



Transmission Infrastructure for Future Generations

INFORMATION BROCHURE ISSUE 1 - NOVEMBER 2023

MARESCONNECT INTERCONNECTOR

The MaresConnect Interconnector (MaresConnect) is a proposed 750-megawatt (MW) subsea and underground electricity interconnector connecting the existing transmission networks in Ireland and Great Britain (GB).

MaresConnect will connect Eirgrid's transmission network, in the Greater Dublin Area (Ireland), and National Grid's Bodelwyddan substation, in Denbighshire (North Wales), allowing electricity to flow in both directions between Ireland and Wales.

MaresConnect will have key strategic importance, as it will provide significant additional interconnection capacity between Ireland, GB and onwards to continental Europe. The construction and development of MaresConnect will deliver:

Increased energy security

```
Downward pressure on wholesale energy prices
```

- Facilitated integration of low-carbon renewable energy sources in Ireland and GB
- Significant Inward investment

MaresConnect will consist of two converter stations. one located near an EirGrid substation within the Greater Dublin Area and one close to the National Grid's Bodelwyddan Substation in Denbighshire. The converter stations will be connected by two High-Voltage Direct Current (HVDC) cables under the Irish Sea. A converter station converts electricity from Alternating Current (AC), as used within national distribution and transmission networks, to Direct Current (DC), to be transmitted efficiently over long distances and vice versa.

DC electricity is typically used for the transmission of electricity over long distances because it has lower losses and negligible heating effects and is therefore suitable to be buried underground. Accordingly, there will be no overhead lines between the two converter stations. Onshore, the cables will be buried underground; offshore, the cables will be buried in the seabed or laid on the seabed with protection, if burial is not practicable.

Constructing and commissioning an interconnector requires the completion of a thorough programme of environmental and technical assessments to ensure that the final interconnector design fully considers the environment in which it is built.



THE DEVELOPER



MARESCONNECT LIMITED

MaresConnect is being developed by MaresConnect Limited (MCL), a special purpose vehicle incorporated in Ireland. MaresConnect is jointly owned by Foresight Energy Infrastructure Partners (FEIP) and Etchea Energy Nominees Limited (EENL).

FEIP was launched in 2020 by Foresight Group and is a fully discretionary investment fund with a broad mandate covering renewable energy generation assets, transmission and distribution assets and renewable energy assets.





SECURITY

Reinforce security of electricity supply

NET ZERO

Integration of green energy across the Irish Sea









Equivalent to power 570,000 homes*

*The number of homes is based on the annual average household consumption of 4,200kWh (CRU's decision paper published in March 2017 following its review of typical consumption figures (CER17042)) and an annual total of electricity transmitted via MaresConnect of approximately 2,400,000MWh

Foresight, the investment manager of FEIP, is a sustainability-focused infrastructure and private equity investment manager listed on the Main Market of the London Stock Exchange. Founded in 1984, the Foresight Group has a long-standing focus on environmental, social and governance (ESG) and sustainability-focused strategies.

EENL is owned by the management team provided by Etchea Energy. Based in London and Dublin, Etchea Energy is a leader in the development of projects in the energy sector.









Jobs in construction and operations







Private capital investment for Ireland and Wales

CONSENTS

MaresConnect will consist of one converter station, underground HVDC cables and a landfall location in both Ireland and Wales. Consents required to construct MaresConnect are expected to include:

	WALES	IRELAND
STATION	 Planning permission Town and Country Planning (Major Development - Outline) Permitting Authority: Denbighshire County Council 	 Planning permission Strategic Infrastructure Development (SID) Permitting Authority: An Bord Pleanála (ABP) Authorisation to construct Permitting Authority: Commission for the Regulation of Utilities (CRU)
CABLE ROUTE	 Planning permission Town and Country Planning (Major Development - Detailed) Permitting Authority: Denbighshire County Council and Conwy County Borough Council 	 Planning permission SID - Permitting Authority ABP Consent to lay electricity lines across lands Permitting Authority: CRU Consent to lay electricity lines under the public road - Permitting Authority: CRU
	Planning permission • Marine Licence - Permitting Authority: Natural Resources Wales (NRW)	 Planning Permission SID - Permitting Authority: ABP Marine Area Consent (MAC) Permitting Authority: The Maritime Area Regulatory Authority (MARA)

STATUS OF THE PROJECT

The project is currently in the development phase. Throughout this phase, we will be consulting with all key stakeholders, including the public, to ensure that they can input into the development process.



AN IMPORTANT INFRASTRUCTURE PROJECT

Further interconnection is supported by Irish, UK and European Energy Policies

In Ireland:

The Irish Government highlighted the importance and need for an interconnector of the same specification as MaresConnect in their Interconnector Policy published on 26 July 2023.

Commitment to supporting a further interconnector between Ireland and GB by

2030: "We will support a further connection to Great Britain by 2030 beyond the completion of the Greenlink Interconnector in 2024. This will require comprehensive engagement between the Department of the Environment, Climate and Communications (DECC), the CRU, and EirGrid with the proposed projects that have the most realistic prospects of delivery by 2030 as soon as possible." External consultant (DNV) conducted a study to support the policy and concluded further interconnection by 2030 is beneficial: "Additional interconnection in 2030 beyond existing projects, or projects that are already at an advance stage of development, has significant economic benefits for the Single Electricity Market and supports the achievement of Ireland's 2030 energy objectives and de-risks offshore wind development."

In the UK:

The UK Government has legislated to achieve Net Zero emissions by 2050, with ambitious targets for renewable and low-carbon technologies. The UK Government is targeting at least 18GW of interconnector capacity by 2030, a three-fold increase on 2020 capacity. This objective has subsequently been progressed through Ofgem's Interconnector Policy Review, which paved the way for the third window for Cap & Floor interconnector projects. Modelling commissioned by Ofgem in support of this review identified that an additional 5.3GW of interconnection capacity with GB by 2030 could be economically justified. This included 2.8GW of additional capacity with Northwest Europe and 2.5GW with Integrated Single Electricity Market.

Recognising the importance of the MaresConnect Interconnector, Ofgem granted it an Interconnector Licence in July 2022.

In Europe:

Launched by the European Commission in February 2015, the "Energy Union" represents a shift towards innovative methodologies in energy production, transportation, and consumption. It also signifies a fresh perspective on the design and execution of energy policies. Central to the Energy Union's success is enhancing the physical interconnection of electricity across EU member states and their neighbouring countries. An interconnected European energy grid is not just important for strengthening Europe's energy resilience and security, but is also pivotal in fostering market competition, potentially leading to more favourable pricing. Furthermore, such a grid is instrumental in realising the EU's decarbonisation and climate goals to become climate neutral by 2050. An interconnected electricity transmission grid is the cornerstone to completing the EU's internal energy market.

ENTSO-E's Ten-Year Network Development Plan (TYNDP) serves as the comprehensive plan for infrastructure development in Europe. It connects, facilitates and complements national grid development plans, providing a holistic view of the future power system. It details how power links and storage could contribute to a costeffective and secure energy transition. The TYNDP is essential to the timely and effective development of transmission infrastructure to deliver long-term European policy and aspirations. MaresConnect is included in the TYNDP 2022 as Project #349. Further information can be found in MaresConnect's project sheet at https:// tyndp2022-project- platform. azurewebsites. net/projectsheets/ transmission/349.

TRANSMISSION NETWORKS



Great Britain:

National Grid is the Electricity System Operator for GB and operates the electricity transmission network in Wales and England, including the 400kV network and substation at Bodelwyddan. In its role as System Operator, National Grid publishes plans and assessments for the economic and efficient development of the GB electricity transmission networks.

In Future Energy Scenarios (FES), National Grid considers different potential future impacts on the electricity system. In the 2023 FES, the amount of interconnection capacity could reach 17.5GW by 2030 compared to 8.4GW today.

In the Network Options Assessment (NOA), National Grid carries out economic analyses to determine which transmission investments are efficient and to identify how much interconnection

capacity would provide benefit to consumers and other interested parties. The NOA highlights the potential benefits of efficient levels of interconnection capacity between GB and other markets. The 2021/22 NOA Refresh recommends additional interconnection from GB to Ireland, beyond the 2.3GW capacity provided by Greenlink and the existing interconnectors (East West Interconnector (EWIC)

and Moyle).

In GB, MaresConnect has a connection agreement with National Grid for a 750MW interconnector connection at the Bodelyddan 400kV substation, and Ofgem has granted MaresConnect an interconnector licence. MaresConnect is seeking Cap & Floor regulatory support from Ofgem. Ofgem is currently assessing the benefits of MaresConnect as part of its Third Cap and Floor Window, with a decision expected in early 2024.

Ireland:

EirGrid is the Electricity System Operator for Ireland. In July 2023, the Department for the Environment, Climate and Communications (DECC) published its National Policy on electricity interconnection and ratified support of a further connection between Ireland and GB by 2030. The policy confirms that projects with the most realistic prospects of delivery by 2030 will be progressed as soon as possible. MaresConnect is engaging with DECC, the Commission for Regulation of Utilities and EirGrid to progress the grid connection in Ireland and to obtain Cap&Floor regulation in Ireland.

MARINE SURVEYS AND DESIGN



SUBSEA CABLE ROUTE:

The subsea cable route is expected to be up to 190km long. The final length of the cable will depend on the findings of subsea surveys as well as ongoing consultation with key stakeholders. Initial cable route selection has centred on desk-based work and the assessment of known data and constraints. Environmental and technical constraints will be assessed and the route that offers

the best solution to challenges identified, while maintaining the shortest route, will be chosen as the preferred route.

SUBSEA SURVEYS:

Subsea surveys are scheduled to commence in 2024 and will include geophysical and geotechnical surveys. The results will not only aid the selection of the preferred cable route, but also the appropriate installation and protection methods to be adopted. Data from the surveys will also be used to inform the environmental assessment accompanying permit applications.

Geophysical Surveys:

The geophysical survey will map the seabed and sub-surface geology along the proposed routes to identify marine habitats, optimise cable routing within the survey corridor and enable assessment of cable target burial depth along the route. It will also provide the geophysical data from which a marine archaeological assessment can be undertaken as part of the consenting process.

Geotechnical Surveys:

The purpose of the geotechnical survey is to evaluate the nature and mechanical properties of the seabed and intertidal sediments along the survey corridor. This will be done using several techniques, including drilling boreholes and collecting samples.

MARINE ENVIRONMENTAL ASSESSMENTS:

Topics covered by the marine environmental assessement will include:

- Coastal processes
- Protected sites
- Benthic ecology
- · Fish and shellfish
- Marine birds
- Marine mammals and reptiles • Marine archaeology and unexploded ordnance
- Fisheries
- Shipping and navigation
- Recreation and other sea users
- Cumulative effects · Biodiversity net gain

The potential impacts to be assessed include:

- Penetration and/or disturbance of the substrate below the surface of the seabed and effects on benthic communities and fish spawning
- Disturbance to birds, fish and marine mammals
- Transient underwater noise changes form of cable installation equipment and project vessels.
- Temporary siltation rate changes from trenching activity
- Permanent, local, hydrological changes resulting from cable protection rock berms.
- Physical loss (permanent) change) of localised areas of marine habitat
- Localised electromagnetic changes and potential effects on fish, marine mammals and shipping
- Temporary, localised displacement of fishing activity and disruption to shipping routes.
- Most of the environmental impacts from cable installation are temporary and transient. For example, temporary disturbance of sea birds through the presence of project vessels and temporary increases in suspended sediment levels associated with trenching.

Possible in-combination effects

Steps are taken during the design of the project to ensure that environmental impacts are minimised where possible e.g., drilling under sensitive coastal features, using a Horizontal Direction Drill (HDD); routeing around sensitive offshore habitats; and avoiding known marine archaeology features such as wrecks. Best practice will also be followed to further reduce the significance of any potential impacts of the project.

MaresConnect is likley to interact with several European Marine Protected Sites: Special Areas of Conservation, designated for the protection of habitats and species, and Special Protection Areas. designated for the protection of wild birds.

To determine if the project is likely to have a significant effect on the conservation objectives of the sites, Habitat Regulations Assessment (HRA) will be carried out. The process identifies any potential impacts the project may have on the sites and assesses whether it is likely that the feature of the sites will be affected.

Where the project is likely to undermine the conservation objectives of a site e.g., it is possible that the condition, characteristics, or distribution of the feature cannot be maintained, then mitigation measures are proposed to manage or reduce the potential negative impacts identified. In accordance with best practice, Environmental Reports will be completed for the marine components of the project in both Ireland and Wales. The HRA will form part of this larger environmental appraisal.

MITIGATION:

Where a potential impact is established, the environmental appraisal will recommend mitigation measures to be taken to reduce or remove the significance of the effect. Suitable mitigation will be established through consultation with stakeholders.

ONSHORE SURVEYS AND DESIGN



Technical and environmental assessment:

As part of the project development, a series of technical and environmental assessment studies are being carried out to establish the viability of all the proposed converter station sites and cable routes and to consider any potential impacts and opportunities arising from the project development. Topics covered by the onshore assessments are likely to include:

Biodiversity:

Surveys and data

assessment will ensure that the final onshore elements of MaresConnect are designed sympathetically to the local environment and wildlife, and where possible enhancement measures will be employed. Surveys will cover the landfall sites, the various cable routes under consideration and the possible converter station locations.

In addition to birds, the assessments will also take into account other wildlife such as badgers, bats, otters, water voles, reptiles, great crested newts and dormice. Consideration is also being given to local vegetation, including hedgerows, trees and important habitats. Our surveys and assessments will be verified and consulted on by Natural Resources Wales and the National Parks and Wildlife Service in Ireland.



of MaresConnect on local archaeology and cultural heritage will be assessed by seeking to identify, predict and evaluate the significance of potential effects on designated and non- designated heritage assets. To mitigate any potential impacts, MCL will consider the predicted impacts of the proposed scheme and will aim to avoid adverse effects. MCL will aim to avoid undisturbed archaeological remains and preserve them in situ. Where this is not possible, preservation by record will be proposed as mitigation.

Landscape and visual impact:

This assessment relates to changes in the physical landscape, brought about by the proposed development. While HVDC cables will be buried, the converter station

will be located above ground. MCL is keen to consult with stakeholders to minimise the visual impact of the converter stations associated with the development. MCL's consultants will produce visualisations of the converter stations from viewpoints that will be selected to represent the character of the area and particularly important landscape and heritage sites. Proposals will be made for appropriate mitigations, including landscaping, building finishes and design layout.

Flooding and hydrology:



the construction and operational phases. The results of this assessment will be incorporated into the final design.

Geology and hydrogeology:



MCL will consider the existing ground conditions in the vicinity of the various scheme components and address the potential effects that the construction and operation of the project may have on the geological and hydrogeological characteristics of the study area. The assessment will include consideration of possible effects on the superficial geology (soils), solid geology and geomorphology, including mineral resources beneath the proposed route of the scheme. The groundwater beneath the site and surrounding area will be considered. The results of this assessment will be incorporated into the final design and the delivery of the proposal to mitigate any potential impact.

Noise and vibration:

This assessment will address potential noise and vibration impacts from the construction and operational phases of the project, and specifically construction noise, construction vibration and operational noise from the converter station sites. The baseline conditions (i.e., existing background noise levels) at noise-sensitive receptors will be determined via noise surveys. Noise sensitive receptors include residential properties, sensitive commercial and community uses (including educational premises, medical facilities and places of worship) and open public spaces (including public footpaths). The results of this assessment will be incorporated into the final design.

Traffic and transport:

The traffic impact assessment will address the traffic impacts on the local road network from the construction and operation of MaresConnect. The assessment will include the supply of materials, plant and equipment, the cable laying operations, and the various components of the converter station. Traffic arising from the construction and operations workforce will also be addressed. A Transport Assessment will be produced in accordance with best practice. During the planning application process, a preliminary Traffic Management Plan (TMP) will

be developed. This plan will detail strategies to manage and mitigate construction traffic associated with MaresConnect. MCL will consult the local community on a preliminary TMP to ensure that all considerations of local amenities have been incorporated and that members of the local communities are satisfied with the mitigation measures being proposed.

Use of agricultural land:

If the converter station is sited on agricultural land, its construction will re-purpose that land from agricultural use. Land disturbed during the construction of the landfall and laying of underground cable will be reinstated and therefore there will be no permanent loss of agricultural land associated with the landfall or cable route. Any loss of agricultural land will be assessed within the planning application.

Socio-economic impact and human health:

This study will provide an overview of the socio-economic conditions in the area of the proposed development and an assessment of potential effects on the local population's health and well-being resulting from the implementation of the project. This will encompass consideration of population and demographic data,

employment data and the volume and value of tourism to the local economy. The results of this assessment will be incorporated into the final design and delivery of the proposal to mitigate any potential impacts and maximise benefits.

Air quality and climate change:

MCL will consider the potential impacts on air quality during construction, including dust emissions, on-site machinery and construction traffic travelling to and from site. Following the assessment of air quality effects during the construction phase, mitigation measures will be recommended to minimise dust-related impacts. These measures, including dust suppressant measures, will be considered for both human and ecological receptors.









Current status of plans in Ireland

MCL's preference is to install cables between the landfall and the sea using a Horizontal Directional Drill (HDD). HDD is a trenchless method of installing underground cables which will minimise impacts on recreational users and nearshore habitats along the Irish coast. An HDD can be up to 2km in length and an illustration of an HDD is shown in Plan 1. Further technical assessment work will be undertaken before the installation methodology is finalised. There are currently five landfall zones under assessment, as shown in Plan 2. Subsea routes off the Irish coast will be assessed during 2024, as depicted in Plan 3. The final route will be selected following the conclusion of subsea surveys and consultation with stakeholders.

MCL is currently working with EirGrid to confirm where MaresConnect will connect into the Irish electricity transmission network, in the Greater Dublin area. Once the precise location is confirmed, MCL will consult key stakeholders including residents and prescribed bodies to ensure that their views and opinions are fully incorporated into any forthcoming proposal. Stakeholders and the local community will be kept informed as the design of the project evolves and views and feedback will be requested.







Current status of plans in Wales

MCL's preference is to install cables between the landfall and the sea using an Horizontal Directional Drill (HDD). HDD is a trenchless method of installing underground cables which will minimise impacts on recreational users and nearshore habitats along the Welsh coast. An HDD can be up to 2km in length and an illustration of an HDD is shown in Plan 1. Further technical assessment work will be undertaken before the installation methodology is finalised.

A desk-based review of environmental and technical constraints was completed for the onshore study area shown in Plan 4. This work along with site visits and initial stakeholder consultation resulted in the identification of three potential landfall zones and three potential converter station zones, which are shown in Plan 5.

It is important to note that, at this early stage of development, the landfall, onshore cable route and final converter station location will be heavily influenced by stakeholder feedback and the results of environmental and technical assessments so the zones in Plan 5 will evolve as development progresses.

Subsea routes off the Welsh coast will be assessed during 2024, as depicted in Plan 6. The final route will be selected following the conclusion of subsea surveys and consultation with stakeholders. Subsea surveys are targeted to commence in 2024.

Stakeholders and the local community will be kept informed as the design of the project evolves and views and feedback will be requested.







CONVERTER STATIONS

MaresConnect will use High Voltage Direct Current Voltage Source Converter (HVDC VSC) technology to link the two-power systems. Direct Current (DC) is typically used for the transmission of electricity over long distances because it has lower losses, negligible heating effects and is therefore suitable to be buried underground. The primary advantage of VSC technology is that it results in smaller converter station sizes compared to analogous technologies.

MaresConnect converter stations:

The indicative converter station site footprint is up to 4 hectares, measuring approximately 265m x 150m. A converter station consists of various components. A typical converter station layout and dimensions are included in Figure 1 below:



ROOM	WIDTH (M)	LENGTH (M)	HEIGHT (M MAX)
Reactor, Valve & DC Hall	55	88	25
CWC Area	15	25	7
Control Building	25	28	7
Store/Spares Area	15	40	9
Harmonic Filter Compound	25	30	11
Shunt Reactor Compound	23	33	10
ESB Control Building	15	25	7.5
Power Transformers	12	43	13

The indicative footprint of the converter station and height of the valve hall (25m) shown in Figure 1 represent the maximum dimensions and these may be reduced as the project proposal is developed.

The layout of the converter station and final dimensions will depend on the local terrain, physical constraints, the results of environmental surveys, consultations and the supplier's technical requirements.

CABLES

Onshore cables:

One of the benefits of HVDC cables is the relatively small footprint required to install them underground onshore. It is anticipated that the MaresConnect onshore cables will be buried within the road network or in private or agricultural land as appropriate.

Offshore cables:

Up to 190km of the MaresConnect cable route will be laid offshore. The final routes will be selected following a detailed assessment of the marine environment and technical challenges. The cables will predominantly be buried in the seabed however where the geology or marine environment is not suitable, cables may be laid on the seabed with protection added. Protection could be in the form of concrete mattress or rock placement on top of the cable.

It is usual to increase the depth of cover in agricultural land to approximately 1 metre. The width of the trench may also vary with depth of cover (the deeper the cables are buried the wider the trench may become). A specific design will need to be engineered for utility crossings, crossing watercourses or other areas where the ordinary depth of cover cannot be achieved.













Integration of green energy across the Irish Sea



Jobs in construction and operations



Reduction in wholesale energy prices



Equivalent to power 570,000 homes*



EODUIII Private capital investment for

Ireland and Wales

*The number of homes is based on the annual average household consumption of 4,200kWh (CRU's decision paper published in March 2017 following its review of typical consumption figures (CER17042)) and an annual total of electricity transmitted via MaresConnect of approximately 2,400,000MWh.

CONTACT US

MaresConnect Limited The Victorians 15-18 Earlsfort Terrace Saint Kevin's Dublin D02 YX28

MaresConnect Limited One Kingdom Street Paddington Central London W2 6BD

+353 1 913 1245

🗹 info@maresconnect.ie

www.maresconnect.ie

FSC

Printed on recyclable paper from sustainable sources

Issue 1 | November 2023