Nautilus Interconnector FAQs

May 2020

Contents

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General

Who is National Grid Ventures?

National Grid Ventures is the competitive division of National Grid plc. It operates outside of National Grid's core regulated businesses in the UK and US where it develops and operates energy projects, technologies and partnerships to make energy cleaner, more secure and more affordable for consumers.

NGV's diverse portfolio of low carbon and renewable energy businesses includes sub-sea electricity Interconnectors in the UK and battery storage, wind and solar power in the US.

NGV's Interconnector fleet gives the GB access to secure and affordable energy and will play a critical role in tomorrow's cleaner and smarter energy systems. NGV currently have three Interconnectors in operation and three in construction. By 2030, 90 per cent of the electricity imported through these six Interconnectors will be from zero carbon sources.

There are different National Grid businesses operating in GB that have different roles

Whilst both organisations are part of the wider National Grid Group, NGV is completely separate to NGET. The separation between NGV and NGET stipulates that NGV is treated the same way as any other energy project promoter.

NGET was separated into two new organisations on 1 April 2019:

- National Grid Electricity System Operator (ESO) – these are responsible for managing and operating the electricity system in Great Britain.
- National Grid Electricity Transmission (NGET) – these are responsible for the development, construction and operation of all electricity assets in England and Wales (e.g. overhead lines, substations).

The regulator OFGEM stipulates that, across any of its activities, it is not possible for National Grid to be a generator of electricity. This is effective across Europe.

nationalgrid

national grid UK

national grid electricity transmission

Transmission Owner (TO)

Own, build, operate and maintain the transmission assets.

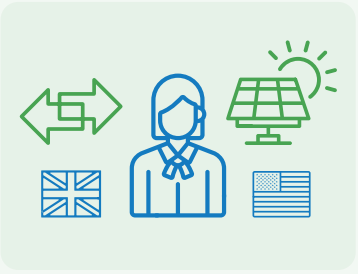
nationalgridESO

System Operator (ESO)

Responsible for managing the electricity network and ensuring the right amount of electricity is where it is needed.

Separate from National Grid's core regulated businesses.

nationalgrid ventures



Develops and operates businesses in competitive markets, including electricity interconnectors, liquefied natural gas (LNG) and metering in the UK, and large-scale renewable generation and electricity & gas transmission in the US.

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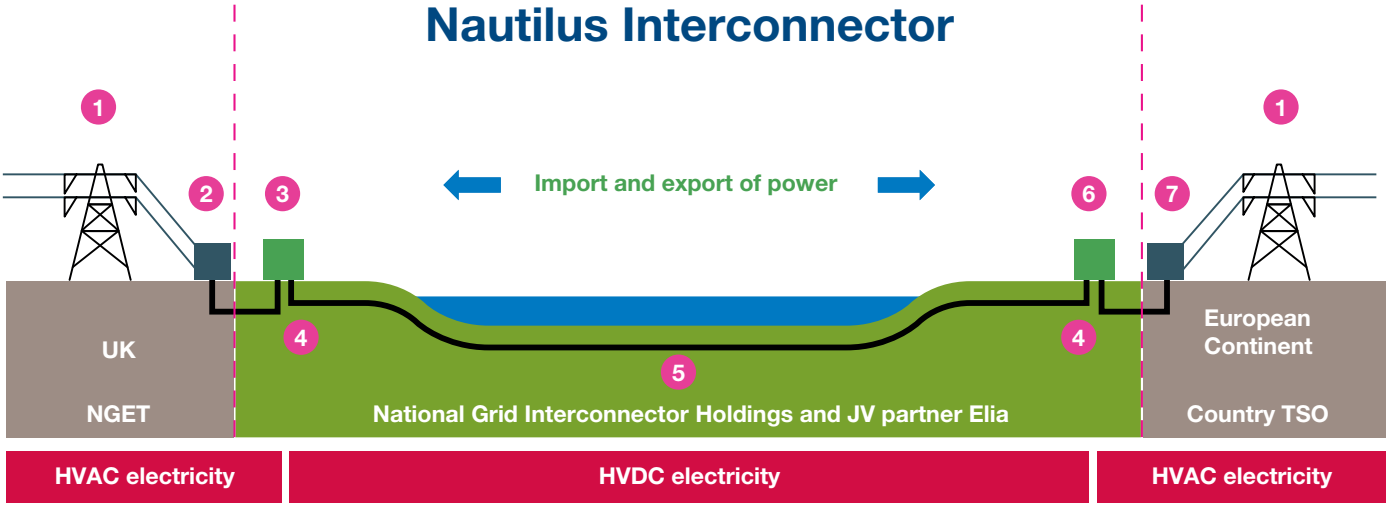
What is Nautilus Interconnector?

Nautilus Interconnector is a proposed second Interconnector between Great Britain and Belgium. When built, it will create a new 1.4 gigawatts (GW) high voltage direct current (HVDC) electricity link between the transmission systems of Great Britain and Belgium. If constructed, Nautilus Interconnector could supply power to one million homes.



HVAC = High Voltage Alternating Current HVDC = High Voltage Direct Current TSO = Transmission System Operator

1. Existing network
2. NGET onshore substation
3. National Grid Interconnectors onshore converter station
4. Underground HVAC/HVDC cables
5. Subsea HVDC cables
6. Elia onshore converter station
7. Belgian transmission network substation

Is NGV supportive of an alternative and more co-ordinated solution to energy supply in East Suffolk?

NGV is supportive of the efforts to achieve greater co-ordination in energy infrastructure. NGV continue to promote and test alternative solutions with the UK Government and promoters at home and in Europe.

NGV believes that to achieve the UK Government's energy targets (40 GW by 2030 and 75 GW by 2050) there needs to be greater co-ordination of how wind and Interconnector projects are connected. This is vital to ensure that the UK can meet both energy and environmental challenges and reduce the impact on coastal communities.

NGV is engaging with its European partners and the UK Government as to how it can best utilise the technology and the Interconnector system to bring greater co-ordination with offshore wind projects.

Who will be the decision-making authority for Nautilus Interconnector?

NGV has received confirmation from the Secretary of State for Business, Energy and Industrial Strategy (BEIS) that the proposed Nautilus Interconnector will be treated as a Nationally Significant Infrastructure Project (NSIP) and as a development requiring a Development Consent Order (DCO). This means that the final decision-maker for the project will be the Secretary of State.

In March 2019, NGV requested that the Secretary of State exercise its powers under section 35 of the Planning Act 2008 to deem Nautilus Interconnector as a development for which a DCO would be required. The DCO regime will require NGV to undertake a thorough Environmental Impact Assessment (EIA) and consultation process prior to any application being submitted. NGV and the Secretary of State acknowledge that the DCO consent process will provide a single, unified consenting process with clear and fixed timescales for the development to engage with stakeholders and bring its application forward.

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What is a ‘Project of Common Interest?’

Projects of Common Interest (PCIs) are key cross border infrastructure projects that link the energy systems of countries in Europe. They are intended to help Europe achieve its energy and climate objectives: affordable, secure and sustainable energy for all citizens. In the long-term, PCIs are also aimed at realising the decarbonisation of the economy in accordance with the Paris Agreement, signed by the UK, which aims to achieve climate neutrality by the end of the century.

In the case of Nautilus Interconnector, the project has been identified as a PCI due to its significant impact on the energy market and market integration between the UK and Belgium. The project will boost competition in the energy market, achieve energy security from a more diverse supply and contribute to our climate and energy goals. The selection process for PCI projects is determined by the Trans-European Networks for Energy (TEN-E) Strategy, which will be complied with throughout the development process for Nautilus Interconnector. PCI status will continue for the project regardless of Brexit, given Member Status is only required for one country involved.

Interconnectors

Why do we need Interconnectors?

Interconnectors are making energy more secure, affordable and sustainable for consumers. Great Britain has experienced success from existing Interconnectors which have connected energy between Great Britain, France, Ireland and the Netherlands.

These projects have helped to lower electricity prices, increase the security of supply and stabilise energy in the Great Britain transmission network.

Interconnectors are vital in making electricity networks more flexible and are increasingly needed to offset the lack of investment in substantial electricity generation plants in the UK, along with addressing the higher demand for cheaper wholesale energy from Europe.

If you would like to find out more about its European partners and the UK Government Interconnectors, you can download NGV’s Interconnectors information pack **here.**

How efficient are Interconnectors?

Interconnectors use HVDC lines. The link between the UK and Belgium will exceed 100 miles end to end. The use of HVDC cables to transport 1400 megawatts (MW) over this distance is proven to be more efficient for losses and will require a smaller number of cables than HVAC.

Which way does the electricity flow between the UK and Belgium?

Electricity normally flows from the market with lower prices to the market with higher prices. On average, UK electricity prices are higher than those in mainland Europe, which typically means that the UK benefits from receiving cheaper electricity.

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Connection point and transmission

How was the connection point to the National Transmission System (NTS) for Nautilus Interconnector chosen?

NGV made two separate connection applications to the ESO for connection points for both the Nautilus and EuroLink Interconnector projects. The ESO then undertook an appraisals process to identify a point of connection on its network for each application which included an assessment of environmental, technical and cost factors. As a result of this process, the ESO have provided grid connection offers (for both Nautilus and EuroLink) to a new 400 kilovolts (kV) substation located close to the Sizewell 400kV network, provisionally referred to as 'Leiston 400kV'. This substation is more locally known as the proposed NGET substation in Friston.

What does an Interconnector need to connect to the onshore grid?

For Nautilus and EuroLink to connect to the proposed NGET substation at Friston, the proposed substation would require an extension for each additional project.

NGV understand that typically the maximum land take required to facilitate extensions to NGET substations is approximately 1.3 hectares (3 acres) for each connection offered at a location.

NGET has indicated that provision for the land required to extend its substation at Friston has been provided for as part of ScottishPower Renewables proposals for East Anglia ONE North (EA1N) and East Anglia TWO (EA2).

Decisions on changes and upgrades to the NTS are made by NGET in its role as the Transmission Owner. NGV remain in dialogue with NGET to understand if any changes or upgrades may be required to the NTS as a result of NGV's connection agreements.

What is the difference between HVAC and HVDC?

HVAC stands for high voltage alternating current. HVDC stands for high voltage direct current.

HVAC technology is the principle means of power transmission in all modern power systems. The vast majority of all electrical power is generated, transported and consumed as alternating current. HVDC technology is an alternative to HVAC for point-to-point power transmission and may be appropriate in some circumstances for bulk power transfer over long distances or between different grids.

Most energy is generated as alternating current, therefore it is necessary to convert the direct current back to alternating current for onward transmission in the national grid at a converter station.

Other energy projects in the area

How are you working with other energy projects planned in East Suffolk?

NGV is working closely with the other promoters in the area including ScottishPower Renewables and EDF as well as East Suffolk and Suffolk County Councils. Decisions for the routeing and siting of Nautilus Interconnector will consider possible benefits of co-location for the environment and surrounding communities as well as other technical constraints. NGV regularly meet with all of the promoters in the area, alongside East Suffolk Council and Suffolk County Council, at the Suffolk Energy Forum.

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Cable routeing

How are the cables buried onshore and offshore?

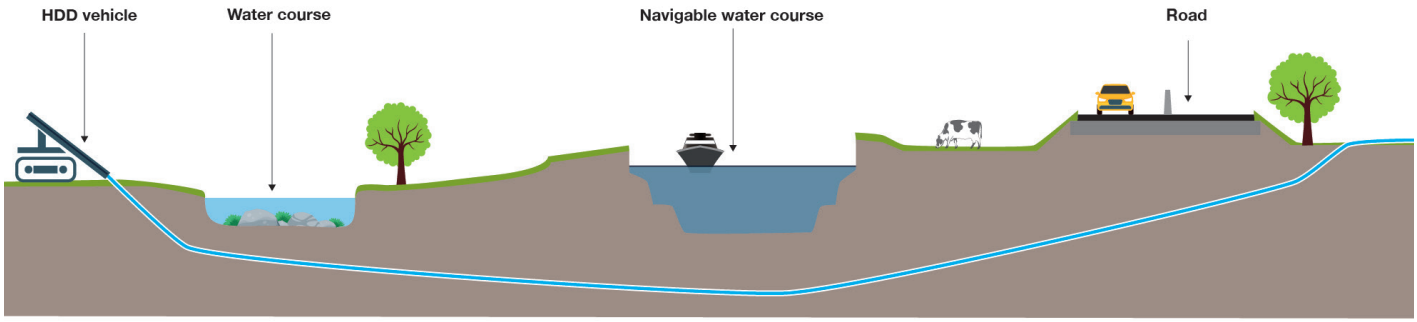
Two HVDC cables are typically buried in a single trench, compared to HVAC cables which typically consist of two trenches with three cables per trench. Offshore, the HVDC cables will be buried far enough below the seabed to ensure that cables don't get snagged.

What are the differences between the crossing techniques of Horizontal Directional Drilling (HDD) and open cut?

Horizontal Directional Drilling (HDD) is a construction technique that involves drilling underneath particularly sensitive areas and infrastructure that the project may encounter along the cable route to lay the onshore cable with minimal disruption. This technique avoids the need for digging deep trenches and allows construction to operate through different ground conditions.

Open cut trench excavation offers an alternative method of cable installation which can be used instead of HDD, particularly in more rural areas and where there are no major obstacles. It consists of excavating a trench section-by-section as the cable is laid. This excavation is then backfilled once the cable laying is complete.

Typical HDD Construction



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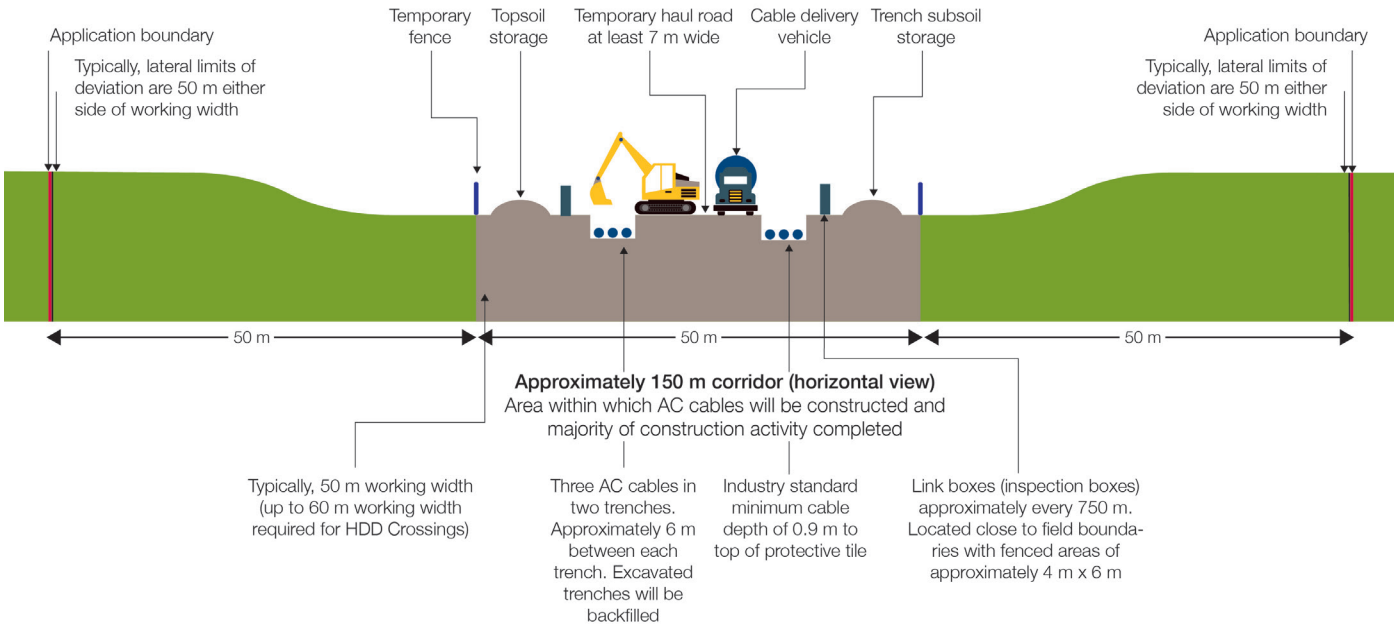
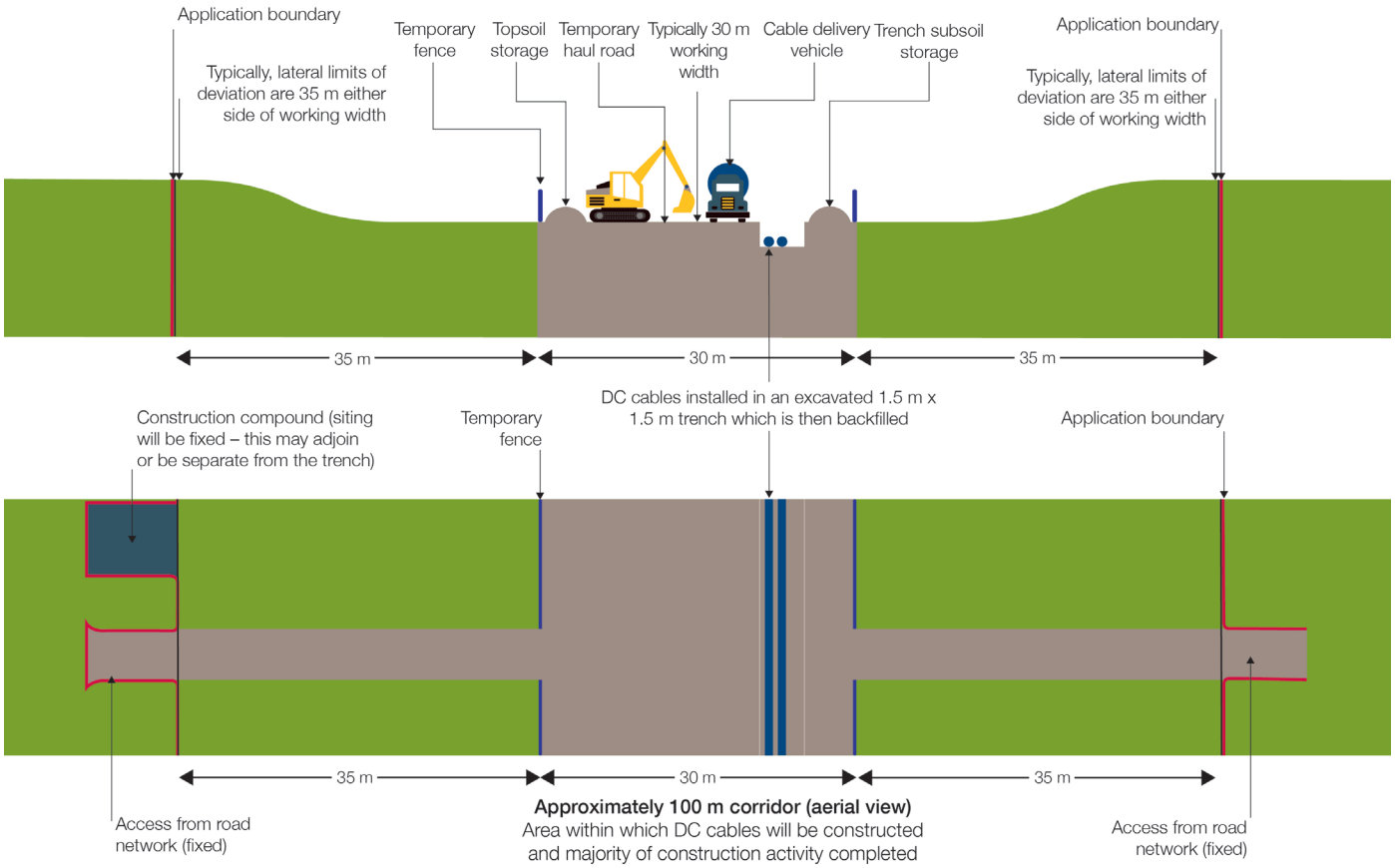
How do the construction of AC and DC cables differ?

Typical AC cable construction



This illustration is for illustrative purposes only and is intended to show the typical construction of AC cables for Interconnectors in the UK

Typical DC cable construction



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Can you use the same cable route as ScottishPower Renewables (SPR)?

The proposed Nautilus Interconnector and the East Anglia ONE North (EA1N) and East Anglia Two (EA2) offshore wind farm projects are different technologies being brought forward by different developers with different timeframes. This means Nautilus Interconnector is not able to share the same cables or cable trenches. There may be potential to locate the proposed cables within an appropriate distance from SPR's cable route which will be considered as NGV assess different options for cable routeing. NGV is studying the applications for both offshore wind farms in detail and liaising directly with SPR to understand as much as possible about its proposed cable route corridor. This is so that NGV can identify any opportunities for joint working and minimise any disruption. In some places, Nautilus may need to cross the cables for EA1N and EA2.

Whilst SPR has already selected its preferred route, Nautilus does not yet have a defined cable route (for either DC or AC cables), and it must undertake its own detailed environmental and technical assessment to progress its project routeing and siting options. National Grid Ventures (NGV) will work to minimise impacts on local communities and the environment where possible and will liaise and consult with communities and stakeholders when the project is ready to discuss the proposed cable route options.

Landfall

Will there be any visible equipment at the landfall site?

Landfall is where the subsea cables are brought onto the land and are connected to the onshore cables. As all the cables will be buried underground at the landfall site, very little will be visible once works are completed, although there may be some relatively small-scale equipment visible above ground. A kiosk type structure (similar to a telephone exchange) may be required at the landfall location to boost the signal for the subsea fibre optic communication system. It is too early to confirm if this would be required at this stage.

Cable joint bays will need to be made at sections along the route during installation. Cable joint bays will be buried for the HVDC cables and will likely require a man hole cover for operations and maintenance access, these manhole covers may require fencing. The man hole covers would be visible above ground. Joint bays on the HVAC cables will require above ground link boxes (see typical AC cable construction figure on page 7).

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Converter station

How big is the converter station for Nautilus Interconnector?

Nautilus Interconnector is at the very early stages of development. The design for the converter station has not yet been developed. A typical footprint for a converter station covers an area of five hectares (12 acres) with a maximum height of 24 metres. The exact size and height will depend upon the specific proposals for mitigation and construction.

NGV is constantly challenging its supply chain to bring down the size of converters. The final design of the converter station will be developed through a thorough consultation process with stakeholders and the local community, as well as through collaboration with the supply chain.

Why does the converter station need to be within 5 km of the substation?

The search radius for the converter station site is limited to 5 km because beyond this distance NGV would need to increase the size of the converter station building. Locating the converter station further away from the substation has an impact on the voltage level needed to transmit the power, thereby requiring additional equipment to be installed at the converter station to maintain the required voltage level.

Can the converter station be buried?

There are a number of environmental, technical and cost factors which must be considered when designing the converter station, and partially or entirely burying the building presents significant challenges relating to keeping the building free from water and moisture.

NGV is constantly challenging its supply chain to consider, develop and review innovative engineering and design techniques. Further work is being undertaken to assess the feasibility of burying converter stations. Site specific constraints and safety will also have an impact on the feasibility of burying a converter station. Converter stations have not previously been buried due to concerns over water ingress into buildings accommodating electrical infrastructure, concerns over the effectiveness of fire-fighting and ventilation systems, and the additional associated costs. NGV would be required to undertake a cost benefit analysis to assess additional cost against potential benefits in order to meet Ofgem requirements.

The final design of the converter station will be consulted on with the community in detail before submitting any application for development consent. This will include the opportunity to provide feedback on items such as visual appearance and landscaping.

Will the converter station be noisy?

The converter station will be designed to minimise noise. Noise modelling assessments will be undertaken as part of the EIA process. Noise levels will be consulted on with environmental health bodies and the local authority to ensure that any noise does not exceed unacceptable levels.

Environment

How will the impact on the environment be considered?

NGV will be undertaking an EIA process to ensure that matters relating to the environment are considered when developing the proposals for Nautilus Interconnector. EIA is a legal requirement for some developments and is strictly regulated. A wide range of environmental subjects will be taken into consideration including traffic, landscape and visual impact and ecology. The results of these assessments will be consulted on in a Preliminary Environmental Information Report (PEIR), before being refined and submitted in an Environmental Statement (ES) which will form part of the DCO application.

Project timeframes

What work will Nautilus be undertaking in 2020?

Between March 2019 and March 2020, the Nautilus team has met with a variety of local groups, statutory and non-statutory bodies, as well as district, county, town and parish councils. This early stage of engagement has been focused on introducing the Nautilus proposals, including the onshore and offshore components, and the work necessary to understand the viability of developing Nautilus in East Suffolk.

Further environmental and technical assessment is now required to progress the initial desktop work for the onshore and offshore components of Nautilus. Over the course of 2020, the team intend to undertake surveys[1] in the area to gather additional information. This is required to more accurately assess project feasibility.

The team are conscious of the interest and resource input from both stakeholders and the community in the pending SPR Examinations for EA1N and EA2 offshore wind farms and EDF's submission of the Sizewell C application for development consent. NGV is registered as an Interested Party in these Examinations and will be participating as appropriate.

When will the project be completed?

Nautilus Interconnector is currently at a very early stage of its development. Should consent be granted, a Final Investment Decision by NGV for the project is planned for 2024. Following this, construction will commence, and the project could be operational by 2028.

What does Brexit mean for Nautilus Interconnector?

NGV is undertaken a thorough analysis of potential risks relating to Brexit, and the results of this analysis highlight that electricity Interconnectors will be able to operate post-Brexit under any outcome.

NGV is confident that the energy markets in the UK, France, the Netherlands, Belgium and Norway will continue to operate as they do now. NGV Interconnectors will continue to have the right export and import power to and from those markets.

COVID-19 update

Nautilus Interconnector in the context of COVID-19

In light of current Government restrictions and as new advice is issued, NGV has, and continues to, review activities on Nautilus to ensure the team are working safely and adhering to government advice. NGV is continuing to progress with its current work while maintaining the safety of its staff. Should you have any questions relating to the project during this period, the contact details at the bottom of this document remain active.

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[1] Onsite surveys will continue to be reviewed in light of the rapidly changing position with COVID-19.