

Celtic Interconnector



TEN-E Regulation

Pre-Application Notification

December 2018



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Introduction

The Celtic Interconnector is a proposed electrical link which will enable the movement of electricity between Ireland and France and will be the first direct energy link between the two countries, running from the south coast of Ireland to the north-west coast of France. The project promoters are EirGrid plc and Réseau de Transport d'Électricité (RTE), the Transmission System Operators (TSOs) in Ireland and France.

EirGrid has an obligation under its TSO licence to explore and develop opportunities for interconnection of the Irish power system with other systems and has previously fulfilled this obligation by developing the East West Interconnector between Ireland and Wales which was delivered in 2012.

The European Commission sees increased interconnection as a key step towards achieving a more integrated electricity system and considers the Celtic Interconnector to be an important move towards achieving such integration.

The Celtic Interconnector was designated in 2013 as a Project of Common Interest (PCI) under the Regulation for the trans-European energy infrastructure (EU 347/2013) (hereafter referred to as the TEN-E Regulation). The Regulation seeks to modernise and expand Europe's energy infrastructure and to interconnect networks across borders to meet the Union's core energy policy objectives of competitiveness, sustainability and security of supply. The project has retained its PCI designation during subsequent reviews in 2015 and 2017.

PCI projects can benefit from accelerated planning and permit granting and also have access to financial support from the Connecting Europe Facility (CEF). The Celtic Interconnector has already been supported with over €3.5m provided for the Feasibility Phase of the project and a further €4m allocated for the current phase of the project.

This document provides formal notification under Article 10(1)(a) of the TEN-E Regulation to An Bord Pleanála, in its role as the delegated National Competent Authority (NCA) in Ireland, that EirGrid intends to commence the permit granting process for PCI 1.6, the Celtic Interconnector project. In France notification has already been submitted by RTE to the Ministère de la Transition Écologique et Solidaire, in its role as the delegated NCA in France, in July 2018 and it was accepted in September 2018.

This document sets out the necessary information to satisfy the pre-application requirements outlined in Article 10(1)(a) of the TEN-E Regulation and in Section 4 of An Bord Pleanála's Project of Common Interest Manual of Permit Granting Process Procedures (March 2018)¹.

Further information about the project can be found on the project websites at:

<http://www.eirgridgroup.com/the-grid/projects/celtic-interconnector/the-project/>

<http://www.rte-france.com/en/project/celtic-interconnector-interconnection-project-between-france-and-ireland/>

¹ <http://www.pleanala.ie/PCI/Projects%20of%20Common%20Interest%20-%20Manual%20of%20Procedures%20%2020March2018.pdf>

Project Information

Project Promoters

The Celtic Interconnector is being jointly developed by EirGrid plc and Réseau de Transport d'Électricité (RTE).

EirGrid plc

EirGrid plc is a wholly owned subsidiary of EirGrid Group and holds licences as independent electricity Transmission System Operator (TSO) and Market Operator (MO) in the wholesale trading system in Ireland, and is the owner of the System Operator Northern Ireland (SONI Ltd), the licensed TSO and market operator in Northern Ireland. EirGrid plc previously developed and delivered the East West Interconnector between Ireland and Wales, which has been in operation since 2012.

Réseau de Transport d'Électricité

Réseau de Transport d'Électricité (RTE) is the French TSO; it owns, operates and develops the French Electricity Transmission System with the primary objectives of balancing electricity generation with consumption, guaranteeing the secure operation of the power system.

Contact Details

The primary contact details for the project promoters are provided in Table 1 below.

Table 1 - Celtic Interconnector project promoter primary contact details

EirGrid	RTE
The Oval, 160 Shelbourne Road, Ballsbridge, Dublin, D04 FW28, Ireland. Tel: +353 (0)1 677 1700 Company No.: 338 522	Immeuble WINDOW, 7C, Place du Dôme, 92073 PARIS LA DEFENSE CEDEX, France. Tel: +33 (0)1 79 24 80 00 Company No.: 444 619 258

National Competent Authorities

The National Competent Authorities (NCAs) for each jurisdiction relating to the Celtic Interconnector are listed in Table 2 below.

Table 2 - National Competent Authorities for the Celtic Interconnector Project

Country	National Competent Authority	Contact Details
Ireland	An Bord Pleanála	Seamus Grant, Executive Officer, An Bord Pleanála, Projects of Common Interest Unit, 64 Marlborough Street, Dublin 1.
France	Ministère de la Transition Écologique et Solidaire	Sidonie BLANCHARD Chargée de mission infrastructures de transport d'électricité, Direction Générale de l'Energie et du Climat, Ministère de la Transition Écologique et Solidaire, 246 Boulevard Saint-Germain, Paris 75007, France.

Irish Consenting Authorities

Significant public infrastructure projects such as the Celtic Interconnector require a wide range of consents to commence construction and to operate. This section of the notification identifies the consents which are anticipated to be required for the onshore and offshore aspects of the development in Ireland.

In line with Section 4.1 of the Manual of Permit Granting Procedures EirGrid has contacted all of the relevant consenting authorities and has commenced the necessary pre-application processes.

Table 3 - Onshore Consents to be submitted by mid-2020 (required as part of statutory consenting process)

Consent Type & area of project required for	Consenting Authority	Legislation under which consent is required / granted	Contact Details
Planning Approval <i>(required for the onshore elements of the interconnector)</i>	An Bord Pleanála	<ul style="list-style-type: none"> Sections 182A of the Planning and Development Acts, 2000 (as amended) Part 18 of the Planning and Development Regulations 2001 (as amended) 	Philip Green
Authorisation to Construct an Interconnector <i>(required for the entire interconnector)</i>	Commission for Regulation of Utilities	Section 16 of the Electricity Regulation Act 1999 (as amended)	Roisin Cullinan
Electricity Interconnector Operator Licence <i>(required for the entire interconnector)</i>	Commission for Regulation of Utilities	Energy (Miscellaneous Provisions) Act 2006	Stuart Coleman

With regard to the principal onshore consent, EirGrid has engaged with the Strategic Infrastructure Development (SID) unit of An Bord Pleanála for the purposes of a pre-application consultation for the intended SID application. By letter dated 12th October 2018, the SID unit of An Bord Pleanála stated that the project was not defined enough for the purposes of entering into such pre-application consultation. This related to the landfall points and proposed sites of the converter station not being sufficiently defined.

As further outlined within this notification EirGrid will have defined the landfall point and proposed site of the converter station within a timeframe of 12 months from the date

lodgement of this notification. EirGrid will thereafter re-submit an application to the SID unit of An Bord Pleanála for the purposes of pre-application consultation for the SID application. This will further enable the completion of the pre-application consultation of the SID unit within the remaining one year period of the two year time period allowed for the completion of the pre-application stage of the PCI process under Article 10(1) of the TEN-E Regulation. This is further in accordance with Section 4.1 of the Manual of Permit Granting Procedures which says in relation to the notification stage:

“Any such report, plan or specification accompanying the notification need not be complete at this stage of the process. However, the level of detail supplied must be sufficient to assure a relevant authority that the complexity and detail required is fully understood by the project promoter. *Where any such detail supplied is not complete a timescale for completion should be given and this timescale should be linked to a timescale for submission of any application to the relevant authority.*”

EirGrid have therefore provided (a) a timescale for completion of any incomplete specifications relating to the landfall points and sites for converter station and (b) linked this with a timescale for submission of the pre-application consultation of An Bord Pleanála. EirGrid therefore submits that the proposed project is mature enough to enter the permit granting process in accordance with Article 10(1) of the TEN-E Regulation.

Table 4 - Onshore Consents to be applied for post 2022 during project implementation (required post statutory consenting decisions)

Consent Type & area of project potentially required for	Consenting Authority	Legislation under which consent is required / granted	Contact Details
Commencement Notice / 7 Day Notice <i>(required for the onshore elements of the interconnector)</i>	Building Control Authority in relevant area	Building Control Act 1990 (as amended) and Building Control Regulations 1997 (as amended)	Overall Contact: Michael Lynch, Director of Services (Planning). Consent Contact: John Sheehan, Assistant Chief Fire Officer, Midleton Fire Station.
Road Opening Licence <i>(required for the DC and AC circuit routes onshore elements of the interconnector)</i>	Cork County Council	Section 13 of the Roads Act 1993 (as amended)	Overall Contact: Michael Lynch, Director of Services (Planning). Consent Contact: Aidan Weir, Roads and Transportation Directorate.
Tree Felling Licence <i>(potentially required for converter station onshore element of the interconnector)</i>	Department of Agriculture, Food and the Marine	Sections 37 and 40 of the Forestry Act 1946 (as amended)	Ann Cunningham, Forestry Division, Department of Agriculture, Food and the Marine.
Excavation Licence (Archaeological) <i>(potentially required for some of the onshore elements of the interconnector)</i>	Minister for Culture, Heritage and the Gaeltacht (licence issued by the Archaeological Licensing Unit of the National Monuments Service)	Section 26 of the National Monuments Act 1930 (as amended)	Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.
Ministerial Consent for works at / near a National Monument <i>(potentially required for some of the onshore elements of the interconnector)</i>	Minister for Culture, Heritage and the Gaeltacht	Section 14 of the National Monuments Act 1930 (as amended)	Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.

<p>Detection Device Consent (Archaeological)</p> <p><i>(potentially required for some of the onshore elements of the interconnector)</i></p>	<p>Minister for Culture, Heritage and the Gaeltacht</p>	<p>Section 2 of the National Monuments Act 1987 (as amended)</p>	<p>Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.</p>
<p>Trade Effluent Discharge Licence</p> <p><i>(potentially required for converter station onshore element of the interconnector)</i></p>	<p>Cork County Council</p>	<p>Local Government (Water Pollution Acts), 1977 and 1990</p>	<p>Overall Contact: Michael Lynch, Director of Services (Planning).</p> <p>Consent Contact: Ted O'Leary, SEO Environment Directorate.</p>
<p>Certificate of Registration</p> <p><i>(potentially required for converter station onshore element of the interconnector)</i></p>	<p>Cork County Council</p>	<p>Article 27 European Communities (Waste Directive) Regulations, 2011</p>	<p>Overall Contact: Michael Lynch, Director of Services (Planning).</p> <p>Consent Contact: Pauline Falvey, Staff Officer.</p>
<p>Fire Safety Certificate</p> <p><i>(potentially required for converter station onshore element of the interconnector)</i></p>	<p>Building Control Authority in relevant area</p>	<p>Building Control Act 1990 (as amended) and Building Control Regulations 1997 (as amended)</p>	<p>Overall Contact: Michael Lynch, Director of Services (Planning).</p> <p>Consent Contact: John Sheehan, Assistant Chief Fire Officer, Midleton Fire Station.</p>
<p>Disability Access Certificate</p> <p><i>(potentially required for converter station onshore element of the interconnector)</i></p>	<p>Cork County Council</p>	<p>Article 20D of the Building Control Regulations, 1997 to 2009</p>	<p>Overall Contact: Michael Lynch, Director of Services (Planning).</p> <p>Consent Contact: Paul Cunningham, Building Control Officer, Midleton Fire Station.</p>
<p>Waste Disposal Licence / Permit</p> <p><i>(potentially required for converter station onshore element of the interconnector)</i></p>	<p>Environmental Protection Agency</p>	<p>Waste Management Act 1996 (as amended)</p>	<p>Ciara Maxwell, Office of Environmental Sustainability, Environmental Protection Agency.</p>

Table 5 - Offshore Consents to be submitted by mid-2020 (required as part of statutory consenting process)

Consent Type & area of project potentially required for	Consenting Authority	Legislation under which consent is required / granted	Contact Details
<p>Foreshore Lease</p> <p><i>(required for the offshore elements of the interconnector)</i></p>	Minister for Housing, Planning and Local Government	<ul style="list-style-type: none"> • Foreshore Acts 1933 to 2011 • Foreshore and Dumping at Sea (Amendment) Act 2009 • Section 10 (2) of the Foreshore Act regulates privately owned Foreshore. • Habitats Directive 	Ms. Jeanine Dunne / Mr. Pat O'Neill, Marine Planning - Foreshore Section (MPFS), Department of Housing, Planning and Local Government.
<p>Dumping at Sea Permit</p> <p><i>(potentially required for the offshore elements of the interconnector)</i></p>	<p>Environmental Protection Agency (EPA)</p> <p>(The Foreshore and Dumping at Sea (Amendment) Act 2009 transferred certain functions relating to dumping at sea from Minister for Agriculture, Fisheries and Food to the EPA in 2010)</p>	Dumping at Sea Acts, 1996 to 2010 (implements OSPAR convention requirements for disposal of dredged material at sea)	Ciara Maxwell, Office of Environmental Sustainability, Environmental Protection Agency.
<p>Ministerial Consent for works under the Continental Shelf Act</p> <p><i>(potentially required for the offshore elements of the interconnector)</i></p>	Minister for Communications, Climate Action and Environment	Section 5, Continental Shelf Act, 1968	Bill Morrissey, Principal Officer, Petroleum Affairs Division, Department of Communications, Climate Action and Environment.

Table 6 - Offshore Consents to be applied for post 2022 during project implementation (required post statutory consenting decisions)

Consent Type & area of project potentially required for	Consenting Authority	Legislation under which consent is required / granted	Contact Details
Excavation Licence (Archaeological) <i>(potentially required for the offshore elements of the interconnector)</i>	Minister for Culture, Heritage and the Gaeltacht (Licence issued by the Archaeological Licensing Unit of the National Monuments Service)	Section 26 of the National Monuments Act 1930 (as amended)	Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.
Dive Survey Licence <i>(potentially required for the offshore elements of the interconnector)</i>	Minister for Culture, Heritage and the Gaeltacht (licence issued by the Archaeological Licensing Unit of the National Monuments Service)	Section 3(5) of the National Monuments Act 1987	Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.
Ministerial Consent for works at / near a National Monument <i>(potentially required for the offshore elements of the interconnector)</i>	Minister for Culture, Heritage and the Gaeltacht	Section 14 of the National Monuments Act 1930 (as amended)	Joanne Lyons, Development Applications Unit, Department of Culture, Heritage and the Gaeltacht.

Project Description

The proposed Celtic Interconnector, which will enable the movement of electricity between France and Ireland, will support Europe's transition to the Energy Union by applying downward pressure on the cost of electricity to consumers in Ireland and France, by strengthening energy security between the two countries and by facilitating the growth of renewables and the transition to a low carbon energy future.

The Celtic Interconnector is well aligned to support the achievement of Europe's energy ambitions:

- It will enable the movement of electricity across Ireland, France and continental Europe, increasing competition in the electricity market and applying downward pressure on cost to the benefit of consumers;
- It will enhance the security of supply for both Irish and French electricity consumers;
- It will support Europe's transition to a low carbon energy future by increasing the market available for renewable electricity and supporting the development of the renewable energy sector;
- It will provide Ireland's only energy connection to an EU Member State once the United Kingdom leaves the EU; and
- It will help to improve telecommunications between Ireland and continental Europe by providing a direct fibre optic link between both countries.

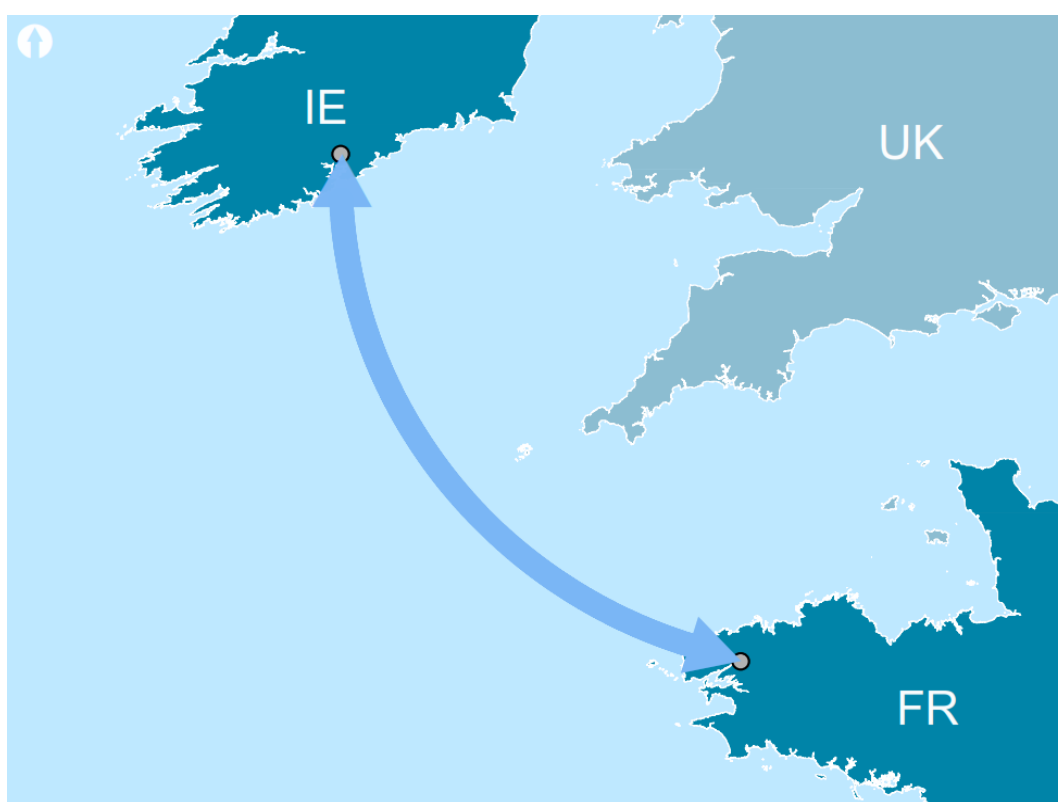


Figure 1 - Celtic Interconnector - proposed electricity interconnector between Ireland and France

Project Elements

The Celtic Interconnector project involves the construction of an electrical circuit between Ireland and France using High Voltage Direct Current (DC) technology, the global standard for the transfer of electricity over long distances using underground technology. The interconnector would have a capacity of 700 MW (equivalent to the power used by 450,000 homes) and measure approximately 575 km in length. The longest spatial element of the Celtic Interconnector would be the submarine circuit which would measure approximately 500 km out of the total 575 km. The interconnector would form a link between the south coast of Ireland and the coast of Brittany in North West France (Nord-Finistère).



Figure 2 - Celtic Interconnector Project Elements

The main elements of the interconnector are illustrated in Figure 2 above and consist of:

- A submarine circuit, approximately 500km in length placed on or beneath the seabed between France and Ireland. The submarine circuit will pass through the territorial waters of Ireland and France and through the Exclusive Economic Zones (EEZs) of Ireland, the United Kingdom (UK) and France.

In addition to the submarine circuit the infrastructure in both Ireland and France will include:

- A landfall point where the submarine circuit comes onshore;
- A High Voltage Direct Current (HVDC) land circuit between the landfall point and a converter station. This circuit is proposed using underground technology and consists of a pair of cables. There are currently two types of HVDC cable available, either Cross Linked Poly-Ethylene insulation (XLPE) or Mass Impregnated Non-Draining (MIND) insulation technology. Typically these cables are each 150mm in diameter and will operate at an expected voltage of 320kV;
- A converter station, to convert the electricity from HVDC to High Voltage Alternating Current (HVAC), which is used on the respective transmission grids in each country. The converter stations will use Voltage Source Conversion (VSC) technology and will operate at an expected voltage of 320kV and typically include a range of technical equipment some of which must be located indoors in a series of large buildings, potentially up to 25m in height. A typical converter station also includes:

- Control Room;
- Converter Power Electronics and associated DC equipment;
- Alternating Switchgear;
- Transformers and other associated AC equipment;
- Ancillary equipment and spares building.
- A relatively short HVAC land circuit between the converter station and the connection point to the grid. This circuit is proposed using underground technology; and
- A connection point to an existing substation on the transmission grid.

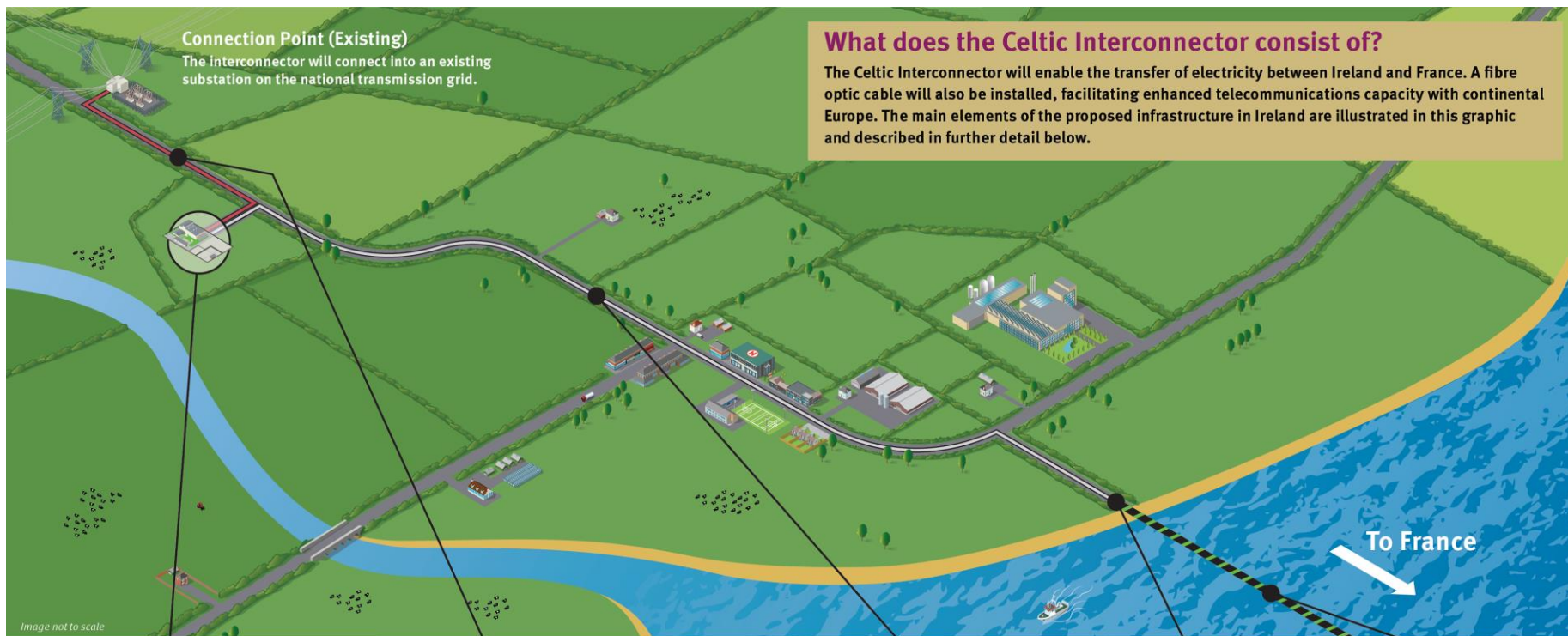
A fibre optic cable would also be laid along the entire route for operational control, communication and telemetry purposes. There would be additional capacity available on the fibre optic cable which could be made available to the market. This model was previously established with the East West Interconnector.

At present there is no direct telecommunications connectivity between Ireland and France, all existing traffic between Ireland, France and the rest of mainland Europe must first pass through the UK land bridge.

A direct telecommunications connection between Ireland and France would provide improved latency performance between the island of Ireland and continental Europe. As well as improved latency, a direct fibre connection between Ireland and France would yield additional strategic benefits for Ireland, including:

- Increased resilience and security of supply;
- Single point of failure reduction;
- Cost reductions for local businesses;
- Increased competitiveness of the region;
- Providing a marketing tool;
- Potential to attract new competition.

EirGrid has produced a detailed infographic, as shown in Figure 3 overleaf, to illustrate in further detail the various elements of the interconnector and how they would be installed.

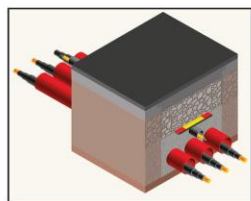


Converter Station



The interconnector will use High Voltage Direct Current (DC) technology, the global standard for the transfer of electricity over long distances using subsea cables. The electricity systems in Ireland and France both use Alternating Current (AC) technology, so converter stations are required at either end. The converter station is an industrial type building and outdoor compound with typical dimensions of 300 m x 150 m and a height of up to 25 m.

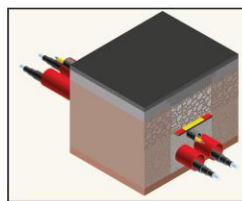
AC Land Circuit



The circuit between the connection point and the converter station can be an underground cable, if they are located within a number of kilometres of each other. Otherwise, the circuit will be an overhead line. As an underground cable, the circuit would be installed in ducts under the road network, which would be fully re-instated.

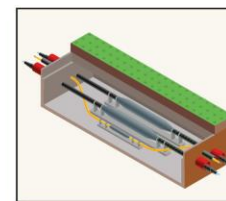


DC Land Circuit



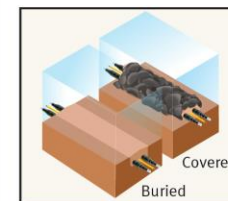
The circuit between the converter station and the landfall point will be by underground cable installed in ducts under the road network, which will be fully re-instated. The total length of this circuit is expected to be between 30 – 40 km.

Landfall Point



This is where the land circuit will connect to the submarine circuit by way of an underground transition joint. This will be installed behind the beach where the submarine circuit comes ashore. The landfall point will be fully re-instated following completion of the works.

Submarine Circuit



The submarine circuit between Ireland and France will be approximately 500 km. It will be either buried beneath the seabed or laid on the seabed and covered for protection.

Figure 3 - What does the Celtic Interconnector consist of?

Consultation and Engagement

As a Project of Common Interest (PCI) the Celtic Interconnector is a key cross border infrastructure project that links the energy systems of EU countries. Its benefits include the furthering of European energy policy in regard to achieving the community's climate objectives. In turn this achievement will provide affordable, secure and sustainable energy, and the long-term decarbonisation of the economy to the benefit of all citizens.

To integrate and involve citizens in the PCI process the project requirements include a distinct obligation for considerable public stakeholder participation via communication, engagement and consultation. At EirGrid we are committed to stakeholder engagement and consultation and operate a bespoke *Framework for Grid Development* approach to all projects as outlined in the *Have your Say document*². This step by step approach to planning the grid facilitates engagement and consultation with our stakeholders and the public which helps us to explore options fully and make more informed decisions.

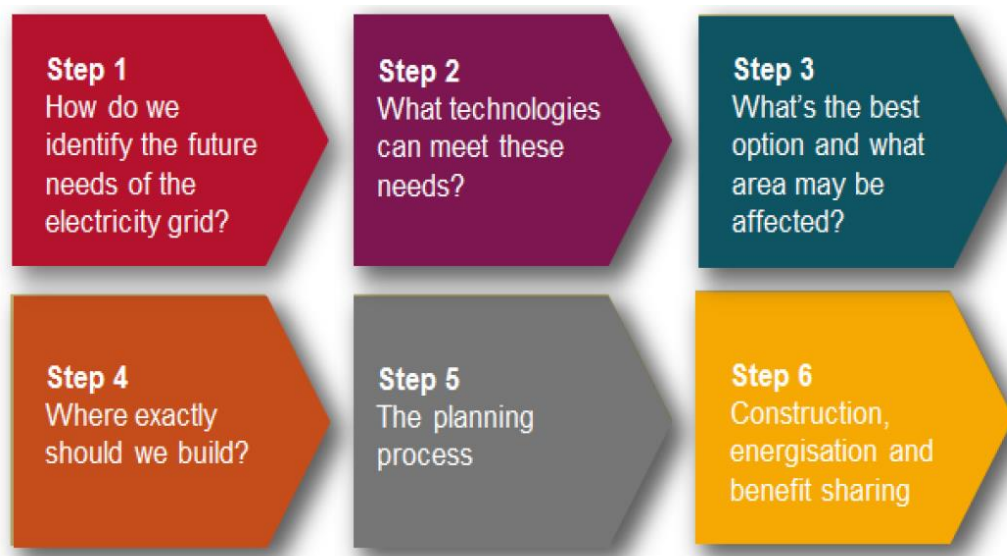


Figure 4 - EirGrid Framework for Grid Development Steps

Step 1 of the process was completed as part of the preliminary feasibility studies carried out on the project which resulted in establishing the benefits of the project and promoting further studies. EirGrid's new Framework for Grid Development was launched in 2016 and at that stage the Celtic Interconnector was aligned to Step 2.

To date we have completed Step 2 consultation and engagement which has included:

- Publication of a Project Information page on the EirGrid website;
- Publication of a detailed Project Update Brochure for Step 2³ (2017);

² http://www.eirgridgroup.com/_uuid/7d658280-91a2-4dbb-b438-ef005a857761/EirGrid-Have-Your-Say_May-2017.pdf

³ <http://www.eirgridgroup.com/site-files/library/EirGrid/Celtic-Interconnector-Project-Update-Brochure.pdf>

- Engagement in stakeholder outreach with elected representatives, municipal districts, local businesses, industry reps, community and environmental groups, fisheries groups;
- Specific public consultation on the 2017 marine survey foreshore licence.

Step 3 consultation and engagement is ongoing and includes:

- Publication of a detailed Project Update Brochure for Step 3⁴ (2018);
- Community Information Sessions in project landfall point communities and communities potentially impacted by the onshore elements of the project;
- Engagement in stakeholder outreach with elected representatives, municipal districts, local businesses, industry reps, community and environmental groups, fisheries groups;
- Specific public consultation on the 2018 marine survey foreshore licence;
- Planned ongoing consultation with stakeholders in line with project development.

EirGrid is committed to meeting all interested parties on the project and will endeavour to maximise all opportunities available for persons and organisations to engage with the project. In 2018 a dedicated, locally based, Community Liaison Officer was appointed to the Celtic Interconnector project. Based in Cork the officer is tasked with ensuring the highest levels of community engagement are met in line with EirGrid and PCI requirements.

Further to EirGrid's commitment to stakeholder consultation and engagement the PCI designation under the TEN-E Regulation brings a number of distinct requirements which will also be met. These include:

- Production of a PCI brochure informing citizens of both partner countries as to the project specifics and benefits;
- Publication and curation of a joint project website;
- A dedicated PCI public consultation event.

Ongoing close cooperation with our project partners is a critical part of the project development process, thereby ensuring clear and correct information on the project is available to all European citizens and that all obligations with regard to public consultation and engagement are being met.

For each specific consultation held on the project materials are prepared in order to enhance and support the consultation process with a view to securing effective engagement and enabling it to influence the location and form of the development. This collateral is delivered through various project specific means including public advertisements, information brochures, project specific web-site, consultation events and community outreach meetings.

⁴ <http://www.eirgridgroup.com/site-files/library/EirGrid/Celtic-Interconnector-Project-Update-Brochure-2018.pdf>

Project Development

The Celtic Interconnector project has been in development since 2011 and is now at a mature stage. EirGrid and RTE studied the high level benefits, technology and costs of the project during the Preliminary Feasibility Phase. After this phase was completed in 2014, EirGrid and RTE agreed to proceed to the Feasibility Phase of the project. A detailed suite of activities were carried out to confirm the project's feasibility including:

- Desktop study of marine route options;
- Marine survey along best performing route between Ireland and France;
- Onshore studies of connection options and associated grid assessment;
- Economic and financial analysis; and
- Cost assessment based on findings of technical studies.

Following the completion of the Feasibility Phase in 2016, EirGrid and RTE were satisfied as to the feasibility of the project and agreed to proceed to the current phase of Initial Design and Pre-Consultation. This phase has focused on:

- Initial design of the project, including refinement of marine route options;
- Technical studies associated with the project's onshore development;
- Public consultation on the general location and configuration of the project;
- Pre-application consultation activities with various Consenting Authorities;
- Submission of an Investment Request⁵ to the National Regulatory Authorities; and
- Preparation of an application for CEF funding for remaining phases of the project.

The current phase of the project is now nearing its conclusion and preparation is underway for the commencement of the Detailed Design, EPC Procurement and Consenting Workstreams, which will be key components of the next phase. The submission of formal consenting applications in both jurisdictions is planned for the second half of 2020, with overall consent expected to be achieved before the end of 2021. The Construction Phase is expected to start in 2022 with practical completion in 2025 and the interconnector would be operational in early 2026. The overall joint EirGrid and RTE project roadmap is shown below in Figure 5.



Figure 5 - Celtic Interconnector Project Roadmap

⁵ <https://www.cru.ie/wp-content/uploads/2018/12/CRU18265a-Celtic-Investment-Request.pdf>

For the development of the project specifically in Ireland EirGrid is following its six-step Framework for Grid Development. The timeline for each of the steps is shown in further detail in Figure 6 below.



Figure 6 - Timeline of Framework for Grid Development Steps - Celtic Interconnector Project

Several studies have been undertaken as part of the initial steps of the project to confirm the availability of feasible offshore and onshore routes between Ireland and France for the installation of a HVDC interconnector. These studies, which are outlined in further detail in the following sections, were carried out following the initial identification of connection points in Ireland and France that had the potential to accommodate the import and export of 700MW between both countries.

Connection Point

Analysis of the capability of the Irish and French transmission systems to accommodate the expected power flows from the Celtic Interconnector found that both systems can reasonably accommodate the expected flows.

For the Irish side of the project, EirGrid undertook a study to identify feasible connection points on the Irish transmission grid which were capable of accommodating the export and import of 700 MW of power to and from France. The study identified:

- The Knockraha substation (East Cork), and
- The Great Island substation (West Wexford).

These points were selected based on their strong connectivity in the Irish transmission grid and their location along the south coast of Ireland, as shown in Figure 7 overleaf.

Further analysis of these two connection points showed that the Knockraha connection point could accommodate the additional power flows associated with the interconnector significantly better than the Great Island connection point⁶.

⁶ <http://www.eirgridgroup.com/site-files/library/EirGrid/Celtic-Interconnector-Feasibility-Phase-Network-Analysis.pdf>



Figure 7 - Connection points identified in Ireland

Landfall Point

Following the identification of feasible connection points EirGrid undertook studies to identify feasible landfall points in both East Cork and West Wexford where an interconnector could be brought ashore. The study⁷ identified five landfall points in each East Cork and West Wexford, as shown below in Figure 8 below, and which concluded that all ten locations were feasible with the landfalls in the East Cork study area performing better than those in the West Wexford study area.

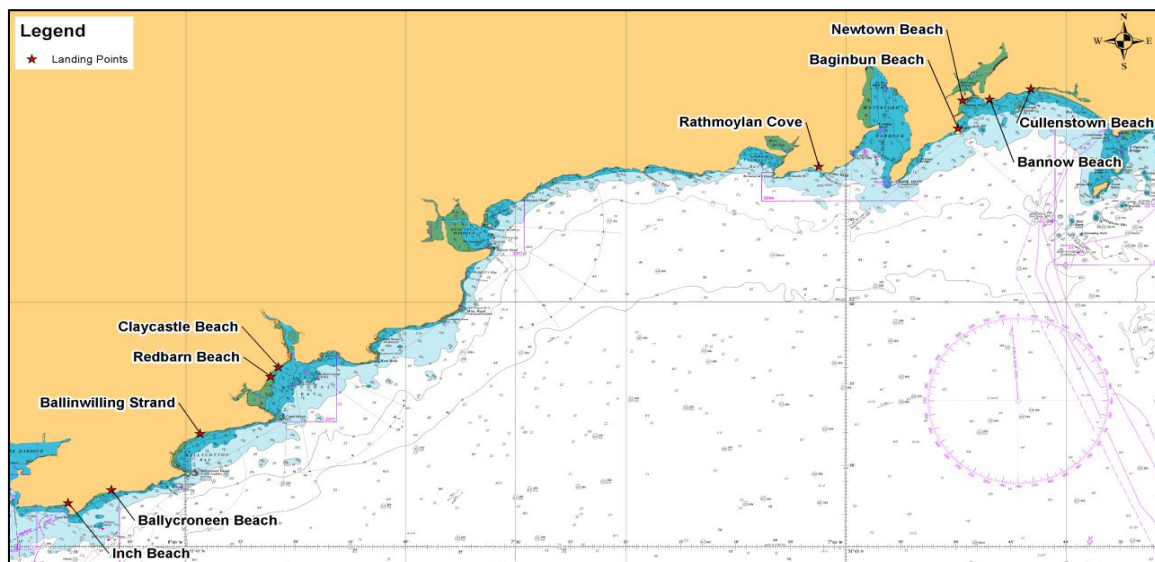


Figure 8 - Landfall points identified in East Cork and West Wexford

Marine Route

A desktop route investigation study⁸ was carried out to identify potential marine routes between the south coast of Ireland and the North West coast of France. The study considered factors including the shortest reasonable route and potential engineering and environmental constraints. Six feasible offshore marine route options were identified as shown in Figure 9 overleaf.

⁷ <http://www.eirgridgroup.com/site-files/library/EirGrid/Celtic-Interconnector-Land-Study-Report-2.pdf>

⁸ <http://www.eirgridgroup.com/site-files/library/EirGrid/Celtic-Interconnector-Marine-Route-Investigation.pdf>

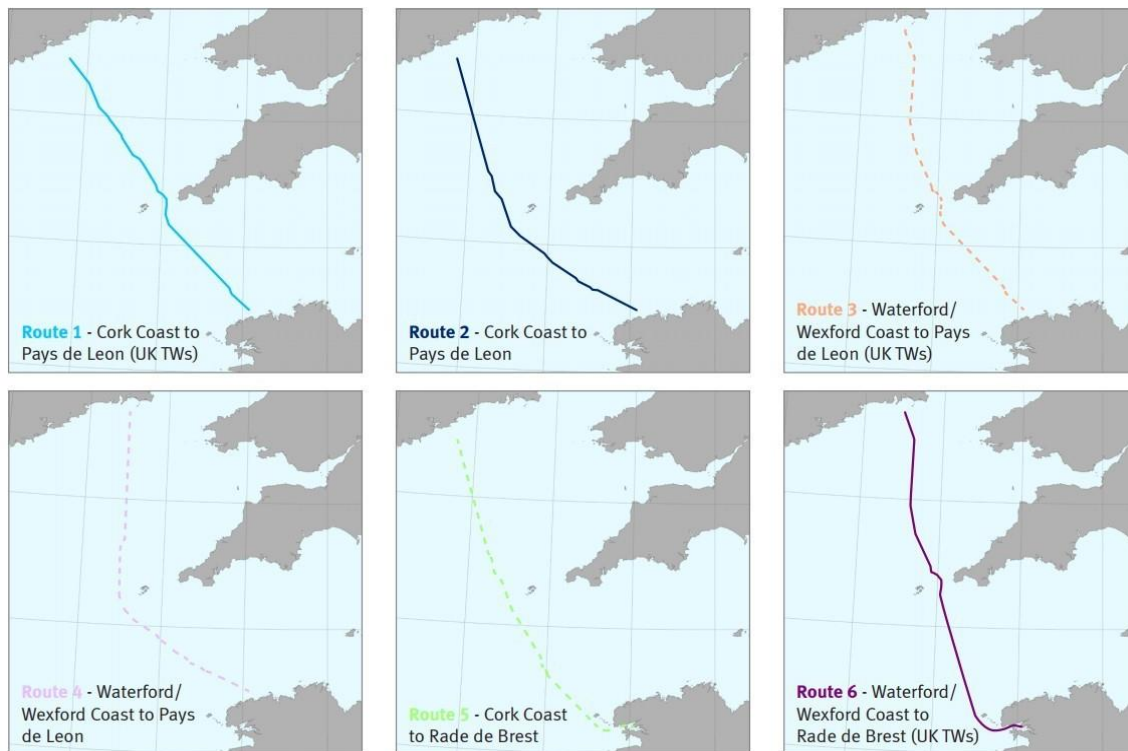


Figure 9 – Feasible offshore marine routes identified

Following a detailed constraints analysis a route alignment was selected which, although not the shortest route option, was considered the best performing route. Route 2 from East Cork, as shown in further detail in Figure 10 overleaf, avoids more technical and environmental constraints when compared to other routes and also avoids UK territorial waters, which would introduce unnecessary additional consenting to the project and enduring cost to the project.

A detailed marine survey of the best performing offshore route along with nearshore approach routes into two East Cork landfall points (Ballycroneen Beach and Ballinwilling Strand) was undertaken, in 2014 and 2015, in order to:

- Develop the offshore and nearshore routes,
- Assess seabed conditions and any technical constraints associated with cable laying, and
- Provide a robust basis for cost estimation.

The marine survey concluded that the offshore route was feasible with no major constraints identified and largely favourable water depths of between 100 and 110 metres pertain for the majority of the route. The marine survey identified challenging areas of geology on the nearshore approach routes in Ireland and therefore additional nearshore marine surveys were undertaken in 2017 and 2018 to investigate alternative approaches into Ballinwilling Strand and also to Redbarn and Claycastle Beaches.

The marine surveys were complemented by shipping, fishing and burial assessment studies to identify the density of maritime traffic along the cable route and determine the optimal burial depth for the cable beneath the seabed. These studies used the results of all of the previous marine studies along with evaluation of the risk using risk based quantification for the entire route.

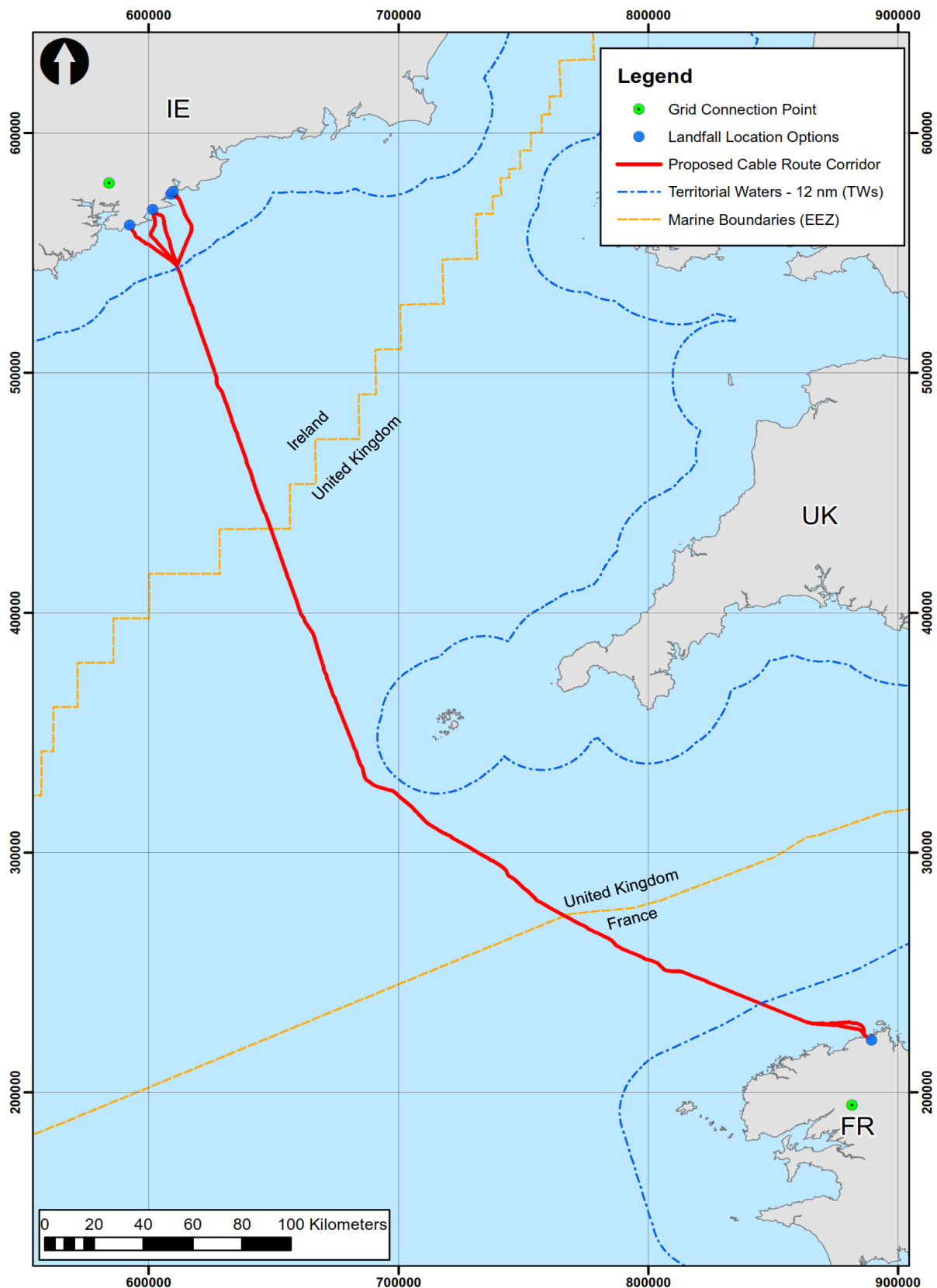


Figure 10 - Celtic Interconnector Marine Route Map

Figure 10 above gives an overview of the entire offshore route, and also shows the nearshore approach route options which are currently being considered into the Irish coast for each of the landfall points that have been identified.

Converter Station and Onshore Route

Onshore investigations considering technical, environmental and planning constraints have concluded that there are a number of feasible options for the onshore elements of the interconnector in France and Ireland. EirGrid is in the process of further developing and refining these options to identify the best performing option for each project element in Ireland with project stakeholders being consulted throughout the development process.

In Ireland, a high-level project scoping study⁹ including a high-level environmental appraisal of the converter station, onshore routing and landfall point options was carried out during the Feasibility Phase of the project.

The report concluded that there were a number of feasible AC and DC circuit routes for each of the project elements in both the East Cork and West Wexford study areas, and provided an outline design of a proposed converter station and the identification of feasible converter station location areas and associated constraints analysis.

The land circuit and the submarine circuit will connect at an underground transition joint. This will be installed behind the beach where the submarine circuit comes ashore. The landfall point will be fully re-instated following completion of the works. The circuit between the converter station and the landfall point will be by underground cable installed in ducts typically under the road network, which will be fully re-instated. The total length of this circuit is expected to be between 30 – 40 km.

Project Development Summary

During Step 2 of the project EirGrid published detailed reports carried out on the project during the Feasibility Phase and the main findings as follows:

- Connection Point – *best performing location in East Cork*
- Marine Route – *best performing route from East Cork*
- Landfall Point – *East Cork performed better than West Wexford*

Following a consultation with stakeholders during the second half of 2017, the Knockraha substation in East Cork was confirmed as the preferred connection point in Ireland for the Celtic Interconnector along with a short list of five landfall points in East Cork. EirGrid announced this in February 2018 at the launch of Step 3 of the project. Therefore, the Celtic Interconnector will connect into the Irish transmission system at the existing Knockraha substation in East Cork and into the French transmission system at the existing La Martyre substation in Brittany.

During Step 3 the locations of the various project elements, as shown in Figure 11 overleaf, are being further developed with the aim of refining the options and providing an optimal solution that considers social, environmental, technical and economic factors.

⁹ <http://www.eirgridgroup.com/site-files/library/EirGrid/PE424-F0000-R000-038-001.pdf>



Figure 11 - Onshore element project options in Ireland

As of December 2018, EirGrid is nearing completion of a detailed constraints assessment of the study area for the converter station locations taking account of a wide range of constraints. This follows a period of consultation and engagement events with project stakeholders on the range of options.

Once the constraints assessments have been completed EirGrid will carry out a shortlisting process, by way of an enhanced performance matrix, in order to determine the most feasible converter station location options to bring forward to the next step of the project's development.

With regard to the current shortlist of landfall point options, EirGrid is currently completing its analysis of the marine survey data from the suite of marine surveys undertaken and associated onshore constraints assessment and is in the process of shortlisting the options for the landfall point and associated nearshore approach route, by way of an enhanced performance matrix.

In early 2019, EirGrid plans to confirm the preferred options and carry out public consultation. Feedback received from stakeholders in response to the consultation will inform the decision to confirm a final short list of both landfall points and converter station location zones before commencing Step 4.

In Step 4, which will be carried out during 2019, the short listed options will be studied in further detail in order to determine the preferred solution for where each element of the interconnector should be located. Following this the project will enter Step 5 in 2020 which involves making formal applications for each of the required project consents as part of the planning process, which is expected to be completed by the end of 2021.

Social and Environmental Impact

For the onshore aspects of the project, high level social and environmental impact assessment baseline reports have been prepared examining issues like:

- The geographical setting,
- Environmental constraints, and
- Communities and amenities of the project study area.

Feasible options for each of the elements of the proposed project have been identified and given that the majority of the onshore circuit route would be installed underground and would follow the existing road network it can be reasonably concluded that the social impact would be minimal and restricted to the Construction Phase of the project. While further detailed social and environmental impact assessments are required and planned to be carried out during Step 4 in 2019, in advance of the formal consenting process in Ireland and France, assessments carried out at this stage do not foresee any major impacts from the proposed project.

For the offshore aspects of the project, a detailed benthic (environmental) investigation has been carried out as an integral part of the marine surveys. A large variance of habitats was encountered along the project's offshore route. However, no evidence of any particularly sensitive habitats was identified. The investigations that were carried out and the samples recovered provided an excellent quality basis for the offshore environmental impact assessment which will be carried out in parallel with the onshore assessment. Engagement with fisheries interests in both Ireland and France has been a feature of this stage and this will continue throughout the project to ensure minimal impact on these and other marine users.

The elements of the project within France are subject to a mandatory requirement for Environmental Impact Assessment (EIA) according to the '*Code de l'environnement*' as follows:

- '*Construction of a substation or extension of a substation (if the surface of the substation is increased)*'. The construction of a new converter station and the extension to the substation at La Martyre therefore both require EIA.
- '*Construction of an underground cable longer than 15km and a voltage higher than 225 kV*'. As the French onshore HVDC cable route is greater than 15km long and the subsea cable route is greater than 15km in French waters, both the land and subsea cables also require EIA.

Recognising the requirements for EIA in France, as noted above, and in the interests of consistency across the project EirGrid intends to submit a voluntary Environmental Impact Assessment Report (EIAR). This would involve submission of an EIAR to An Bord Pleanála covering the onshore elements under the Planning and Development (Strategic Infrastructure) Act 2006 and to the Department of Housing, Planning and Local Government covering the marine elements under the Foreshore Act 1933 (as amended).

Environmental Designations

Within the wider study area for the converter station, landfall points and circuit routes in Ireland there are a range of designated environmental sites which are protected by national and European legislation. These sites are described in Table 7 Environmental Designations Onshore and Table 8 Environmental Designations Offshore. It should be noted that some sites are both onshore and offshore and have been included in both tables for completeness.

Table 7 - Environmental Designations Onshore

Type	Name	Reason for Designation
Special Area of Conservation and proposed National Heritage Area	Great Island Channel	Annex I habitats that are a primary reason for selection of this site: Estuaries Mudflats and sandflats not covered by seawater at low tide Perennial vegetation of stony banks Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritima) Otter (Lutra lutra) Mediterranean salt meadows (Juncetalia maritimi) Killarney fern (Trichomanes speciosum) Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation Old sessile oak woods with Ilex and Blechnum in Islands of the North Atlantic Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Taxus baccata woods of the Islands of the North Atlantic Annex II species that are a primary reason for selection of this site: Freshwater pearl mussel (Margaritifera margaritifera), White-clawed crayfish (Austropotamobius pallipes), Sea lamprey (Petromyzon marinus), Brook lamprey (Lampetra planeri), River lamprey (Lampetra fluviatilis), Allis shad (Alosa alosa), Twaite shad (Alosa fallax fallax), Salmon (Salmo salar)
Special Protection Area	Cork Harbour	Cork Harbour is a large, sheltered bay system, which stretches from the two main estuaries of the River Lee, near Cork City in the northwest, and the Owenacurra River, near Midleton, in the northeast, southwards as far as Roches Point. It is a complex site and encompasses many other estuaries and inlets Owing to the sheltered conditions, the intertidal flats are often muddy in character but described principally as 'mixed sediment to sandy mud with polychaetes and oligochaetes' (NPWS, 2014a). These muds support a range of macro-invertebrates, notably Macoma balthica, Scrobicularia plana, Pterinea (Hydrobia) ulvae, Nephtys hombergi, Nereis diversicolor and Corophium volutator. Green algae are a common occurrence on the mudflats while Common Cordgrass (Spartina spp.) has colonised the intertidal flats in places, and is particularly prevalent at Rossleague and Belvelly in the North Channel. Salt marshes are scattered through the site and these provide high tide roosts for waterbirds. Cork Harbour is an internationally important wetland site, regularly supporting in excess of 20,000 wintering waterfowl, for which it is amongst the top ten sites in the country. Of particular note is that the site supports internationally important populations of Black-tailed Godwit and Redshank, while a further 20 non-breeding waterbird species occur in numbers of national importance. The Annex I species Common Tern has a breeding population at the site.
Geological Heritage Site	Baneshane Quarry	The bedrock is limestone with karst features. A spring and a cave are located within the townland of Water Rock. According to the Geological Survey of Ireland data, the spring is 'apparently fed by castle rock stream sink,' and the cave has three openings in the north face of the limestone crag. The most easterly cave has a stream permanently flowing into it. Water enters the other two caves at times of high flow. Fluvial cobbles and pebbles are found on the cave floor.
Proposed National Heritage Area	Leamlara Woods	Woodland
Special Area of Conservation	Blackwater River	Annex I habitats that are a primary reason for selection of this site: Estuaries Mudflats and sandflats not covered by seawater at low tide Perennial vegetation of stony banks Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritima) Otter (Lutra lutra) Mediterranean salt meadows (Juncetalia maritimi) Killarney fern (Trichomanes speciosum) Water courses of plain to montane levels with the Ranunculus fluitantis and Callitriche-Batrachion vegetation Old sessile oak woods with Ilex and Blechnum in Islands of the North Atlantic Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Taxus baccata woods of the Islands of the North Atlantic Annex II species that are a

Type	Name	Reason for Designation
		primary reason for selection of this site: Freshwater pearl mussel (<i>Margaritifera margaritifera</i>), White-clawed crayfish (<i>Austropotamobius pallipes</i>), Sea lamprey (<i>Petromyzon marinus</i>), Brook lamprey (<i>Lampetra planeri</i>), River lamprey (<i>Lampetra fluviatilis</i>), Allis shad (<i>Alosa alosa</i>), Twaite shad (<i>Alosa fallax fallax</i>), Salmon (<i>Salmo salar</i>)
Special Area of Conservation	Ballymacoda (Clonpriest and Phillmore)	This coastal site stretches north-east from Ballymacoda to within about 6 km of Youghal, Co. Cork. Though moderate in size, it has a good diversity of coastal habitats, including several listed on Annex I of the E.U. Habitats Directive. The site is a Special Area of Conservation (SAC) selected for the following habitats and/or species listed on Annex I / II of the E.U. Habitats Directive-Estuaries, Tidal Mudflats and Sandflats, Salicornia Mud Atlantic Salt Meadows, Mediterranean salt meadows (<i>Juncetalia maritima</i>).
Special Protection Area and RAMSAR site	Ballycotton Bay	Supporting European important populations of Annex II listed species: Bar-tailed Godwit (<i>Limosa lapponica</i>) Golden Plover (<i>Pluvialis apricaria</i>) Supporting nationally important wintering populations of 9 bird species: Teal (<i>Anas crecca</i>), Ringed Plover (<i>Charadrius hiaticula</i>), Golden Plover (<i>Pluvialis apricaria</i>), Grey Plover (<i>Pluvialis squatarola</i>), Lapwing (<i>Vanellus vanellus</i>), Black-tailed Godwit (<i>Limosa limosa</i>), Bar-tailed Godwit (<i>Limosa lapponica</i>), Curlew (<i>Numenius arquata</i>), Turnstone (<i>Arenaria interpres</i>), Common Gull (<i>Larus canus</i>) and Lesser Black-backed Gull (<i>Larus fuscus</i>). Internationally important wetland
Proposed National Heritage Area	Ballycotton, Ballynamona and Shanagarry	<p>This is a composite coastal site stretching northwards from Ballycotton towards Garryvoe. The site is important for its wetlands, which have, however, been damaged by drainage, land reclamation and a breach in the shingle bar in recent years. Wetlands on the site include reedswamp with Common Reed (<i>Phragmites australis</i>) and marshes near Garryvoe with Greater Pond-sedge (<i>Carex riparia</i>), Water Dock (<i>Rumex hydrolapathum</i>) and Pink Water-speedwell (<i>Veronica catenata</i>), amongst others. The shingle beach on the site is mobile and is influenced by storms, which create open conditions that favour a particular suite of species. Species found here include Grass-leaved Orache (<i>Atriplex littoralis</i>), Black Mustard (<i>Brassica nigra</i>), Sea Radish (<i>Raphanus raphanistrum</i> subsp. <i>maritimum</i>), Sand Couch (<i>Elymus farctus</i>) and Lyme-grass (<i>Leymus arenarius</i>). Also growing on the shingle beach is Sea-kale (<i>Crambe maritima</i>), a rare species listed in the Red Data Book.</p> <p>The site is also of ornithological importance. It contains nationally important numbers of waterfowl, including. Bewick's Swan, Gadwall, Shoveler, Coot, Ringed Plover, Grey Plover, Sanderling and Turnstone. The site is also notable for its use by rare migrant species. Reed Warblers, rare in Ireland, breed in the Common Reed beds.</p>
Proposed National Heritage Area	Capel Island and Knockadoon Head	The site is of importance for its migrant birds which has included a number of rare migrants, including Pied Wheatear and Sardinian Warble. Scarce migrants have included Hoopoe, Lapland Bunting, Yellow-browed Warbler, Pied Flycatcher, Black Redstart (the latter occasionally in large numbers). The island hosts Chough, Peregrine and a colony of Cormorants
Proposed National Heritage Area	Ballyvergan Marsh	The marsh is of particular importance as it is the largest freshwater coastal marsh in County Cork, and accommodates important plant and bird species.

Table 8 - Environmental Designations Offshore

Type	Name	Reason for Designation
Special Area of Conservation	Blackwater River	Annex I habitats that are a primary reason for selection of this site: Estuaries Mudflats and sandflats not covered by seawater at low tide Perennial vegetation of stony banks Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae) Otter (Lutra lutra) Mediterranean salt meadows (Juncetalia maritimi) Killarney fern (Trichomanes speciosum) Water courses of plain to montane levels with the Ranunculus fluitans and Callitriche-Batrachion vegetation Old sessile oak woods with Ilex and Blechnum in Islands of the North Atlantic Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae) Taxus baccata woods of the Islands of the North Atlantic Annex II species that are a primary reason for selection of this site: Freshwater pearl mussel (Margaritifera margaritifera), White-clawed crayfish (Austropotamobius pallipes), Sea lamprey (Petromyzon marinus), Brook lamprey (Lampetra planeri), River lamprey (Lampetra fluviatilis), Allis shad (Alosa alosa), Twaite shad (Alosa fallax fallax), Salmon (Salmo salar)
Special Protection Area and RAMSAR site	Blackwater Estuary	Supporting important winter populations of Annex II listed species: Black-tailed Godwit (Limosa limosa) Curlew (Numenius arquata) Supporting nationally important wintering populations of 6 bird species: Wigeon (Anas penelope), Golden Plover (Pluvialis apricaria), Lapwing (Vanellus vanellus), Dunlin (Calidris alpina), Bar-tailed Godwit (Limosa lapponica), Redshank (Tringa totanus) Internationally important wetland of conservation importance for overwintering bird species.
Proposed National Heritage Area	Blackwater River and Estuary	Riparian vegetation, marshes and reedbeds and dry woodlands and nationally important wintering bird species
Special Protection Area and RAMSAR site	Ballymacoda Bay	Supporting important European populations of Annex II listed species: Black-tailed Godwit (Limosa limosa) Regularly supporting at least 20,000 waterfowl: Overwinter, the area regularly supports 22,000 individual waterfowl. Supporting nationally important wintering populations of 15 bird species Internationally important wetland
Special Protection Area and RAMSAR site	Ballycotton Bay	Supporting European important populations of Annex II listed species: Bar-tailed Godwit (Limosa lapponica) Golden Plover (Pluvialis apricaria) Supporting nationally important wintering populations of 9 bird species: Teal (Anas crecca), Ringed Plover (Charadrius hiaticula), Golden Plover (Pluvialis apricaria), Grey Plover (Pluvialis squatarola), Lapwing (Vanellus vanellus), Black-tailed Godwit (Limosa limosa), Bar-tailed Godwit (Limosa lapponica), Curlew (Numenius arquata), Turnstone (Arenaria interpres), Common Gull (Larus canus) and Lesser Black-backed Gull (Larus fuscus). Internationally important wetland
Special Area of Conservation and Proposed National Heritage Area	Ballymacoda (Clonpriest and Phillmore)	Estuaries Mudflats and sandflats not covered by seawater at low tide Salicornia and other annuals colonizing mud and sand Atlantic salt meadows (Glauco-Puccinellietalia maritimae)
Proposed National Heritage Area	Ballycotton, Ballynamona and Shanagarry	Coastal vegetation and bird species
Proposed National Heritage Area	Capel Island and Knockadoon Head	Coastal vegetated cliffs. Capel Island is important for nesting Cormorants, gulls, fulmar and black guillemot
Proposed National Heritage Area	Ballyvergan Marsh	Coastal sand & clay cliffs and fresh water marsh Supports a diversity of bird species including Annex I Species - Hen Harrier Important as a pre-migration stop-over point for various passerine species on their way to wintering grounds further south and as a breeding site for Reed Warbler.
Geological Heritage Area	Ballycroneen Bay Geological Heritage Area	Ballycroneen Bay designated for its widely occurring till deposited by the Irish Sea glacier.

Key Milestones and Implementation Plan

The Celtic Interconnector has already achieved and is aiming at a number of key milestones, progressing towards a Final Investment Decision (FID) in 2021 with a target to commence trial operations in 2026. Table 9 below outlines the key milestones achieved to date and those planned in future.

Table 9 - Key Project Milestones

Milestone	Status	Date	Comment
ENTSO-E TYNDP Listing	In place	2012	The Celtic Interconnector was recognised as an important project of pan European significance in ENTSO-E's 2012 Ten Year Network Development Plan (TYNDP) and has retained this listing during each 2 year review.
Project of Common Interest (PCI) Status	In place	2013	The Celtic Interconnector was included in the first Union List of PCIs under the TEN-E Regulation in 2013 and has remained on the list since.
e-Highway 2050 Status	In Place	2015	The Celtic Interconnector was designated as an Electrical Highway under the EU supported e-Highway 2050 project. This identifies the project as part of developments on the European grid needed to meet the EU's 2050 low carbon economy goals.
Project Feasibility Confirmed	Complete	2014 - 2016	The Feasibility Phase of the project was completed with approval from both Irish and French governments to proceed to next phase of the project.
Marine Surveys Completed	Complete	2014 - 2018	Extensive geophysical, geotechnical, unexploded ordnance and benthic surveys completed across entire offshore route and for a number of nearshore approach route options.
Submission of Investment Request	Complete	2018	EirGrid and RTE submitted a joint investment request to the National Regulatory Authorities under Article 12 of the TEN-E Regulation which included a detailed cost-benefit analysis of the project.
Submission of Grant Application	Expected	2019	EirGrid and RTE intend to submit an EU grant application to the Connecting Europe Facility to support the detailed design and construction of the project.
Submission of Consents Applications	Expected	2020	The submission of formal consenting applications in both jurisdictions is planned for the second half of 2020.
PCI Comprehensive Decision	Expected	2021	The PCI Comprehensive Decision is expected to be achieved before the end of 2021.
Final Investment Decision	Expected	2021	The Final Investment Decision on the project is expected to be made once all necessary milestones have been achieved.
Commence Trial Operations	Expected	2026	The Celtic Interconnector is expected to be under construction from 2022 – 2025 and to commence trial operations in 2026.

A high level indicative project timeline is provided in Figure 12 overleaf which includes the key consenting activities planned for the Celtic Interconnector project.

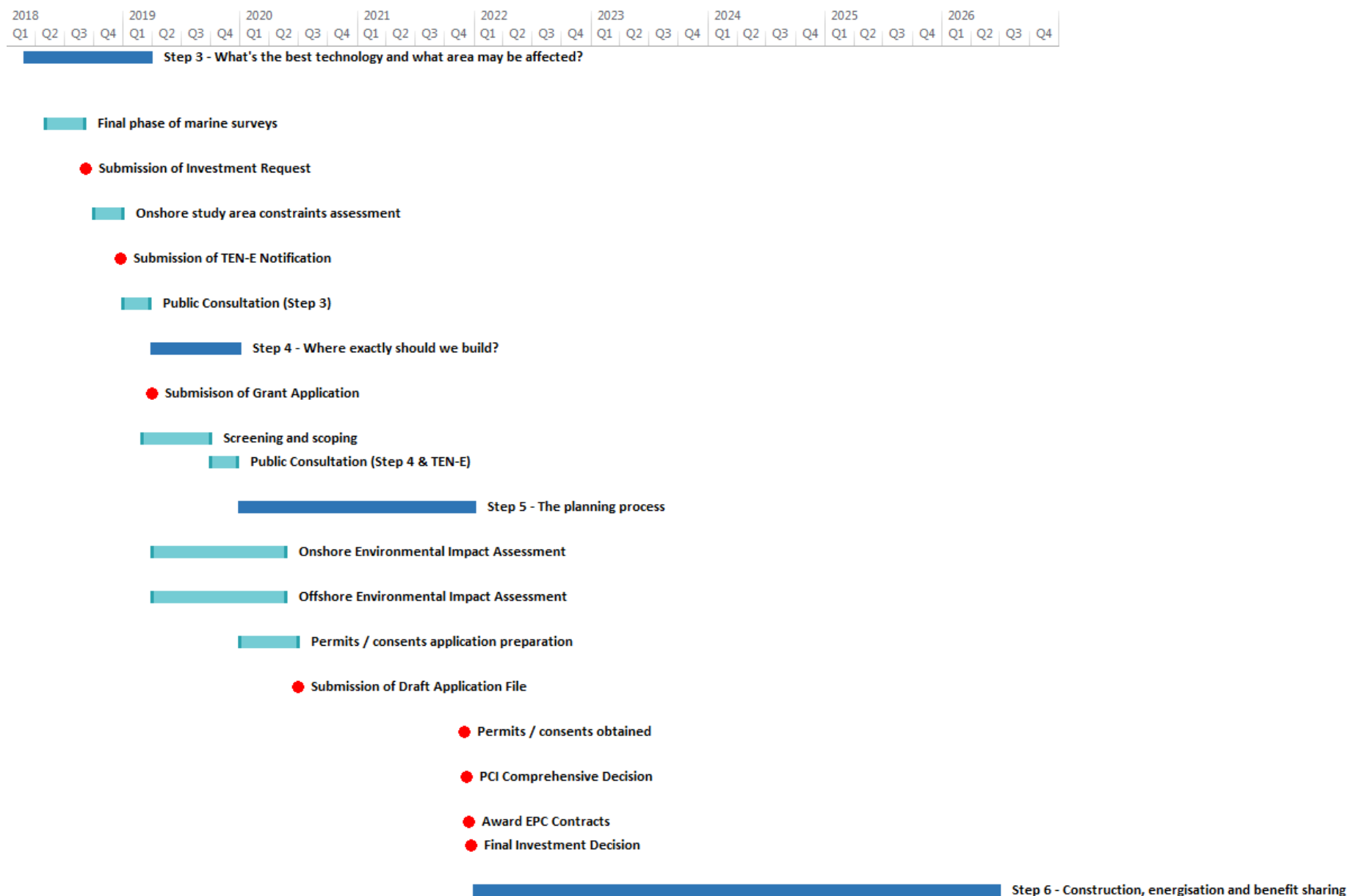


Figure 12 - Indicative project timeline