Greenlink

INTERCONNECTOR

Greenlink - an interconnector between GB and the Republic of Ireland

An application to the Commission for Regulation of Utilities for regulation under a Cap and Floor regime in Ireland

22/12/2017

Private and Confidential

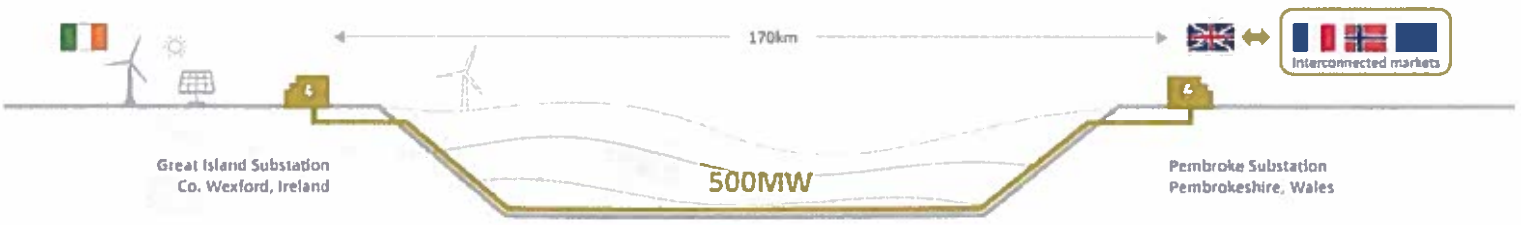


Table of Contents

Application contact:

Simon Ludlam
Greenlink Interconnector Limited,
C/O Element Power Ireland Limited,
Unit C, Building 4200,
Cork Airport Business Park,
Cork T12 D23C

simon.ludlam@elpower.com

1. Application

Element Power ("**EP**" or the "**Shareholder**") is developing a new 500MW interconnector known as "Greenlink" which will link the power markets in Great Britain ("**GB**") and Ireland (the "**Single Electricity Market**" or "**SEM**"). Greenlink has been designated as a Project of Common Interest ("**PCI**") pursuant to Regulation 347/2013 on guidelines for Trans-European Energy Infrastructure (the "**2013 Regulation**") and has been granted a "cap and floor" regime by Ofgem to provide a regulated revenue stream in GB for the development of Greenlink.

By submitting this document (the "**Application**"), we hereby request that the Commission for Regulation of Utilities ("**CRU**"):

- makes a determination pursuant to Section 2A of the Electricity Regulation Act 1999 (as amended) (the "**1999 Act**") that it is in the public interest for Greenlink to be considered to be part of the transmission system for the purposes of calculating charges and imposing charges for use of the transmission system. A copy of the Cost Benefit Analysis ("**CBA**") produced by Baringa in respect of Greenlink is included as Exhibit A to this Application in support of this request; and
- approves the proposed charging methodology for Greenlink pursuant to Section 35 of the 1999 Act which is based on a 25 year "cap and floor" mechanism as described in Section 3 below, together with the licence conditions to implement such charging methodology.

We understand the legislative regime to underpin the determination requested in this Application is as follows:

- Pursuant to Section 2A of the 1999 Act the CRU may determine that it is in the public interest for an interconnector to be considered to be part of the transmission system for the purposes of calculating charges and imposing charges for use of the transmission system.
- Pursuant to Section 35(1)[1] of the 1999 Act, EirGrid[2] "shall prepare a statement for the approval of the CRU setting out the basis upon which charges [for use of the transmission system] are imposed". Pursuant to Section 35(2) of the 1999 Act, EirGrid must comply with directions from the CRU in preparing such a statement ("the **Statement**").
- The Statement must include costs associated with any interconnector which is deemed to be part of the transmission system for charging purposes. This will require a direction from the CRU to EirGrid to include such charges, together with appropriate licence conditions or protocol to be agreed with EirGrid in relation to the basis on which charges associated with the interconnector are included in the Statement and approved by the CRU. The CRU has anticipated the development of interconnector regulation stating that *"The CER has not been required to perform a revenue review on an asset not owned by*

[1] [redacted]

[2] Under its licence as Transmission System Operator (TSO) Licence pursuant to Section 14(1)(e) of the Electricity Regulation Act, 1999

a network owner or operator, however, a similar approach may be considered for any submissions received from relevant project promoters"[3].

- Section 35 requires the CRU, solely, to determine the "appropriate proportion" of the costs directly or indirectly incurred in carrying out any necessary works[4]. Greenlink is of the view that the "appropriate proportion" may be variable to incentivise performance and the CRU has a reasonably wide discretion in this regard. Section 35 permits incentive based charging, as confirmed on the CRU website which states that "*The [network] price control process also sets incentives which are designed to encourage the network companies to operate, maintain and invest in the network appropriately and as efficiently as possible*". To this end, the CRU indicated that it will review incentive models from other jurisdictions including the cap and floor model, stating that "*the [CRU] will closely review incentive models from other jurisdictions and other industries, for example, the Cap and Floor model of incentive support applied to some merchant electricity interconnector projects*"[5].

Greenlink is obtaining the necessary consents for the development of the Project and will, in due course, prepare (i) a submission of an application pursuant to Section 14 of the 1999 Act for a licence to maintain an interconnector (the **"Licence"**) and (ii) an application pursuant to Section 16 of the 1999 Act for an authorisation to construct an interconnector ("the **Authorisation**" and together "the **Licence Application**").

The timing of the Licence Application will be subject to further discussions with the CRU to confirm the appropriate timing for Greenlink's submission. Receipt of the Licence and Authorisation are required prior to the Project achieving financial close. Consequently, the CRU may elect to consider our Licence Application as part of the process of approving the Project under Section 2A of the 1999 Act.

2. Background

This document provides a high-level overview of the Project, including an overview of the costs and benefits of the Project, as well as a description of the development activities completed to date and underway to ensure deliverability by 2023.

This section provides high-level background to the Project, including:

- Policy context
- Cap and floor regime
- Project of Common Interest status

[3] CRU Information Paper: "PCI Incentive Methodology in accordance with Article 13(6) of Regulation (EU) No. 347/2013" (CER/15/269)
[4] "works" includes all project costs, including costs related to the construction, operation and maintenance of an interconnector and any ancillary grid reinforcement costs
[5] CRU Information Paper: "PCI Incentive Methodology in accordance with Article 13(6) of Regulation (EU) No. 347/2013" (CER/15/269)

2.1. Policy context

Policy case for further interconnection between Ireland and GB

Interconnectors are transmission infrastructure that link two separate power systems or electricity markets to enable trading in a controlled fashion. It is a major objective of the EU to create a single internal electricity market, requiring sufficient physical transport capacity to exist between member states. Interconnectors are at the heart of EU energy policy as the building blocks to establish the internal electricity market. On 25 February 2015, at the request of the European Council, the European Commission published the Energy Union Framework Strategy which included an Interconnection Communication, setting out measures needed to reach the target of 10% minimum electricity interconnection by 2020. Interconnectors are seen as a cost effective way to increase energy supply security, and help to enable a single competitive EU electricity market. Four Irish interconnectors have been designated as PCIs, including Greenlink, the Celtic Interconnector, the ISLES Project and EirGrid's North-South interconnector.

President Juncker addressed the importance for an interconnected market in his 2014 Madrid speech stating: *"We need to build a true Energy Union over the next years. Europe must organise an effective internal energy market where energy can flow seamlessly from one side of the continent to the other, whether from East to West or from West to East, whether from North to South or from South to North. This will in itself reduce our external energy dependency."*[6] In 2017 President Juncker reiterated the importance of interconnection, stating that *"Ambitious levels of interconnection will help Europe, thanks to the optimisation of the system that will lead to a reduction of fuel imports and of the price of energy."*[7]

This is further reinforced by the European Commission, ACER and ENTSO-E in the context of the development of the intra-day target model within the framework of the new network codes. ACER notes on its website that the *"Intraday target model implementation will make it easier for market parties to trade electricity across borders close to gate closure and keep their position in balance. The intraday timeframe is seen as increasingly important in the context of growing intermittent generation."*

The Irish Government has made strongly supportive statements in relation to additional interconnection in the interests of Irish consumers. The Irish Government's Energy White Paper "Ireland's Transition to a Low Carbon Energy Future 2015-2030" included an energy vision that by 2030 *"the energy system will be part of a single, physically interconnected EU internal energy market, which will bring greater security of supply and easier access to cross-border flows of electricity and gas from other EU Member States"*. Interconnection is expressly recognised as being critical to Ireland achieving its renewable targets; placing downward pressure on electricity prices and securing Ireland's energy supply. Increased physical interconnection is critical to achieving these objectives and is therefore at the core of Ireland's energy policy.

Consistent with this policy, the CRU has taken a number of steps to facilitate the development of interconnectors with PCI status:

[6] http://juncker.epp.eu/news/europes-challenges-next-five-years-towards-stronger-better-europe
[7] http://europa.eu/rapid/press-release_STATEMENT-17-320_en.htm

- In December 2015 the CRU published a consultation entitled "Review of Connection and Grid Access Policy: Initial Thinking & Proposed Transitional Arrangements" (CER/15/284) representing the CRU's initial step in the development and implementation of an integrated and enduring connection policy for the electricity system in Ireland. The paper explicitly proposed that the enduring policy should provide for new interconnection and noted the provisions of the Third Package and the EU Network Codes requiring preferential treatment for interconnectors, facilitated by PCI Regulations.

- In November 2015 the CRU published an information paper entitled "PCI Incentive Methodology in accordance with Article 13(6) of Regulation (EU) No. 347/2013" (CER/15/269) noting the additional benefits afforded to projects with PCI status such as accelerated licensing procedures, improved regulatory conditions and access to financial support from the Connecting Europe Facility. The information paper notes that the CRU currently uses a capital asset pricing model to regulate asset owners over five yearly intervals and takes into consideration all assets on the network, referred to as the Regulated Asset Base. However, the CRU, as noted above, may consider an assessment of the appropriateness of the existing policy on a case-by-case basis. This would include a close review of incentive models from other jurisdictions and whether it is appropriate for the general customer to bear any of the risk associated with the specific project and/or whether other regulatory mechanisms may be more appropriate.[8]

- In August 2016 the CRU announced it had decided to conduct a separate and distinct consultation process for the determination of interconnector policy in its information paper entitled "CER Information Paper Policy for Electricity Interconnectors - Consultation Process and Call for Initial Comments" (CER/16/239). The paper referred to key drivers for policy emanating from EU law and European Commission Communications and the clear preference shown for treating electricity interconnectors separately to the wider enduring connection policy that pertains to generation and demand in response to CER/15/284.

- In the CRU's information note of October 2017 entitled "Grid Connections for Electricity Interconnectors with PCI status" (CRU/17/300), the CRU confirmed that it considers it is appropriate at this juncture to progress to the next stage grid connections for any electricity interconnector applications that have received PCI status. The CRU directed EirGrid to commence processing grid connection applications from interconnectors with PCI status it may have received, or receives, in respect of such projects.

- Following the consultation in response to CER/15/284, the CRU has published a proposed decision in November 2017 entitled "Enduring Connection Policy Stage 1 (ECP-1) Proposed Decision". The proposed decision relates to the first stage of the enduring policy ("ECP-1") for connection to the transmission and distribution systems. ECP-1 sets out to address the existing large volumes of applications in a way that promotes a more optimal use of the existing network taking into account the current system needs, national policy and the consumer interest. In particular, ECP-1 states its aim to ensure that the projects

[8] CRU Information Paper: "PCI Incentive Methodology in accordance with Article 13(6) of Regulation (EU) No. 347/2013" (CER/15/269)

which receive connection offers are those that are most likely to be built. However, ECP-1 does not address policy for interconnection, it notes that the CRU's policy on interconnectors will be progressed as per the CER/16/239 consultation and the CRU's direction to EirGrid to commence processing any electricity interconnector applications for connection to the Irish system that have received PCI status (i.e. CRU/17/299 and CRU/17/300, referred to above).

In the UK, there is clear support for further interconnection.

The Secretary of State for Energy and Climate Change explained that the UK *"must step up the integration of European Energy markets so that countries can buy clean competitive low carbon electricity from where-ever it is the cheapest"* In 2013 DECC commissioned a study which concluded that *"Our least regret interconnection analysis (on the basis of net welfare) has shown that incremental increases in interconnection with GB's closest neighbours including France, Ireland and Belgium, with a total new additional GB interconnection reaching 5.0 GW by 2040, are likely to be beneficial to GB net welfare under a broad range of future states of the world."*[9]

In May 2014, Ofgem decided to roll out a cap and floor regulatory regime to new near-term electricity interconnectors. Ofgem recognised that *"Before the cap and floor regime was introduced, only a limited number of electricity interconnectors had been build or proposed. Ofgem therefore created the cap and floor regime to unlock beneficial investment by reducing risks"*.[10] Following the success of the cap and floor window, Ofgem opened a second cap and floor application window on 31 March 2016. In November 2016, the Secretary of State for Energy and Climate Change confirmed that *"We remain strongly supportive of new interconnectors."*[11]

Against this background, Greenlink has received strong support from the UK regulatory authorities, including receipt of a GB Interconnector Licence on 10 February 2015, award of a cap and floor regime in principle following a successful Initial Project Assessment on 30 September 2015 and is now proceeding to Final Project Assessment.[12]

2.2. *Cap and floor regime*

Regulatory models for interconnectors

There exist three broad models for European interconnectors: (i) a regulated asset regime where all risk sits with the consumer, typically employed by national Transmission System Operators ("**TSO**"), (ii) a "merchant" operating model where the risk sits entirely with the projects' owners, achieved through obtaining a derogation from parts of EU regulation and (iii) an incentive based regulatory model such as cap and floor.

The cap and floor regime is a risk-sharing alternative where a minimum guaranteed return is provided in exchange for capping excessive earnings through a revenue-sharing arrangement. The

[9] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266307/DECC_Impacts_of_further_electricity_interconnection_for_GB_Redpoint_Report_Final.pdf
10 https://www.ofgem.gov.uk/system/files/docs/2016/05/cap_and_floor_brochure.pdf
11 https://www.gov.uk/government/speeches/greg-clark-speech-at-energy-uk
[12] https://www.ofgem.gov.uk/sites/default/files/docs/2015/09/greenlink_ipa_decision_sept_2015.pdf. The deadline for submission for Final Project Assessment was subsequently extended by Ofgem to 30 September 2018. Refer to section 4 of this Application for further details.

floor is a call on the consumer to top up congestion rents to the extent they were below a fixed level. The cap requires the interconnector owner to rebate any revenues in excess of a certain level to the consumer. A cap and floor can be considered "merchant" while revenues are between the cap and floor, but "regulated" if they fall outside that range. This mechanism has the ability to stimulate investment whilst encouraging a healthy level of competition.

Cap and Floor for Greenlink

Interconnectors are infrastructure projects of significant size that require substantial upfront investment creating a funding barrier that needs to be overcome by private developers. Large scale projects such as these have historically been developed and funded by regulated TSOs with access to the capital markets in addition to their regulated revenues. The model currently adopted by independent private developers of large infrastructure projects is to require some form of revenue 'underpinning' that allows the introduction of project level funding. Providing a guaranteed revenue floor will generate a minimum stream of predictable cashflows over the course of the regulatory period on which lenders will issue a finite amount of debt at inception of the project. This would allow developers to access cheaper sources of debt financing to partially fund development and construction costs. Introducing project level debt is essential to funding Greenlink and has the added benefit of being a cheaper source of finance, making the project more cost-effective for end consumers. The Shareholder intends to raise equity and project specific debt to fund the investment, all of which will represent new sources of investment in the EU energy industry.

Accordingly, Greenlink is seeking a cap and floor regime in respect of 50% of Greenlink's revenues to be agreed in consultation with CRU such than an award of a cap and floor regime could be made on or before 30 September 2018 subject to the Project satisfying the relevant criteria. In principle, Greenlink is seeking a regime that is symmetrical (insofar that law and regulation permits) with Ofgem's 25 year cap and floor regime that will apply to Greenlink in GB. This will avoid unnecessary obstacles for financing and associated structuring costs, and will ensure that the commercial drivers in the operating phase are not influenced by misaligned regulatory regimes. This is consistent with the CRU's proposal in its PCI Incentive Methodology Information Paper (CER15/269) that it will review incentive models from other jurisdictions, for example the cap and floor model of incentive support applied to some merchant electricity interconnector projects.

Greenlink acknowledges that there will be Irish-specific elements of the regime that will need to be tailored to meet the regulatory objectives in Ireland. We have provided further detail in relation to the current status of the GB cap and floor regime as it applies to Greenlink below. Greenlink looks forward to working with CRU to discuss the parameters of the regime at the next stage.

Benefits for Ireland and Irish Consumers

The cap and floor regime is an effective operating model for the Greenlink interconnector and the Project is uniquely positioned to provide benefits to Irish consumers under such regulation. The benefits to Irish consumers is shown in the CBA included as Exhibit A to this Application. An extract of the key findings of the CBA is set out in section 5 of this Application.

The cap and floor framework adopted by Ofgem to promote interconnector development incentivises high quality project development at lowest price. The levels of the cap and the floor are set by the regulator following a project assessment process whereby the proposed project costs, procurement and contracting strategy and risk allocation between the developer and the supply chain are examined to ensure cost efficiency and value for money. If the Project subsequently fails to achieve its minimum revenues, the resulting loss will first be suffered by Greenlink's Shareholders as the floor is typically set close to the cost of debt of such projects. As a result, the developer, rather than consumers, bares the risk of inefficiency and is incentivised to reduce unnecessary overspend. The consumer also benefits from a limit or cap to the revenues that can be enjoyed by the project owner.

The regime provides a cost-effective delivery model for an interconnector with an appropriate level of risk to the Irish consumers. The regime also fits within existing Irish legislation and regulation, as set out in more detail in section 1 of this Application.

Alignment with GB cap and floor regulatory policy

In GB, Ofgem have adopted a cap and floor framework for future interconnectors which combines elements of both merchant-based projects with the regulated regimes. Ofgem conducted an Initial Project Assessment (IPA) in respect of Greenlink and in September 2015 determined that it was minded to grant a cap and floor regime to the Project.

In May 2014, Ofgem issued a consultation titled "The regulation of future interconnection: Proposal to roll out a cap and floor regime to near term projects." This provides a preliminary cap and floor framework to build and develop upon. Ofgem's proposed cap and floor regime is a high-level framework and as such the details of the fully functioning regime are to be evaluated and developed further on a project specific basis. One of the key drivers for Greenlink in the development of the GB cap and floor regime will be to ensure the financeability of the regime. In their December 2015 letter "Enabling a range of financing solutions under the cap and floor regime"[13] Ofgem explain that they are willing to look at variations of certain aspects of the regime to support bankability on a project-specific basis.

Adopting a symmetrical regime between Ireland and GB would have many benefits, including aligning the Projects' interests across both jurisdictions and increasing the bankability of the Project. It would also avoid any incentive for abnormal behavior in operating the interconnector as a result of asymmetric regulation.

Refinement of the cap and floor regime

There are certain aspects of the cap and floor regime proposed in GB that will require adjustment and refinement to accommodate "non-TSO" financing with private sector equity and debt capital. EP would anticipate discussing these refinements and Irish specific elements with the CRU in due course.

[13]https://www.ofgem.gov.uk/sites/default/files/docs/cap_and_floor_regime_variations_open_letter.pdf

2.3. Projects of Common Interest status

PCIs are key infrastructure projects, especially cross-border projects that link the energy systems of EU countries. They are intended to help the EU achieve its energy policy and climate objectives: affordable, secure and sustainable energy for all citizens, and the long-term decarbonisation of the economy in accordance with the Paris Agreement. Every two years, the European Commission draws up a new list of PCIs.

A PCI project must demonstrate a significant impact on energy markets and market integration between EU countries, boost competition on energy markets and help the EU's energy security by diversifying sources, and contribute to the EU's climate and energy goals by integrating renewables. The selection process gives preference to projects in priority corridors including the North Seas Offshore Grid which would integrate offshore electricity grid development and related interconnectors in the North Sea, Irish Sea, English Channel, Baltic Sea, including Greenlink.

PCIs may benefit from accelerated planning and permit granting, a single national authority for obtaining permits, improved regulatory conditions, lower administrative costs due to streamlined environmental assessment processes, increased public participation via consultations, and increased visibility to investors. They also have the right to apply for funding from the Connecting Europe Facility ("CEF").

Greenlink was designated a PCI by EC Regulation 89/2016, which amended the 2013 Regulation by replacing the list of PCIs and adding further PCIs, including Greenlink. On 23 November 2017, Greenlink was included on the third list of PCI projects. PCI status affords Greenlink a significant degree of credibility having demonstrated the significance of the benefits that the Project can deliver. PCI status provides objective and independent evidence of public benefit which may facilitate the CRU determining that the interconnector is in the public interest for the purposes of Section 2A of the 1999 Act, which would allow it to be deemed part of the transmission system for the purposes of calculating and imposing use of system charges.

Furthermore, the PCI process aims to streamline permit granting procedures to significantly reduce their duration and increase public participation and acceptance for the implementation of such projects. The guidance introduces the concept of a "Collaborative Scheme", which in turn sets targets for permitting authorities to reach decisions in a timely manner. In particular, the PCI guidance ensures that there is co-ordination between the planning authorities in both GB and Ireland Article 7 of the 2013 Regulation requires all authorities concerned to ensure that "*the most rapid treatment legally possible*" is given to the efficient administrative processing of the application files related to PCIs. PCIs are also to be given the "*highest national significance possible*" and be treated as such in the permit granting process. The 2013 Regulation is binding in its entirety and has direct effect on the CRU as an emanation of the State[14]. This places a binding obligation on Irish authorities to ensure "the most rapid treatment legally possible" and places an obligation on Irish authorities to expedite decision making (and consultation in respect of same) in respect of the development of the regulatory regime for development of interconnectors owned by persons other than ESB and EirGrid.

[14] Article 24 of the 2013 Regulation.

CRU has acknowledged this, stating that "*The provisions of the Third Package and the EU Network Codes require preferential treatment for interconnectors and such projects are explicitly facilitated under the Projects of Common Interest Regulations.*" This has been reflected in the practice of the CRU, most recently by giving a direction to EirGrid pursuant to Section 34 of the 1999 Act to commence processing any applications for connections that it may have received respect of PCI projects.

Greenlink qualifies for funding under the CEF and can recover up to 50% of its eligible development costs. CEF funding creates a positive dynamic on the overall risk/reward balance for investors funding the development cost of Greenlink, and would give the Project the best possible chance of success.

3. Project description

This section summarises the Project, including:

- Location
- Technology
- Grid connection
- Permitting
- Licensing
- Promoters

3.1. Location

Greenlink is a proposed new 500MW interconnector linking the UK and Irish electricity markets. There are two existing interconnectors between the two markets, the Moyle cable linking Northern Ireland to Scotland, and EWIC which links the grid near Dublin to Shotton in Wales. Moyle has been operating since 2001 and EWIC since 2012. The Project will connect Waterford in south east Ireland to Pembroke in Wales.

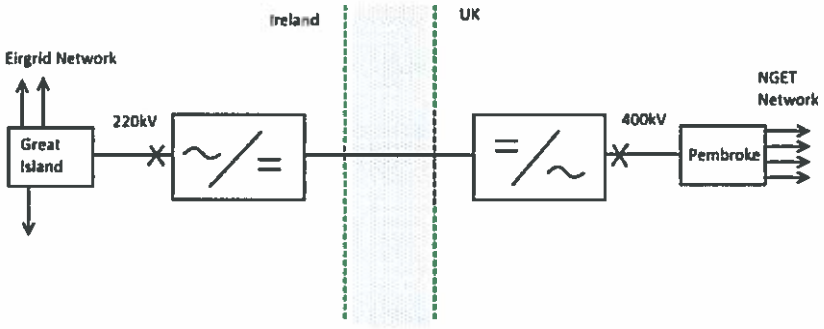
Figure 1 Overview map of Greenlink

3.2. Technology

Greenlink will use high voltage direct current voltage source converter ("HVDC VSC") technology to link the two power systems. HVDC is required (vis-a-vis an AC connection), because the GB and Irish power systems are independent island systems and are not synchronized. HVDC flows can be easily controlled according to system operation and HVDC has lower losses than AC over the distances being considered. The VSC technology (as compared to current source converters) requires typically less reinforcement to the AC grids 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.

Greenlink expects to use similar technology to EWIC but will be able use a higher HVDC voltage (at +/-320kV versus +/-200kV) due to the advancements in technology since EWIC was commissioned. Greenlink's HVDC cables will be around 100km shorter than EWIC and are expected to have lower electrical power losses.

The HVDC converters will be linked to the existing grid with AC underground cables and connected to each other by two HVDC cables, one operating at a positive voltage and the other a negative voltage relative to ground. The configuration is planned to be a symmetrical monopole.



There are established suppliers of HVDC equipment and Greenlink has developed relationships with these suppliers to identify and manage supply chain risks as well as to inform the development and design process. Our understanding of the supply chain and technology capabilities will ensure that the Project is deliverable and optimized to maximise power flows.

Further detail is included in the Technical overview in Exhibit B.

3.3. Grid connections and cable route

Ireland - Converter station

Greenlink applied to EirGrid for a 500MW connection to Great Island 220kV substation on 5 October 2016, subsequently deemed complete and queued on 19 October 2016. The CRU instructed EirGrid to process the application on 17 October 2017.

The converter station will be located close to the Great Island substation. The converter station itself will mainly comprise a valve hall containing the HVDC converter. Transformers and AC equipment will be located externally. The overall site footprint will be approximately 8 acres,

although environmental surveys and consultation with key stakeholders may result in a larger area being utilised due to landscaping and habitat management, external to the site perimeter. The HVDC building will be around 20m high, although the final design will take into consideration technical and environmental constraints and opportunities.

The preferred converter station site, located on agricultural land, is adjacent to the 220kV substation and SSE's Great Island CCGT power station. Following planning and environmental reviews it is believed that planning prospects for the site are good, however, other suitable sites have been identified to provide flexibility in the development process.

Ireland - Onshore cable route

The preferred landfall has been identified at Baginbun Bay on the Hook Peninsula. Two other sites, on the peninsula - Boyces Bay and Sandeel Bay - are also being assessed as potential alternative landfalls. The onshore cable route has been the subject of initial consultation with Wexford County Council and follows the local road network to the proposed converter station site adjacent to the Great Island Substation. Options will be assessed to optimise the onshore cable route and to reduce the length of the current circa. 28km route by leaving the road network, crossing agricultural land and potentially incorporating directional drilling under water bodies. At the landfall point circa. 1km directional drills will take the cables underneath cliffs and the beach beyond the low water mark. The sub-sea cable lay vessel will interface at that point.

Offshore route

A desk-based marine route study has been undertaken in consultation with key stakeholders. This work has resulted in the identification of a circa. 160km subsea route to be optimised following the completion of subsea surveys.

Wales - Converter station

Greenlink will connect to the existing 400kV power system in Wales at the National Grid Pembroke substation. The converter station will be located close to the substation. The converter station itself will mainly comprise a valve hall containing the HVDC converter. Transformers and AC equipment will be located externally. The overall site footprint will be around 8 acres, although environmental surveys and consultation with key stakeholders may result in a larger area being utilized due to landscaping and habitat management, external to the site perimeter The HVDC building will be around 20m high although the final design will take into consideration technical and environmental constraints and opportunities.

Wales - Cable route

The National Grid substation, RWE's CCGT units and the Valero oil refinery are all located in the area and, following consultation with key stakeholders including Pembrokeshire County Council and Natural Resources Wales, it is believed that planning policy and zoning is supportive of such a development in that area. All the potential converter station sites being assessed are sited on low grade agricultural land. The cable route corridors predominantly cross agricultural land, for circa. 7 km to the identified landing point at Freshwater West which is owned by the National Trust. From this point circa. 1km directional drills will take the cables underneath sand dunes and the beach beyond the low water mark. The sub-sea cable lay vessel will interface at that point.

Greenlink holds agreements with National Grid for 500MW of interconnector capacity at Pembroke, for completion on 31 October 2022. The agreements will be modified in the period Q4 2018/ Q1 2019 to update the date for completion once there is greater certainty on the expected completion date.

3.4. Permitting

Greenlink was granted PCI status and was included in the third PCI list published on 23 November 2017. Greenlink intends to submit formal PCI notification to An Bord Pleanála (Ireland) and the Welsh Government (Wales) in March 2018. The formal notification will be accompanied by a full Schedule of Permits.

Natural Resources Wales, the Welsh Government and An Bord Pleanala (Ireland), have all confirmed that the they do not believe that the completion of an Environmental Impact Assessment (EIA) will be required for the Greenlink development.

In Ireland, Greenlink will be assessed as a Strategic Infrastructure Development by An Bord Pleanála. Following the completion of a Marine Route Assessment and Landfall Selection Report a preferred landfall has been identified at Baginbun Bay. This will result in a circa. 28km onshore cable route following the local road network, with opportunities for further optimisation, to a proposed converter station site adjacent to the Great Island Substation. A formal public consultation process is anticipated to commence in 2018 to feed into the development process.

In Wales, the converter station will be subject to a Town and Country Planning Act 1990 application submitted to Pembrokeshire County Council for consideration. The onshore cable route (circa. 7km) is considered to be permitted development, however, it will be fully assessed and consulted upon to ensure that the local community can comment on all of the Welsh onshore elements of Greenlink. Key stakeholders including Pembrokeshire County Council, Pembrokeshire Coast National Park Authority and Natural Resources Wales (NRW) have been consulted on the current plans and will be fully involved in the development process moving forward.

The Project will require Crown Estate lease and Foreshore Lease in Ireland, as well as a Marine Licence under the Marine and Coastal Access Act 2009 for cable installation. A detailed environmental assessment will be completed for the offshore elements of the Project. To support this a sub-sea survey, which will require specialist offshore surveying vessels, will be undertaken. These are typically contracted for the summer months, and record detailed information (including geotechnical investigations at defined intervals) about the seabed conditions. This in turn allows designers to set appropriate burial depths and contractors to quote installation costs. Desk-based Fishery Activity and UXO Assessments are currently ongoing and will inform the scope of the subsea surveys scheduled to take place in 2018.

[redacted]

3.5. Interconnector licencing

Greenlink will require appropriate licences from the respective electricity regulators. In GB, Ofgem has granted Greenlink an electricity interconnector licence to operate.[15] As noted in

[15] https://www.ofgem.gov.uk/publications-and-updates/greenwire-transmission-pembroke-limited-notice-

section 1 of this Application, Greenlink will be applying to CRU for a licence to operate the Greenlink interconnector under section 14 of the Electricity Regulation Act 1999.

We do not anticipate that Greenlink will need to seek exemptions from the EU directives, on the basis that Greenlink is requesting CRU to adopt a cap and floor regime in full compliance with the Third Package as Ofgem has done in the UK.

Greenlink is aware that it may need to comply with the unbundling requirements of Article 9 of Directive 2009/73/EC concerning common rules for the internal market in electricity (the **"2009 Directive"**) unless it has an exemption from the provisions of Article 9 pursuant to Article 17 of Regulation (EC) No 714/2009 of the European Parliament and of the Council of 13 July 2009 on conditions for access to the network for cross-border exchanges in electricity (the **"2009 Regulation"**). If Greenlink requires an exemption pursuant to Article 17 of the 2009 Regulation it will submit an application for such an exemption at the appropriate time.

3.6. Promoter of the Greenlink interconnector

Element Power is the promoter and owner of the Greenlink interconnector project. Element Power is an established global developer in the green energy sector with a focus on developing infrastructure assets and related services in its three business divisions; (i) generation and storage projects (power projects); (ii) interconnection and (iii) asset management. Element Power currently operates primarily in the UK, Ireland, Sweden and Finland with additional projects in the Americas.

Element Power is present in all major segments of the lifecycle of the assets it originates. The company develops, acquires, builds, owns, operates and maintains a portfolio of assets across its business divisions. Further information on Element Power and its businesses can be found at its web site www.elpower.com

Greenlink is being developed in Element Power's Interconnection division. Element Power and has brought together a team of professionals and expert advisors to develop all aspects of the Project. In bringing forward the Project, Element Power has built up a wide range of interconnector experience, relationships and contacts with policymakers, regulators, consultants and various stakeholders. Element Power staffs the Project with a team located in Cork and London. [redacted]

Element Power has the financial and technical capability to complete the development and permitting of Greenlink. Element Power recently passed a milestone of successfully raising over €500 million third party debt and equity funding for construction of its projects. During the course of the development phase we expect to explore opportunities to introduce third party debt and equity investors to reduce the concentration of risk to a single investor. [redacted]

grant-electricity-interconnector-licence

4. Greenlink development timetable

The high-level Gantt chart below shows the planned development and construction timeline for Greenlink.

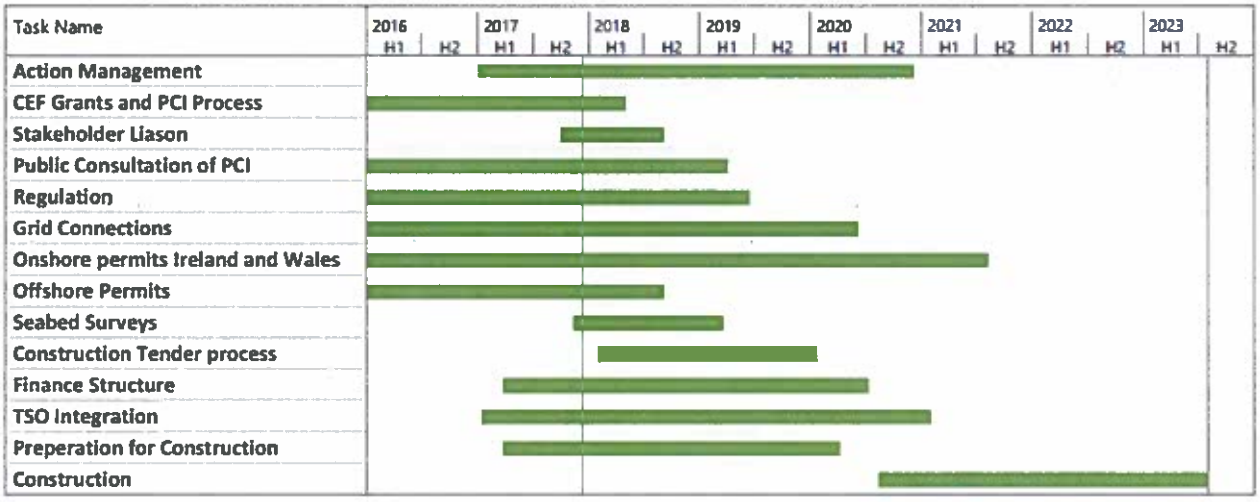
The development phase is scheduled to complete at financial close in June 2020 and marks the transition from the development phase to the three-year construction period leading to operations commencing in 2023.

Greenlink's environmental permitting tasks are on the critical path and will require the commencement of sub-sea surveys in summer 2018, in order that permits can be submitted by early 2019, and granted by late 2019. Greenlink anticipates a further six months to complete the financing of the Project in conjunction with the award of the major construction contracts for the converter stations, provision and installation of the onshore and offshore cables at financial close.

Greenlink is required to make its final project assessment (FPA) submission to Ofgem by 30 September 2018. Greenlink has benefited from a one-year extension for its FPA submission which cannot not be further extended. The objective of the FPA submission is to demonstrate the maturity of the Project's forecast costs and revenues, the latter evidenced by the regulatory regime that will apply to Greenlink in Ireland.

On 28 November 2017 Ofgem, CRU and Greenlink met and discussed a series of steps to enable the CRU to issue a minded to decision on a proposed a Cap and Floor regime for Greenlink. Following discussions between CRU, Ofgem and Greenlink (including the tripartite meeting on 28 November 2017) a proposed timetable and framework was agreed between the parties to ensure that Greenlink can meet the FPA submission deadline. [redacted]

Figure 2 Greenlink Development and Construction Programme



The construction programme is scheduled to commence in the summer 2020 and run for 36 months and include the commissioning of the system and testing with EirGrid and NGET.

NGET has agreed the completion of its connection works for October 2020. A back-feed at lower power levels will enable commissioning and testing some months prior to that date. Greenlink is working with EirGrid to determine the detailed timing of its grid connection at the Great Island substation to coincide with National Grid's commissioning and testing timetable.

5. Benefits and costs of Greenlink

Element Power commissioned Baringa Partners LLP ("**Baringa**") to assess the impact on net social welfare of the Greenlink interconnector. A copy of the CBA produced by Baringa is included as Exhibit A to this Application. In addition the detailed CBA economic results and underlying assumptions are provided in two excel spreadsheets that form an integral part of the Application[16]. The CBA is provided as the basis on which we request the CRU to make its determination that it is in the public interest for Greenlink to be considered to be part of the Irish transmission system for the purposes of calculating charges and imposing charges for use of the transmission system. In October 2014, EP submitted a CBA (prepared on the same basis, save for updated information on commodity prices and forward looking energy scenarios) to Ofgem for a cap and floor regime in GB. The CBA should be read in conjunction with Greenlink's Project financial information to obtain an overview of development, capital expenditure, operating and maintenance costs (refer to Exhibit C to this Application). An extract of section 1.2 of the CBA (the key findings from Baringa's analysis) is set out below. The CBA is based on the assumption that a homogenous cap and floor regime applies to the entire capex and revenues of the Project and that there is a 50/50 split between Ireland and GB in terms of allocation of payments when revenues are above the cap, and collection of any payments required when revenues are below the floor.

Extract from section 1.2 of the CBA:

"The key findings from our analysis are:

1. **Greenlink demonstrates a new operating model for interconnection in a world of increased intermittency, deriving its value from increasing the ability of the two markets to integrate potential low carbon output (particularly wind) across the region**

   The modelling results illustrate a fundamentally different business model for interconnection compared to the "traditional" business model, which is commonly based upon a long-term skew between two markets' prices. Instead, we observe short-term flow patterns frequently changing across the interconnector, which increasingly reflects the output of low carbon technologies in the two markets as the penetration of low carbon generation increases.

   Therefore, any CBA for Greenlink will need to take particular account of the benefits offered by the interconnector on improving the integration of low carbon generation technologies between the two islands, and how these benefits can translate into lower costs for consumers in the longer term.

2. **In two out of the three main scenarios modelled, Greenlink produces an overall positive impact to net welfare across Ireland and GB**

[16] The detailed CBA results are contained in the excel file Modelling Results_Greenlink 2017 CBA Update for the CRU_Final and the underlying assumption are provided in Assumptions Book_Greenlink 2017 CBA Update for the CRU_ Final

Net social welfare (i.e. the sum of net producer, consumer and interconnector welfare) in SEM and GB is positive in the Reference Case (between €0.2-0.5bn in NPV[17] terms depending on whether Celtic is also assumed to be operational or not) and High Case (€0.7-1.1bn), but slightly negative in the Low Case (approximately -€0.4bn). Note that net consumer welfare in SEM and GB is positive throughout the scenarios: strongly positive in the Reference and High Case (€1.2-2.6 bn) and still positive in the Low Case (€0.1-0.5 bn).

A pattern common to all scenario CBA results is that Ireland in aggregate benefits strongly from Greenlink's addition, causing a net gain in welfare for consumers that often offsets the reduced welfare it causes for producers and other interconnector owners. The impact on Irish consumers is strongly positive under all cases, ranging between €0.2-0.6bn in the Low Case, up to €1.4-2.8bn in the Reference Case and €1.9-2.5bn in the High Case.

- For scenarios excluding Celtic, this gain in consumer welfare is driven both by lower wholesale electricity costs (as GB tends to have lower prices than Ireland), as well as by improved wholesale market revenues for renewable technologies (leading to higher payments from renewable generators to consumers);
- For scenarios including Celtic, Irish prices are now lower due to imports from France, and thus gains in consumer welfare are mainly driven by improved wholesale market revenues for renewable generators.

3. **Project economics are strong; the project makes payments to consumers at the cap in our Reference and High scenarios, with small payments to Greenlink in the Low scenario**

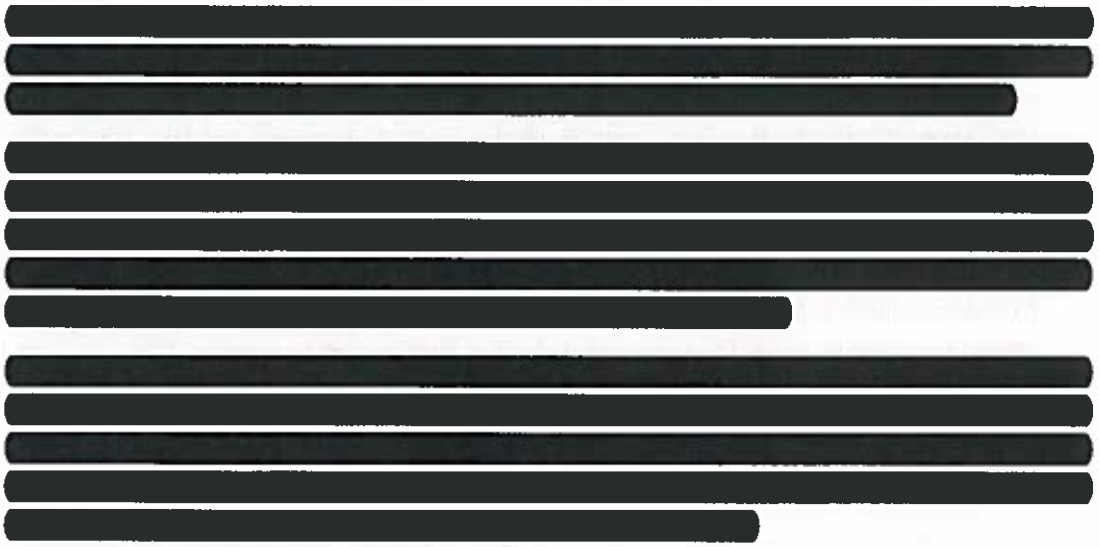
The project's revenues constitute wholesale market revenues (i.e. the price spread that the interconnector earns between the two markets at an hourly level), capacity mechanism payments and ancillary service revenues. These are inserted into a financial model to simulate annual payments under illustrative cap and floor levels determined by the project's costs[redacted]

Under the cap and floor regime, the cap on revenues provides benefits to consumers in return for their exposure in underwriting the floor. For interconnectors, it provides an investment route that complies with use of revenues requirements under EU legislation. There is also a wide band of 'merchant' exposure for the link between the cap and floor levels.

Our modelling shows that, due to strong revenues particularly in the medium-to-long term, Greenlink would result in significant payments back to Irish and GB consumers for two out of the three scenarios modelled. [redacted]

[17] All welfare figures are stated in Net Present Value (NPV) terms at the HM Treasury discount rate of 3.5%.

[redacted]



5. **Greenlink improves the integration of renewable technologies in Ireland by reducing curtailment and improving captured prices in the wholesale market**

Greenlink can significantly improve the wholesale power prices captured by wind generators in SEM by allowing them to export surplus output to GB during oversupply periods in SEM. For the Reference Case, for example, Greenlink leads to an increase in average annual wind captured prices of between 2.9-3.2 €/MWh over the period 2023 to 2047. For the High Case the equivalent figure is 1.9-2.7 €/MWh and 0.9-1.6 €/MWh for the Low Case.

Greenlink can also significantly reduce the amount of wind and solar energy that is curtailed in Ireland. In the Reference Case including Celtic, the sum of avoided wind curtailment due to Greenlink over the period 2023-2047 is 5.5 TWh, which translates to an average of 0.8% of annual wind energy produced in Ireland. Similarly, in the Reference Case excluding Celtic the sum of avoided wind curtailment due to Greenlink over the period 2023-2047 is 10.7 TWh, which translates to an average of 1.7% of annual wind energy produced in Ireland. The equivalent figures for the Low Case are 0.3-1.2 TWh (0.1%-0.3%) and 5.4-8.8 TWh (0.8%-1.3%) in the High Case depending on whether Celtic is assumed to be operational or not[19]."

[19] Note that this refers to 'energy-related' curtailment, i.e. the amount of renewable energy that is available but cannot be produced due to insufficient demand in the system and does not take into account any renewable energy that may be curtailed due to network limitations and other power system stability constraints. As a result, we may be underestimating the potential benefits offered by Greenlink with respect to reducing the total levels of wind and solar energy that may be dispatched-down in Ireland.