EirGrid

GRID25
Implementation Programme
2011 - 2016

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GRID25
DELIVERING IRELAND'S ELECTRICITY FUTURE


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Implementation Programme
2011 - 2016

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Section 1 - Introduction and Context

1.1 Context

EirGrid plc ("EirGrid") is the National electricity Transmission System Operator (TSO). The European Communities (Internal Market in Electricity) Regulations, 2000 (SI No. 445 of 2000) sets out the role and responsibilities of the TSO; in particular, Article 8(1)(a) gives EirGrid, as TSO, the exclusive function:

> *"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 having due regard for the environment."*

"Develop" in this context refers to planning, routing, obtaining consents etc, but not to constructing the transmission system (the Grid), which is carried out by ESB Networks as Transmission Asset Owner (TAO). Neither does EirGrid's role include the generation, distribution and selling of electricity in Ireland.

Grid25[1] is a high-level strategy outlining how EirGrid intends to undertake the development of the electricity transmission grid in the short-, medium- and longer-terms, to support a long-term sustainable and reliable electricity supply. The Grid25 strategy seeks to implement the provisions of the 2007 Government White Paper on Energy - *Delivering a Sustainable Energy Future for Ireland* in terms of development of electricity transmission infrastructure.

Grid planning and development are highly dynamic processes that are constantly responding to changes in demand and the emerging conditions of the grid[2]. Grid development is essentially a reactive process – reacting to, and facilitating, identified demand for an enhanced network in an area, for example new generation sources, or new demand centres such as new centres of employment or population growth. As such, grid development, and Grid25 in particular, does not dictate where such new demand is to occur; rather, grid planning and development has significant cognisance of other strategies for spatial and strategic planning and development.

This *Grid25 Implementation Programme* (IP) is a practical strategic overview of how the early stages of Grid25 are intended to be implemented. The IP identifies the best current understanding of those parts of the transmission system that are envisaged as likely to be developed over the next five years – this is separately set out in EirGrid's annual Transmission Development Plan (the identified projects of which are reproduced in Section 4 and Appendix A of this IP) to give effect to current Government Policy. The IP identifies the issues, objectives and associated processes that will need to be adopted when making decisions about how

[1] Grid25 – "A Strategy for the Development of Ireland's Electricity Grid for a Sustainable and Competitive Future", published by EirGrid in October 2008.

[2] This dynamism is reflected in the Statutory reporting processes of the Commission for Energy Regulation (CER) which require the publication of annual reviews and update of a Transmission Development Plan – prepared in accordance with Article 8(6) of The European Communities (Internal Market in Electricity) Regulations, 2000 (SI No. 445 of 2000), and which is submitted for approval to the Commission for Energy Regulation (CER).

and where developments will occur. In this way it establishes the parameters and criteria for the processes by which subsequent decisions will be made.

This IP and accompanying Strategic Environmental Assessment (SEA), incorporates advice and comments received from both the Environmental Protection Agency (EPA) and the National Parks and Wildlife Service (NPWS) of the Department of Arts, Heritage and the Gaeltacht (DAHG), as well as from other parties during the period of public consultation in respect of the Draft IP. The SEA was undertaken following a scoping exercise, in line with current best practice for the carrying out of SEAs for National-scale programmes. These associated documents have also been revised in response to submissions made during the period of public consultation.

It is important to note that, while other SEAs, such as in respect of land-use plans, may make retrospective recommendations[3] about how the plans or policies should be altered to avoid impacts on the environment, due to the high level and strategic nature of the SEA for this IP, most of the recommendations have been about how to change decision-making processes within the IP itself. As such, the recommended mitigation measures in many instances have already been incorporated into the IP in an iterative process, some of which have brought about changes in the organisational and working practices within EirGrid. These high level mitigation measures are outlined in Section 5 of this document, while lower tier measures are included in Appendix B.

It is intended that following adoption, the IP and associated SEA[4] will have a 5–year lifespan, with the review and drafting process for the subsequent

[3] These are usually included as 'mitigation measures'

[4] Presented in an Environmental Report (ER) with accompanying Natura Impact Statement

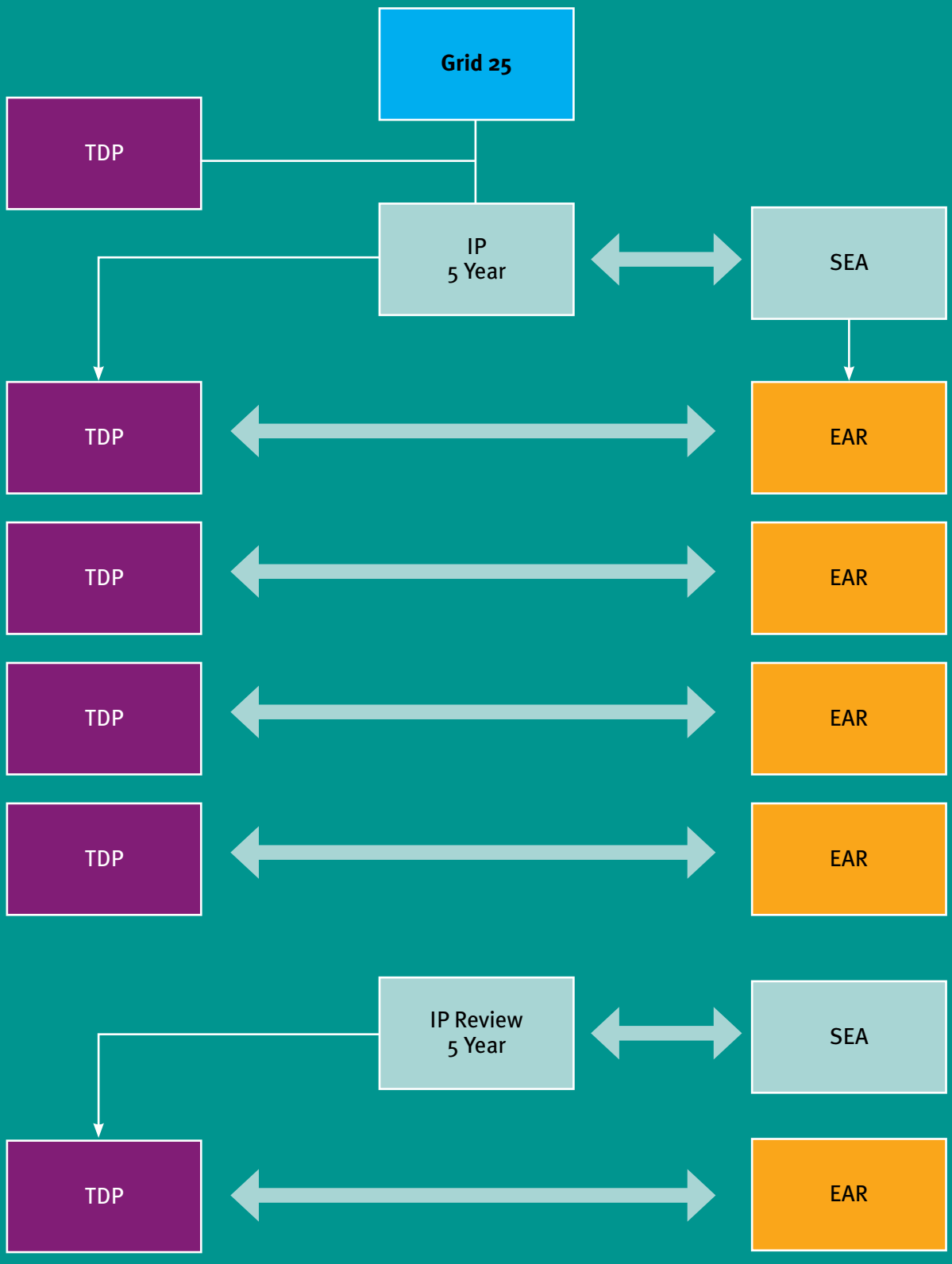


Figure 1.1 Structure for Grid25 strategy and associated Implementation Programme, SEA, Transmission Development Plan* and associated Environmental Appraisal Report.

* The TDP is a five year plan which is subject to annual review.

All references to 'Transmission Development Plan (TDP) 2010' in the IP, and associated SEA documents, refer to the 'Draft TDP 2010' which is currently with the Commission for Energy Regulation (CER) for formal review and approval.

IP and SEA commencing within the final year of that lifespan. However, the content of these documents will be subject to ongoing review and update over the period of Grid25, in the context of the EirGrid Transmission Development Plan, which is updated annually. An Environmental Appraisal Report (EAR) will be produced to accompany each annual TDP, to demonstrate how the TDP is in accordance with the provisions of the IP and SEA, or to identify any updates to these documents. Ongoing monitoring measures as set out in the SEA will also be addressed in each annual EAR.

This relationship is set out graphically at Figure 1.1.

1.2 The Vision of Grid25

Given that the demands for transmission infrastructure are likely to be far different in 2025, and beyond, than currently, EirGrid must plan for the longer-term future strategic transmission development and reinforcement needs of the electricity transmission network.

The Vision of Grid25 *"is of a grid developed to match future needs, so it can safely and reliably carry power all over the country to the major towns and cities, and onwards to every home, farm and business where the electricity is consumed and so it can meet the needs of consumers and generators in a sustainable way"* (p.13). The Strategy to achieve this vision states, inter alia,:

> "*Grid25 will deliver an efficient transmission network for Ireland's social and economic development. It will have the necessary capacity to reliably transport the future anticipated power levels from renewable and conventional generators and interconnectors to the cities and towns and the villages where the power is required.*
>
> *We will follow international best practice and innovative methods to provide the necessary transmission capacity. The technology options available to implement Grid25 will increase as research and development is carried out. We will be proactive in investigating and adopting new technologies taking due consideration of the cost and effectiveness of the technology*". (p.21)

Grid25 notes EirGrid's Statutory obligation to balance the provision of reliable transmission infrastructure with the costs to the final customer and with the impact of that infrastructure on the environment (p.21).

1.3 Strategic Objectives of Grid25

In developing the Grid, the Grid25 strategy envisages the deployment of strategic alternatives designed for the long-term development of a safe, secure, reliable, economic and efficient grid. In this context, the Grid Development Strategy of Grid25 (pp 21-22) notes that, in consideration of the capacity of new transmission lines, there will be a positive presumption towards building new lines at 400 kV and at 110 kV where appropriate. Building at 400 kV rather than 220 kV is more efficient and provides greater power carrying capability. Building one 400 kV circuit avoids the need for building a multiplicity of 220 kV and 110 kV lines and so has less long-term impact on the environment and on local communities. In the longer term, it may be appropriate to upgrade the 220 kV network to 400 kV, for similar reasons of efficiency and capacity. EirGrid will examine each case as the need to upgrade arises.

The Strategy notes EirGrid's commitment to seek to minimise the net length of new line build in a region through a number of initiatives (p.22):

- By utilising the existing network where possible to avoid building new overhead circuits. Re-utilising the existing network may be more costly than building new circuits, but may result in a lower impact on the environment;

- Seeking to up-rate existing lines by using a higher capacity conductor, where appropriate, to avoid the need for major structural changes and so to minimise security issues;
- Where the required increase in capacity cannot be achieved through a new conductor, considering upgrading the circuit to a higher voltage;
- Where appropriate, considering replacing an existing single-circuit line with a double circuit line to provide the required additional capacity; while this is a more costly option, and less reliable than having two separate lines, it avoids building a new line on a separate route;
- In limited circumstances, putting certain 110 kV circuits underground to minimise the impact of new build in a region. This may be considered, for example, in areas where there is congestion of urban development, a multiplicity of overhead lines, a relatively wide expanse of water, or an area of unique natural beauty;
- Examining the potential for using HVDC technology for certain applications where appropriate, for example such as transporting high volumes of power over long distances;
- Considering the appropriateness of new tower designs and other mitigating measures outlined in the Government-sponsored report, prepared by Ecofys, on *The Comparative Merits of Overhead Electricity Transmission Lines Versus Underground Cables* in order to minimise the landscape and visual impact of necessary infrastructure, and taking account of the National Landscape Strategy when published.

1.4 The Strategic Policy Context for Grid25

Irish energy policy is set firmly in a global and EU context which has put energy security and climate change among the most urgent international challenges. In pursuit of this, the EU has set a legally binding obligation for Member States that greenhouse gases across the EU must be reduced by

at least 20% by 2020, compared with 1990 levels.

The strategic context for energy infrastructure is set out in a number of policy documents covering National, Regional and Local levels, and comprising both spatial and non-spatial planning policy. These include:

- Irish Government's Energy White Paper *Delivering a Sustainable Energy Future for Ireland* (March, 2007)
- National Development Plan 2007–2013, National Spatial Strategy 2002–2020,
- Regional Planning Guidelines 2010–2022,
- County Development Plans and relevant Local Area Plans.

The 2007 White Paper sets a target of 33% of electricity produced from renewable generation by 2020; this was subsequently increased to 40%.

Some 58% of current demand for electricity is in gateway cities and towns, as identified in the National Spatial Strategy (NSS). The NSS defines gateways as having a strategic location, nationally and relative to their surrounding areas and providing national-scale social and economic infrastructure and support services. The Grid25 strategy will contribute to achieving the NSS goal of developing gateways and achieving balanced regional development. In this strategic context, the provisions and policies of the various Regional Planning Guidelines are of essential importance.

EirGrid publishes a Transmission Forecast Statement annually which highlights opportunities for the connection of demand at 31 points on the grid. The document presents the opportunities for generator connections identified through the Gate 3 connection process and outlines the generation opportunities arising from Grid25.

Each Planning Authority is required to provide an objective within its Development Plan for the provision/facilitation of infrastructure including energy. In addition, Section 10 (1B) of the Planning and Development Acts 2000–2010 requires that all planning authorities shall, within one year after making Regional Planning Guidelines, prepare a Core Strategy. The Core Strategy must show that County Development Plan objectives are consistent with national and regional development objectives in the National Spatial Strategy and Regional Planning Guidelines. This ensures that the strategic vision of these higher-level planning and policy documents are appropriately and adequately reflected in local Development Plan policies and objectives.

The core strategy must, among other aspects:

- Detail and take account of existing and proposed transmission infrastructure in a county;
- Provide the framework for deciding on the scale, phasing and location of new development, having regard to existing serviced and planned investment over the coming years.

Consequently, key electricity projects which are critical to the future development of a county and region can be prioritised.

1.5 The Challenges

Energy Potential

Given Ireland's significant potential for generation of renewable energy through both onshore and offshore wind energy, and other marine renewable energy generation, the potential exists to make use of these natural resources to provide for Ireland's internal energy needs, meet National commitments to reduce CO_2 emission levels under the Kyoto Protocol, and to make Ireland more energy secure. EirGrid identifies further renewable generation as an increasingly important part of the overall generation mix, and is committed to supporting and facilitating government policy for the capturing of renewable energy, primarily by means of the

development of a robust, secure and reliable electricity transmission grid. The Government's renewable generation target for 2020 is to meet 40% of electricity consumption from renewable energy sources. EirGrid's *Grid Development Strategy*, as set out in Grid25, involves planning and developing the transmission system to meet anticipated longer-term generation/demand needs, thereby providing for a more cost effective, optimal and efficient system than would be the case with a more short-term and piecemeal approach. In particular, Grid25 provides for the optimal connection of a very significant capacity of renewable generation in Ireland over the coming years; such connection will occur through a long-term strategic programme of transmission development.

Economic Development

Continued commitment to investment in national strategic infrastructure, including transmission infrastructure, provides a key basis for economic recovery and growth. Given current economic circumstances, there is a need to prioritise projects and expenditure with the most immediate positive impact on the economy and employment. Investment must also be delivered in a coherent and efficient manner and be consistent with the Government vision to create a 'Smart Economy'. The provision of energy infrastructure is one of the key drivers for economic growth and regional and national competitiveness. The Government has endorsed EirGrid's strategy for National infrastructure development as per Grid25, and supports significant investment in the strategic and longer-term development of the electricity transmission network

Export of Energy

In response to the 2007 Government White Paper on Energy - *Delivering a Sustainable Energy Future for Ireland*, EirGrid has carried out an assessment of the costs and benefits of additional interconnection between the island of Ireland and the UK and France[5] (in addition to the existing Moyle Interconnector[6] and the East-West Interconnector, currently under construction by EirGrid between Ireland and Wales). In carrying out this assessment, EirGrid has examined a broad range of scenarios such as the likely required number of interconnectors, different fuel prices and different generation portfolios. The report concludes that enhanced interconnection between the all-island grid and other grids has the potential to deliver significant benefits to the island of Ireland.

Balanced Regional Development

Because of the importance of the electricity system to customers all over Ireland, EirGrid is very conscious of government policies to support regional development. The investment in this transmission strategy is distributed across all regions, and thereby will significantly improve regional electricity infrastructure, and will provide the backbone for further economic development in the regions. Further development emerging from Grid25 will maintain priority in supply standards across all parts of the network, thus enabling economic development in all regions.

It is important that national and regional spatial planning and development policies and strategies recognise the established relationship between economic growth and electricity consumption. As part of the economic recovery of each region, and the country as a whole, it is important that each region has a modern efficient transmission network that will allow it to compete with other regions in Ireland and Europe in attracting potential investors and employers. In this context, it is important that local authorities, local and county development plans, and regional planning guidelines ensure adequate priority for key electricity transmission projects that are critical to the future development of a region.

[5] Interconnection Economic Feasibility Report, EirGrid, November 2009, available at www.eirgrid.com

[6] The Moyle Interconnector connects the electricity grids of Northern Ireland and Scotland

Section 2 - The Grid Development Strategy

2.1 Introduction

The high voltage (HV) electricity transmission network (110 kV, 220 kV and 400 kV) forms the backbone of the electricity supply system in Ireland. High-quality and reliable electricity transmission infrastructure, providing quality performance, is vital for Ireland's ongoing socio-economic development, and thus is of national strategic importance.

2.2 The Grid

The national electricity transmission grid plays a vital role in the supply of electricity, providing the means to transport power across a meshed network, linking generator locations with often significantly spatially distant demand centres. The 400 kV network provides a high capacity link between Moneypoint generation station on the west coast and the Greater Dublin Area on the east. The 220 kV network forms a number of single circuit loops around the country. The 110 kV network, which is the most extensive element of the overall transmission system, extends across the country (refer to Figure 2.1).

The Irish network is currently connected to the transmission system of Northern Ireland primarily by means of a single 275 kV double circuit interconnection between Louth and Tandragee substations. There are also two lower-capacity 110 kV connections with the Northern Ireland network, at Letterkenny in Co. Donegal and Corraclassy in Co. Cavan.

The transmission system on the island of Ireland is almost entirely constructed as overhead line (OHL), except in very limited circumstances, such as congested or built-up areas, where underground cable (UGC) used.

2.3 Transmission System Planning

The main determinants in transmission system planning are:

- The demand for electricity from consumers;
- Additional generation from new generators, comprising both conventional generation and renewable generation;
- Potential major demand centres, i.e. NSS gateways and hubs;
- Interconnection and potential import and export of energy.

These are addressed in the following sub-sections.

2.3.1 Electricity demand

In many cases, growth in demand for electricity results in higher power flows on the transmission network. A well established relationship exists between economic growth and electricity consumption. Where power flows exceed the capability of the Grid, reinforcement is necessary. Grid25 is a strategy designed to meet increasing anticipated demand for electricity.

In the context of the Government commitment for 40% of National electricity supply from renewable sources by 2020, and the clear potential for longer-term future export of energy, EirGrid is adopting a more proactive approach to the strategic planning of the transmission network, whereby transmission infrastructure is planned and prioritised in anticipation of forecasted longer-term future levels of import, export and generation demand. This strategic approach is crucial, given the relatively long lead-in times for such infrastructure development – including project identification, study and assessment, planning and consenting, construction and energisation. This is why the Grid25 strategy is being actively pursued in the context of a short-term economic decline.

Figure 2.1 Map of the Irish Transmission System as at December 2010 (extract from EirGrid Transmission Development Plan 2010)

2.3.2 Generation

As noted above, generation from renewable energy sources is a key factor in Grid25 to meeting the Government target of 40% by 2020, to reducing carbon emissions, and to maintaining a sustainable energy supply. It is recognised in the 2007 Government Energy White Paper that wind energy will play a pivotal contribution to meeting that goal. Marine technologies and biomass are also expected to contribute.

In general, addition of generation output creates a much greater and immediate impact on the grid than demand increases, due to the size of a generator, or cumulative size of clustered generators, relative to the more gradual increases in local demand. The grid often has to be reinforced to facilitate the flow of power from the generator to the rest of the system. This is particularly apparent in respect of non-traditional modes of generation, such as renewables, where many of the locations suitable for renewable energy generation schemes are in areas where there has, historically, been little or no generation development and associated provision of supporting transmission infrastructure.

The aggregate of renewable generation capacity in some areas is equivalent to that of a large conventional generation station. In many cases, the existing transmission network is of insufficient capacity to carry the power from these generation sources. Significant reinforcement and new build of the grid is therefore required to cater for the new power flows from renewable generation.

In short, it will not be possible to utilise Ireland's natural resources of renewable energy without the associated essential upgrading and reinforcement of the National electricity transmission network, as outlined in Grid25.

2.3.3 Potential major demand centres

As noted above, some 58% of current demand for electricity is in gateway cities and towns, as identified in the National Spatial Strategy (NSS). The NSS defines gateways as having a strategic location, nationally and relative to their surrounding areas and providing national-scale social and economic infrastructure and support services. The Grid25 strategy endorses the NSS goal of developing gateways and achieving balanced regional development.

2.3.4 Interconnection

The primary benefits of Interconnection are:

- Improving competition – by linking to other European markets;
- Supporting development of renewable power generation – by enhancing the flexible exchange of power flows over the island of Ireland. This will enable the connection and operation of larger volumes of renewable generation (especially wind powered generation) throughout the island;
- Improving security of supply – by providing a dependable high capacity link between the transmission systems of Ireland and other countries.

The existing Moyle Interconnector connects the electricity grids of Northern Ireland and Scotland. It has a capacity of 500MW and currently is capable of importing 450MW in winter and 400MW in summer from Scotland. However, this Interconnector is limited by contractual arrangements to an export capacity to Scotland of 80MW. This restriction is being reviewed at the moment, and it is therefore assumed for the purposes of this Implementation Programme that export capability is increased to 400MW.

EirGrid is currently developing the 500MW East West Interconnector between Ireland and Wales. This has a scheduled completion date of 2012.

It is therefore assumed that the island of Ireland will have some 900MW of interconnection with the United Kingdom within the next number of years.

EirGrid and Northern Ireland Electricity (NIE) are currently progressing the planning of a second major interconnector between the Republic of Ireland and Northern Ireland. These, and other potential longer-term future interconnectors, could play a significant role in internationalising the Irish energy market, and in facilitating the anticipated high levels of renewable generation on the island, by providing a means to export excess generation when output from renewable generation is high, and to import power when it is low.

2.3.5 Planning, environmental and community considerations

EirGrid is committed to ensuring that the planning and development of the transmission network occurs in accordance with all relevant legislation and international best practice. Recent changes in legislation (especially the Habitats Directive), coupled with the experience of public concern regarding the perceived effects of transmission developments, particularly as articulated in the public planning process through which strategic infrastructure now proceeds, means that energy planning must now demonstrate consideration, from the outset, of how to avoid or reduce environmental and community impacts.

EirGrid takes the view that it will not be possible to develop the transmission network – and thereby to realise the potential of the country's natural resources of renewable energy – without putting planning, environmental and community considerations at the heart of its Transmission System Planning. Ignoring these issues will delay or prevent the future development of the transmission network – resulting in increased costs and reduced efficiencies. As set out in more detail in Chapter 3 of this IP, EirGrid applies a best practice approach to the planning and development of all transmission projects.

2.4 Future Grid Requirements

2.4.1 Onshore grid

The 220 kV network was first introduced in the early 1960s in Ireland, and the 400 kV network was built in the mid-1980s. Since this time, this bulk power network has changed little while demand over the same period has grown by over 150%, thereby leaving little capacity for further growth on the existing network. Anticipated increasing power flows on the network means that between now and 2025, the capacity of the bulk transmission system will need to be significantly increased. The associated 110 kV network, which primarily brings power from the bulk networks to bulk supply points serving population centres, also needs to be substantially upgraded.

Grid25 seeks to achieve a balance between costs and the impact of new transmission infrastructure, through maximising the capability of the existing grid and, where new high capacity infrastructure is required, building it mainly at the 400 kV voltage. The following estimates have been made regarding the provision of infrastructure required to strengthen the National transmission network, in accordance with Grid25 (refer to Figure 2.1):

- Grid25 states that in respect to future grid requirements that approximately 1,150 km of new circuits will be required up to 2025 to meet the needs of consumers and generators. This represents an increase of about 20% on the total length of the existing network. Of this, 800 km will need to be at 220 kV or higher; the remaining 350 km will be at 110 kV. In addition to these circuits, other circuits will be needed to connect many of the new generators to the grid;
- Some 2,300 km of the existing transmission network will need to be upgraded by 2025 to provide greater capacity. This comprises 1,100 km, or 70%, of the existing 220 kV network, and 1,200 km of the 110 kV network.

It should be noted that these figures may be subject to change over the period of Grid25, in response to changing demand and other circumstances.

Figure 2.2, extracted from EirGrid's Transmission Development Plan 2010, identifies areas of change, driving planned network development.

The EirGrid National Control Centre, Dublin

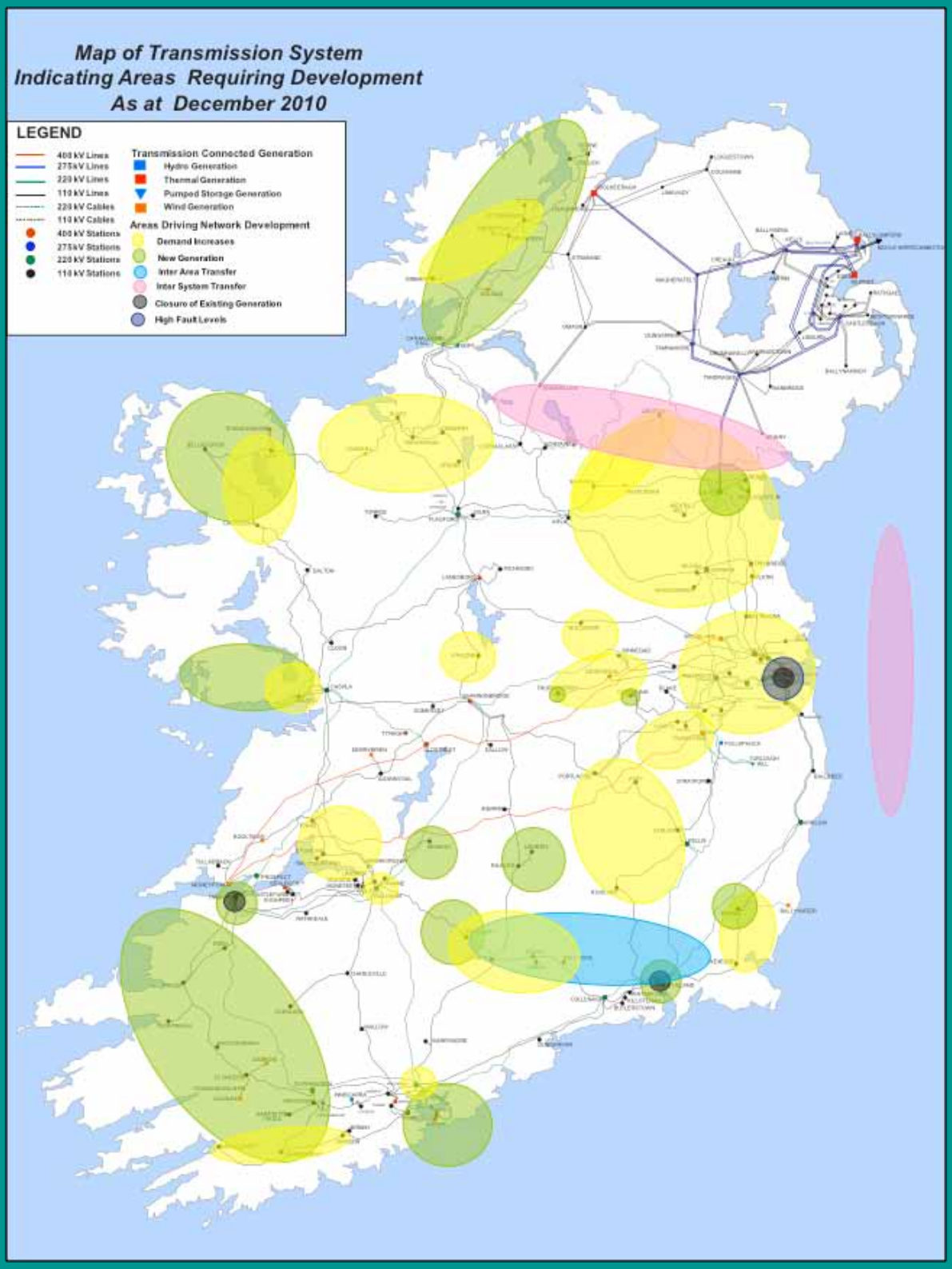


Figure 2.2 **Network Map Showing Areas of Change Driving Network Development (extract from EirGrid Transmission Development Plan 2010)**

2.4.2 Offshore grid

A number of scenarios for future electrical generation and transmission in Ireland involve the development of offshore grid infrastructure. This has the potential to occur in many areas off the Irish coast, on account of developments including the exploitation of offshore renewable resources (wind, wave and tidal), increased interconnection with other EU Member States, and the participation of Ireland in a Pan-European offshore grid. This has potentially significant implications for grid development and for interactions with terrestrial and inshore environments.

2.5 The Grid Development Strategy

Grid25 is aimed at delivering an efficient and high-quality National electricity transmission network. It will ensure the necessary capacity to reliably transport future anticipated power levels from renewable and conventional generators and interconnectors to the cities, towns, villages, homes, and other key markets where the power is required.

The National electrical transmission network is a dynamic and meshed system that is constantly subject to change, and where the change of a single variable has the potential to change the system at large. This makes future predictions a complex and dynamic process, which are likely to change over time as demand, generation flows, and grid capacity fluctuate and change.

Figure 2.3, and subsequent Figures 2.4-2.10, have been extracted from EirGrid's Transmission Development Plan 2010, and provide a high-level indicative overview, and regional breakdown, of the general strategy for the future development of the grid, as per the provisions of Grid25. The arrows coloured green on these figures provide an indicative representation of the strategy for transmission of the potential flow of electricity (between demand/load centres, generators and the system at large).

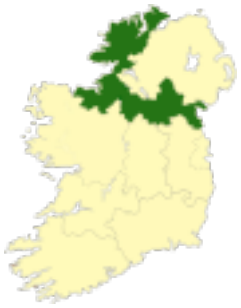
It should be noted that these figures derive from an un-scaled map with indicative representation. As such, these arrows represent the overall intended development strategy, and do not purport to represent specific projects; nor is it intended to suggest that the eventual realisation of these projects will be contained within the area of these arrows.

Most of the electricity transmission network is currently performing within required standards. Some areas have been identified as likely to require network reinforcement, as demand increases and/or new generation is connected. The network reinforcement projects within this Implementation Programme (and within EirGrid's Transmission Development Plan 2010), have been designed to deal with these emerging challenges.

Because of the meshed nature of the network, the identified strategic developments are likely to benefit a wider area than the actual scope of a particular reinforcement project.

Detailed studies are being carried out to identify network solutions which will be brought forward in the planning process and ultimately to construction. Such solutions are ultimately identified as projects in EirGrid's Transmission Development Plan 2010 following receipt of internal Capital Approval. The key areas for planned, and longer-term, strategic grid network development as outlined in Grid25 are presented on a regional basis below.

Figure 2.3 Map Indicating Future Network Development Requirements (extract from EirGrid Transmission Development Plan 2010)



2.5.1 Reinforcement of the transmission system in the BORDER REGION

There are a number of issues that need to be addressed for the strategic development of the electricity transmission infrastructure in the Border Region of the Republic of Ireland. These issues arise due to:

- The significant extent of new generation, in particular generation from renewable sources, that is expected to materialise throughout both the Border Region itself, and the West Region;
- The requirement to optimally integrate renewable generation in the Border Region and Northern Ireland;
- Security of supply in the region.

Figure 2.4 provides an indicative strategic representation of areas requiring future network development within the Border Region.

A substantial number of new electricity generators are intending to locate in the Border Region, particularly in Counties Donegal and Sligo, and in Northern Ireland, each of which will require connection to the electricity transmission grid. These mainly comprise renewable generation sources such as wind farms. The electricity transmission infrastructure will require to be significantly strengthened to facilitate such connection, which will result in the requirement both to upgrade existing infrastructure and to construct new high voltage electricity transmission infrastructure.

This will have the benefit of strengthening the overall meshed grid, thus providing a more secure and reliable system for inward investment, as well as facilitating the transmission of energy generated to load centres throughout the region and the country.

EirGrid is currently working with the electricity network operator and owner in Northern Ireland to identify the optimal solution for the network to cater for renewable generation in the North-West of the island (i.e. Donegal and the western part of Northern Ireland).

The substantial number of new generation connections being sought in the West Region (Section 2.5.4) may also have an impact on the Border Region. Further inter-regional transmission reinforcement will be required to ensure that this generation is adequately connected to the National network.

The planned second major interconnector between the Republic and Northern Ireland is required to improve competition by reducing transmission constraints that are currently restricting the efficient

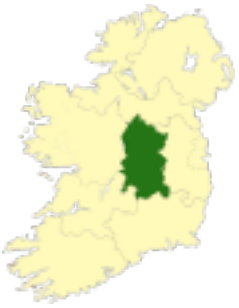
The COntrol Room at SONI, Belfast

performance of the all-island Single Electricity Market, to support the development of generation from renewable energy sources, and to improve security of supply on the island.

Longer-term forecasted growth in demand for electricity in the Border Region, as outlined in Grid25, will place pressure on the transmission network, requiring its upgrading to ensure continued security of supply to local homes and businesses in the Region. Strengthening of circuits between the North-West and North-East regions will be required in the longer-term to facilitate power flows, including:

- Further integration of the Donegal and Northern Ireland networks;
- Upgraded networks supplying Dundalk;
- Upgrading of the existing transmission network.

Figure 2.4 Areas Requiring Future Network Development In The Border Region



2.5.2 Reinforcement of the transmission system in the MIDLANDS REGION

The transmission reinforcement projects in the Midlands region are, in the short-term, driven by the need to increase the security and quality of supply to key parts of the network. This is the case with the construction of new 110 kV circuits between Thornsberry and Cushaling, and the reinforcement of transmission infrastructure in the Mullingar area.

A 400/110 kV substation is required in the Laois area to support the 110 kV networks and provide the requisite level of security of supply in Laois, Carlow and Kilkenny.

As highlighted in Grid25, longer-term reinforcements are associated with the transmission of wind generation that will assist in meeting the government commitment of providing 40% of the Republic of Ireland's electricity demand from renewable sources by 2020. This includes upgrading the transmission network to facilitate power flows from both renewable and conventional sources and maximise the use of existing power corridors.

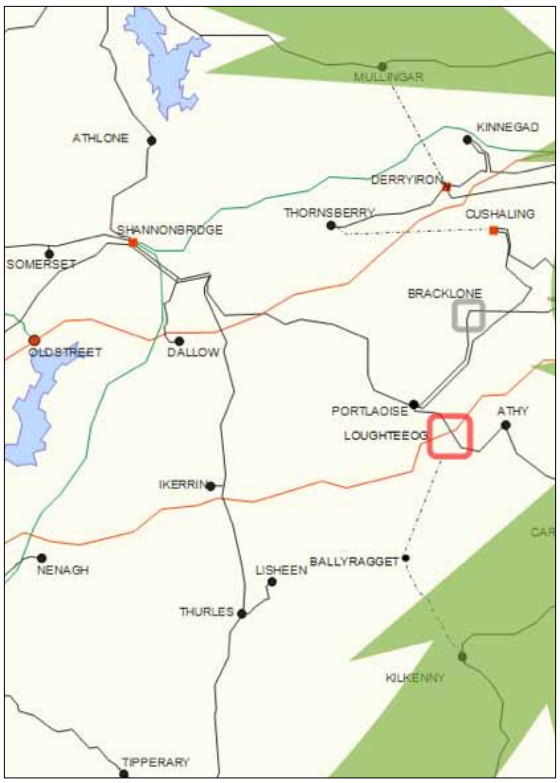
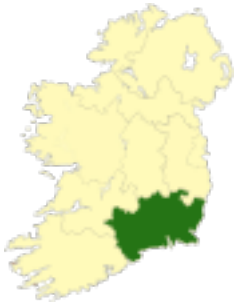


Figure 2.5 Areas Requiring Future Network Development In The Midlands Region



2.5.3 Reinforcement of the transmission system in the SOUTH-EAST REGION

There are a number of issues that need to be addressed regarding the long-term strategic development of the transmission infrastructure in the South-East region of the Republic of Ireland. These issues arise due to:

- General demand growth, particularly in the Greater Dublin Area;
- New generation connections within the South-East region;
- The potential for additional transmission interconnection with Great Britain and mainland Europe based in the region; and
- The significant amount of wind generation expected to materialise throughout the country, particularly in the South of the country.

The existing transmission infrastructure is expected to come under strain both at a local and at a regional level: At a local level, demand growth (despite current reductions in load) places pressure on the transmission infrastructure, requiring local reinforcement. There is also a need to integrate new generation that is planned to connect to the network. At a regional level, a large amount of wind generation is planned to connect in the South of the country and would result in an increase in the amount of energy that would require to traverse the South-East region. In order to facilitate these power flows, transmission reinforcement will be required, (see Figure 2.6) as outlined in Grid25.

There is a potential for further interconnection to be constructed between the Republic of Ireland and United Kingdom and/or mainland Europe. Given its geographical location, the South-East region is considered to constitute a likely area for termination of a future interconnector.

Longer-term reinforcement in the region includes:

- Strengthening of the high voltage transmission links to both Dublin and Cork to facilitate increased power flows;
- Strengthening of the networks supplying major cities and towns in the South-East region;
- Reinforcement of current infrastructure while maximising the use of existing corridors where possible, through up-rating the existing 110 kV and 220 kV circuits.

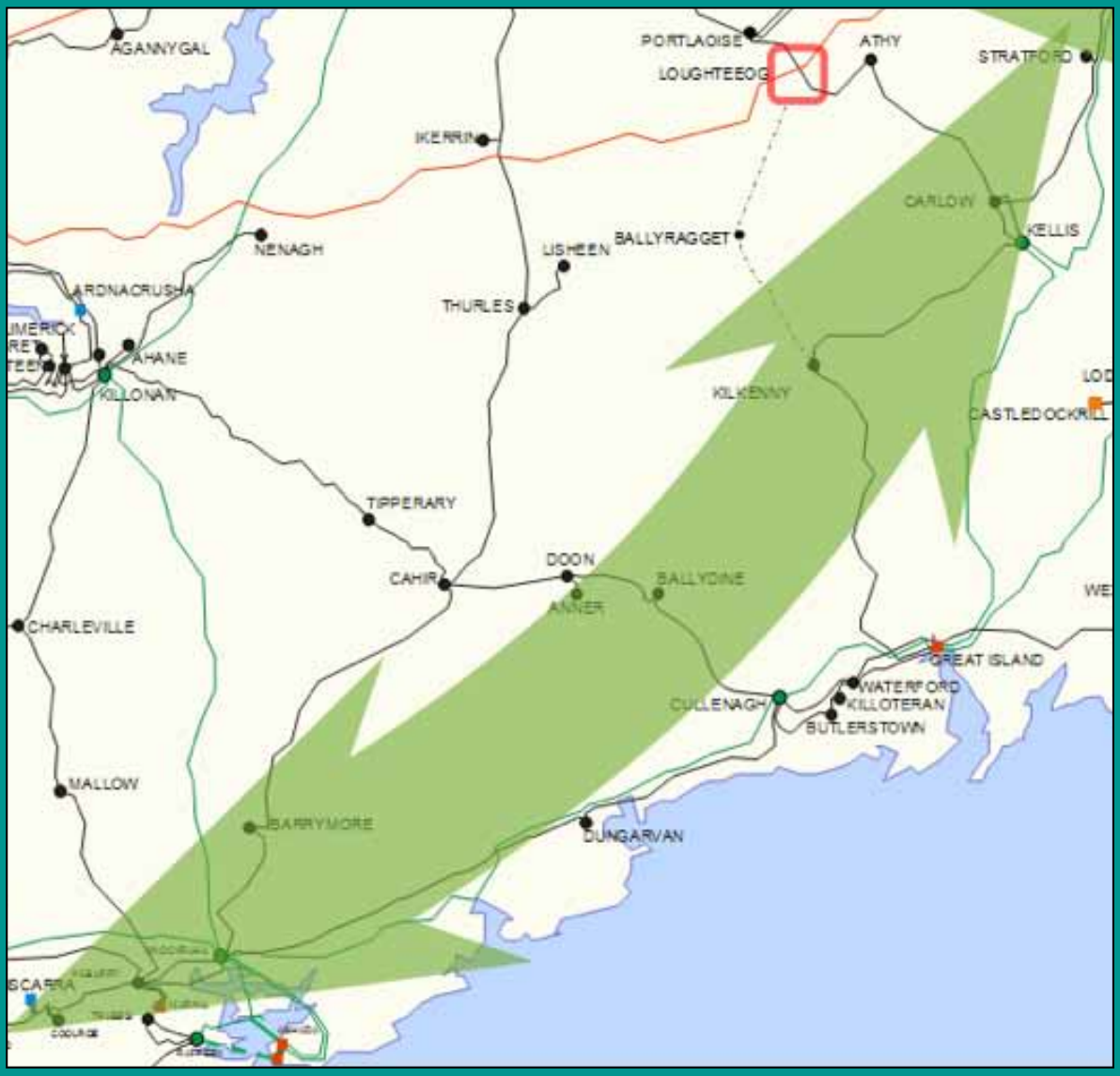
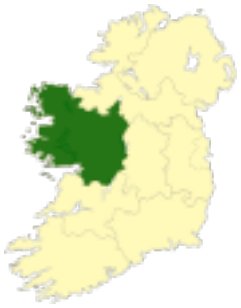


Figure 2.6 Areas Requiring Future Network Development In The South-East Region



2.5.4 Reinforcement of the transmission system in the WEST REGION

The issues that need to be addressed in the long-term strategic development of the electricity transmission infrastructure of the West Region include the following:

- The significant quantity of generation, in particular generation from renewable sources, that is expected to materialise in the West Region;
- General demand growth in the area.

A substantial number of new electricity generators are proposing to locate in the West Region, and each requires to be connected to the electricity grid. These generators comprise mainly renewable generation sources such as wind farms, biomass plants and marine-based generation technologies. This will result in the requirement to build new high voltage electricity transmission infrastructure in the region, which will have the benefit of strengthening the existing transmission infrastructure, thus providing a more secure and reliable system for inward investment as well as distributing the energy generated to load centres throughout the region and the country.

The main new corridors in the West Region comprise:

- New electricity infrastructure which will be required from the North Mayo area, initially towards existing grid infrastructure located in either the east or south part of the West Region. It is likely that such infrastructure will then continue to the key markets on the eastern side of the country.
- New electricity transmission infrastructure which will also be required from west Co. Galway to Galway city and beyond.

The connection of these new generators will also result in an associated requirement to upgrade many parts of the existing transmission network.

Grid25 states that general longer-term forecasted demand growth in the region will also result in the requirement to upgrade the existing network, and to build new transmission lines. This includes:

- Major infrastructural development from Mayo to the main bulk transmission system in the eastern part of the region;
- Upgrading the existing transmission network.

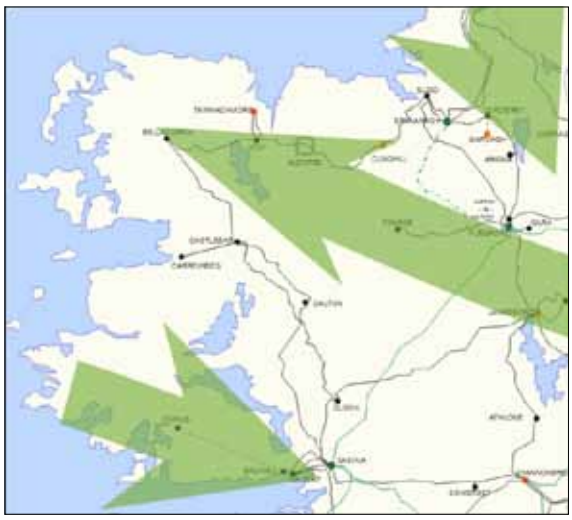
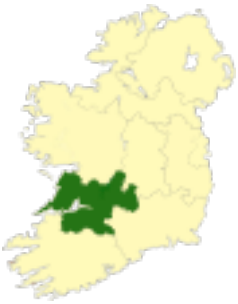


Figure 2.7 Areas Requiring Future Network Development In The West Region



2.5.5 Reinforcement of the transmission system in the MID-WEST REGION

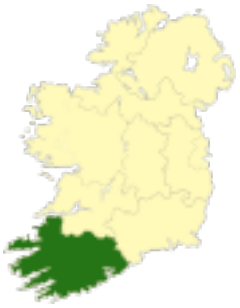
Reinforcement of the transmission system between Moneypoint and Tarbert, including the provision of a new substation to the west of the existing Tarbert substation, and the ongoing development of Moneypoint as a key transmission hub, is required to facilitate power flows in the mid-west and south-west of the country. This reinforcement is required to enable renewable and conventional generation to be transmitted to the load centres, thus providing increased security and availability for consumers.

Such reinforcement gives flexibility for meeting the power requirements of the region.

Longer-term development includes:

- Strengthening the transmission capacity across the Shannon Estuary;
- Upgraded networks supplying the urban centres of Ennis and Limerick;
- Up-rating existing networks to facilitate higher capacity power flows, using existing corridors where possible.

Figure 2.8 **Areas Requiring Future Network Development In The Mid-West Region**



2.5.6 Reinforcement of the transmission system in the SOUTH-WEST REGION

There are a number of issues which need to be taken into account when planning for the long-term strategic development of the electricity transmission infrastructure of the South-West region. These include:

- The significant amount of generation, in particular generation from renewable sources, that is expected to materialise throughout the South-West region;
- General demand growth in the area.

The South-West region has seen a high level of renewable generation and conventional generation seeking to connect to the electricity network, as outlined in Grid25. This will result in the requirement to build significant new high voltage electricity transmission infrastructure in the region, including new substations connecting to key transmission hubs in Moneypoint and Cork. This will have the benefit of strengthening the existing transmission infrastructure, thus providing a more secure and reliable system for inward investment, as well as transmitting the energy generated to load centres throughout the region and the country.

Growth in demand for electricity in the South-West region needs to be facilitated, and this may lead to the requirement to construct new electricity transmission infrastructure. This will ensure that the region has the appropriate transmission infrastructure to enable it to attract new industry and allow existing industry to expand.

Longer-term forecasted development in the Region includes:

- Significant strengthening of capacity between the South-West and South-East regions to allow excess power to flow from both renewable and conventional sources to supply demand in other parts of the country;
- Upgrading of transmission network.

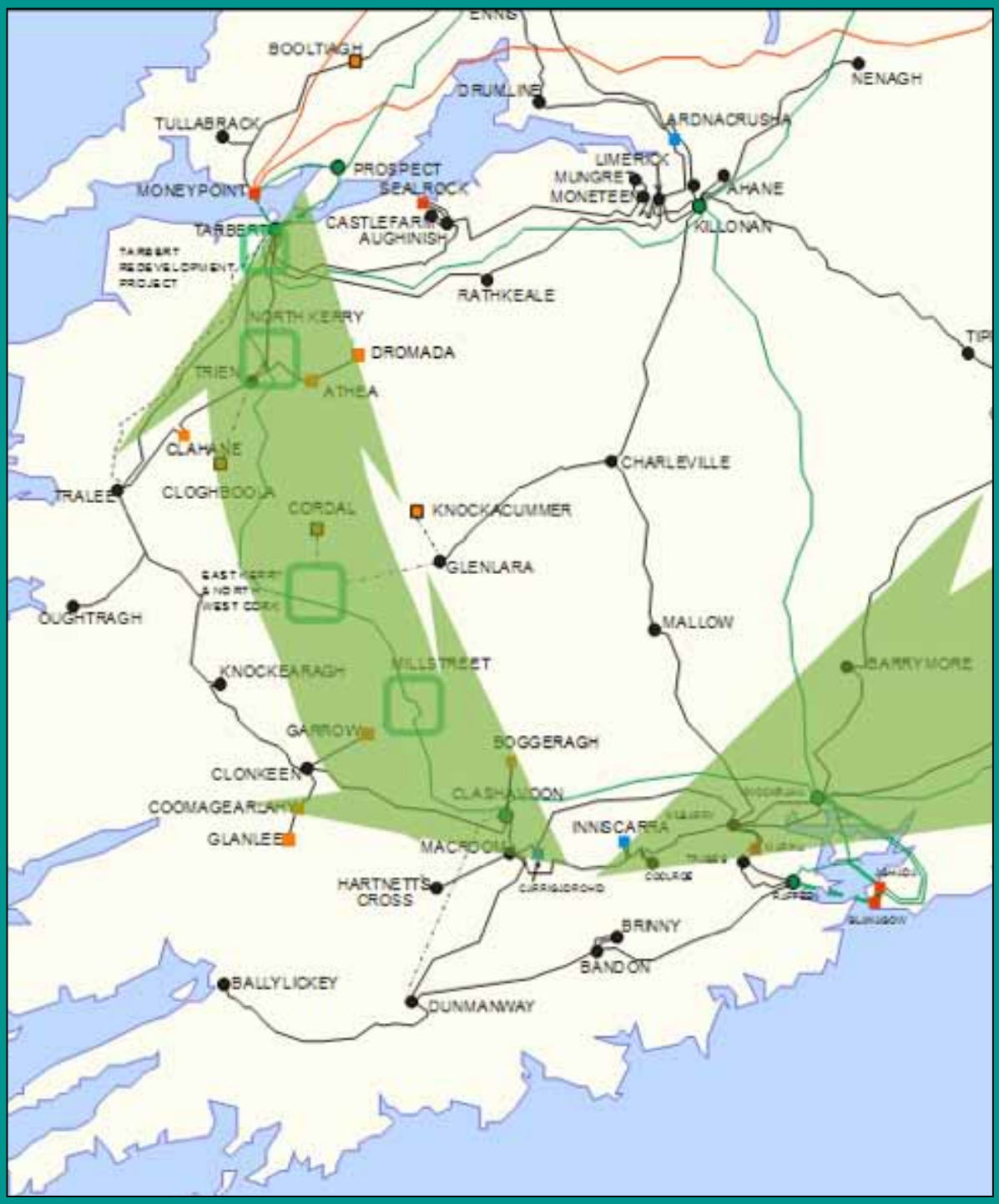
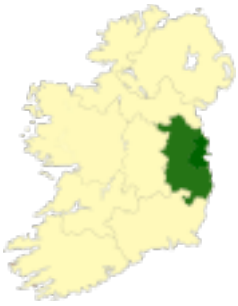


Figure 2.9 Areas Requiring Future Network Development In The South-West Region



2.5.7 Reinforcement of the transmission system in the DUBLIN AND MID-EAST REGIONS

It is perhaps unsurprising, given its relatively high density of residential and employment populations, that the Greater Dublin Area (formed by the Dublin and Mid-East Regions) is the most significant electricity demand centre in the country. As such, a large concentration of transmission lines are located in the area which includes 110 kV, 220 kV and 400 kV lines and stations.

The Dublin 220 kV system currently consists of a ring of four primary Bulk Supply Points, comprising the hubs of Carrickmines, Finglas, Inchicore and Poolbeg 220/110 kV stations. Planned development includes additional 220 kV Bulk Supply Points at Finnstown (near Adamstown), and in the Dublin North City Fringe area. Other planned development includes increased transformer capacity at Carrickmines, Finglas and Inchicore stations. EirGrid and ESB Networks (the Distribution System Operator-DSO) are working together to provide additional transformer capacity at Carrickmines and Inchicore 220 kV stations.

In relation to the Dublin networks, EirGrid in conjunction with ESB networks has identified the need for the two new 220/110 kV in-feed stations in the north and west of Dublin. New stations are planned in the north and west city areas, to accommodate demand growth, and to better manage existing demand levels highlighted in Grid25.

It is likely that some reconfiguration and/or reinforcement of the 220 kV and the 110 kV networks will be required in the longer-term to meet DSO demands, and to avoid network constraints in the Dublin area.

The 400 kV network provides a high capacity link between Moneypoint generation station and Galway on the west coast and Dublin on the east. EirGrid also is considering the need for and options to expand its 400 kV network in the Greater Dublin Area. This could be by the alteration of existing routes or equipment or with entirely new overhead line or underground cable routes. Additional transformer capacity is planned at the two existing 400 kV stations – at Woodland near Dunshaughlin, Co. Meath, and at Dunstown, Co. Kildare.

Longer-term development in the Region includes:

- Strengthening of network into and out of the Region to allow the demand to be met by renewable generators located mainly in the west of the country;
- Strengthening of network serving Dublin city load;
- Development to allow north-south flows to by-pass the network serving the Dublin load;
- Reinforcement of the network to cater for strong growth in Kildare and north Wicklow;
- Upgrading of the existing network.

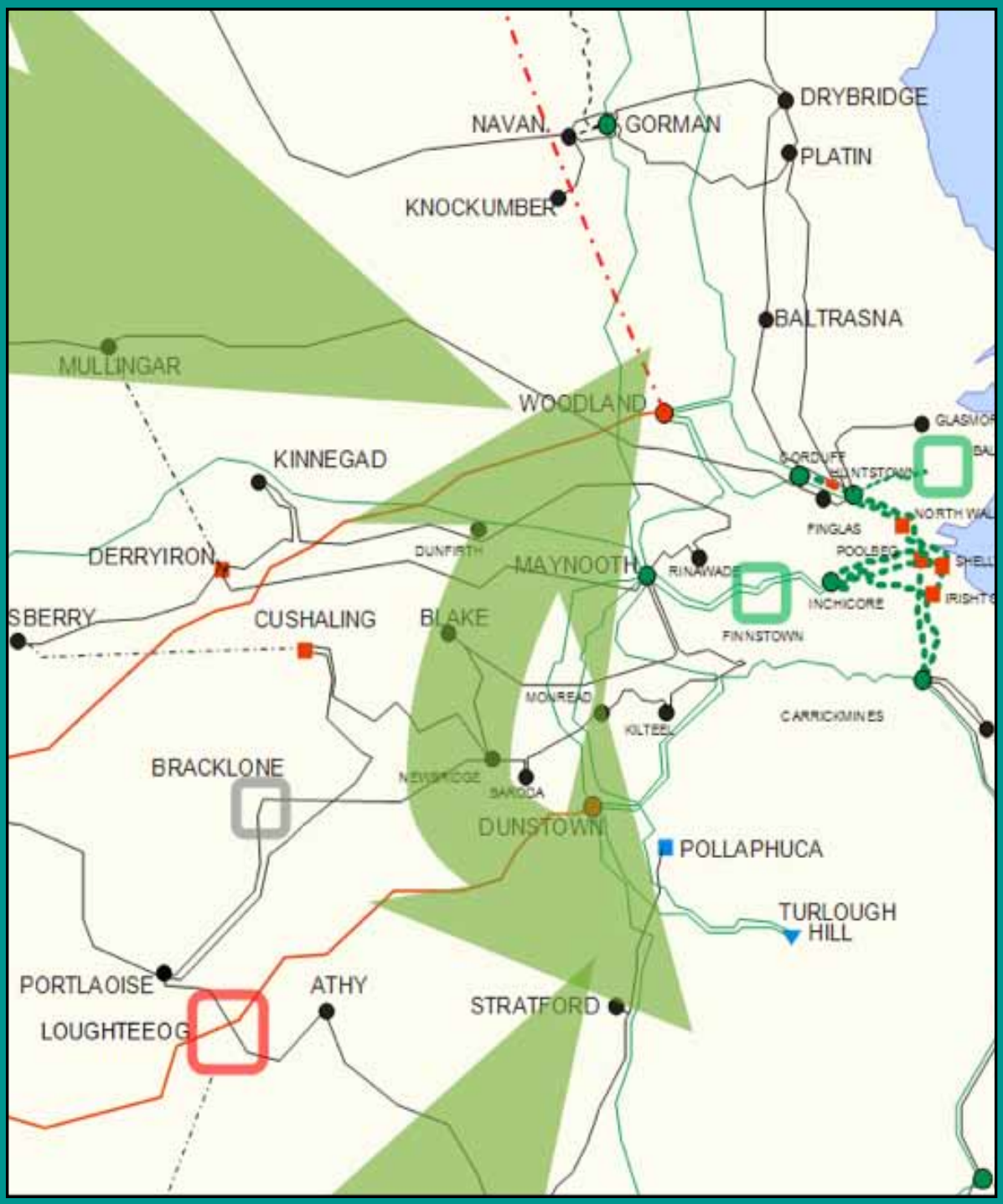


Figure 2.10 Areas Requiring Future Network Development In The Dublin And Mid-East Region

Section 3 - Towards a Planning and Environmental-led Approach to Electricity Transmission Infrastructure Development

3.1 Context

Under the provisions of the Planning and Development Acts 2000–2010, the major electricity transmission infrastructure development being carried out by EirGrid now generally comprises strategic infrastructure development, as defined under the Acts, requiring an application for Statutory Approval to be made directly to An Bord Pleanála.

As such, these complex developments now occur within the vehicle of the public planning process, where the focus is on matters of proper planning and sustainable development, and where public participation is a key pillar of the process.

Combined with this, there is now a significant emphasis and focus on the environmental impact of all development projects, primarily in reference to the EU Habitats Directive, which gives appropriate protection to sites and species of designated international importance.

EirGrid has responded proactively to this new regime in terms of the planning and development of electricity transmission infrastructure. This has primarily occurred by shifting the management and structure of project development towards a planning and environmental context.

3.2 Governance and Process

EirGrid has instituted a new internal section for the governance of the Grid25 Programme. In addition to covering matters of administrative, financial and corporate governance, the Programme Management Office (PMO) includes experienced experts in the areas of ecology, public planning, wayleaving and landowner engagement, and project communications. These experts are assigned to all EirGrid projects, to advise and assist project managers and their project teams with the planning and development of all EirGrid projects.

In order to ensure that the planning and development of all EirGrid projects occurs in a consistent and transparent manner, and with appropriate emphasis on planning, environmental, and community issues, the PMO has developed a process (known as a Project Development and Consultation Roadmap) which is applied to all large scale projects. The process is set out in a series of stages which progress from the broadest early stage of information gathering to the detailed pre-application stage of siting, environmental assessment and preparation of the planning application. The Roadmap also includes the post-consent construction phase.

The emphasis of the Roadmap is that planning, environmental and community issues are identified from the earliest stage of a project. The early identification of such issues means that consideration is given at the outset to the avoidance of constraints, rather than later mitigation of impacts arising. Thus, in the first stage of information gathering in respect of a project, a study area is identified, environmental and other constraints within that study area are identified, and the project is sited or routed with the emphasis on avoiding those identified constraints. All issues, decisions and solutions are subject to a structured project-specific strategy of public and stakeholder consultation, with feedback incorporated into the ongoing progress and planning of the project.

A summary graphic of the Project Development and Consultation Roadmap is set out in Figure 3.1. The eventual project submitted for Statutory Approval will therefore have been subject to detailed environmental and other assessment, with a clear statement of alternatives considered, and appropriately communicated to the public, landowners and other stakeholders, including An Bord Pleanála as the Statutory Competent Authority.

Figure 3.1 **EirGrid's Project Development and Consultation Roadmap**

3.3 Environmental Data and Guidelines

EirGrid has committed significant resources to gathering environmental data and information which will inform decisions for project development. Responsibility for the delivery and interpretation of this information rests generally with the Consultant Ecologist of the PMO, and therefore can be most appropriately and effectively disseminated to the project teams within EirGrid, as part of the Project Development and Consultation Roadmap process. Such data and guidelines includes the following:

- The Strategic Environmental Assessment (SEA) – comprising an Environmental Report & Natura Impact Statement – which has informed this IP;
- Strategic Environmental Constraints Mapping, which uses a GIS database to map designated environmental and other sensitive sites and areas – this mapping has been used to inform the SEA;
- EirGrid is in the final stages of completing Ecology Guidelines to inform the development of transmission infrastructure;
- The PMO issues internal Practice Notes for project managers relating to planning and environmental issues, including on the screening and scoping of Environmental Impact Statements, and Appropriate Assessment;
- EirGrid has commenced the preparation of Evidence-Based Environmental Studies to determine the actual effect of the construction and existence of transmission infrastructure projects on their receiving environment. These studies will both inform EirGrid and all stakeholders as to the actual environmental impact of transmission projects, but also will identify necessary or appropriate modifications to current design and practice which will have a lower environmental impact. This is addressed in more detail in Chapter 5 of this IP, and in Section 9 of the accompanying SEA Environmental Report.

These data and guidelines, combined with EirGrid's internal governance processes, and in particular its Project Development and Consultation Roadmap, serve to place planning and environmental matters at the heart of all EirGrid's decision-making relating to the planning and development of transmission infrastructure, from the strategic policy level to the more detailed project-specific level.

This approach is set out graphically in Figure 3.2, which sets EirGrid's processes into their wider context of internal environmental processes, as well as external policy context. It should be noted that, whilst each level of EirGrid's process is set in a particular policy context, the more detailed process levels will always have regard to the higher-level policy context and processes.

Thus, for example, any proposed development will be set into the governing context of local, county, regional, and National strategic and statutory plans and strategies, as well as the over-riding policy of the Energy White Paper. Equally, the project will be subject both to the project-specific statutory EIA and AA processes, as well as having regard to the higher-level SEA.

Construction on the transmission grid

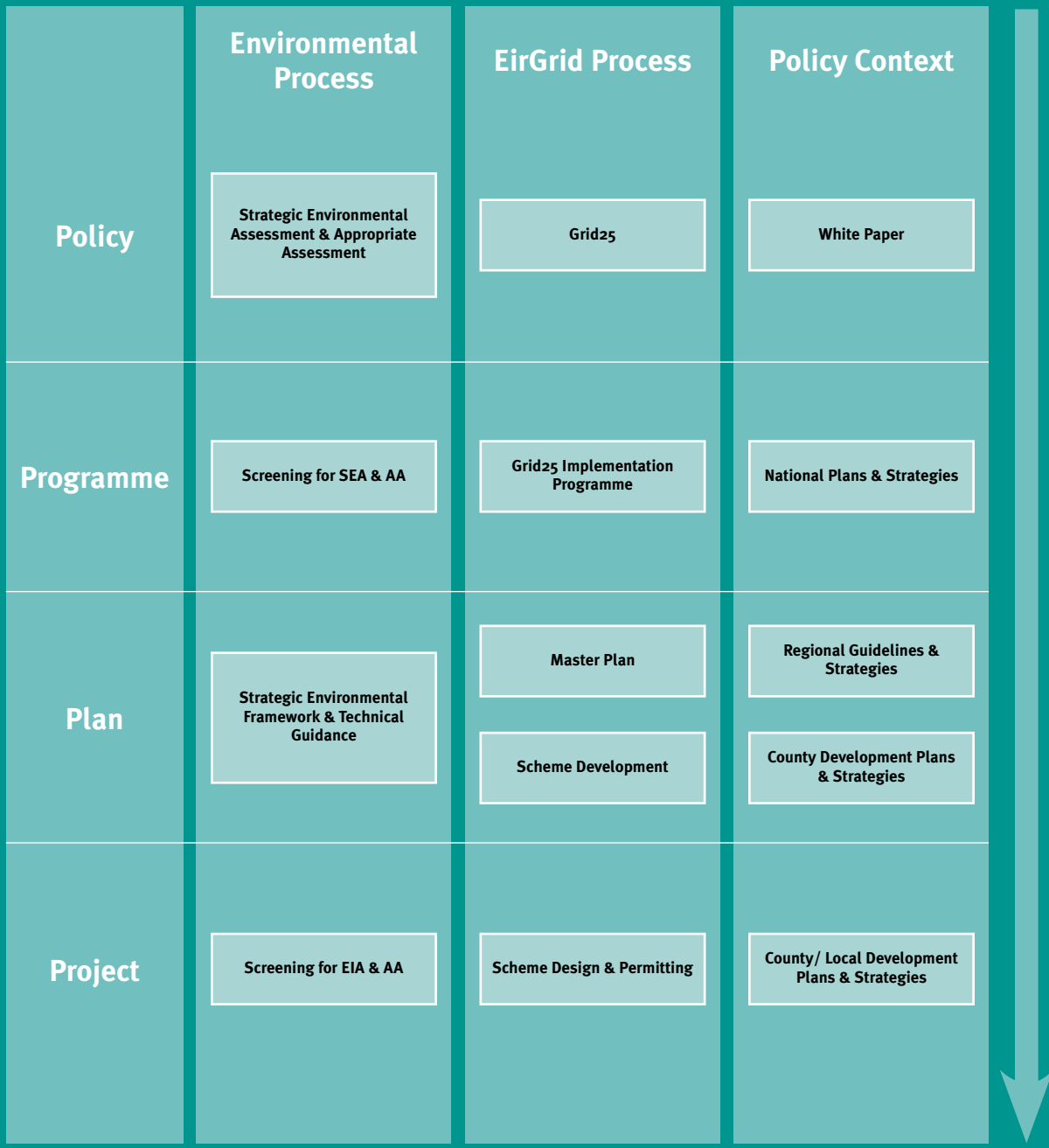


Figure 3.2 EirGrid's Strategic Decision Making Process
(illustrating integration of environmental consideration at each level)


Planned Transmission System
400 kV, 220 kV and 110 kV
Indicating Future Network Development
Requirements
As at December 2010
LEGEND
400 kV Lines
275kV Lines
220 kV Lines
110 kV Lines
220 kV Cables
400 kV Stations
275 kV Stations
220 kV Stations
110 kV Stations
Transmission Connected Generation
Hydro Generation
Thermal Generation
Pumped Storage Generation
Wind Generation
Planned New Station
Planned New Circuit
Areas Requiring Future
Network Development

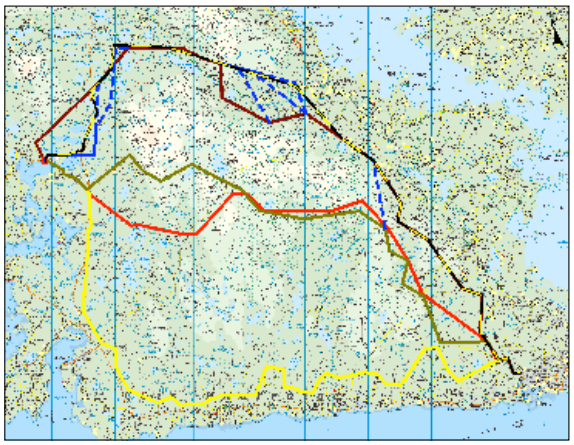
3.4 Procedures for Transmission System Planning

In the context of these processes and governance, the procedures for Transmission System Planning to take account of Planning and Environmental considerations occur at each stage, as follows:

At **Strategic Level**, (this IP), procedures, processes, and resources (staff and data) are put in place.

At **Technical Planning Level**, a range of alternative approaches are considered – these include grid configuration and management, and re-use of existing assets, technical and routing options. EirGrid is currently considering the merits of capturing this in the form of regional Masterplans for grid development. The ongoing preparation of these Masterplans will be subject to continual environmental scrutiny and assessment as appropriate, to ensure compliance with the SEA.

At **Project Level**, once the need and technical configuration has been determined, more detailed alternatives for the realisation of that project are considered, with a formal consideration of all alternatives – using SEA and EIA techniques



At **Permitting Level** the application for consent is subject to formal EIA and there is formal public and agency consultation, in reference to the Project Development and Consultation Roadmap process.

Overall, with the implementation and ongoing governance of these processes and procedures, strategic planning and environmental considerations are now at the heart of EirGrid's project development process. This is considered to be appropriate, consistent with best practice for transmission infrastructure planning, and in accordance with the principles of proper planning and sustainable development.

Section 4 - Planned Network Developments

4.1 Context

EirGrid's Transmission Development Plan (TDP) 2010, available on www.eirgrid.com presents the planned network development projects that EirGrid has progressed to the point where they are the preferred scheme to meet the changing system requirements in the context of the long-term development of the network. These projects have all been subject to initial environmental evaluation, primarily in reference to strategic constraints mapping, as per the process set out in Figure 3.1 and 3.2; a number of these projects have progressed to the stage at which their general nature, location and extent is confirmed, such that they are currently subject to project-specific environmental assessment (with AA as appropriate). In addition, these projects have been considered against the Grid25 IP SEA.

The TDP 2010 identifies a total of 111 projects that are in progress, 70 of which are in the detailed design and construction phase – these are reproduced in their entirety Appendix A of this IP. A number of transmission projects are currently in the Statutory planning consents process, or permitted and under construction. These have not been specifically identified in this Implementation Programme (although they are included in the projects listed in Appendix A), as they are, or have been, separately subject to specific environmental and other assessment, in accordance with EirGrid's processes for the planning and development of projects, as per its Project Development and Consultation Roadmap, as well as in accordance with Statutory procedure and best practice.

The TDP 2010 presents the anticipated totals of new equipment currently planned/at internal Capital Approval stage – this is reproduced in Table 4.1. These are estimates only, because the scopes of transmission projects, particularly those in the preliminary stages of design, can change.

In addition, the TDP 2010 anticipates that some 7.7 km of 220 kV, and 575 km of 110 kV transmission circuits will have their thermal ratings increased. 2 no. 220 kV transmission lines and 2 no. 110 kV transmission lines will be refurbished without affecting their ratings.

It is important to note that the various transmission development projects are at different phases of their lifetime. This IP identifies 26 no. network development projects contained within the TDP 2010 that are at design and environmental assessment stage, and which EirGrid considers are required to meet changing system requirements in the short to medium term development of the network, as identified at a strategic level in Chapter 2 of this IP.

	400 kV	220 kV	110 kV
Number of New Stations	1	9	7
Number of New Station Bays	8	49	181
Overhead Line, (km)	140	56	313
Underground/ Undersea Cable, (km)	0.5	33.5	0

	400/ 220 kV	400/ 110 kV	220/ 110 kV
Number of New Transformers	2	2	16
New Transformers, Total MVA	1,000	500	3,250

	110 kV
Number of New Capacitor Banks	7
Capacitor Banks Total Mvar	135

Table 4.1 Estimates of Identified New Transmission Assets (Table S-1 of EirGrid's TDP 2010)

The transmission infrastructure projects outlined below are categorised under three subsections relating to the main drivers for transmission development:

- Network Reinforcements;
- Generator Connections;
- DSO Connections.

Because of the uncertainties inherent in the public planning process, the timeframe and the scope of projects not yet in the construction phase may be subject to change.

Tables 4.2, 4.3, and 4.4 present the following project information:

- Capital Project number (CP No.) – each project is referenced with a Capital Project number for co-ordination between EirGrid and the Transmission Assets Owner (TAO - ESB Networks);
- Project Title and Description – for projects in the Preliminary Design stage, the project descriptions are EirGrid's current best estimates and may be liable to change;
- Expected Completion Date (E.C.D.) – these estimates are subject to the planning process, the construction progress, availability of transmission outages, and commissioning, and may be liable to change.
- Phase – relating to the stage of project development.

Line lengths are approximate for Network Reinforcement projects that are in the preliminary design phase or in public planning process.

EirGrid and ESB Networks, as TSO and TAO respectively, are also co-ordinating other capital projects not listed herein, generally comprising minor capital works, and line uprating, diversions and alterations.

Figures 4.1 and 4.2, extracted from EirGrid's Transmission Development Plan 2010, provide an indicative overview of the planned network developments at Outline Design and EIA, or consent and construction stages, as outlined in the Draft TDP 2010. This provides an indicative representation of planned development, and does not represent specific alignments of proposals.

As noted in Chapter 3 above, all EirGrid projects in the pre-planning stages of project development (noted as "outline design and EIA" in the following tables) are subject to the EIA and AA processes; this initially comprises a screening process. Where a project is currently in the planning process, and has been accompanied by an EIS and Appropriate Assessment, this is indicated in the more comprehensive tables extracted from EirGrid's TDP 2010, reproduced at Appendix A of this IP.

Figure 4.1 Map Indicating Planned Network Developments in the Detailed Design & Construction Phase (from EirGrid's Transmission Development Plan 2010)

4.2 Network Reinforcement Developments

This Section deals with the identified development projects that are driven by generic demand growth and reinforcements resulting from generator demand and interconnector connections. Table 4.2 lists the network reinforcement projects relevant to this Implementation Programme (as extracted from EirGrid's Transmission Development Plan 2010).

Of note, in the TDP 2010, the North-South 400 kV Interconnector development was identified as in the public planning process. The application was subsequently withdrawn from that planning process and the project has reverted to the status of 'Outline Design and EIA'. However, for consistency, the status has not been altered in this IP, which reflects the content of the TDP 2010. The project is listed in Table A1 of Appendix A.

CP No.	Project Title & Description	E.C.D	Phase
CP0501	**Clashavoon-Dunmanway 110 kV New Line** Construction of a new 110 kV line from Clashavoon to Dunmanway station and associated station works.	Mar-14	Outline Design or EIA
CP0580	**Carrickmines 220 kV GIS Development** Replacement of existing air-insulated switchgear with gas-insulated switchgear (GIS); Installation of a new 4th 220/110 kV transformer.	Dec-12	Outline Design or EIA
CP0585	**Laois /Kilkenny Reinforcement** **New Station & Associated Lines & Station Works** New 400/110 kV transmission station in Co. Laois. The station will be looped into the existing Dunstown-Moneypoint 400 kV line and Carlow-Portlaoise 110 kV line. A new 110 kV circuit from the new station to Kilkenny using the existing Ballyragget-Kilkenny 38 kV line which is built to 110 kV standards. A new 110/38 kV station at Ballyragget to cater for loss of the Kilkenny-Ballyragget 38 kV line. [Details to be finalised with DSO].	Dec-14	Outline Design or EIA
CP0596	**New 110kV Circuit To Mullingar** Construction of a new 110 kV circuit to Mullingar 110 kV station from either Kinnegad or Derryiron 110 kV stations.	Oct-14	Outline Design or EIA
CP0597	**Reinforcement of the Ardnacrusha & Ennis Area** Uprating of the Moneypoint-Tullabrack-Booltiagh-Ennis 110 kV circuit to equivalent of 430mm2 ACSR @80 o C. Dependent on Moneypoint 400/220/110 kV GIS Development, see CP0688	Dec-14	Outline Design or EIA
CP0674	**Tralee 110 kV Station** New Coupler	Aug-12	Outline Design or EIA
CP0699	**Cathaleen's Fall - Srananagh 1 110kV Line Uprate** Uprate line to equivalent of 430mm2 ACSR @ 80 o C	Oct-12	Outline Design or EIA
CP0709	**Dunmanway 110kV Station Upgrade**	Dec-14	Outline Design or EIA
CP0707	**Barrymore 110kV station extension -** **Loop into Cahir - Knockraha 110kV line**	Jun-13	Outline Design or EIA
CP0619	**New Capacitors at Shankill** Installation of 15 Mvar and 30 Mvar re-deployable capacitor units at Shankill 110 kV station	On Hold	Outline Design or EIA

4.3 DSO Connections

Most demand connections to the transmission system are sought by ESB Networks, the Distribution System Operator (DSO) which applies for new station connections. Table 4.3 lists the development projects that relate directly to the connection of new TSO/DSO interface stations to the grid, or to changes in existing connection arrangements.

The DSO has further development plans which are at various stages of preparation, several at an advanced stage. EirGrid is co-operating with the DSO on these expansion plans in order to bring them forward to project initiation when required. EirGrid will initiate the necessary transmission connections when formal notifications from the DSO to proceed are received.

Table 4.3
DSO Connection Projects

CP No.	Project Title & Description	E.C.D	Phase
CP0437a	**North Dublin 220kV Project - New 220kV Station** A new 220 kV station in the North Dublin Works area and associated networks. The development is part of a wider TSO/DSO agreed reinforcement strategy to enhance the network in the northern fringe of Dublin city. The station will be tail fed from Finglas 220 kV using cable and constructed with GIS. The process of acquisition of a new site for this project is currently underway.	Dec-14	Outline Design or EIA
CP0506	**Finnstown 220kV Project (Adamstown) - New 220kV Station** Finnstown 220 kV station, south of Lucan, a new 220 kV station looped into the Inchicore-Maynooth No. 1 and No.2 220 kV lines. The station will be initially a single transformer 220 kV station, but allow final development for a four transformer station. Due to space restrictions on potential sites an entirely GIS station is proposed.	Mar-14	Outline Design or EIA
CP0644	**Bracklone 110 kV Station and Loop In** New 110 kV station to be looped into Portlaoise-Newbridge 110 kV line. Replaces existing Portarlington 38 kV Station.	Dec-12	Outline Design or EIA
CP0649	**Drumline 110 kV Station Works** Two 20 MVA Transformers supplying 12.2 MW New load and 11.4 MW transfered load from existing Drumline transformers.	Jun-13	Outline Design or EIA
CP0627	**Bandon 110 kV Station** New Transformer Bay.	On Hold	Outline Design or EIA
CP0075	**Ballycummin 110 kV New Station** New station looped into the Limerick-Moneteen 110 kV line.	On Hold	Outline Design or EIA

4.4 Generator Connections

This section outlines projects that relate directly to connection of generation to the transmission system or to changes in existing generation connection arrangements. Some of these connections are contestable, i.e. the generator has decided to build the connection assets to TSO specified standards.

The Estimated Completion Date (E.C.D.) is EirGrid's current best estimate of when the generation connection will be completed. It should be noted that this is dependent on progress by the applicant and not EirGrid. The date of completion for these projects is co-ordinated with the Independent Power Producer (IPP) programme of connection.

Table 4.4 lists the generator connection projects relevant to this Implementation Programme (as extracted from EirGrid's Transmission Development Plan 2010).

Table 4.4

Generator Connection Projects

CP No.	Project Title & Description	E.C.D	Phase
CP0500	**North Kerry Project** A new 220 kV station looped into the existing Clashavoon-Tarbert 220 kV line. The work includes connection works for Athea, Dromada and Cloghboola windfarms	Apr-14	Outline Design or EIA
CP0603	**IPP088 Mulreavy Connection** Connection of a new 110 kV station for connection of new windfarm.	Jan-12	Outline Design or EIA
CP0608	**IPP119 Cloghboola Wind Farm** Connection of a new windfarm into the existing Trien 110 kV station.	Apr-14	Outline Design or EIA
CP0615	**Glenree 110kV Station** Connection of a new 110 kV station, looped into the existing Cunghill-Moy 110 kV line. This station will facilitate the connection of new DSO windfarms.	Sep-11	Outline Design or EIA
CP0648	**Garrow 110 kV Station** Extension Works for a new 110 kV transformer bay for the provision of renewable energy.	Aug-11	Outline Design or EIA
CP0650	**Millstreet 220/110 kV station** New 220/110 kV station looped into the existing Clashavoon-Tarbert 220 kV line for the connection of wind farms.	Aug-14	Outline Design or EIA
CP0651	**East Kerry & North West Cork 220 kV Station** A new 220 kV station looped into the existing Clashavoon-Tarbert 220 kV line for the connection of wind farms. Two new 110 kV lines will be constructed, one to Glenlaraand the other to the planned Cordal station in Co. Kerry. Knockacummer connection into Glenlara is also part of this project.	Jan-14	Outline Design or EIA
CP0602	**IPP044 Keelderry Wind Farm** Connection of a new windfarm to a new station, looped into the existing Agannygal-Derrybrien 110 kV line.	On Hold	Outline Design or EIA
CP0641	IPP118 Nore Power Station Extension works in the existing Kilkenny station for the connection of a new OCGT.	On Hold	Outline Design or EIA

Figure 4.2 Map Indicating Planned Network Developments in the Outline Design Phase and Public Planning Process. Note: All new developments on this map are subject to on-going EIA and AA processes

Section 5 - Environmental Mitigation Measures

5.1 Introduction

Mitigation measures are measures envisaged to prevent, reduce and, as fully as possible, offset any significant adverse impacts on the environment of implementing the IP.

Mitigation involves ameliorating significant negative effects. Where there are significant negative effects, consideration is given in the first instance to preventing such effects or, where this is not possible for stated reasons, to lessening or offsetting those effects. Mitigation measures can be roughly divided into those that: avoid effects; reduce the magnitude or extent, probability and/or severity of effects; repair effects after they have occurred, and; compensate for effects, balancing out negative impacts with other positive ones.

There are two types of mitigation measures. The first involves high-level preventative mitigation measures that were incorporated into the drafting of the IP document or by bringing about changes in organisational and working practices within EirGrid. These include seven major procedures, identified below and outlined in the subsequent sections of this chapter, which will be employed to identify and avoid environmental effects:

EMM 1. Full Integration of Planning and Environmental Considerations in Transmission System Planning;

EMM 2. Preparation of Strategic Environmental Constraints Mapping;

EMM 3. Preparation of Evidence-Based Environmental Guidelines, consisting of:

a) Environmental Benchmarking Studies;

b) Evidence-Based Environmental Design Guidelines; and

c) Guidelines on EIA for Transmission Projects in Ireland;

EMM 4. Consideration of the Broadest Possible Range of Alternatives in all future Energy Transmission Strategies;

EMM 5. Preparation of Transmission Development Plan Environmental Appraisal Report;

EMM 6. Ongoing Co-operation in preparation of Renewable Energy Generation Guidelines and Strategies; and,

EMM 7. Integrating Offshore Grid connectivity requirements and environmental considerations in EirGrid's Strategic Environmental Framework (SEF).

The second type of mitigation measures involves those that address the implementation of the IP. These are identified in Appendix B of this report and have been fully integrated into the IP. Project teams should refer to these interim general mitigation measures. These measures will be extended and augmented by the output from the Environmental Benchmarking Studies and Evidence-Based Environmental Design Guidelines referred to above and outlined below. It is noted that there are linkages between various mitigation measures and that the mitigation of certain effects will be contributed towards by multiple measures.

Additional, more detailed mitigation measures to those identified below would be likely to be required by lower tier, project-specific, environmental assessments and would need to be integrated into relevant specific plans and projects. It should be noted that many of the identified lower tier mitigation measures are procedures and processes that will need to be adopted.

The mitigation measures set out under Sections 5.2 to 5.8 were recommended by the SEA and AA processes to be integrated into an earlier draft of the IP. The IP preparation team took on board this recommendation and fully integrated the measures into Section 5 in the IP. The status of implementing all mitigation measures is detailed in Table 5.1.

[7] Note EMM = Environmental Mitigation Measure

Table 5.1

Status of Implementing Mitigation Measures

Mitigation Measure Code	Mitigation Measure Title	Status
EMM1	Full Integration of Planning and Environmental Considerations in EirGrid's Transmission System Planning	Has already occurred; changes will continue to be implemented.
EMM2	Preparation of Strategic Environmental Constraints Mapping	Has already occurred; will be updated on an ongoing basis, as appropriate, to include most up-to-date, relevant environmental data.
EMM3	Preparation of Evidence-based Environmental Guidelines	Has begun; Guidelines to be published.
EMM4	Consideration of the Broadest Possible Range of Alternatives in all Future Energy Transmission Strategies	Measure to be adhered to as relevant on adoption of IP.
EMM5	Preparation of Transmission Development Plan Environmental Appraisal Report	Measure to be adhered to as relevant on adoption of IP.
EMM6	Ongoing Co-operation in preparation of Renewable Energy Generation Guidelines and Strategies	Measure to be adhered to as relevant on adoption of IP.
EMM7	Integrating Offshore Grid connectivity requirements and environmental considerations in EirGrid's Strategic Environmental Framework (SEF)	Measure to be adhered to as relevant on adoption of IP.
EMM8 (A to K)	Other measures integrated into the IP	Measures to be adhered to for new projects as relevant and as appropriate on adoption of IP. Measures to be extended and augmented by the output from the Environmental Benchmarking Studies and Evidence-Based Environmental Design Guidelines

5.2 EMM1 Full Integration of Planning and Environmental Considerations in EirGrid's Transmission System Planning

Considerable changes of procedures and personnel have been put in place to ensure that environmental factors are considered at the earliest stage of EirGrid's Transmission Planning System – as a result of the parallel SEA process. These are preventative measures aimed at anticipating strategic decisions that would be likely to result in avoidable adverse environmental effects.

This Strategic Environmental Framework (SEF) has resulted in four major types of interventions:

1. The EirGrid Transmission System planning procedures have been strengthened to incorporate environmental considerations as an early determinant (refer to Chapter 3 of this IP) and as a critical stage in the process of decision making. These systems are now operational.
2. EirGrid has established a Programme Management Office (PMO) and new positions of responsibility within the organisation that provide senior planning and ecological advice to project teams. Appointments have been made to these positions.
3. EirGrid is implementing Strategic Environmental Constraints Mapping that provides decision-makers and system planners with high-level environmental data that can be used for the conceptual development stage of Transmission Planning.
4. Procedures to be followed on a project-by-project basis for the detailed consideration, weighting and evaluation of likely environmental effects – including cumulative effects – having particular regard to the requirements of the Habitats Directive[8]. Such procedures include the need for timely consultation with relevant planning and environmental authorities such as the NPWS, the evaluation of up-to-date mapping, designations and development plans, policies, and a consideration of any relevant sectoral guidelines.

In addition, EirGrid will continue to work pro-actively with the Department of Arts, Heritage and the Gaeltacht (DAHG) and with local planning authorities and regional authorities to identify critical policies, objectives and constraints - e.g. critical river crossing points – in Development Plans and Regional Planning Guidelines, to ensure that the planning and development of national strategic transmission infrastructure occurs in the context of best environmental practice, and in accordance with the principles of proper planning and sustainable development.

EirGrid will also continue to work alongside ESB Networks, Bord Gais, the National Transport Authority, the National Road Authorities and other key strategic bodies in order to ensure that sustainable development, spatial planning and transport and grid infrastructure are promoted in an integrated manner.

[8] Referenced statutory obligation

5.3 EMM2 Preparation of Strategic Environmental Constraints Mapping

The Scoping Report for the SEA identified the need to put Strategic Environmental Constraints Mapping in place in order to ensure that environmental considerations are included at the earliest stage of project inception and in the consideration of alternatives. A study was commissioned and completed while consultations were being undertaken for the SEA and the information contained in the Study informed numerous sections of this SEA Environmental Report.

The Strategic Environmental Constraints Mapping comprises mapping of the environmental considerations – both constraints and opportunities – that need to be incorporated into strategic decisions about projects and other developments likely to give rise to environmental effects. The mapping is of sufficient detail to provide an overview of the likelihood of encountering environmental challenges when planning routes though particular areas – at a regional level – and should assist in more detailed consideration of potential route corridors and in the selection of routing alternatives. The mapping should form a framework for more detailed mapping – on a project by project basis – of site specific sensitivities for ecology and cultural heritage and for local development plan designations of scenery and visual vulnerability.

The constraints mapping will become part of EirGrid's Standard Operational Procedure as part of the overall SEF to which designers are required to have regard. It is hoped that the constraints mapping can ultimately be updated to include Northern Ireland and will be updated periodically to ensure the use of the most up-to-date, relevant environmental baseline data.

5.4 EMM3 Preparation of Evidence-based Environmental Guidelines

Through the SEA scoping process the idea of a series of authoritative studies examining the actual effects of the construction and existence of power transmission projects in Ireland was recommended to be prepared and these are in the process of being commissioned.

These authoritative, *ex post* [9] studies will provide benchmarks to facilitate the preparation, presentation and defence of power projects that will be robust and will rigorously assess the impacts of transmission projects in Ireland. Details of the three types of studies that will mitigate impacts by anticipation and avoidance are as follows:

1. Environmental Benchmarking Studies

Studies will be carried out to determine the actual effect of the construction and existence of power projects in a representative range of typical Irish environmental conditions. The studies will focus on the principal topics of concern in environmental impact assessments – including ecology, visual impact, and impact upon human beings.

The studies will examine the effect on a typical area, habitat or circumstance that is commonly encountered – such as pastures in the lowlands, blanket bogs or the environs of a village. They will examine the effects of the construction and existence of a range of power transmission projects – including substations and a range of sizes of transmission lines ranging from 110 – 400kV.

Studies will describe the effect of power projects on specific topics in specific environments – these will be compared to unaffected areas, on the one hand, and to non-standard and 'worst case' conditions on the other, in order to establish the full range of conditions that could arise, as follows.

[9] *Ex post* is the Latin for "after the fact". In models where there is uncertainty that is resolved during the course of events, the *ex post* values (e.g. of expected gain) are those that are calculated after the uncertainty has been resolved.

Typical Conditions

In each case an area will be identified – and agreed with stakeholders – as being typical of the specific conditions where the transmission project has interacted with the environmental topic. The area of interaction will be scrutinised and compared with an unaffected control area to describe the nature, magnitude and significance of the effects that have occurred.

In addition to the Typical Condition there will also be an examination of two other conditions – Non-standard and Worst Case conditions – that can be used to determine the parameters within which the benchmarking of the environmental effects can be deemed to be reliably predicted.

Non-standard Conditions

Locations will be identified and agreed with key stakeholders which are typical of a landscape, habitat or land use but which have objective circumstances or factors that increase the potential for environmental effect – such as steeper slope, greater age, different management regimes. These will be scrutinised and compared with both Typical Conditions and unaffected control area, in order to describe the nature, magnitude and significance of the effects that have occurred.

Worst Case Condition

Locations will be identified and agreed with stakeholders which are typical of a landscape, habitat or land use in which there is objective evidence of adverse environmental effects due to the existence, construction or maintenance of the power project. The nature, magnitude and significance of the effects that have occurred will be described and evaluated to determine how such adverse effects occurred, and how they might be avoided in future.

Lessons Learned

Each section will include a summary of what project designers can learn from this analysis in terms of what practices appear to give rise to the least and the greatest environmental effect. This advice will be clearly differentiated into best practice to bring about 'Legal Compliance', as well as 'Best Practice'.

Summary Study

All studies for each section of the countryside will be summarised into an overall route selection and project design guide for each component of the Irish countryside. For instance, there will be a section entitled 'Power Projects in Wetlands'. This will provide authoritative design advice on all aspects of each step of a power project – from route selection through to project design and contract implementation. Using this, designers will be able to anticipate, avoid or ameliorate adverse effects on communities, flora, fauna, water, landscape or cultural heritage. This information will be compiled into *Evidence-Based Design Guidelines for Power Projects in Ireland* [see below].

On-going Studies

The studies are conceived as an on-going body of work that will be continuously updated and amended to take account of developments in understanding – arising from practice or research.

2. Evidence-Based Environmental Design Guidelines

The primary objective is that these Design Guidelines will provide practical guidance for how best to incorporate each type of power project into each part of the Irish environment in such a way as to anticipate and avoid adverse effects to the greatest extent possible.

The secondary objective is to establish an evidence based approach – accepted by stakeholders – that can be used to demonstrate that any residual effects are consistent with 'best practice'.

The Environmental Benchmarking Studies will identify evidence for the types of routes, designs, construction and maintenance methods that give rise to the least effect on the environment. This knowledge will be translated by project designers into Guidelines for route planners, project designers, managers and those responsible for construction and management of power assets.

The Design Guidelines will address the issues that arise at each of three stages of a project beginning at the Initiation stage where a project is first conceived, through the Planning Stage – where routes are selected – finishing with the Design Stage where detailed decisions are taken about how the project will be built. These issues are considered as follows:

- Project Initiation Issues
- Planning Issues
- Design Issues

The reports from the *Environmental Benchmarking Studies* will be examined to determine the routing, design and construction methods that produce the most environmentally suitable outcomes. These reports will also describe and detail evidence of environmental degradation that has occurred as highlighted in the 'worst case' evaluations. The advice from the *Lessons Learned* and the *Summary Study* sections of the Environmental Benchmarking Studies will be used as a basis for most of this material.

The emphasis throughout will be on providing concise, practical advice from practitioners to practitioners that will make the outcome of more detailed studies by specialists available in an immediately applicable way.

3. Guidelines on EIA for Transmission Projects in Ireland

The *EIA Guidelines* are meant to accompany the *Evidence-Based Design Guidelines* and are intended to provide an agreed and authoritative format for the preparation of EIA for power projects in Ireland.

The objective is to minimise challenges and disputes about the procedures and content of the coverage of EIAs for power projects. It will achieve this by identifying and agreeing appropriate scope, content and structure for power project EIAs with all relevant stakeholders – in advance of any specific project.

It is proposed that the structure and content will exactly match that employed in the EPA's *Advice Notes on Current Practice in the Preparation of Environmental Impact Statements*. It will, however provide considerably more detail on each section.

These Guidelines will draw heavily on both the *Environmental Benchmarking Studies and the Evidence-Based Design Guidelines* to provide the detail about the scope of environmental studies on the one hand and to describe how the projects should be described on the other. They will also take into account EirGrid's Ecology Guidelines for Transmission Powerlines which will be updated as appropriate following completion of the benchmarking studies. One of the most important components of the Guidelines will be a standardised Glossary of Impacts. This will collate a standardised and authoritative set of descriptions of levels of impact for power projects.

This is intended to remove uncertainty in the preparation of Environmental Impact Statements by facilitating rapid and consistent scoping and screening. It will also make key determinations more robust and protect their decisions against any threats and disputes about the sufficiency of the data or the appropriateness of the methods employed.

The benchmark studies will provide the factual basis for Evidence-Based Design Guidelines for Power Transmission Projects in Ireland. The benchmark studies and the design guidelines, in turn will provide the basis for specialist EIA Guidelines for this sector.

It is noted that projects will also have to be screened with respect to the Habitats Directive Assessment/ Appropriate Assessment as required by Article 6 of the Habitats Directive[10] – available DEHLG Guidance 'Appropriate Assessment of Plans and Projects in Ireland' (2009) should be considered as appropriate in this regard.

5.5 EMM4 Consideration of the Broadest Possible Range of Alternatives in all Future Energy Transmission Strategies

Alternative routes and regional grid development strategies will consider the broadest range possible of spatial and environmental alternatives at the next level of environmental assessment – i.e. that of lower tier plans, multiple or individual projects. All projects will be subject to detailed constraints and routes study, in accordance with EirGrid's Project Development and Consultation Roadmap.

5.6 EMM5 Preparation of Transmission Development Plan Environmental Appraisal Report

EirGrid produces an annual rolling operational document, the Transmission Development Plan (TDP), as required by regulation 8(6) of SI 445/2000, and submitted for approval to the CER (Commission for Energy Regulation).

In compliance with SI 435 of 2004, TDPs will be screened for the need to undertake SEA and AA. Notwithstanding the outcome of screening, an Environmental Appraisal Report will be prepared to accompany each annual TDP which will describe any effects arising that will be significantly greater, different or more significant than those anticipated by the SEA or AA.

The Environmental Appraisal Report which accompanies the next TDP shall take into account maritime mapping and issues emerging from the separate SEA in respect of the current Offshore Renewable Energy Development Plan, as appropriate.

5.7 EMM6 Ongoing Co-operation in preparation of Renewable Energy Generation Guidelines and Strategies

Some parts of the country are better situated for generation of renewable supplies of energy than others. However, there is currently no governing terrestrial renewable energy strategy detailing where renewable energy generation should occur in Ireland. A number of policies and objectives exist in various County Development Plans and County Wind Energy Strategies which promote the development of renewable energy at identified locations in their jurisdictions.

[10] Referenced statutory obligation

There is clear merit in the preparation of Regional Renewable Energy Generation Guidelines, as renewable energy developments may often traverse county and regional boundaries. EirGrid is keen to support, co-operate and participate in the preparation of any such future Regional Renewable Energy Generation Guidelines, Regional Renewable Energy Strategies, County Wind Energy Strategies and County Renewable Energy Strategies. Furthermore, EirGrid will continue to support the implementation of aspects of the National Renewable Energy Action Plan 2010 where applicable.

5.8 EMM7 Integrating Offshore Grid connectivity requirements and environmental considerations in EirGrid's Strategic Environmental Framework (SEF)

It is emerging that a number of scenarios for future electrical generation and distribution strategies in Ireland are likely to involve the development of offshore grid infrastructure. This has the potential to occur in areas off many parts of Ireland on account of various developments including the exploitation of offshore renewable resources (wind and wave), interconnectors with other EU Member States and the participation of Ireland in a pan-European offshore grid. All of these have significant implications for grid development and potential for significant interactions with inshore and terrestrial environments.

The SEA Directive[11] requires the identification of a range of environmental effects including those which are indirect. Interconnection across water and renewable energy generation infrastructure enabled by the IP, for example, can cause potential indirect and cumulative effects on both the onshore and offshore environments. Currently available offshore environmental data is not sufficiently complete to facilitate a comprehensive evaluation of likely impacts to the transition zone between terrestrial and marine environments. The OREDP will be reviewed and updated, and integration will become more apparent with time. It is anticipated that improved offshore data will become available in the period following this SEA, particularly as a result of the SEA which is currently being undertaken for offshore renewable resources. This data will be taken into account in the Environmental Appraisal Reports for forthcoming annual TDPs and in the SEAs of future iterations of the IP.

Figure 5.1 illustrates a qualitative indication of general, potential locations for land/sea connections where there are less sensitive onshore environments in the vicinity of coasts. This qualitative indication was determined by the sensitivity of onshore environments in the vicinity of coasts, as illustrated by the Overall Development Potential Rating mapping for the various regions to which Grid25 relates, as well as relevant corresponding data – including that relating to landscape and ecological constraints – for Northern Ireland. It would be useful if offshore grids generally aimed to make landfall in these areas and it would be desirable for such decisions to consider comparable, equivalent on-shore and offshore data.

Any consideration of alternative routes/locations for land/sea connections will be required to consider spatial and environmental alternatives at the next level of environmental assessment – i.e. that of lower tier plans, multiple or individual projects – as is required by mitigation measure EMM4, which has been integrated into the IP.

[11] Referenced statutory obligation

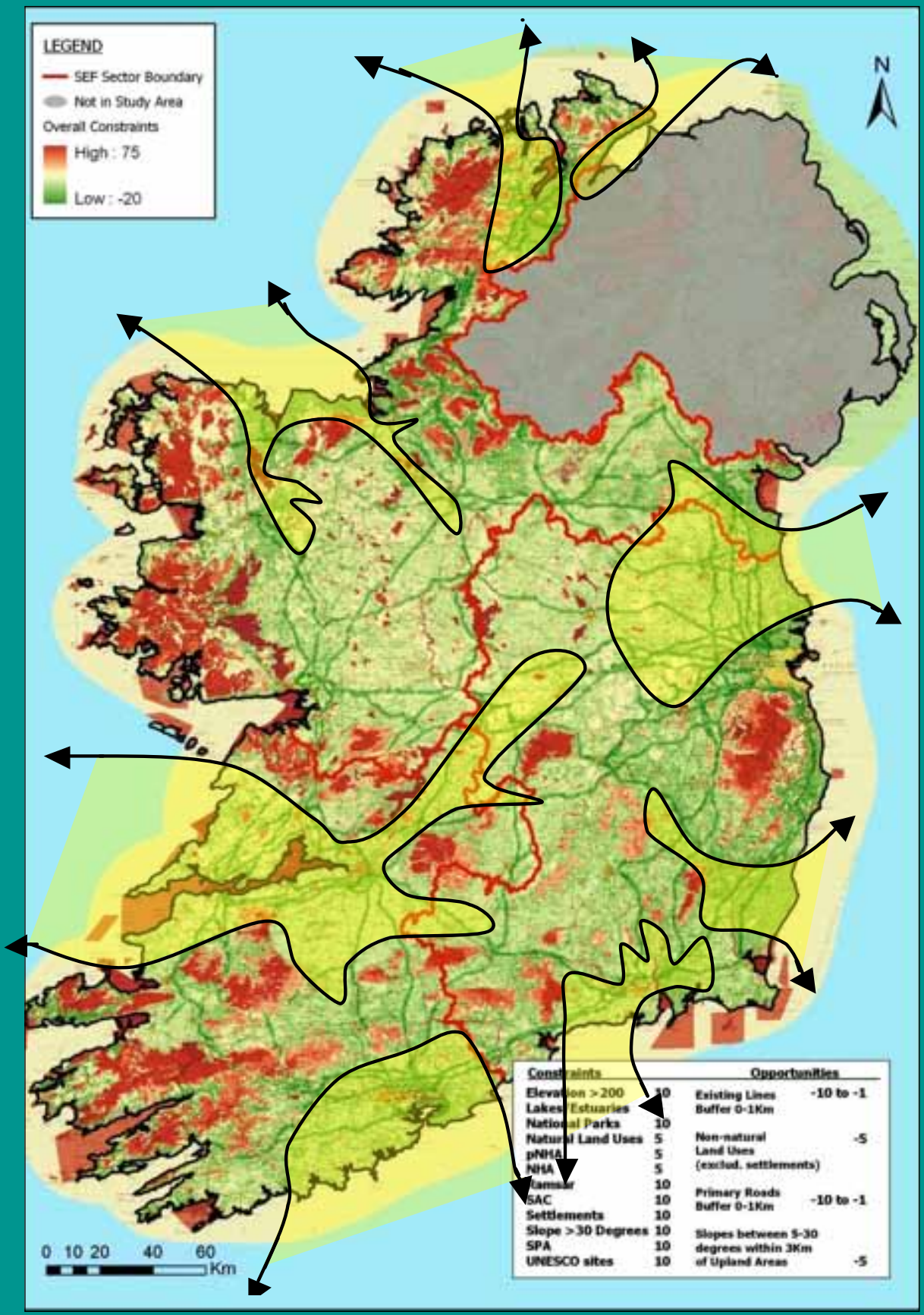


Figure 5.1 Less Sensitive[12] Areas for Land/Sea Connections (identified in yellow)

[12] Presence of less environmental sensitivities

APPENDIX A - Network Reinforcement Projects, Demand Customer and DSO Connection Projects, and Generator Connection Projects, identified in EirGrid's Transmission Development Plan 2010

A1 Network Reinforcement Developments

These comprise development projects that are driven by generic demand growth and the deep reinforcements resulting from generator demand and interconnector connections.

Table A1

Network Reinforcement Projects

CP No.	Project Title & Description	Major New Equipment	Project Justification	ECD	Phase
CP0217a	**Blake-Cushaling-Maynooth 110 kV Line - Loop into Newbridge 110 kV station** Existing Cushaling-Maynooth 110 kV circuit to be looped into Newbridge 110 kV station between Blake T and Cushaling.	110 kV bays: 2 110 kV line: 14 km	To improve the quality of supply to the 110 kV stations in this area by preventing low voltages and line overloads under certain contingencies.	Jun-10	Complete
CP0241a	**Lodgewood 220kV Project - New 220kV Station** A new Lodgewood 220/110 kV station in Co.Wexford, connected into the Arklow-Great Island 220 kV line and linked with a new Crane-Lodgewood 110 kV line, through a 250MVA 220/110 kV transformer	220 kV Station 220/110 kV 250 MVA Trafo: 1 220 kV bays: 5 110 kV bays: 5 In other stations 110 kV bays: 1 **New Line 220 kV** line: 1 km 110 kV: 7 km	To provide support to the 110 kV network in this area and by preventing low voltages and line overloads under certain contingencies.	Dec-10	Complete

CP0264a	**Finglas 220kV Station:** **5th 250MVA 220/110 kV Transformer (T2105)** Installation of a fifth 250 MVA 220/110 kV transformer and coupler	220 kV bays: 2 110 kV bays: 2 220/110 kV 250 MVA Trafo: 1	To maintain short circuit levels within standards and to alleviate potential overloading of the Maynooth-Ryebrook 110 kV line under certain maintenance-trip conditions.	Feb-10	Complete
CP0379	**Carrigadrohid-Kilbarry 110 kV Line Uprate** Uprate line and busbars to equivalent of 430mm² ACSR @80oC	Uprate 110 kV line 33.6 km	Refurbishment required due to condition of line, uprate indicated necessary by studies for Gate 2 wind.	Dec-10	Complete
CP0451	**Dungarvan-Knockraha 110kV Line Uprate** Uprate line to 430mm² ACSR @80oC	Uprate 110 kV line: 54 km	This uprate is necessary to avoid unacceptable overloading of the 110 kV during certain contingencies as a result of new generation in the south west The uprating of the line has been completed, work is currently being carried out to uprate the remote ends to enable full operating capacity of the circuit.	Dec-10	Complete
CP0512	**New Capacitors at Kilkenny** One new 30 Mvar capacitor at Kilkenny 110 kV station	110 kV station. 110 kV bays: 1 Caps: 1 x 30Mvar	To ensure that voltages in the Kilkenny area continue to comply with standards and to minimise the risk of voltage collapse following the tripping of the Kilkenny-Kellis 110 kV line.	Mar-10	Complete
CP0515	**New capacitor at Drumline:** **One new 15 Mvar capacitor at Drumline 110 kV station.**	110 kV bays: 1 Caps.: 1 x 15 MVar	To ensure that voltages in the Drumline area continue to comply with standards.	Oct-10	Complete
CP0528	**New capacitor at Kilteel** One new 30 Mvar capacitor at Kilteel 110 kV station	110 kV bays: 1 Caps.: 1 x 30Mvar	To ensure that voltages in the Kildare area continue to comply with voltage standards following the looping of Kilteel station and to minimise the risk of voltage collapse.	Nov-10	Complete

CP0549a	**Shannonbridge-Dallow T-Portlaoise** **110 kV Line Partial Uprate** Partial line uprate so that all of the line is equivalent to 430mm² ACSR @80°C	Uprate 110 kV line: 18.3km of 66.7 km	The need of uprating has been identified to avoid potential overloads of the line.	Sep-10	Complete
CP0562	**Great Island-Waterford 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110 kV line 11.8 km	The need of uprating has been identified to avoid potential overloads of the line.	Oct-10	Complete
CP0576	**Cathaleen's Fall-Corraclassy 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	61.3 km	The need of uprating has been identified to avoid potential overloads of the line in times of high wind output from Donegal	Nov-10	Complete
CP0584	**Shannonbridge-Ikerrin T 110 kV Line Uprate:** Uprate line to the equivalent rating of 430 mm² ACSR @ 80°C and uprate all station equipment to this rating.	Uprate 110 kV line: 54 km	The need of uprating has been identified to avoid potential overloads of the line.	Sep-10	Complete
CP0590	**Raffeen-Trabeg No.2 110 kV Line Uprate:** Uprate line to the equivalent of 430mm² ACSR @ 80°C.	Uprate 110 kV line: 9.23 km	The need of uprating has been identified to avoid potential overloads of the line.	Dec-10	Complete
CP0592	**Aghada-Raffeen 220 kV Cable** The new 220 kV circuit consisting of a section of cable and a section of overhead line. The overhead line portion of the circuit has been completed in 2006	220 kV bays: 2 220 kV cable: 7 km 220 kV line: 8 km	The increased growth in both demand and generation in the Cork area has placed a large strain on the networks in this area.	Jun-10	Complete

CP0626	**Killonan-Knockraha 220 kV Line Uprate:** Replace the existing conductor with a High Temperature Low Sag (GAP) conductor to achieve a higher rating.	Uprate 220 kV line: 82 km	Condition assessment identified the need for refurbishment. The line was replaced with one of a higher rating which adheres to current standards.	Dec-10	Complete
CP0175	**Charleville-Killonan 110 kV Line Uprate** Uprate Line to 430mm² ACSR @80°C	Uprate 110 kV Line: 36.9km	The need for uprating has been identified to avoid potential overloads of the line. The uprating of the line has been completed and work is currently being carried out to uprate the remote ends to enable full operating capacity of the circuit.	Jun-11	Detailed Design & Construction
CP0197a	**Cushaling-Thornsberry 110kV New Line** Construction of a new Cushaling-Thornsberry 110 kV line as a 2nd connection to Thornsberry 110 kV station	110 kV bays: 2 110 kV line: 30 km	To improve the quality of supply to the 110 kV stations in this area by preventing low voltages and line overloads under certain contingencies. The DSO has requested a second 110 kV line to the DSO station at Thornsberry to improve the security of supply.	Sep-11	Detailed Design & Construction
CP0211	**Srananagh 220 kV Station and Line:** A new Srananagh 220/110 kV station connected by a new 220 kV line to Flagford 220 kV station; 110 kV work now complete	**220 kV Station:** 220/110 kV 250 MVA Trafo: 1 220 kV bays: 3 **New Lines:** 220 kV: 56 km	This development is needed to reinforce the network in the North-West area by supporting the voltage and reducing the risk of loss of supply during the winter peaks and the summer maintenance outages. It is also required to facilitate the export of renewable generation from the north west.	Dec-11	Detailed Design & Construction
CP0218	**Gorman-Navan No. 3 110 kV line:** A third line from Gorman 110 kV station to Navan 110 kV station will be constructed.	110 kV bays: 2 110 kV line: 4 km	To alleviate unacceptable overloads of either of the existing Gorman-Navan 110 kV lines from 2012 under certain contingencies.	Sep-11	Detailed Design & Construction

CP0246a	**Tarbert-Tralee No.2 110 kV New Line** A second line from Tarbert to Tralee constructed at 110 kV	110 kV bays: 2 110 kV line: 47km	This is needed to overcome 110 kV line overloads and voltage collapse in the Tralee area.	Nov-11	Detailed Design & Construction
CP0254	**Cashla loop-in of the Dalton-Galway 110 kV line:** Looping of the Dalton–Galway 110 kV line into the Cashla station, creating the Cashla–Dalton line and the Cashla–Galway No. 4 110 kV line. This line will then be extended out to the new Salthill 100 kV station, creating a Cashla-Salthill 110 kV line. Ref CP0543 in DSO section.	110 kV bays: 2 110 kV line: 22 km	To avoid overloading the existing Cashla-Galway 110 kV lines during certain contingencies by removing the Dalton load connection and providing an additional circuit into Galway.	Sep-11	Detailed Design & Construction
CP0265	**Cullenagh - Great Island 220 kV Line Uprate** Uprate line to equivalent of 600mm² HTLS ACSR @ 80°C	Uprate 220kV Line 23 km	The uprate will avoid unacceptable overloading of the line during certain contingencies.	Oct-12	Detailed Design & Construction
CP0292a	**Gorman-Meath Hill 110 kV New Line** A new110 kV line will be constructed between Gorman and Meath Hill 110 kV stations	110 kV bays: 2 110 kV line: 30 km	The DSO has requested a second connection to Meath Hill 110 kV station.	Dec-11	Detailed Design & Construction
CP0374a	**Arva-Shankill No.2 110 kV New Line** A new 110 kV line constructed between Arva and Shankill 110 kV stations.	110 kV bays: 2 110 kV line: 20 km	To alleviate unacceptable overloads of a number of 110 kV lines in the area for certain contingency conditions. This reinforcement is associated with generation connection.	Dec-11	Detailed Design & Construction
CP0371	**Ballydine - Doon 110 kV Line Uprate (inc of Ballydine busbar) (11.4km)** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV line: 11.4 km	The uprate will avoid unacceptable overloading of the line during certain contingencies.	Oct-12	Detailed Design & Construction

CP0406a	**Cashla-Cloon 110kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @80°C	Uprate 110 kV line: 23 km	The uprate will avoid unacceptable overloading of the line during certain contingencies.	Jun-11	Detailed Design & Construction
CP0421	**Binbane-Letterkenny 110 kV New Line (Donegal Reinforcement)** A new 110 kV line between the existing Binbane and Letterkenny 110 kV stations in County Donegal; this new line is looped into a new 110 kV switching station, Tievebrack, east of Glenties to facilitate DSO connection to Ardnagappary.	110 kV bays: 4 110 kV line: 65 km	The DSO has requested a second 110 kV connection to Binbane. The Binbane-Letterkenny line meets the DSO's needs while facilitating generation exports from Donegal during low demand periods and meeting the increasing electricity demand in the area.	Oct-13	Detailed Design & Construction
CP0467a	**Louth 220kV Station - Reactive Compensation** Installation of a 30 Mvar re-deployable capacitor unit at the 110 kV busbar in Louth station.	**Louth 110 kV** Bays: 1 Caps: 1x30 Mvar	To resolve temporary and long term voltage problems in the north east.	Jun-10	Detailed Design & Construction
CP0511	**Killonan 220kV Station** Installation of a 4th 220/110 kV Transformer. The unit will have a rating of 250 MVA.	220/110 kV 250 MVA Trafo: 1	Required to avoid overloading the existing 63 MVA transformers when the 125MVA transformer is out of service and one of the remaining 63 MVA transformers trips.	Jun-11	Detailed Design & Construction
CP0513	**Carrickmines 220kV Station** Installation of a 3rd 250MVA 220/110kV Transformer	220/110 250 MVA Trafo: 1 110 kV bays: 1 220 kV bays: 1	Necessary to avoid unacceptable voltage levels in the area when one transformers is out of service and the subsequent loss of the second transformer.	Oct-11	Detailed Design & Construction
CP0514	**Ardnacrusha 110 kV Station Reactive Compensation** Installation of a new 30 Mvar capacitor at Ardnacrusha110 kV Station.	110 kV bays: 1 Caps.: 1 x 30 Mvar	To ensure that voltages in the Ardnacrusha area continue to comply with standards.	Jun-11	Detailed Design & Construction

CP0523	**Inchicore 220kV Station - 4th 250MVA 220/110kV Transformer** Connection of a new 250 MVA, 220/110 kV double wound transformer (T2103) in Inchicore 220 kV station; extension of the existing GIS 220 kV busbar and building; installation of a new 220 kV transformer bay, line bay and coupler.	220 kV bays: 3 220/110 250 MVA Trafo: 1	This will maintain security of supply and alleviate existing 220 kV short circuit problems.	Jun-11	Detailed Design & Construction
CP0529	**New Capacitor at Thurles** One new 15 Mvar Capacitor at Thurles 110 kV station	110 kV bays: 1 Caps.: 1 x 15 Mvar	To ensure that voltages in the Thurles area continue to comply with the TPC and to minimise voltage drop violations	Oct-12	Detailed Design & Construction
CP0537	**Limerick-Moneteen 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110 kV line 6.4 km	The need of uprating has been identified to avoid potential overloads of the line	Aug-11	Detailed Design & Construction
CP0551	**Cahir-Doon 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110 kV line 6.4 km	The need of uprating has been identified to avoid potential overloads of the line	Aug-11	Detailed Design & Construction
CP0552	**Athlone-Shannonbridge 110 kV Line Uprate** Uprate line to equivalent rating of 430mm² ACSR @80°C	Uprate 110 kV line: 21 km	The need of uprating has been identified to avoid potential overloads of the line	Oct-11	Detailed Design & Construction
CP0575	**Corraclassy-Gortawee 110 kV Line Uprate** Refurbishment and full uprating of the Corraclassy - Gortawee 110 kV line to an equivalent of 430mm² ACSR @ 80°C	Uprate 110 kV line 10.9 km	A condition assessment of the Corraclassy – Gortawee 110 kV line was carried out and showed the requirement to replace the conductor. The need for uprating has been identified to avoid potential overloads on this line in times of high wind output from Donegal Line Work now complete, Awaiting bay conductor uprate	Mar-11	Detailed Design & Construction

CP0586	**Knockraha 220 kV Station** Installation of a 3rd 250MVA 220/110kV transformer	220/110 kV trafo: 1 220 kV bay: 1 110 kV bays: 1 110 kV cable:1	Two new CCGTs in Cork drive the need for additional transformer capacity in Knockraha 220 kV station.	Jun-11	Detailed Design & Construction
CP0593	**Aghada 220 kV AIS Station** Replacement and upgrading of existing station	**220 kV Station**	The increased growth in both demand and generation is placing a large strain on the networks in this area. The condition of the plant and apparatus due to age is also a factor	Aug-11	Detailed Design & Construction
CP0594	**New Capacitors at Mullingar** Two new 15 Mvar capacitors at Mullingar 110 kV station	110 kV bays: 2 Caps: 2 x 15 Mvar	To ensure that voltages in the Mullingar area continue to comply with the TPC and to cater for increasing demand	Oct-12	Detailed Design & Construction
CP0618	**New Capacitors at Lisdrum** Installation of two 15 Mvar fixed capacitor units at Lisdrum 110 kV station	110 kV bays:2 Caps: 2x15 Mvar	To resolve the temporary and long term voltage problems in the north east	Apr-11	Detailed Design & Construction
CP0587	**Glanagow-Raffeen 220 kV Underground Cable Circuit** A new 220 kV circuit consisting of a section of cable and a section of overhead line.	**220 kV Cables** Underground: 4 km Undersea: 4.5 km 220 kV bays: 2	This is necessary to facilitate the export of generation from the Cork harbour area	Jul-11	Detailed Design & Construction
CP0620	**Arva-Gortawee 110 kV Line Uprate** Refurbishment and full uprating of the Arva - Gortawee 110 kV line to an equivalent of 430 mm² ACSR @ 80°C	Uprate 110 kV line: 30.6 km	A condition assessment of the Arva-Gortawee 110kV line was carried out in 2008. The need for refurbishment was identified by this assessment while system studies indicated the need to uprate to avoid unacceptable overloading.	Jun-11	Detailed Design & Construction

CP0517	**Coolroe - Kilbarry 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 14.5km	The need of uprating has been identified to avoid potential overloads of the line.	Dec-12	Detailed Design & Construction
CP0518	**Coolroe - Inniscarra line uprate (inc Innicscarra busbar)** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 2.74 km	The need of uprating has been identified to avoid potential overloads of the line.	Oct-11	Detailed Design & Construction
CP0559	**Butlerstown - Killoteran line uprate (inc of busbars)** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 2.7 km	The need of uprating has been identified to avoid potential overloads of the line.	Oct-12	Detailed Design & Construction
CP0560	**Cullenagh - Waterford 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 12.5 km	The need of uprating has been identified to avoid potential overloads of the line.	Oct-12	Detailed Design & Construction
CP0637D	**Portlaoise busbar uprate-Athy Carlow Line Works** Busbars, sectionalisers and disconnectors to be uprated.	110kV Station: BB uprate: 1	The need of uprating has been identified to enable development of the network.	Oct-11	Detailed Design & Construction
CP0656	**Arklow - Crane 110 kV Line Uprate incl busbars in Arklow & Crane** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 41.8km	The need of uprating has been identified to avoid potential overloads of the line.	Aug-11	Detailed Design & Construction
CP0659	**Arva - Navan 110 kV Line Uprate & Line Works** Uprate line to equivalent of 430mm² ACSR @ 80°C	Uprate 110kV Line 65.5km	The need of uprating has been identified to avoid potential overloads of the line.	Jul-11	Detailed Design & Construction

CP0667	**Inchicore - Maynooth 1 & 2 220kV Line (double cct)- Uprate with HTLS**	Uprate 220kV Line 2x19 km	The need of uprating has been identified to avoid potential overloads of the line	Dec-12	Detailed Design & Construction
CP0687	**Dunmanway - Macroom 110kV Refurbishment** New line equivalent of 430mm² ACSR @ 80 °C	Uprate 110kV Line 26.2 km	Condition Assessment indicates requirement for line refurbishment. Existing line to be upgraded according to current policy	Oct-11	Detailed Design & Construction
CP0689	**Ennis 110kV station - Busbar Uprate**	110kV Station: Busbar uprate: 1	The need of uprating has been identified to enable development of the network	Oct-12	Detailed Design & Construction
CP0694	**Athlone 110kV Busbar Uprate**	110kV Station: Busbar uprate: 1	The need of uprating has been identified to enable development of the network	Dec-11	Detailed Design & Construction
CP0696	**Marina - Trabeg 1 110kV Cable Uprate**	110kV Cable uprate 3.3km	The need of uprating has been identified to avoid potential overloads of the line	Dec-12	Detailed Design & Construction
CP0698	**Prospect - Tarbert 220kV Line Uprate (7.7km)**	Uprate 220kV line 7.7 km	The need of uprating has been identified to avoid potential overloads of the line	Dec-12	Detailed Design & Construction
CP0701	**Cullenagh - Dungarvan 110 kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80 °C	Uprate 110kV line 34.32 km	The need of uprating has been identified to avoid potential overloads of the line	Oct-13	Detailed Design & Construction

CP0702	**Butlerstown - Cullenagh 110kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80° C	Uprate 110kV Line 14.5km	The need of uprating has been identified to avoid potential overloads of the line	Oct-13	Detailed Design & Construction
CP0660	**Cashla-Ennis 110 kV Line Uprate** Uprate Line to equivalent of 430mm² @ 80° C	Uprate 110 kV Line 54.3 km	The need of uprating has been identified to avoid potential overloads of the line	Jul-11	Detailed Design & Construction
CP0466a & CP0469	**North-South 400 kV Interconnection Development** A new 400 kV line constructed between the existing Woodland 400 kV station, in south east Co. Meath and Turleenan in Co. Tyrone	**Woodland 400 kV** Bay: 1 400 kV line: 140 km	To increase transfer capacity between the two systems in both directions and avoid situations where a single event could lead to system separation. Also to provide network reinforcement in the north east	Dec-14	Public Planning Process[1]
CP0399	**Moneypoint-Tarbert 220 kV New Cable** A new submarine cable constructed across the Shannon Estuary from Moneypoint in Co. Clare to a new 220 kV station west of Tarbert in north Co. Kerry; installation of a new 400/220 kV transformer in Moneypoint	400 kV bays: 1 220 kV bays: 1 500 MVA Trafo: 1 220 kV cable: 10 km	To provide an alternative route for power into and out of the south west as well as an additional link between the 400 kV and 220 kV networks.	Jul-13	Public Planning Process[2]
CP0682	**Woodland 400 kV Station - 2nd 400/220 500MVA Trafo**	400kV Station:1 500MVA Trafo:1	Required deep reinforcement for East-West Interconnector.	Jul-12	Public Planning Process[3]
CP0683	**Dunstown 400kV Station - 2nd 400/220 500MVA Trafo**	400kV Station:1 500MVA Trafo:1	Required deep reinforcement for East-West Interconnector.	Dec-12	Public Planning Process[4]

CP0647	**Tarbert Redevelopment Project** New 220/110 kV station to the west of the existing Tarbert Station. All existing 110 kV circuits connected into Tarbert 220 kV station will be diverted to this new station	220/110 kV Station:1 220/110 kV Trafos: 3 220 kV Bays: 12 110 kV Bays:12	Required to accommodate planned generation in the south west and the refurbishment of the existing Tarbert 220 kV station. The new 110 kV part of the station will allow for the existing Tarbert 110 kV equipment to be removed for a cleanup of lines in the area. Also the route access into Tarbert is restricted, the new station will improve this	Jul-13	Public Planning Process[5]
CP0501	**Clashavoon-Dunmanway 110 kV New Line** Construction of a new 110 kV line from Clashavoon to Dunmanway station and associated stations works	110kV line: 35 km 110 kV bays: 2	The construction of a Clashavoon - Dunmanway 110 kV line will improve security of supply for west Cork and facilitate renewable generation	Mar-14	Outline Design or EIA
CP0580	**Carrickmines 220 kV GIS Development** Replacement of existing air-insulated switchgear with gas-insulated switchgear (GIS); Installation of a new 4th 220/110 kV transformer.	220 kV substation:1 220 kV bays: 1 220/110 kV 250MVA Trafo: 1	The requirement to change the switchgear is due to the assets' condition and expansion needs. The 4th 220/110 kV 250 MVA transformer is necessary to avoid unacceptable low voltage levels in the area when one transformer is out for maintenance and a fault occurs on a second transformer	Dec-12	Outline Design or EIA
CP0585	**Laois /Kilkenny Reinforcement New Station & Associated Lines & Station Works** New 400/110 kV transmission station in Co. Laois. The station will be looped into the existing Dunstown-Moneypoint 400 kV line and Carlow-Portlaoise 110 kV line. A new 110 kV circuit from the new station to Kilkenny using the existing Ballyragget-Kilkenny 38 kV line which is built to 110 kV standards. A new 110/38 kV station at Ballyragget to cater for loss of the Kilkenny-Ballyragget 38 kV line. [Details to be finalised with DSO].	400 kV Station 400 kV bays: 5 400 kV busbar 110 kV Station: 110 kV bays: 7 110 kV busbar In other 110 kV stations 110 kV bays: 5 110 kV OHL: 30km	This will provide a strong injection from the 400 kV network into the 110 kV network near Portlaoise, and will significantly improve the quality and security of supply in counties Laois, Carlow and Kilkenny and provide for long term growth throughout the region.	Dec-14	Outline Design or EIA

[5] Including environmental report and AA screening

CP0596	**New 110kV Circuit To Mullingar** Construction of a new 110 kV circuit to Mullingar 110 kV station from either Kinnegad or Derryiron 110 kV stations	110 kV bays: 2 110 kV Line: 30km	Required to ensure voltage levels at Mullingar remain within standards during certain contingencies and allow for economic growth in the area	Oct-14	Outline Design or EIA
CP0597	**Reinforcement of the Ardnacrusha & Ennis Area** Uprating of the Moneypoint-Tullabrack-Booltiagh-Ennis 110 kV circuit to equivalent of 430mm² ACSR @ 80 ° C. Dependent on Moneypoint 400/220/110 kV GIS Development, see CP0688	Uprate 110 kV line: 53.1 km	To alleviate low voltage levels in the Ardnacrusha and Ennis areas during the summer maintenance of certain existing overhead lines in the area	Dec-14	Outline Design or EIA
CP0674	**Tralee 110 kV Station** New Coupler	110 kV Coupler: 1	Required to improve security of supply in Kerry	Aug-12	Outline Design or EIA
CP0688	**Moneypoint - New 400/220/110kV GIS development**	400, 220, 110kV station	Required to comply with busbar policy and security of supply standards. Also facilitate development of transmission network	Oct-15	Outline Design or EIA
CP0699	**Cathaleen's Fall - Srananagh 1 110kV Line Uprate** Uprate line to equivalent of 430mm² ACSR @ 80 ° C	Uprate 110kV Line 52.7 km 110 kV Bay : 1	The need of uprating has been identified to avoid potential overloads of the line	Oct-12	Outline Design or EIA
CP0709	**Dunmanway 110kV Station Upgrade**	100kV Station: Trafo Bay: 1 BB/coupler: 1	Required to comply with busbar policy and security of supply standards. Also facilitate development of transmission network	Dec-14	Outline Design or EIA
CP0707	**Barrymore 110kV station extension - Loop into Cahir - Knockraha 110kV line**	New Lines: 110kV: 0.3 km	DSO has requested connection of of 2nd 110/38 kV transformer. This drives need for full 4 bay looped in station to comply with transmission standards	Jun-13	Outline Design or EIA
CP0619	**New Capacitors at Shankill** Installation of 15 Mvar and 30 Mvar re-deployable capacitor units at Shankill 110 kV station	110 kV bays:2 Caps: 1 x 15 Mvar 1 x 30 Mvar	To resolve the temporary and long term voltage problems in the north east	On Hold	Outline Design or EIA

A2 Demand Customer and DSO Connections

Most demand connections to the transmission system are sought by the Distribution System Operator which applies for new station connections. Table A2 lists the development projects that relate directly to the connection of new TSO/DSO interface stations to the grid, or to changes in existing connection arrangements.

Table A2

DSO Connection Projects

CP No.	Project Title & Description	Major New Equipment	ECD	Phase
CP0489	**Castlebar 110 kV Station - New 110 kV Line bay for Carrowbeg** Carrowbeg is the name for a new 110 kV station near Westport, Co. Mayo, tail fed from Castlebar. Installation of 110 kV equipment in an existing line bay in Castlebar 110 kV station. It is proposed that the new station will supply 1 MVA of new load and accommodate the transfer of 22 MW from Castlebar	110 kV bay: 1	Jun-10	Complete
CP0535	**College Park 110 kV Station - 3rd Transformer bay** Connect 1 X 20 MVA, 110/10 kV transformer (T103) in College Park 110 kV station. It is proposed that the new transformer will enable College Park 110 kV station to accommodate an increase in MIC of 24 MVA	110 kV bay: 1	Mar-10	Complete
CP0628	**Doon 110 kV Station** New Transformer Bay	110 kV Trafo bay: 1	Dec-10	Complete

CP0631	**Waterford 110 kV Station - Uprate 2 bays to 63 MVA** Replace the existing 2 x 31.5 MVA Transformers at Waterford 110 kV station with 2 x 63 MVA units.	110 kV Trafo bay: 2	Sep-10	Complete
CP0173b	**Banoge 110 kV New Connection** The existing Arklow-Crane 110 kV line looped into Banoge 110 kV station, creating new Arklow-Banoge and Banoge-Crane 110 kV lines. This station has already been built and is awaiting connection	**110 kV station** 110 kV bays: 4 110 kV line: 6 km	Jun-11	Detailed Design & Construction
CP0201a	**Athy 110 kV Station** The existing Carlow-Portlaoise 110 kV line looped into a new Athy 110 kV station, creating new Athy-Portlaoise and Athy-Carlow 110 kV lines. Station is complete and energised, but is tee'd on to Carlow-Portlaoise 110 kV line. A further outage is required in 2010 to loop this new station into the existing circuit.	**110 kV station** 110 kV bays: 5 110 kV line: 18 km	Dec-11	Detailed Design & Construction
CP0507	**Arklow 220/110 kV Station –** New 2x20 MVA DSO Transformers (T2101/T2102) to be installed to accommodate growing load in the area	**110 kV bays: 2**	Mar-11	Detailed Design & Construction
CP0543	**Salthill 110kV Station - New Station** New looped 110 kV station will be built on site of existing Salthill 38 kV station. Salthill will be connected to Galway 110 kV station and to Cashla by re-directing the proposed Cashla-Galway 110 kV No.4 line to Salthill, which will become Cashla-Salthill 110 kV. This project also incorporates a bay in Salthill for the DSO connection to Screeb	110 kV line bays: 5 110 kV trafo bays: 3 110 kV cable: 12 km	Jul-11	Detailed Design & Construction
CP0630	**Carlow 110 kV Station - Uprate 2 bays to 63 MVA** Replace the existing 2x31.5 MVA Transformers at Carlow 110 kV station with 2 x 63 MVA units	110 kV Trafo Bay: 2	Oct-11	Detailed Design & Construction
CP0646	**Finglas 110 kV Station** **New 35 bay 110 kV GIS Station to replace existing 110 kV AIS.**	110 kV Station Bays: 35	Dec-14	Public Planning Process [6]

[6] This project has subsequently been approved, and is now at detailed design and construction phase

CP0437a	**North Dublin 220kV Project - New 220kV Station** **A new 220 kV station in the Balgriffin area and associated networks. The development is part of a wider TSO/DSO agreed reinforcement strategy to enhance the network in the northern fringe of Dublin city. The station will be tail fed from Finglas 220 kV using cable and constructed with GIS.** **The process of acquisition of a new site for this project is currently underway.**	220 kV Station (GIS):1 220/110 kV 250 MVA Trafo: 1 220 kV bays : 1 In other stations 220 kV bays: 1 220 kV cable; 15 km	Dec-14	Outline Design or EIA
CP0506	**Finnstown 220kV Project** **(Adamstown) - New 220kV Station** **Finnstown 220 kV station, south of Lucan, a new 220 kV station looped into the Inchicore-Maynooth No. 1 and No.2 220 kV lines. The station will be initially a single transformer 220 kV station, but allow final development for a four transformer station. Due to space restrictions on potential sites an entirely GIS station is proposed.**	220 kV GIS station Trafo bay: 4 Line/cable bays : 4 Coupler bay: 3 220/110 kV 250 MVA Trafo: 1 110 kV GIS Station Double busbar: 1 Trafo bay: 4 Line/cable/MV trafo bays: 8 GIS coupler bay: 3	Mar-14	Outline Design or EIA
CP0644	**Bracklone 110 kV Station and Loop In** **New 110 kV station to be looped into Portlaoise-Newbridge 110 kV line. Replaces existing Portarlington 38 kV Station.**	110 kV station line bays: 2 Trafo Bays: 2	Mar-14	Outline Design or EIA
CP0649	**Drumline 110 kV Station Works** **Two 20 MVA Transformers supplying 12.2 MW New load and 11.4 MW transfered load from existing Drumline transformers.**	110 KV Bays: 2	Jun-13	Outline Design or EIA
CP0627	**Bandon 110 kV Station** **New Transformer Bay.**	110 kV Trafo bay: 1	On Hold	Outline Design or EIA
CP0075	**Ballycummin 110 kV New Station** **New station looped into the Limerick-Moneteen 110 kV line.**	110 kV line bays: 5 110 kV line: 0.2 km	On Hold	Outline Design or EIA
CP0629	**Monread 110 kV Station** **New Transformer Bay** **Cancelled – included in Minor Capital Works instead Jan 10)**	110 kV Trafo Bay: 1	Dec-10	Cancelled

A3 Generator Connections

This section outlines the projects underway that relate directly to connection of generation to the transmission system or to changes in existing generation connection arrangements. Some of these connections are "contestable", i.e. the generator has decided to build the connection assets to TSO specified standards. It should be noted that this is dependent on progress by the applicant.

Table A3

Generator Connection Projects

CP No.	Project Title & Description	Major New Equipment	ECD	Phase
CP0563	**IPP62 Garvagh Connection** **Installation of Garvagh 110 kV bay in Corderry 110 kV station (IPP build)**	Bays: 1 (located at Corderry 110 kV) Line: 7 km	Apr-10	Complete
CP0599	**IPP048E Coomagearlahy Wind Farm Extension** **A new bay in the existing Coomagearlahy 110 kV station to facilitate an extension of the wind farm (IPP Build)**	110 kV Bay: 1	Feb-10	Complete
CP0614	**IPP142 Edenderry Peaker Project** **A new 110 kV bay at the existing Cushaling 110 kV station to connect a new 116 MW distillate generator**	Bays: 1 (at Cushaling 110 kV)	Apr-10.	Complete
CP0555	**IPP111 Castledockrill Connection** **A new 110 kV station connected to Lodgewood station, see CP241 in Table 4-2. This will facilitate connection of DSO windfarm. (IPP Build).**	110 kV station 110 kV bays: 2 110 kV Cable: 6.6km	Dec-10	Complete

CP0479a	**IPP055 Athea Phase 1 Connection** **A new Athea 110 kV station connected to the existing Trien 110 kV station for the connection of Athea Windfarm (IPP Build).**	110 kV GIS Station Bays: 7 (inc. 1 bay at Trien 110 kV) Line : 13km (to Dromada)	Jul-11	Detailed Design & Construction
CP0595	**Glanagow 220 kV Station** **A new 220 kV GIS station for the connection of a new CCGT plant. (Already generating, with temporary connection via AIS station)**	New 220 kV Station: 1	Jul-11	Detailed Design & Construction
CP0500	**North Kerry Project** **A new 220 kV station looped into the existing Clashavoon-Tarbert 220 kV line. The work includes connection works for Athea, Dromada and Cloghboola windfarms**	220 kV Station: 1 250MVA Trafo: 1 Bays: 2 110 kV Station: 1 Bays: 5 Line: 15.2 km	Apr-14	Outline Design or EIA
CP0603	**IPP088 Mulreavy Connection** **Connection of a new 110 kV station for connection of new windfarm.**	110 kV Station:1 110 kV Bays: 5 110 kV Line: 7.7 km	Jan-12	Outline Design or EIA
CP0608	**IPP119 Cloghboola Wind Farm** **Connection of a new windfarm into the existing Trien 110 kV station.**	110 kV Station Bays : 3 Line: 13 km Trien 110 kV Bays: 1	Apr-14	Outline Design or EIA
CP0615	**Glenree 110kV Station** **Connection of a new 110 kV station, looped into the existing Cunghill-Moy 110 kV line. This station will facilitate the connection of new DSO windfarms.**	110 kV Station Bays: 3 Sectionaliser: 1 Line: 1.4km (2 x 0.7km)	Sep-11	Outline Design or EIA
CP0648	**Garrow 110 kV Station** **Extension Works for a new 110 kV transformer bay for the provision of renewable energy.**	110 kV station 110 kV Line Bays: 3 110 kV Trafo Bay: 1 110 kV Coupler 1 110 kV busbar extension	Aug-11	Outline Design or EIA
CP0650	**Millstreet 220/110 kV station** **New 220/110 kV station looped into the existing Clashavoon-Tarbert 220 kV line for the connection of wind farms.**	220/110 kV Station 220/110 kV Trafo: 1 220 kV Bays: 2 110 kV Bays: 1	Aug-14	Outline Design or EIA

CP0651	**East Kerry & North West Cork 220 kV Station** **A new 220 kV station looped into the existing Clashavoon-Tarbert 220 kV line for the connection of wind farms. Two new 110 kV lines will be constructed, one to Glenlaraand the other to the planned Cordal station in Co. Kerry. Knockacummer connection into Glenlara is also part of this project.**	220/110 kV Station 220/110 kV Trafo: 1 220 kV Bays: 2 110 kV Bays: 2	Jan-14	Outline Design or EIA
CP0602	**IPP044 Keelderry Wind Farm** **Connection of a new windfarm to a new station, looped into the existing Agannygal-Derrybrien 110 kV line.**	110 kV Station: 1 Bays: 3	On Hold	Outline Design or EIA
CP0641	**IPP118 Nore Power Station** **Extension works in the existing Kilkenny station for the connection of a new OCGT.**	110 kV station 110 kV busbar extension 110 kV Cable Bay (at Kilkenny)	On Hold	Outline Design or EIA
CP0669	**IPP159 Cuilleen Power Shallow Connection** **Connection of a new OCGT into the existing Athlone 110 kV station**	Athlone 110 kV station Line Bay: 1 110 kV Coupler	On Hold	Outline Design or EIA
CP0670	**IPP112 Suir Power Shallow Connection** **Connection of a new OCGT into the existing Cahir 110 kV station**	110 kV Station 110 kV busbar extension 110 kV Cable Bay: 1 (at Cahir)	On Hold	Outline Design or EIA

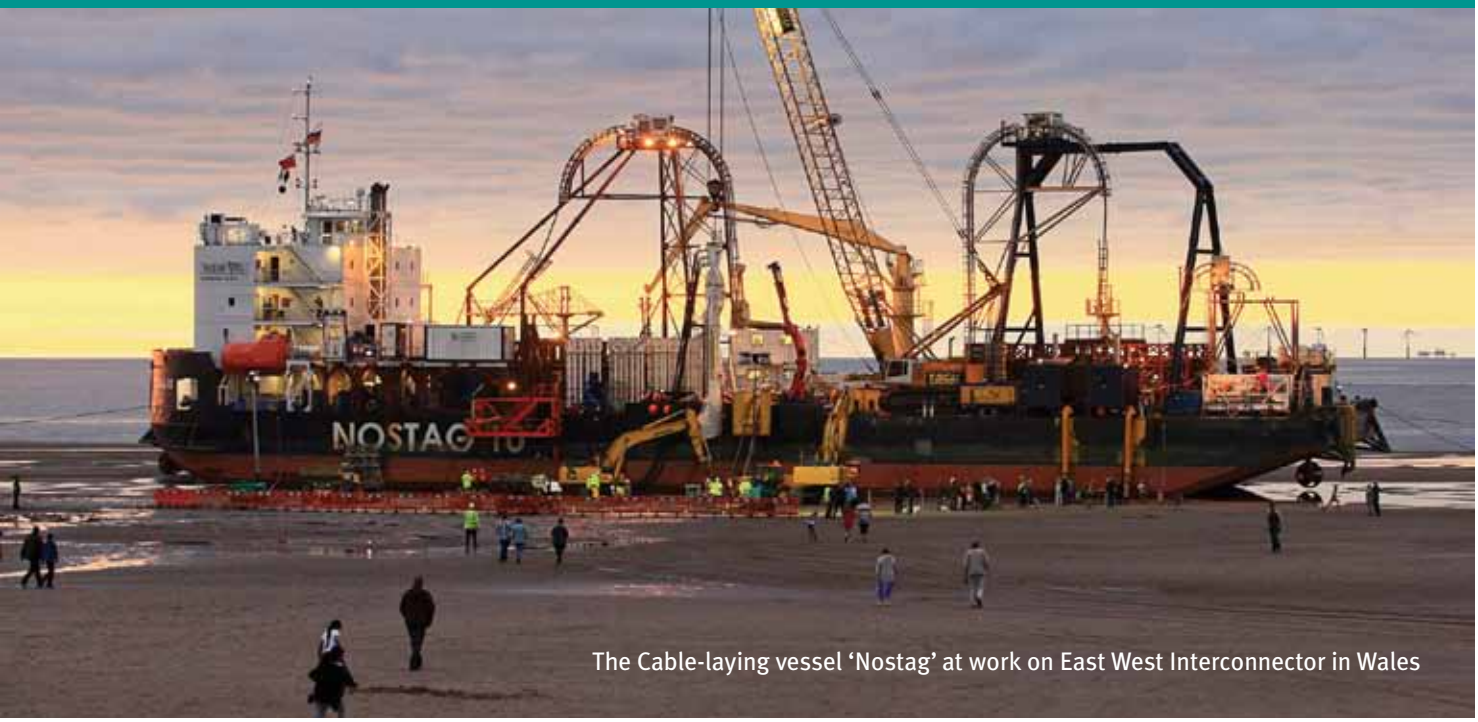
A4 Connection of Interconnectors

This section outlines the projects that relate directly to the connection of interconnectors to the transmission system. These are listed in Table A4.

Table A4

Interconnector Connection Projects

CP No.	Project Title & Description	Major New Equipment	ECD	Phase
CP0652	**East-West Interconnector** **Shallow connection of East-West Interconnector into Woodland** **400 kV station from new HVDC/HVAC Converter Station at Portan, near Woodland in Co. Meath**	400kV bays:1 400 kV tailed converter station: 1 400 kV cable: 500 m	Sep-12	Detailed Design & Construction



The Cable-laying vessel 'Nostag' at work on East West Interconnector in Wales

APPENDIX B - Environmental Mitigation Measures

As extracted from Section 9 of the Environmental Report of the SEA accompanying this IP.

EMM8 Other Measures Integrated into the IP

Mitigation measures described below have been worded to facilitate direct transcription and incorporation into the Implementation Programme.

Note that the following mitigation measures will be extended and augmented by the output from the Environmental Benchmarking Studies and Evidence-Based Design Guidelines described above.

EMM8A Biodiversity and Flora and Fauna

EMM8A(i) Designated European and National Sites of Nature Conservation Interest

Every effort will be made to avoid designated sites of conservation importance. However, where this is not possible, routing will be selected to ensure no significant impacts on the integrity of the site. Restricted working areas will be imposed to ensure minimal disturbance to sensitive habitats.

Sensitive construction techniques will be used such as the use of bog mats for machinery access, particularly if underground cables are proposed or in remote bogland areas. Aerial access will be considered – for both materials and workforce – in exceptionally sensitive sites.

Ecological monitoring will be undertaken at sensitive sites during construction as appropriate. Such sites will be identified on a case by case basis.

EMM8A(ii) General Habitat Loss and Disturbance

- Where possible, direct habitat loss within designated sites will be avoided.
- When construction occurs within a designated site, sensitive construction techniques will be used such as the use of bog mats for machinery access, particularly if underground cables are proposed or in remote bogland areas. Aerial access will be considered – for both materials and workforce – in exceptionally sensitive sites.
- Use of bog-mats to minimise the impact of heavy machinery on vegetation and soils.
- Minimise extent of works areas.
- Re-distribute vegetation and soil stripped from the construction areas to provide a seedbank and do not re-seed with Perennial Ryegrass.
- Land within the working area will be reinstated as near as practical to its former condition.

EMM8A(iii) Bogs and Peatland areas

- Areas of deep and active peat shall be avoided.
- Detailed peat slip risk assessments should be carried out for all proposed developments in areas where peat substrates occur.
- Construction machinery should be restricted to site roads and designated access routes. Machinery should not be allowed to access, park or travel over areas outside development construction zones.
- Peat excavated during construction activity should not be stored (temporarily or otherwise) on areas of adjacent mire habitats or near flushes or drains. Temporary storage of spoil material excavated during the construction phase developments should be stored at suitable locations away from surface watercourses.
- All spoil material excavated during the construction phase should be reinstated following the completion of the construction phase of a proposed development.
- Where disturbance of peat soils cannot be avoided, there should be some consideration given to possible re-seeding with native species to stabilise the peat and accelerate recovery of the vegetation.

EMM8A(iv) Birds

- Where feasible, site clearance involving the cutting or destruction of vegetation and hedgerows shall not take place in the bird breeding season between March 1st and August 31st inclusive.
- In the event that site clearance does take place during the bird nesting season, the appropriate licence will be applied for.
- On the advice of relevant ornithological experts and agencies bird warning devices shall be put in place where crossings of sensitive flight corridors cannot be avoided.

EMM8A(v) Bats

- The removal of bat commuting and foraging habitat shall be avoided where possible during the construction and operation phase of infrastructure.
- Where the removal of commuting or foraging habitat cannot be avoided alternative habitat should be established prior to such habitat removal.
- Trees scheduled for felling as part of site clearance shall be checked by a bat specialist for the presence of bats.
- Where bats are noted to be within a tree prior to felling operations, it will be necessary to postpone felling to create the opportunity for bats to cease usage. If bats do not leave a tree or building within a reasonable time frame, it may be possible for a bat specialist to seek to exclude the bats (or otherwise remove them to safety). This shall be carried out by a qualified bat specialist with written permission from the National Parks and Wildlife Section of the Department of Arts, Heritage and the Gaeltacht by way of a licence to derogate from the protection afforded bats by Irish and EU law. All licences shall be in place prior to felling procedures as to destroy a roost without a licence is an offence.

EMM8A(vi) Otters

- Destruction of active otter holts shall be avoided
- No works shall be undertaken within 150 m of any holts at which breeding females or cubs are present.
- No wheeled or tracked vehicles (of any kind) should be used within 20 m of active, but non-breeding, otter holts. Light work, such as digging by hand or scrub clearance should also not take place within 15 m of such holts, except under licence.

EMM8A(vii) Other protected species

- The breeding and resting sites of protected species shall be avoided during the appropriate seasons.
- Heavy machinery shall not be used within 30 m of an occupied badger sett.
- A derogation licence from the respective Wildlife Acts[13] shall be sought – and works shall not be commenced without such consent where it appears that protected flora and fauna species are likely to be unavoidably disturbed.

EMM8A(viii) Protected Surface Water or Riparian Habitats

In all cases where works have the potential to impact on protected surface water or riparian habitats, the Inland Fisheries Ireland document Requirements for the Protection of *Fisheries Habitat during Construction and Development Works at River Sites* shall be adhered to. Development of transmission infrastructure adjacent to designated fisheries shall be carried out in consultation with Inland Fisheries Ireland to minimise the potential effects on designated surface waters.

[13] Referenced statutory obligation

EMM8A(ix) Freshwater Pearl Mussel Catchments

- Action measures as outlined in the Sub Basin Management Plans shall be taken into account where development is considered adjacent to areas associated with Freshwater Pearl Mussels.
- In the vicinity of waters that sustain populations of Freshwater Pearl Mussels the following additional mitigation measures shall be employed:
  - There shall be no stream crossing by machinery.
  - Silty water will be collected in settlement ponds prior to discharge to watercourse.
  - Buffering strips will be provided near watercourses.

EMM8A(x) Fisheries

- All works adjacent to designated fisheries waters will be done in consultation with Inland Fisheries Ireland.
- All works involving open cut crossings shall be conducted during the period May to September to avoid interruption of salmonid spawning runs, spawning, incubation of eggs and the early developmental stages.
- Where appropriate and practical, bank vegetation and bed material which has been removed shall be stored to facilitate its replacement when channel works have been completed.
- Works in the vicinity of a watercourse shall be carried out with reference to a water quality protection plan for each site which shall ensure that:
  - All necessary measures shall be taken to minimise the generation and release of sediments into all watercourses.
  - Levels of suspended solids in the river shall be monitored during the course of the works.
  - Precautions shall be put in place to avoid spillages of diesel, oil or other polluting substances.

EMM8A(xi) Mature Trees

Where construction work is required close to trees, the National Joint Utilities Group 'Guidelines for the Planning Installation and Maintenance of Utility Services in Proximity to Trees' (NJUG 10) will be followed.

EMM8A(xii) Hedgerows

All disturbed hedgerows will be re-planted as soon as possible after construction, using Irish nursery stock and indigenous species. Planting will be maintained until vigorous re-growth has been established. Where hedges of particular value are encountered the extent and duration of the works shall be minimised. For species-rich banks, turf will be stripped and stored separately for replacement or re-instatement.

EMM8B Water Resources

EMM8B(i) Accidental spillage of fuel chemicals or sewage causing pollution to water or ground

- Develop, implement and enforce a Water Pollution Prevention and Environmental Emergency Response Plan for all work sites. This should include good site practices as described in the Good Practice Guidance notes proposed by EA/ SEPA/EHS.

EMM8B(ii) Suspended solids & sediment deposition

- Precautions shall be put in place to avoid or minimise the generation and release of sediments[14] into all watercourses.

EMM8B(iii) Physical Damage to watercourses

- Develop, implement and enforce a code of best practice for construction and reinstatement methods to be used for unavoidable construction works in the vicinity of watercourses.

[14] Sediments in this instance include all soils including peat.

EMM8B(iv) Flooding

- Within known floodplains, measures shall be taken to avoid any potential impact of construction or existence of the works on the capacity for floodwater storage.
- Damage to any flood defence embankments shall be immediately repaired to a standard equal to or better than the existing embankments.
- EirGrid shall carefully examine development proposals to ensure consistency with the requirements of *The Planning System and Flood Risk Management: Guidelines for Planning Authorities* (DEHLG, 2009)[15].
- EirGrid shall engage with planning authorities at an early stage, utilising arrangements for pre-planning application consultation with regard to any flood risk assessment issues that may arise.
- EirGrid shall carry out a site-specific flood risk assessment, as appropriate, and comply with the terms and conditions of any grant of planning permission with regard to the minimisation of flood risk.

EMM8C Soils and Geology

EMM8C(i) Geological Features

- Site investigations shall be undertaken at intervals and specific locations along the power circuit route. This information shall be used to plan sitework operations to anticipate, avoid or minimise construction impacts arising from disturbance of sub-surface conditions.
- Cut and fill operations should be avoided unless absolutely necessary.
- Route selection and lower tier assessments should consult Geological Survey of Ireland as appropriate in relation to geological heritage sites either recommended for NHA or County Geological Site designation.

EMM8C(ii) Soil

- Height of stockpiles should be limited to less that 3 m and storage time will be minimised.
- Material handling and reinstatement operations should follow good practice to avoid inadequate or over compaction of the materials.
- Route selection and lower tier assessments for peatland areas should consider relevant government guidelines on development in these areas as well as relevant datasets including the Geological Survey of Ireland's landslide dataset and Teagasc's subsoils dataset.

EMM8C(iii) Mineral Resources

The power circuit shall be routed to avoid disturbance to existing or planned operations of areas of extraction and licensed mineral reserves.

EMM8C(iv) Contaminated Land

- A ground investigation may be undertaken to survey, analyse and assess the areas where there is a potential for this risk to arise.
- Following this, method statements shall be prepared to deal with any area of contaminated ground.

EMM8C(v) Bedrock

- Route selection and lower tier assessments should consider Geological Survey of Ireland's bedrock data as appropriate in order to anticipate engineering difficulties.
- Route selection and lower tier assessments should consider Irish National Seabed Survey data and INFOMAR survey data as appropriate to anticipate the nature and depth of stable substrate for offshore projects foundations and connection to onshore grid.

[15] Referenced statutory obligation

EMM8D Cultural Heritage

- Where the proposed route is in close proximity to archaeological sites the working area shall be kept to a minimum.
- Pre-construction works shall be carried out in those unrecorded areas identified as having archaeological potential.
- There will be full implementation of an Archaeological Plan including, pre-construction works, watching brief and excavation.
- Where previously unrecorded finds are uncovered during construction, adequate archaeological investigation and recording will be carried out before construction works in these areas are continued.

EMM8E Landscape and Visual

Routes shall be selected according to the following criteria:

- Avoidance of areas designated as being of scenic sensitivity or significance.
- Avoidance of areas that would disproportionately impinge upon sensitive landscape features – such as prominent skyline ridges, shores, river crossings.
- Avoid areas that would disproportionately impinge upon sensitive areas or sites of cultural or historic significance – including monuments, listed and protected structures and their contexts and sites.
- Route selection and lower tier assessments should consider (as appropriate) data from the landscape character assessments contained in the development plans of local authorities.

EMM8F Noise

In relation to noise sensitive receptors, the constraints mapping identified areas of high building density and therefore any route corridors selected shall attempt to minimise impacts on built up areas.

EMM8G Liquid Effluent and Spillages

Portable toilets will be provided at the site offices. They will be emptied regularly by a specialist contractor as appropriate.

EMM8H Solid Wastes

Waste Management Plans will be prepared as part of the overall project design. This will identify likely waste arisings, approximate quantities and appropriate handling and disposal methods.

EMM8I Construction of New Substations and Extension of Existing Substations

EMM8I(i)

The construction of new substations can have a significant impact particularly where the area is undeveloped. Site selection needs to ensure sensitive landscapes and habitats are avoided. Opportunities for natural screening from topography and vegetation should be maximised and used wherever possible as this will provide the best opportunity for integrating the facility into the existing landscape.

EMM8I(ii)

It will be important to ensure that substations are not located within the floodplain of major watercourses, which could impact on the access and functioning of the substation. Also, it will also be important to ensure that new substation locations avoid designated conservation sites and sensitive habitats where possible.

EMM8I(iii)

Where existing substations need to be extended it will be important to ensure the extension does not impact on any nearby built up areas and that the extension is appropriately designed to ensure adequate integration with the existing environment. The scale of the extension should be suited to the surrounding area and should not be inappropriate given the size of the existing facility and its surroundings.

EMM8J Reinforcement of the Transmission System in the Regions[16]

EMM8J(i) Midlands Region

The Midlands Region is transected by many kilometres of major and minor grid infrastructure as well as having a significant concentration of junctions and substations – many associated with existing or former power stations. These routes and sites offer strong precedent that should be re-used wherever possible. It should be recognised that large areas of cut-over peat lands may not be suitable low-resistance routing options as many of these sites are nearing the end of production and most if not all will shortly be reinstated as peat land sites that are likely to be deemed to be sensitive – if not protected – habitats.

New major grid projects in this Region will be challenged when trying to identify optimum crossing points over the sensitive Shannon system. Existing crossing points should be re-used or intensified wherever possible. Such crossing points should be identified and secured in regional and county development plans as a matter of urgency – they are nationally significant economic assets.

EMM8J(ii) South-East Region

Larger scale grid developments in the South-East Region should parallel coastal plains and major river systems – ideally occupying the transitional foothills – without encroaching on either the more sensitive uplands or the immediate environs of rivers and coasts.

Most major routes within this region follow the transition between uplands and lowlands and cause little adverse environmental effect. If future development continues this general pattern there is a low potential for significant effects to arise.

EMM8J(iii) Mid-West Region

Major grid development works in the Mid-West Region should re-use or closely follow established routings or areas with established precedent of large-scale infrastructural and industrial development. New works should parallel the coasts and rivers – which contain dense corridors of anciently established settlement – while avoiding more sensitive upland interiors. High levels of rural dwellings in some areas may require sub-optimal proximity to some environmental sensitivities, such as cultural heritage.

EMM8J(iv) South-West Region

If new grid development continues patterns of following the strongly East-West trending river valleys in the South-West Region there is a low potential for significant adverse effects on the environment. Major grid developments should be confined to the more environmentally robust centre and east of this region.

The development of new transmission lines between Moneypoint and Cork City would need to carefully consider ecological and visual impact issues, especially in upland areas. Alternatives should consider the reuse of existing power and transport links.

EMM8J(v) Dublin & Mid-East Region

It would be useful to integrate with Development plans – both at Regional and County level - to identify infrastructure corridors – ideally paralleling the existing and emerging major road and rail corridors that will develop in the Dublin and Mid-East Region during the period to 2025. It would also be of merit, for working in existing and emerging urban and peri-urban areas, to clearly identify criteria that would lead to determining when and where to underground electricity infrastructure.

[16] Note that no specific measure are stated here for the Border and West Regions; all other mitigation measures apply as relevant.

Land Use Plans for Urban Areas should be encouraged to specifically zone land for sub-stations and to protect existing strategic corridors from inappropriate development.

EMM8K National and EU Legislation and Plans/Programmes

Where grid related development is proposed, EirGrid will seek to contribute towards the protection of environmental features, as relevant and appropriate to EirGrid's responsibilities and obligations under national and EU environmental legislation and including those which relates to specific regional/national plans/programmes for particular aspects of the environment e.g. Catchment Flood Risk Assessment and Management Study Plans, River Basin District Management Plans and Fresh Water Pearl Mussel Sub Basin Management Plans.

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