

# Greenlink – Interconnector

## Introduction

“**Greenlink**” is a new 500MW electricity interconnector that will link the power markets in Ireland and Great Britain (GB). The project is being led by Element Power, an international developer of renewable energy and interconnection projects, with established teams of experienced engineers, environmental and financial professionals covering both countries.

Greenlink will form a physical link between the Great Island transmission substation in Wexford and Pembroke transmission substation in south Wales. The project consists of a twin high voltage subsea and underground cable, connecting into two new converter stations, which then allows power flows between the transmission systems.



Greenlink is a strategically important investment, as it will provide additional much needed cross-border capacity between Ireland and GB, to maximise the utilisation of low cost generation in both markets, and strengthen physical ties to the rest of the EU. In doing so, Greenlink will deliver increased security of supply, fuel diversity, and greater competition which is expected to provide significant benefits to consumers in Ireland and GB.

Greenlink has also been found to deliver additional benefits for networks in each market, such as reinforcing the existing electricity grids in south-east Ireland and south Wales to provide additional transmission capacity, and contribute to each country’s strategic interconnection objectives.

## The Need for Interconnectors

An interconnected European energy grid is vital for Europe's challenges of maintaining energy security, delivering decarbonisation and maintaining affordability for consumers:

- As regards **energy security**, interconnection enables energy to flow without hindrance from regions where it is generated to regions where it is needed the most.
- Interconnection facilitates **decarbonisation** by assisting in the efficient delivery of low carbon sources of energy generated in one market, and be transported to be used in another market, which lowers the overall costs of meeting the EU’s decarbonisation targets
- **Affordability** of energy is enhanced as more interconnection improves access to different markets, increasing competition between electricity producers in the internal market, resulting in lower overall costs for consumers.

The “Energy Union” launched by the European Commission on 25<sup>th</sup> February 2015 is driving a fundamental transition towards more innovative ways to produce, transport and consume energy, and to address different approaches to the design and implementation of energy policy. Facilitating the Union requires a range of actions, chief amongst them being an increase in the physical interconnectedness of the EU and surrounding country energy grids (both gas and electricity) to meet a 10% interconnectedness target by 2020 and to reach 15% by 2030.

The Irish Authorities recognise the benefits of interconnection, and the challenges set by the Energy Union. In the Government’s Energy White Paper, published on 16th December 2015, it recognised that Ireland has limited electrical interconnection, and specifically calls for “promoting and facilitating interconnection with other countries and regions” (§209). One of the key goals of EU energy policy is to create a single market for electricity across all countries, and to facilitate this aim the EU is pushing for increased levels of interconnection between countries.

### **The Energy Union and applicability to Irish interconnection**

“One of the objectives of EU energy policy is the establishment of the Internal Energy Market (IEM) in order to achieve better outcomes for EU citizens through economic growth, jobs, secure energy at affordable prices, and sustainable energy use. The IEM should bring Irish wholesale electricity and gas prices closer to those in Europe. The European Commission has prioritised the establishment of the Energy Union, which reiterates the goal of greater integration of the European Energy markets.” (Energy White Paper §218)

Irish Security of Supply is coming under increasing scrutiny, as the Department of Taoiseach noted in a recent review that “Ireland’s situation as an island on the periphery of Europe renders it particularly vulnerable to disruptions to the supply of oil, gas or electricity.”<sup>1</sup> Foreign direct investment in Ireland relies on very high standards of electricity supply reliability, especially for critical facilities such as data centres and micro-chip manufacturing plant.

### **Benefits of additional Interconnection for Ireland**

- Increase Ireland’s energy security
- Contribute to the reduction of Irish, regional and EU CO2 emissions
- Strengthen energy infrastructure to meet rapidly growing electricity demand
- Reduce electricity costs for consumers through energy trading
- Reduce cost of operating the power system through sharing ancillary services and capacity

### **Greater Interconnection for Ireland**

Interconnector capacity for the island of Ireland is currently provided by two interconnectors; Moyle, (rated 500MW, established in 2001) linking the electricity grids of Northern Ireland and Scotland; and the East West Interconnector (EWIC) (rated 500MW, established in 2012) connecting the electricity grids in Ireland and Great Britain. Their combined export capacity is limited to 800MW today, although this reduces to 585MW in 2017<sup>2</sup>. Therefore, Greenlink will provide additional import and export capacity at a time of growing need but reducing capability.

In addition to the Greenlink interconnector there is a current proposal for an interconnector between

<sup>1</sup> [http://www.taoiseach.gov.ie/eng/Publications/Publications\\_2015/2015\\_05\\_15\\_Draft\\_NRA\\_.pdf](http://www.taoiseach.gov.ie/eng/Publications/Publications_2015/2015_05_15_Draft_NRA_.pdf)

<sup>2</sup> The Moyle interconnector export capacity will reduce to 80MW on 10/11/2017 – see National Grid Interconnector Register 12.04.2016, pending upgrades to electricity networks in Scotland.



Ireland and France. The Celtic Interconnector, proposed by EirGrid, is intended to connect to Brittany in France. Both interconnectors are complementary, since they connect to very different markets. This means that Irish consumers will be able to access low cost electricity from France, while also accessing low cost electricity from GB when, periodically, there will be high levels of wind and solar generation in GB. Similarly, when Ireland generates more electricity than it can manage or use itself, it can export to both of these markets.

### Strengthening the grid

- Greenlink is strategically placed to reinforce the south of Ireland grid by connecting to the existing radial transmission network in South Wales, creating an increasingly meshed network so improving security of supply.
- Greenlink's location in respect of Moyle and EWIC also enables EirGrid and National Grid to increase the use of these interconnectors to manage power flows on their networks reducing network constraints and hence reducing costs of operating their transmission systems.

### Greenlink – A Project of Common Interest

Greenlink is recognised and supported by the European Commission. In 2013, the European Union identified 248 energy infrastructure projects, which were designated as projects of common European interest (PCI). These projects encompass a range of network development, smart grids, energy storage and interconnector projects involving two or more EU Member states. To ensure effective and efficient implementation of the projects, the European Commission is focusing on improving regional cooperation between Member States as part of the implementation of EU Regulation 347/2013 on guidelines for trans-European energy infrastructure.

Greenlink is referenced in ENTSO-E's Ten Year Network Development Plan (TYNDP) 2014, and is under assessment in ENTSO-E's 2016 TYNDP<sup>3</sup>. Greenlink is included in the second Project of Common Interest (PCI) list published by the European Commission in 2015<sup>4</sup>.

The interconnector has been awarded financial support from the Connecting Europe Facility (CEF), which is a source of funding only available to PCI projects<sup>5</sup>. The CEF funding supports a proportion of the development of the project in 2015 and 2016 alongside Element Power's own capital.

### EU Funding of Greenlink supports Energy White Paper

“Developing the interconnection infrastructure (§239-242) required to achieve policy goals presents particular challenges because of Ireland's small market size and location as an island on the north-west periphery of Europe. It is essential that the costs associated with this infrastructure continue to be minimised. We will work to unlock EU funding for interconnectivity projects, which are cost efficient for the Irish consumer, including through PCIs. “  
(Energy White Paper §280)

<sup>3</sup> <https://www.entsoe.eu/major-projects/ten-year-network-development-plan/ten%20year%20network%20development%20plan%202016/Pages/default.aspx>

<sup>4</sup> [http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L\\_2016\\_019\\_R\\_0001&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=OJ:L_2016_019_R_0001&from=EN)

<sup>5</sup> [https://ec.europa.eu/inea/sites/inea/files/cef\\_energy\\_brochure\\_superfinal\\_web.pdf](https://ec.europa.eu/inea/sites/inea/files/cef_energy_brochure_superfinal_web.pdf)



## Greenlink –Regulatory Progress

Greenlink was awarded an Interconnector Licence in GB, by Ofgem (the GB regulator), on 10<sup>th</sup> February 2015<sup>6</sup> and was awarded Initial Project Assessment (“IPA”) Status under Ofgem’s Cap and Floor Regime, on 30<sup>th</sup> September 2015<sup>7</sup>. This Cap and Floor regime is an arrangement introduced by the GB regulator to promote the development, financing and construction of new interconnectors with other European countries. A regime is only awarded following extensive due diligence and analysis of the costs and benefits of each project, which demonstrates the Ofgem’s support for the project.

By designing the Cap and Floor structure through consultation with stakeholders, Ofgem has encouraged private capital to bring forward projects and thereby bring innovation, efficiencies, and overall cost reduction to the process of infrastructure delivery for the benefit of consumers.

By their nature, interconnectors typically require the involvement and approval of the regulators for the electricity markets in each of the markets being connected. The IPA decision of Ofgem in respect of Greenlink will see underwriting for part of the revenues for the half of the project in GB, on the condition that the regulator for the Irish Electricity markets, the Commission for Energy Regulation (CER), also provides the project with a regulatory regime.

Element Power has actively engaged with the CER since June 2014 regarding the Greenlink interconnector, and in May 2015 made a formal submission to CER including a cost benefit analysis. The cost benefit study assesses all aspects of the economic impact of adding Greenlink to the Irish and GB markets on consumers, producers and other interconnector owners. The study shows a strong overall benefit, as well as for Irish consumers in particular.

Greenlink is currently awaiting clarity from CER on the process of developing a regulatory regime in the Irish jurisdiction that would be applied to its revenues, including details of the process and timescale for determining that regime. Now that Ofgem has approved the project from a GB perspective, the CER process is a critical path item in respect of enabling the project to proceed.

## Preparing for construction

### *Development and permitting*

Element Power has engaged with statutory consultees and stakeholders since 2013 regarding various aspects of the Greenlink project. The project will require planning permission in Ireland and Wales. Detailed non-statutory environmental reports will be prepared for all parts of the project, both onshore and offshore. The developers of the Greenlink project strongly believe that a proactive and constructive dialogue with stakeholders, throughout the development programme, will result in a high quality and comprehensive application being submitted and delivered.

### *Grid connections*

A connection agreement for 2,000MW is already in place between Element Power and National Grid (the Transmission System Operator and Owner in Wales) for a connection at Pembroke Substation in Wales. This agreement is currently being modified to allow Greenlink to use 500MW of that capacity.

Great Island has been identified as the appropriate location for the connection of the Greenlink interconnector to the existing EirGrid infrastructure. This followed a review of existing grid

<sup>6</sup> <https://www.ofgem.gov.uk/publications-and-updates/greenwire-transmission-pembroke-limited-notice-grant-electricity-interconnector-licence>

<sup>7</sup> <https://www.ofgem.gov.uk/publications-and-updates/decision-initial-project-assessment-greenlink-interconnector>



infrastructure and connection options. Studies are being commenced with EirGrid to confirm the final design, and the connection process is under discussion with EirGrid and Commission for Energy Regulation (CER).

### *HVDC design*

Greenlink will use high voltage direct current voltage source converter (HVDC VSC) technology with underground and subsea cables to link the two power systems. HVDC has been selected over an alternating current (AC) connection, because AC is technically difficult over this distance and because the EirGrid and National Grid systems are not synchronised. HVDC has lower unit costs, can be much more easily controlled according to trading and market requirements, and has much lower losses. The VSC technology (as compared to older current source converters) requires less reinforcement to the AC grid at the connection points, as well as allowing very rapid change of flow direction and reactive power, which is valuable to system operators when managing grid stability and in providing ancillary/system services.

### **Next steps**

Greenlink will play a key role in delivering the objectives detailed in the Irish Energy White Paper, helping the progression towards the EU Energy Union and increasing Ireland's security of energy supply at a time of renewed economic growth, increased inward investment and the associated increased in projected demand for energy.

To ensure the timely delivery of this strategic piece of national infrastructure, the Greenlink's developers will continue to engage with the CER and relevant stakeholders regarding the details, process and timescale for delivering a regulatory regime in Ireland.

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### ***Greenlink and the implications of the UK referendum decision to leave the European Union ('EU')*** ***25 July 2016***

*Element Power has no plans to change its ongoing development work in respect of the proposed Greenlink interconnector following the recent decision by the UK to leave the EU.*

*The development of Greenlink has been initiated and progressed by Element Power due to the compelling needs case for additional strategic interconnection, and the significant benefits it will bring to consumers in Ireland and the GB. Greenlink's recognition as a Project of Common Interest by the European Commission was an important step, and is testimony to its advanced status and the strength of its case to proceed. The UK referendum decision has not altered the case for Greenlink, which remains as strong as ever. Throughout Europe there are many examples of electricity and gas interconnectors, both existing and planned, between EU member and non-member states. Greenlink would emulate the relevant regulatory and policy arrangements.*

*Increasing levels of interconnection remains of key national strategic importance to both Ireland and GB. Greenlink will provide significant additional interconnection between Ireland, the UK and continental Europe. It will also provide additional transmission network capacities, reinforcing the existing electricity grids in south-east Ireland and south Wales. The development and construction of Greenlink will deliver increased security of supply, fuel diversity and greater competition in Ireland, Wales and Great Britain as a whole and continental Europe.*

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