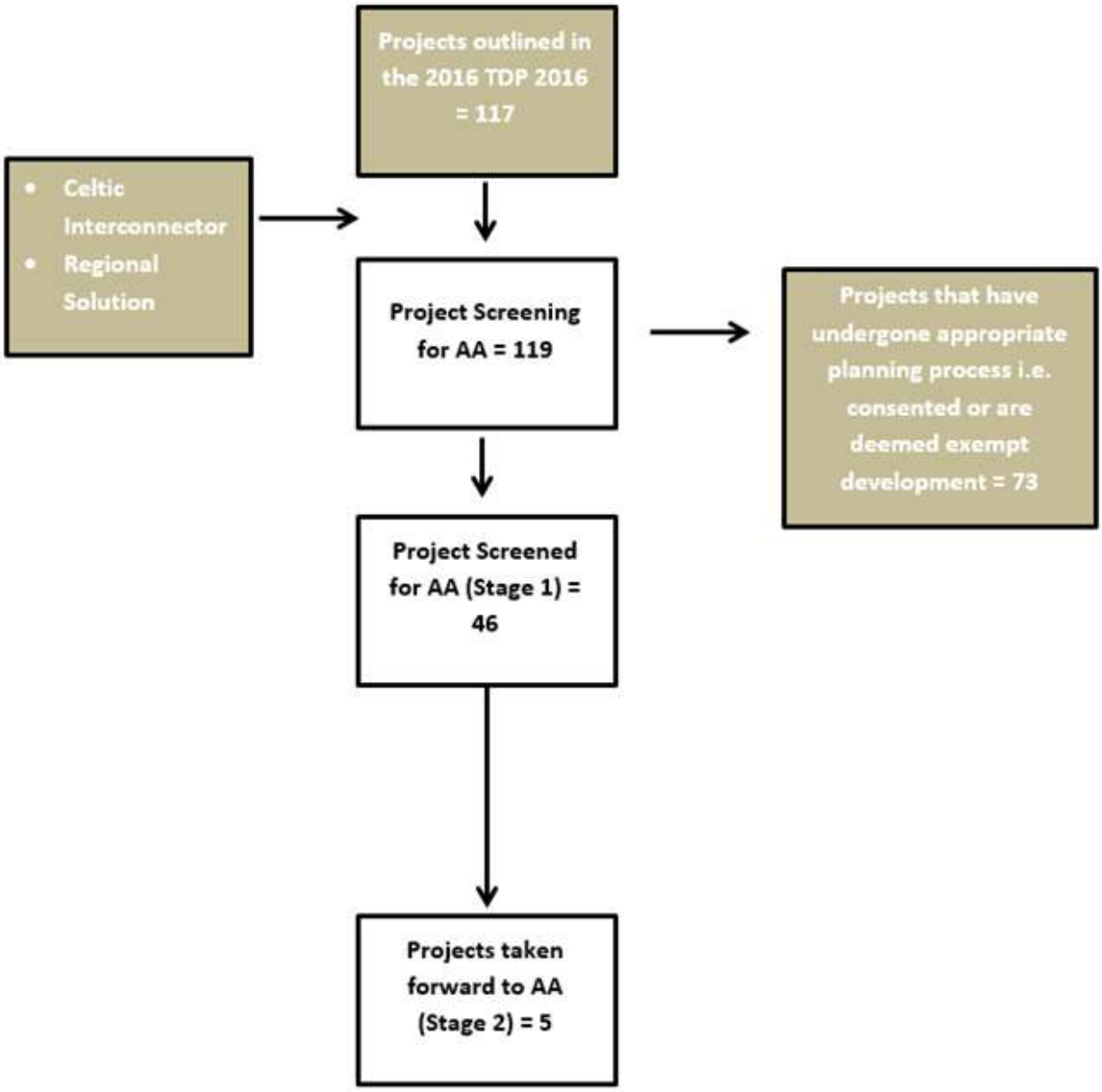

Figure 12.1: From NIS: Figure 5. AA screening of projects in the draft Grid IP

12.1 Assessment of Effects of Projects Contained within the draft Grid IP on the integrity of European sites

Activities arising from a plan may give rise to a variety of effects on species and habitats for which a European site has been designated. To determine whether these activities could have an adverse effect on a European site, it is necessary to determine what effects pathways there might be to a Qualifying Interest species or habitat (QI) /Special Conservation Interest (SCI). These could result in likely significant effects (LSEs) on the QI/SCI of European sites and could therefore have implications for the conservation objectives of the sites and leading to adverse effects on site integrity. It should be noted that potential effects pathways have been identified in the absence of mitigation and/or other control measures.

The draft Grid IP may lead to grid infrastructure development for instance, that could result in a variety of possible effect pathways through, but not limited to:

- species mortality;
- habitat loss and/or fragmentation;
- disturbance (noise, vibration, movement, lighting);
- changes in water quality; and
- changes in hydrology.

Following AA screening, 5 projects (at various stages of consideration or development) contained within the draft Grid IP were brought forward to Stage 2 AA including:

- North West Project – a new build project located in the border region;
- The North Connacht 110kV Solution – a new build project located in the west region;
- Celtic Interconnector - a new build project located on the southeast coast connecting to the northwest coast of France; and
- Regional Solution – a number of elements including new build, series compensation and uprates; of these two projects were screened in for further assessment (Shannon Crossing and the Great Island to Kilkenny 100kV line uprate).

Further information on the projects is provided in Sections 6.2.1 of the NIS.

Part D: Recommendations and Mitigation arising from SEA and AA

13.0 Mitigation Measures arising from SEA and AA

13.1 Introduction

The SEA process, including public consultation on the draft IP has resulted in recommendations and mitigation measures designed to assist in the sustainable delivery of the IP. Recommendations and mitigation measures arising from the SEA and the NIS (prepared to support Appropriate Assessment of the IP) are presented in this chapter.

13.2 SEA Recommendations for Grid Development

No likely significant negative effects have been identified in relation to the development set out in the draft Grid IP. All grid development projects will be subject to inherent mitigation including EirGrid's six step Development Framework, appropriate planning processes, and construction best practice as set out in **Section 11.4** of the Environmental Report.

On a precautionary basis, some *unknown effects* have been acknowledged as being a possibility, largely due to a lack of project specific information available at the time of the assessment.

Section 12.1.2 of the SEA Environmental Report outlines the recommendations proposed in relation to grid development. These SEA recommendations will contribute to EirGrid Strategy Statements and will complement the existing inherent mitigation as set out in **Section 11.** These recommendations will also facilitate effective monitoring of the SEA Objectives throughout the IP cycle.

13.2.1 Review and update of the EirGrid Evidence Based Environmental Studies (ER1) and the EirGrid Environmental Guidelines (ER2)

As outlined in objective ENVO2 of the draft Grid IP, EirGrid intends "*To continue to prepare and/or update EirGrid evidence-based environmental guidelines, particularly in the context of new or updated evidence-based environmental information*". EirGrid is committed to the continuous review and update of its environmental studies and associated guidelines, where required. The EirGrid environmental studies will be reviewed against the current knowledge base during this cycle of the Grid IP. The studies will be updated where necessary to take account new developments and new research in the field.

13.2.2 SEA Compliance Check (ER3) integrated into the Transmission Development Process

EirGrid will develop an SEA compliance check within the six step framework for grid development to facilitate the SEA monitoring as outlined in **Section 12** of the SEA Environmental Report. The SEA compliance check will be adapted for each stage of the six-step Framework for Grid development and will be proportionate to the project scale i.e. from project that are exempted development to SID projects. This SEA compliance check will extend to Step 6 of the Framework, i.e. the construction phase. This process will be documented through a standardised compliance check template and the finding will be reported in the annual EirGrid EAR reports.

13.2.3 Environmental Advisory Group (ER4)

The EAG will continue to function during the second cycle of the Grid IP and will meet over the cycle of the plan to discuss SEA monitoring, the EARs, and the progress of the recommendations as may be required. The annual EARs will be sent to all EAG membersfor information as part of the ongoing rolling Transmission Development Plans.

13.2.4 Environmental Enhancements (ER5)

In the development of new infrastructure and upgrading of existing infrastructure EirGrid will consider, where practicable, measures that could be taken to enhance the natural environment and to improve the biodiversity of the areas where their facilities are located.

It is recommended that EirGrid consider should developing a guide/ tool kit for natural environment enhancement/ mitigation which could be informed by the relevant Evidence Based Environmental Studies (EBES) and related guidelines. This tool could then assist in the identification of potential enhancement opportunities and management measures. There are also the potential merits associated with piloting agreed measures across a range of habitat types, where appropriate, in consultation with key stakeholders. This could involve ecological management of overhead lines that are adapted to local site conditions and take into consideration the local ecological and social objectives, functions and interests.

13.2.5 Review and update of the EirGrid Strategic Environmental Constraints Mapping

The EirGrid *Strategic Environmental Constraints Mapping* will be reviewed against the current knowledge base during this cycle of the Grid IP. The system will be updated where necessary to take account of new development in this area.

13.3 Grid Development Specific Mitigation

13.3.1 Bird Study in the Northwest Area (EM1)

Prior to the selection of the route and technology to be used for the two proposed infrastructure projects in the north-west, namely the North-West Project and North Connaught Project - a study of migratory birds and their routes will be undertaken to inform the selection of the route and/or technology to be used having regard for other constraints. This study will build upon work undertaken to date for the discontinued Grid West Project. The study of birds in the north-west area will have regard to potential cumulative effects from other projects in the region.

13.3.2 Alternatives Assessment and Cumulative Assessment (EM2) Mitigation

Assessment of alternatives is a fundamental part of the EirGrid six-step Framework including an assessment of the environmental impact of each technology option in order to understand the environmental implications of a project. No further or specific mitigation measures or recommendations are proposed in this report

This SEA Environmental Report has presented a non-exhaustive list of projects in the vicinity of some of the larger projects outlined in the draft Grid IP, such as the Celtic Interconnector. A number of these projects or future projects could result in cumulative impacts with Grid development projects at the project level scale. EirGrid undertakes cumulative impact assessment as part of its project assessment process such as EIA and AA. EirGrid will use best practice documents including the UK Planning Inspectorate Advice Note 17: Cumulative effects assessment relevant to nationally significant infrastructure projects (Planning Inspectorate, 2015) when undertaking EIA.

As part of this process, EirGrid will consult with local authorities in the form of county planning departments and with key infrastructure developers (such as TII, Irish Rail and Irish Water, and private wind farm developers), to gain an understanding of the projects proposed in an area that could result in cumulative effects with grid development.

13.4 Monitoring Framework

A monitoring framework has been developed for the IP using the SEA objectives and indicators (Table 13.1 of the SEA Environmental Report). The purpose of this monitoring is to:

- provide the evidence needed to monitor and manage the potential significant negative effects and unforeseen effects of the draft Grid IP during detailed project development; and

- monitor the baseline environmental conditions for all SEA objectives and inform the planned six yearly update of the Grid IP when all available monitoring data will be reviewed.

The development of this monitoring framework included a review of the appropriateness and practicality of the previous objectives, indicators, targets and monitoring measures outlined in the Grid 25 IP and SEA. The monitoring frequency for each indicator will vary depending on availability of data however, where available, these will be recorded annually in the EAR which will accompany the annual TDP. Any effects or issues identified during SEA monitoring will be used to inform the development of the next Grid IP.

13.5 Appropriate Assessment

The Implementation Plan has been assessed in terms of examining the likely significant effects of the plan on European Sites and where these effects could lead to adverse effects on the integrity of European sites. Key principles for protecting European Sites are presented in Chapter 7 of the accompanying NIS and are reproduced in this chapter for ease of reference (See Table 13.3 below).

Table 13.3: From NIS- Box 7A. Key Principals for Protecting European Sites

Avoidance: In developing any future major projects EirGrid will always seek to find options that avoid impacts on European sites (for example, by assessing alternative route options). Any future projects developed as a result of the draft Grid IP will be subject to examination of constraints, route selection and project level AA. All of which will be informed by detailed ecological assessment, so that sensitive receptors are avoided. Avoidance of European sites, including SACs and SPAs, will always be a key consideration informing route options.

Mitigation: Where avoidance is not possible adverse effects on site integrity will be avoided through project specific mitigation measures, either through the design of the project or subsequent measures that can be guaranteed – for example, through a condition or planning obligation. Mitigation measures should ensure that no significant residual impacts remain thus preserving site integrity.

- **Habitat Loss:** Underground cables are usually (where practicable) constructed within existing public roads therefore limiting or avoiding the potential for habitat loss within SACs. The construction of towers or other supporting structures for OHLs may be required to pass through SACs. In such instances towers or supporting structures would be erected outwith sensitive areas informed by detailed surveys. In undertaking this assessment and screening potential impact pathways (see **Appendix D**) an assumption has been made that where European sites cannot be avoided altogether detailed surveys of habitats within the affected area of an SAC will be undertaken to locate and avoid sensitive habitats to ensure there is no loss of QI Annex I habitats or QI species (in particular habitat surveys would also seek to identify any QI plant species, where present, associated with the European site).
- **Supporting Habitat Loss:** Surveys focusing on mobile QI/SCI species (which can move outside the confines of a European site) would ensure any significant areas of supporting habitat (e.g. foraging areas for SCI birds in close proximity to, but outwith the SPA, otter holts outwith an SAC etc.) would be identified and avoided or appropriate mitigation measure put in place.
- **Invasive species:** There is the potential for non-native invasive species to be present in areas within the study area the draft Grid IP. If present, these could potentially be spread to habitats within SACs/SPAs during construction works/ operation (e.g. maintenance works for OHL line uprate, modification works). The introduction of invasive species into a European site can affect the conservation objectives for QI habitats or species, potentially adversely affecting the integrity of the European site (e.g. affecting vegetation composition of an Annex I QI habitat, affecting species distribution and abundance and/or out competing native species). Invasive species survey (for species listed on Schedule 3 of the Birds and Habitats regs, 2011) will be undertaken for all projects arising from the draft Grid IP. If invasive species are found to be present an invasive species management plan will be prepared to outline control and or removal measures to ensure such species are not spread during construction or operation of any future projects.

- **Preconstruction Surveys/seasonal restrictions:** To ensure appropriate protection of QI/SCI habitats and species preconstruction surveys will be undertaken for all projects (where required), while the implementation of seasonal working restrictions may be required. Furthermore, works in sensitive areas will be supervised by an experienced ecologist/ecological clerk of works (ECoW).

High level mitigation measures are presented for projects in Section 7.2 to 7.5 of the NIS. These mitigation measures are reproduced in this section.

Box 7B. Mitigation measures in relation to habitat degradation (hydrogeology/water quality) affecting QI habitats and species in European sites - North West Project

Petrifying springs, Turloughs and other GWDTHs

Where there is potential for construction related impacts on ground water sources (e.g. tunnelling/excavation works) from the placement of UGCs in the vicinity of sensitive groundwater dependant terrestrial habitats (GWDTHs)a detailed geological and hydrogeological assessment will be undertaken to ensure that impacts on these QI habitats are **avoided**. The surveys must be sufficient to inform a detailed assessment as to whether the predicted effects on ground water would affect the conservation objectives supporting these habitats favourable conservation status within a given site, and thus adversely affect the integrity of a given SAC. Where such impacts are predicted **appropriate mitigation** will be put in place to ensure site integrity is not compromised. Such detail would only be available at the project level.

Groundwater Dependant Terrestrial QI species

Detailed surveys will be undertaken for QI species (*Vertigo spp./other QI plant species)* where works are required within an SAC (supporting this QI) outside of Annex I/QI habitats but in habitats with the potential to support these species or where works outside of the SAC but within close proximity of (250m) the SAC could potentially impact on groundwater sources. If these species are identified within the potential ZoI of the works, works will be moved to **avoid** mortality risk effects on these species.

Sensitive Aquatic Species and Habitats

If aquatic habitats within a SAC cannot be avoided, an appropriate level of survey work would be carried out to assess potential impacts and develop the necessary mitigation. A habitats' role in supporting aquatic QI species (e.g. Atlantic salmon, otter, lamprey species, white-clawed crayfish or freshwater pearl mussel) would form a component of the assessment work. Following on from this as part of the design phase potential risks of construction works affecting water quality/aquatic species will be identified. Depending on the nature and scale of the works and the final technology option(s) chosen, **appropriate mitigation** will be put in place.

To minimise the environmental impacts of the works and to ensure best practices and suitable mitigation measures are adopted, the contractor would be required to produce an environmental management plan, including a pollution contingency plan prior to the commencement of activities. Mitigation would be proportionate to the nature and scale of the works and the technology option(s) chosen. In more sensitive locations, an ECoW would be required to regularly inspect all pollution prevention controls.

An Erosion and Sedimentation Control Plan (ESCP) would also be prepared. This would be adapted depending on the nature of the works and the species concerned, for example works being undertaken close to a watercourse within a FWPM catchment is likely to require more stringent mitigation measures in relation to sediment control measures. In such instances action measures, as outlined in the FWPM Sub Basin Management Plans shall be taken into account. Key mitigation measures identified in the recent EBES studies will be implemented where required and appropriate. For example, the EBES on soils and geology recommended implementing a 50m buffer between a watercourse and a structure/construction works and the avoidance areas of soft/fine soils. Where these measures cannot be implemented the use of silt curtains are recommended.

Best practice construction methods will be implemented at all times in relation to the protection of watercourses in accordance with the following non-exhaustive list of guidance:

- Guidelines on the protection of Fisheries during Construction Works in or Adjacent to Waters
- (Inland Fisheries Ireland, 2016).
- SEPA Pollution Prevention Guidelines (PPG) including 'PPG 1: General Guide to the Prevention of Pollution', 'GPP 5: Works or Maintenance on or Near Water', 'GPP 6: Working at Construction or Demolition Sites'; http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/.
- CIRIA Technical guidance (C648). Control of water pollution from linear construction projects.

Where risks are identified, the ESCP must include sufficient pollution control measures to prevent run-off, silt, hydrocarbons or any other harmful substances or substrates from entering any surrounding water features including rivers or lakes or any other water features (drainage ditches) which drain into same thus preventing any significant impacts to water quality and or aquatic QI species within an SAC, thus maintaining site integrity.

Storage facilities would contain and prevent the release of fuels, oils and chemicals associated with plant, refuelling and construction equipment into the environment. All protective coatings used would be suitable for use in the aquatic environment and used in accordance with best environmental practice. A pollution contingency plan would establish methods and procedures to deal with any spills and the timely reporting of incidents.

Box 7C. Mitigation measures in relation to mortality risk affecting QI/SCI species of European sites - North West Project

Otter

At the outset of the project detailed ecological assessments will be undertaken including detailed surveys for otter. Surveys will be required to identify, if and how, otter are using habitats potentially directly affected by construction works (e.g. an active holt in the vicinity of the works which could be prone to collapse from tunnelling/excavation works). The surveys must be sufficient to inform a detailed assessment as to whether the predicted mortality risk effects would affect the conservation objectives supporting otter favourable conservation status within a given site, and thus adversely affect the integrity of the SAC. In the first instance works should be carried out to **avoid** potential impacts on otter. Where such impacts cannot be avoided **appropriate mitigation** will be put in place.

Mitigation measures to reduced mortality risk on otter may include but are not limited to:

- Avoiding works within 150m of active otter holt.
- Temporary exclusion of an otter holt during works.

SCI bird species at high risk from collision

Detailed ornithological surveys to identify flight lines, numbers, local concentrations and evidence of ringed birds (which can be used to identify bird movements) will be undertaken at the very early stages of this project if it to be progressed, to inform the most appropriate route option and technology options to **avoid** significant impacts. Surveys will identify how SCI birds are utilising the surrounding habitats and therefore the potential for them to be affected by mortality risk associated with the operation of OHLs in particular. The surveys will likely need to be undertaken over at least two wintering seasons and will be used together with data already gathered (for other projects in the area) to inform a detailed assessment as to whether the predicted mortality risks from collisions with OHLs would affect the conservation objectives supporting SCI species favourable conservation status within a given site, and thus adversely affect the integrity of the SPA. Where such impacts are predicted **appropriate mitigation** will be put in place.

Mitigation measures to reduced mortality risk to SCI bird species may include but are not limited to;

- Construction of UGCs over OHLs in particularly sensitive areas (e.g. where important migration routes would be transversed).
- Where the option for UGCs in sensitive areas is not viable and OHLs are required, bird markers/

diverters will be placed on OHLs to increase visibility and reduce collision related impacts.

It is recommended that a system of monitoring is put in place to assess the effectiveness of these mitigation measures should they be required, and contingency for ineffective measures established. With both mitigation and monitoring measures in place significant impacts which could undermine the conservation objectives supporting favourable status of these species will be avoided so that site integrity is maintained.

Box 7D. Mitigation measures in relation to disturbance affecting QI/SCI species of European sites - North West Project

Otter

At the outset of the project detailed ecological assessments will be undertaken including detailed surveys for otter. Surveys will be required to identify, if and how, otter are using habitats potentially affected by disturbance effects associated with construction/operation works. The surveys must be sufficient to inform a detailed assessment as to whether the predicted disturbance effects would affect the conservation objectives supporting otter favourable conservation status within a given site, and thus adversely affect the integrity of the SAC.

Mitigation measures to reduced disturbance effects on otter may include but are not limited to:

- Timing of works (e.g. no construction works in the vicinity of watercourse at night when otter is most active).
- **Avoiding** works in the vicinity of an active otter holt.
- Temporary exclusion of an otter holt or otter shelter locations during disturbing works.
- If breeding is suspected, suspension of works may be required or a larger protection zone of between 100-200m from the breeding holt may be required, to be determined in consultation with the statutory consultation body.

SCI bird species

Detailed ornithological surveys to identify flight lines, numbers, local concentrations and evidence of ringed birds (which can be used to identify bird movements) will be undertaken at the very early stages of this project to inform the most appropriate route and technology options to **avoid** significant impacts. Surveys will identify how SCI birds are utilising the surrounding habitats potentially affected by disturbance effects associated with either construction or operational (maintenance) works. The surveys will likely need to be undertaken over at least two wintering seasons and will be used together with data already gathered (for other projects in the area) to inform a detailed assessment as to whether the predicted disturbance effects would affect the conservation objectives supporting favourable status of these species within a given site, and thus adversely affect the integrity of a given SPA. Where such impacts are predicted appropriate mitigation will be put in place.

Mitigation measures to reduce disturbance effects on SCI birds may include but not limited to:

- Timing of works (e.g. avoiding works in or close to SPAs during the bird breeding season [March to August inclusive] or avoiding works in the vicinity of SPAs with over wintering birds between the months of November and March inclusive), or avoiding works simultaneously with other projects which could also cause disturbance.
- Screening of works to reduced disturbance impacts.

Box 7E. Mitigation measures in relation to habitat loss (specifically in relation to Annex I habitats and supporting habitat for Annex II species) - North Connacht Project

Annex I habitats

In the event that a European site cannot be avoided altogether, detailed surveys of habitats associated with the site would be undertaken to locate notable occurrences of Annex I habitats view to developing a pre-construction strategy to avoid, or protect any Annex I habitats identified. The contractor would be obliged to submit a detailed mitigation plan, prior to the commencement of activities with respect to

sensitive Annex I habitats (saltmarsh, mudflats and bogs etc.), including proposals for reinstatement where appropriate. To minimise ground disturbance and compaction to saltmarsh and mudflat habitat, excavation works within the intertidal zone should be carried out using low ground pressure excavators and bog mats, rolled steel / aluminium sheeting or temporary walkways in accordance with the necessary requirements identified in the mitigation plan. Equipment, temporary structures and debris would be removed from the site upon completion to facilitate reinstatement. Similar mitigation measures could be utilised when having to gain access across bog habitats.

Annex II Species - Groundwater Dependant Terrestrial QI species/plant species

Detailed surveys will be undertaken for QI species (*Vertigo spp./other QI plant species)* where works are required within an SAC (supporting this QI) outside of Annex I/QI habitats but in habitats with the potential to support these species or where works outside of the SAC but within close proximity of (250m) the SAC could potentially impact on groundwater sources. If these species are identified within the potential ZoI of the works, works will be moved to **avoid** mortality risk effects on these species.

Annex II Species - Bats

Construction of either an OHL or UGC and associated infrastructure could result is the loss of supporting habitat for lesser horseshoe bat (Rhinolophus hipposideros) outside the confines of the SAC. This species is a qualifying interest species for Ballinafad SAC, Lough Corrib SAC, Towerhill House SAC and Lough Carra/Mask Complex SACs. This species is known to commute up to 4km from their roost sites to forage at night. Commuting routes are important features of the landscape for lesser horseshoe bats as they generally avoid flying across open spaces. The same tree line, woodland or hedgerow can be used by the same population year on year. If the proposed project was to proceed within the core foraging and commuting range of this species/the SAC. detailed surveys will be undertaken to identify key commuting routes and foraging areas and any other roosts used by the SAC populations within the zone of influence of the works. Any important commuting routes, foraging areas or associated roost would be protected/avoided to ensure the integrity of the SAC populations is not undermined.

Annex II Species – Otter

At the outset of the project detailed ecological assessments will be undertaken including detailed surveys for otter. Surveys will be required to identify, if and how, otter are using habitats potentially directly affected by construction works (e.g. an active holt in the vicinity of the works which could be prone to collapse from tunnelling/excavation works). The surveys must be sufficient to inform a detailed assessment as to whether the predicted mortality risk effects would affect the conservation objectives supporting otter favourable conservation status within a given site, and thus adversely affect the integrity of the SAC. In the first instance works should be carried out to avoid potential impacts on otter. Where such impacts cannot be avoided appropriate mitigation will be put in place.

Mitigation measures to reduced mortality risk on otter may include but are not limited to:

- Avoiding works within 150m of active otter holt.
- Temporary exclusion of an otter holt during works.

Box 7F. Mitigation measures in relation to habitat degradation (hydrogeology/water quality) affecting QI habitats and species in European sites - North Connacht Project.

Petrifying springs, Turloughs and other GWDTHs

See mitigation outlined in **Section 7.2, Box 7B.**

Annex I (Bog Habitats)

The location of an UGC route would present direct risks to bog habitats within SAC. The effects on hydrological flows within the bog would need to be assessed in detail. The surveys must be sufficient to inform a detailed assessment as to whether the predicted effects on ground water would affect the conservation objectives supporting these habitats favourable conservation status and thus adversely affect the integrity of the sites. If, after the implementation of mitigation measures, there remains a risk that effects on ground water sources would adversely affect the integrity of a given SAC the project, route or technology option would not be progressed unless and alternative solution could be implemented which avoids or reduces the impact so that no significant residual impacts remain, thus maintaining site integrity.

Sensitive Aquatic Species

See mitigation outlined in **Section 7.2, Box 7B.**

Box 7G. Mitigation measures in relation to disturbance affecting QI species in European sites - North Connacht Project

Otter

See mitigation outlined in **Section 7.2, Box 7D.**

SCI bird species

See mitigation outlined in **Section 7.2, Box 7D.**

Box 7H. Mitigation measures in relation to mortality risk affecting SPA species of European sites – - North Connacht Project

SCI bird species at high risk from collision

See mitigation outlined in **Section 7.2, Box 7C.**

Vertigo spp.

See mitigation outlined in **Section 7.2, Box 7C.**

Marsh Fritillary (*Euphydryas aurinia*)

This species is known to occur within the study area of the North Connacht project within Bricklieve Mountains & Keishcorran SAC. This mobile species may occur outside the confines of the SAC where suitbale habitat is present. Where there is potential for the proposed project to occur within the ZoI of this species detailed surveys will be undertaken to avoid any impacts on this species.

Box 7I. Mitigation measures in relation to habitat degradation (hydrogeology/water quality) affecting habitats and species – Celtic Interconnector

Annex I habitats

Where there is potential for construction related impacts on water courses that are hydrologically connected to Annex I habitats (e.g. tunnelling/excavation works from the placement of UGCs, sediment run-off following land clearance or contamination from pollutants from construction materials), a geological and hydrogeological assessment would be undertaken to ensure that impacts on Annex I QI habitats are **avoided.** The surveys must be sufficient to inform a detailed assessment as to whether the predicted effects on ground water would affect the conservation objectives supporting these habitats favourable conservation status within a given site, and thus adversely affect the integrity of a given SAC. Where such impacts are predicted **appropriate mitigation** will be put in place to ensure site integrity is not compromised. Such detail would only be available at the project level.

Species mortality (aquatic species)

A habitats' role in supporting aquatic species (e.g. Atlantic salmon, otter, lamprey species, white-clawed crayfish or freshwater pearl mussel) and prey species would form a component of the assessment work. To minimise the environmental impacts of the works and to ensure best practices and suitable mitigation measures are adopted, the contractor would submit an environmental management plan, including a pollution contingency plan, prior to the commencement of activities. Mitigation would be proportionate to the nature and scale of the works. In more sensitive locations, an ECoW would be required to regularly inspect all pollution prevention controls.

An Erosion and Sedimentation Control Plan (ESCP) would also be prepared. This would be adapted depending on the nature of the works and the species concerned, for example works being undertaken close to a watercourse within a FWPM catchment is likely to require more stringent mitigation measures in

relation to sediment control measures. In such instances action measures, as outlined in the FWPM Sub Basin Management Plans shall be taken into account. Key mitigation measures identified in the recent EBES studies will be implemented where required and appropriate. For example, the EBES on soils and geology recommended implementing a 50m buffer between a watercourse and a structure/construction works and the avoidance areas of soft/fine soils. Where these measures cannot be implemented the use of silt curtains are recommended.

Best practice construction methods will be implemented at all times in relation to the protection of watercourses in accordance with the following non-exhaustive list of guidance:

- Guidelines on the protection of Fisheries during Construction Works in or Adjacent to Waters (Inland Fisheries Ireland, 2016).
- SEPA Pollution Prevention Guidelines (PPG) including 'PPG 1: General Guide to the Prevention of Pollution', 'GPP 5: Works or Maintenance on or Near Water', 'GPP 6: Working at Construction or Demolition Sites'; http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/.

  CIRIA Technical guidance (C648). Control of water pollution from linear construction projects.

Where risks are identified, the ESCP must include sufficient pollution control measures to prevent run-off, silt, hydrocarbons or any other harmful substances or substrates from entering any surrounding water features including rivers or lakes or any other water features (drainage ditches) which drain into same thus preventing any significant impacts to water quality and or aquatic QI species within an SAC, thus maintaining site integrity. Storage facilities would contain and prevent the release of fuels, oils and chemicals associated with plant, refuelling and construction equipment into the environment. All protective coatings used would be suitable for use in the aquatic environment and used in accordance with best environmental practice. A pollution contingency plan would establish methods and procedures to deal with any spills and the timely reporting of incidents.

Box 7J. Mitigation measures in relation to disturbance affecting species in European sites - Celtic Interconnector (Cork option)

Otter

See mitigation outlined in **Section 7.2, Box 7D.**

SCI bird species

See mitigation outlined in **Section 7.2, Box 7D.**

Box 7K. Mitigation measures in relation to collision mortality risk affecting SPA species of European sites – Celtic Interconnector (Cork option)

SCI bird species at high risk from collision

See mitigation outlined in **Section 7.2, Box 7C.**

Vertigo spp.

See mitigation outlined in **Section 7.2, Box 7C.**

Box 7L. Mitigation measures in relation to habitat loss (specifically in relation to Annex I habitats and supporting habitat for Annex II species) – Shannon Crossing.

Annex I habitats (Estuarine habitats)

Works will take place with The Lower River Shannon SAC, presenting a risk of habitat loss / damage to Annex I estuarine habitats on the foreshore, along the cable route. Prior to construction and use of the foreshore, detailed surveys of habitats within the site would be undertaken to locate notable occurrences of Annex I habitats within the site, with a view to developing a pre-construction strategy to avoid, or protect any Annex I habitats identified. The contractor will produce a detailed mitigation plan prior to the commencement of activities with respect to sensitive Annex I habitats (saltmarsh, mud and sandflats, sandbanks), including proposals for reinstatement where appropriate. To minimise ground disturbance and compaction to saltmarsh and mudflat habitats, excavation works within the intertidal zone should be carried out using low ground pressure excavators and bog mats, rolled steel / aluminium sheeting and/or temporary walkways, in accordance with the necessary requirements identified in the mitigation plan. To limit habitat loss and use of the foreshore, a works area and access corridor(s) would be demarcated, to prevent the movement of vehicles and plant outside the works area/access corridor on the foreshore habitats that form part of the designated features of the site. Equipment, temporary structures and debris would be removed from the site upon completion to facilitate reinstatement.

Supporting habitat for Annex II Species

To avoid the loss of supporting habitat that is within the site, full surveys will be undertaken to identify commuting routes, foraging, breeding and roosting areas and any other used by SAC and SPA species within the zone of influence of the works. These areas would be avoided to ensure no that habitat loss is negligible and not of any key supporting habitat.

Box 7M. Mitigation measures in relation to disturbance affecting species in European sites - Shannon Crossing.

Otter

See mitigation outlined in **Section 7.2, Box 7D.**

SCI bird species

See mitigation outlined in **Section 7.2, Box 7D.**

Box 7N Mitigation measures in relation to habitat degradation (water quality) affecting habitats and species – Great Island to Kilkenny 110kV Uprating

Sensitive Aquatic Species and Habitats/Species Mortality

To minimise the environmental impacts of the works and to ensure best practices and suitable mitigation measures are adopted, the contractor would be required to produce an environmental management plan, including a pollution contingency plan prior to the commencement of activities. This will be put in place to protect sensitive aquatic QI species during works. In more sensitive locations, an ECoW would be required to regularly inspect all pollution prevention controls.

An Erosion and Sedimentation Control Plan (ESCP) would also be prepared. This would be adapted depending on the nature of the works and the species concerned, for example works being undertaken close to a watercourse within a FWPM catchment is likely to require more stringent mitigation measures in relation to sediment control measures. The status of the freshwater pearl mussel as a qualifying Annex II species for the River Barrow and River Nore SAC is currently under review. The status of this species in the Arrigle River (tributary of the SAC) is uncertain.

Key mitigation measures identified in the recent EBES studies will be implemented where required and

Box 7N Mitigation measures in relation to habitat degradation (water quality) affecting habitats and species – Great Island to Kilkenny 110kV Uprating

appropriate. For example, the EBES on soils and geology recommended implementing a 50m buffer between a watercourse and a structure/construction works and the avoidance areas of soft/fine soils. Where these measures cannot be implemented the use of silt curtains are recommended.

Best practice construction methods will be implemented at all times in relation to the protection of watercourses in accordance with the following non-exhaustive list of guidance:

- Guidelines on the protection of Fisheries during Construction Works in or Adjacent to Waters.
- (Inland Fisheries Ireland, 2016).
- SEPA Pollution Prevention Guidelines (PPG) including 'PPG 1: General Guide to the Prevention of Pollution', 'GPP 5: Works or Maintenance on or Near Water', 'GPP 6: Working at Construction or Demolition Sites'; http://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/.
- CIRIA Technical guidance (C648). Control of water pollution from linear construction projects.

Where risks are identified, the ESCP must include sufficient pollution control measures to prevent run-off, silt, hydrocarbons or any other harmful substances or substrates from entering any surrounding water features including rivers or lakes or any other water features (drainage ditches) which drain into same thus preventing any significant impacts to water quality and or aquatic QI species within an SAC, thus maintaining site integrity.

Storage facilities would contain and prevent the release of fuels, oils and chemicals associated with plant, refuelling and construction equipment into the environment. All protective coatings used would be suitable for use in the aquatic environment and used in accordance with best environmental practice. A pollution contingency plan would establish methods and procedures to deal with any spills and the timely reporting of incidents.

Annex I habitats (Estuarine habitats)

Works will take place within close proximity of the River Barrow and River Nore SAC presenting a risk of habitat loss / damage to Annex I estuarine habitats during the replacement of polesets. Prior to construction detailed surveys of habitats within the ZoI to locate notable occurrences of Annex I habitats within the site, with a view to developing a pre-construction strategy to avoid, or protect any Annex I habitats identified. The contractor will produce a detailed mitigation plan prior to the commencement of activities with respect to sensitive Annex I habitats. To minimise ground disturbance and compaction to mudflat habitats, excavation works within the intertidal zone (if required) should be carried out using low ground pressure excavators and bog mats, rolled steel / aluminium sheeting and/or temporary walkways, in accordance with the necessary requirements identified in the mitigation plan.

These mitigation measures have been prescribed to ensure the projects (in their current form) as detailed in this Implementation Plan will not result in adverse effects on site integrity either alone or in-combination with other plans or projects. Some of the projects proposed do not have defined locations or technology options developed as yet. As such project level AA will be undertaken (informed by detail surveys) to identify changes to potential impact pathways and build on and refine the mitigation measures outlined above.

The NIS concludes that the development and implementation of the draft Grid IP will be largely positive in terms of protecting the environment as it will contribute to the sustainable development of the transmission system in Ireland over the next six years and beyond. A key element of future Grid development is a focus on using the existing network as far as reasonably practical thus reducing potential negative effects on the

environment that could be associated with new transmission infrastructure. In particular, the IP has been formulated with the intention of avoiding adverse effects on European sites.

The conclusion of the NIS for the draft Grid IP is that, following appropriate mitigation and following the key principles for protecting European sites, there will be no adverse effects on the integrity of any European site(s), either alone or in-combination with other plans or projects.

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