

GREENLINK – SUPPLY CHAIN PLAN – NOVEMBER 2016



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1. INTRODUCTION

Greenlink has prepared this Supply Chain Plan to provide an outline of how it intends to procure a cost effective and competitive project and also communicate the opportunities for the supply chain, within the UK and Ireland, arising from the Greenlink interconnector project.

The Supply Chain Plan will be updated, during the development process, to reflect the evolution of the Greenlink development programme.

2. PROJECT OVERVIEW

Greenlink is a proposed, multi-million euro interconnector, rated at 500MW, linking the power markets in Great Britain (GB) and Ireland.

Greenlink will use high voltage direct current voltage source converter (HVDC VSC) technology to link the two power systems. HVDC has been selected over an AC connection, because the GB and Irish networks are not synchronized and because AC is technically difficult over this distance, HVDC has lower unit costs, can be much more easily controlled according to trading and market requirements, and has lower losses. The VSC technology (as compared to older current source converters) reduces reinforcement requirements on the AC networks 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. Figure 1 shows the high level locations.

- Greenlink is strategically placed to reinforce the south of Ireland by connection to Wales, creating synergy with existing EWIC and Moyle interconnectors to GB:
- Greenlink provides reinforcement to transmission boundaries in South Wales.
- Greenlink provides additional import and export capacity for the Island of Ireland.



Figure 1 Overview map of Greenlink interconnector.

2.1 IMPORTANCE OF INTERCONNECTORS

An interconnected European energy grid is vital for Europe's energy security, for more competition on the internal market resulting in more competitive prices as well as for better achieving the decarbonisation and climate policy targets which the European Union has committed to. An interconnected grid will help deliver the ultimate goal of the Energy Union, i.e. to ensure affordable, secure and sustainable energy, and also growth and jobs across the EU.

3. COST REDUCTION AND COMPLETION

Greenlink intends to manage the supply chain to ensure that the project is constructed and operated with lowest lifetime cost taking into account the various innovations, requirements, risks and options in development, design, construction and operation.

Greenlink is continuing and developing a dialogue with the specialist supply chain for HVDC converters, HVDC cable and offshore cable installation vessels which has been underway since 2012 as part of the HVDC transmission planned for the Greenwire project.

Timing is yet to be finalised but this information will be made available as the project matures.

The process to achieve this effective and competitive procurement process is as follows:

1. Supply chain and FEED engagement (ongoing).
2. Supply chain strategy determination.
3. Pre-qualification.
4. Tendering.
5. Negotiations and selection.
6. Financial close and contract commencement.

The HVDC market is expected to expand both domestically and globally due to the increased importance being placed on interconnection and the development of offshore renewables. Greenlink, like other planned interconnectors, has the potential to provide valuable experience to the sector and will aid the market's ability to provide innovation, cost reductions and improved designs using the experience gained.

Compared to other GB interconnectors, Greenlink is expected to regularly carry power in both directions and have some periods of low or no transfer, so that the real and reactive capabilities can be more readily available to provide system services to EirGrid and National Grid systems. The software, communications and control systems to provide these system services are an area of potential innovation for Greenlink that could then be replicated more widely. Because Greenlink is not predominantly unidirectional flow like most other GB interconnectors, the focus on this area will be greater for this project and experiences gained will benefit future similar interconnector projects.

4. SUPPLY CHAIN

An infrastructure project, of the scale of Greenlink, offers important supply chain opportunities - the challenge is to provide the opportunity to domestically based companies to enter the supply chain. Greenlink is committed to working with the Irish, Welsh and UK Governments and Development Agencies to facilitate the economic opportunities for domestic supply chains.

The supply chain opportunities arising from Greenlink span across the project phases from the feasibility and development phase, the construction phase through to the operational phase. In order to facilitate the supply chain there will be a requirement to plan ahead and work with key stakeholders including the Irish, Welsh and UK Governments and Development Agencies.

4.1 FEASIBILITY AND DEVELOPMENT PHASE

The development of a project such as Greenlink requires the completion of various environmental and technical survey works. The following types of opportunity arise during the development phase:

- marine survey vessels and equipment;
- marine survey expertise;
- onshore and offshore unexploded ordnance expertise;
- onshore and offshore archaeological expertise;
- civil engineering expertise;
- geotechnical assessment;
- geophysical surveying;
- topographic surveying;
- environmental survey work;
- landscape and visual impact expertise; and
- planning expertise.

Using sound management principles Greenlink has already selected the majority of companies required to assist with the delivery of this phase of the project with the exception of marine surveys which will be tendered.

The onshore and offshore planning and environmental work for Greenlink is being led by companies with offices in Ireland and the UK.

Greenlink will seek to make use of local and regional skills and services. The use of such skills and services offers the benefit of existing understanding of the local environment, regulations and stakeholders while also presenting cost savings, due to a reduced requirement for travel and support time.

An Invitation to Tender for marine survey work will be published following the OJEU process.

4.2 CONSTRUCTION AND PROCUREMENT PHASE

Throughout the development of the project Greenlink will work to identify support services within the local supply chain that could benefit during the during the construction phase. Support services provided locally are likely to include welfare, accommodation and catering.

Timing is yet to be finalised but this information will be made available as the project matures.

There are two likely general contracting and procurement scenarios.

- 1) Single EPC contract – this would be a single EPC contract for the complete interconnector from the AC connection in EirGrid’s substation through to the AC connection in National Grid’s substation.
- 2) A multi contract option which could include packages such as:
 - a) HVDC converters and converter station;
 - b) AC cable supply and installation;
 - c) HVDC offshore cable supply;
 - d) HVDC offshore cable installation and burial;
 - e) Onshore ducting and directional drilling;
 - f) HVDC onshore cable supply and installation into ducts and jointing; or
 - g) any subset of the above.

The decision on contracting strategy (i.e. 1 or 2 above) is likely to be taken in the FEED stage.

Contractors delivering the principle contract or contracts are anticipated to be large multinational companies with experience of similar contracts and projects.

Once the contactor(s) is/are appointed, Greenlink anticipates that it will promote meet the buyer events in Wales and Ireland to facilitate the local provision of services to the lead contractors in line with the needs of the project. These supplier events are anticipated to take place at the end 2018.

Greenlink will work with the selected contractors plus relevant national bodies and organisations to ensure that the local supply chain has enough advanced notice of the construction requirements associated with the project so that they may be in a position to qualify for appropriate subcontracts from the appointed contractors.

Examples of goods and services required in the construction phase are detailed in Appendix 1.

Examples of support materials for previous meet the buyer events arranged by Element Power can be found in Appendix 2.

4.3 CONSTRUCTION AND PROCUREMENT PHASE

The majority of the supply chain value will be captured within the Construction phase however there may be continued opportunities moving forward.

Greenlink will work with the local supply chain to facilitate operational phase opportunities.

The design and procurement process will take account of the costs in the operational phase and the cost reduction opportunities during this phase.

5. INNOVATION AND SKILLS

Greenlink will be seeking appropriate innovations in the development, design and procurement phases to reduce risks, reduce costs and improve utility.

Greenlink's development and construction will require and enhance the skill base in the UK and Irish economies which will provide a legacy benefit for other projects which can use these skills.

In the development process and in the formal and informal engagement with the supply chain, Greenlink will seek to identify skills bottlenecks and shortages which could impact the construction and operation of Greenlink. Where appropriate, Greenlink will work with the supply chain, and relevant skills providers to promote relevant training.

In addition to the opportunities for innovation and cost reduction there are other opportunities for skills and innovation directly linked to Greenlink.

Work is ongoing in this area and further detail will be provided in the next 'Greenlink - Supply Chain Plan' to be published in the middle of 2017.

6. NEXT STEPS

Greenlink will proactively engage with the Irish, Welsh and UK Governments to identify domestic companies that can provide services and goods to assist the delivery of the Greenlink interconnector. It will also work to develop a plan to assist the identified companies with the necessary capabilities, to have the certifications and licences to take part in the future tender processes.

7. CONTACT DETAILS

Companies interested in receiving further information about the Greenlink project and supply chain opportunities should contact:

United Kingdom

Greenlink,
c/o Element Power,
2nd floor Meridien House,
42 Upper Barkley Street,
London,
W1H 5QJ

Ireland

Greenlink,
c/o Element Power,
Unit C Building 4200,
Cork Airport Business Park,
Cork

APPENDIX 1

EXAMPLES OF CONSTRUCTION GOODS AND SERVICES

TIMING

Timing is yet to be finalised but this information will be made available as the project matures.

GOODS

COMPONENT	COMMENT
HVDC Converters	2 x 500MW HVDC Voltage Source Converters
HVDC Onshore Cable 1	Spec tbc - Circa. 60km
HVDC Offshore Cable 2	Spec tbc - Circa. 360km
Cable Installation Ducts	Spec tbc - Circa. 60km
Fibre Optic Cable	Spec tbc – Circa. 210km (there is a possibility that fibre optics might be built into HVDC cables)
AC Cables	AC cables 220kV in Ireland and 400kV in GB to connect converter station to substation.
Cable temperature monitoring system	Tbc
Thermal Backfill Lean Mix Material	Tbc

Note: This data is likely to change as design and routing work progresses

SERVICES

Project Phase	Service / Opportunity
Construction Phase	Offshore installation and support vessels, monitoring vessels, guard vessels, rock dumping, mattresses,
Construction Phase	civil engineering - installation of underground ducts including trenching
Construction Phase	civil engineering - directional drilling
Construction Phase	civil engineering - ground works , foundations, and building construction
Construction Phase	material and equipment storage facilities - including inland and waterfront storage with an ability to manage heavy loads were necessary
Construction Phase	transport - marine and road delivery
Construction Phase	landscaping - delivery of required screening programmes
Construction Phase	support services - welfare, accommodation and catering

Note: This data is likely to change as design and routing work progresses

APPENDIX 2

EXAMPLES OF SUPPORT MATERIALS

Examples of support Materials for previous meet the buyer events arranged by Element Power

Wind Farm Contract and Business Opportunities

Thursday 19th November
3pm and 8pm
Nithsdale Hotel, 1 High Street,
Sanquhar DG4 6DJ

Element Power would like to invite businesses to attend a meet the buyer event, to learn more about contract opportunities that will be available from construction of the Twentyshilling Hill windfarm near Sanquhar and, if consented, the Windy Rig windfarm 18km north of St John's Town of Dalry.

The event will provide an opportunity to meet the main contractor and Gregor Bryce, Element Power Construction Manager.

Twentyshilling Hill windfarm has planning consent and is scheduled to commence construction in early 2016. Windy Rig windfarm planning application was submitted to Dumfries and Galloway Council in May 2015.

Contract and Business Opportunities will include:

- Landscaping and tree works
- Plant and Machinery
- Drainage
- Geosynthetics and bank stabilisation
- Concrete
- Fencing
- Accommodation
- Catering
- Cleaning and Waste Management
- Security

To register for the event please visit: **www.elpower.com**

and download our 'Meet the Buyer' registration form

or email us at: **Scotlandinfo@elpower.com**

or alternatively call us on: Tel: **0131 240 1237**

Company Name			
Address	<hr/> <hr/> Post Code <hr/>		
Telephone		Mobile	
Email			
Contact Name		Position	
Field	Sub-Field	Details of type of works/ services/etc.	
Landscape and Ecology	Gardening, Landscaping. Tree Works		
Landscape and Ecology	Ecology Surveys		
Construction	Training		
Construction	Plant and Machinery		
Construction	Drainage		
Equipment Supply	Plant Hire		
Material Supply	Geosynthetics And bank stabilisation		
Material Supply	Concrete		
Services	Fencing		
Services	Accommodation Catering		
Services	Cleaning and Waste Management		
Services	Security		
Is your company registered with the Dumfries and Galloway Renewable Energy Partnership?		Yes	No
If not may we share your details with Dumfries and Galloway Renewable Energy Partnership?		Yes	No