



Nautilus Interconnector

National Grid Ventures

Update on our proposals and
consultation programme | **September 2021**

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Introducing Nautilus Interconnector

At National Grid Ventures (NGV), we are bringing forward plans for Nautilus, a new multi-purpose interconnector (MPI) that could supply enough electricity to power around 1.4 million UK homes.

Nautilus could connect up to 1.4 gigawatts (GW) of offshore wind to the transmission systems of Great Britain and Belgium through a subsea electricity cable called an interconnector. The 1.4 GW interconnector could connect up to 2.8 GW of offshore wind, given the import and export capability of the high voltage direct current (HVDC) cable to two demand centres (Great Britain and Belgium). The project would include underground cabling works and onshore infrastructure, located in East Suffolk.

We are seeking feedback on Nautilus as part of its development process, including options for the onshore infrastructure – namely, a cable route, landfall and converter station search areas. These emerging options are detailed in this Briefing Pack on page 10.

The previous briefing pack published in April 2021 provided initial information on the project in its early stages. This briefing pack provides an update on our plans for Nautilus and the details for our non-statutory consultation – which will begin on 14 September and will run for 6 weeks, closing on 26 October.

National Grid Ventures (NGV)

Proposals for Nautilus are being developed by NGV and our partner in Belgium, Elia. Elia is the Belgian National Transmission System Operator (TSO).

Elia and NGV have a track record of working together successfully during the development of Nemo Link. Operational since 2019, this interconnector connects Belgium and Great Britain (GB) electricity networks providing both countries with access to electricity generation, improved grid reliability and access to cheaper electricity for consumers.

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

There are three distinct electricity business entities under the umbrella of National Grid plc in the UK, as detailed in the diagram below, all with different roles and responsibilities. The separation between NGV, National Grid Electricity Transmission (NGET) and National GridESO stipulates that NGV is treated the same way as any other energy project promoter.

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Group PLC

Electricity Transmission

Owns and manages the high voltage electricity transmission system in England and Wales

Electricity System Operator

Ensures that Great Britain has the essential energy it needs by making sure supply meets demand every second of every day

National Grid Ventures

Operates a mix of energy assets and businesses to help accelerate the development of our clean energy future (e.g., undersea electricity interconnectors with other countries and European transmission partners)

Figure 1: National Grid plc's electricity business entities in the UK



Our vision for the scheme

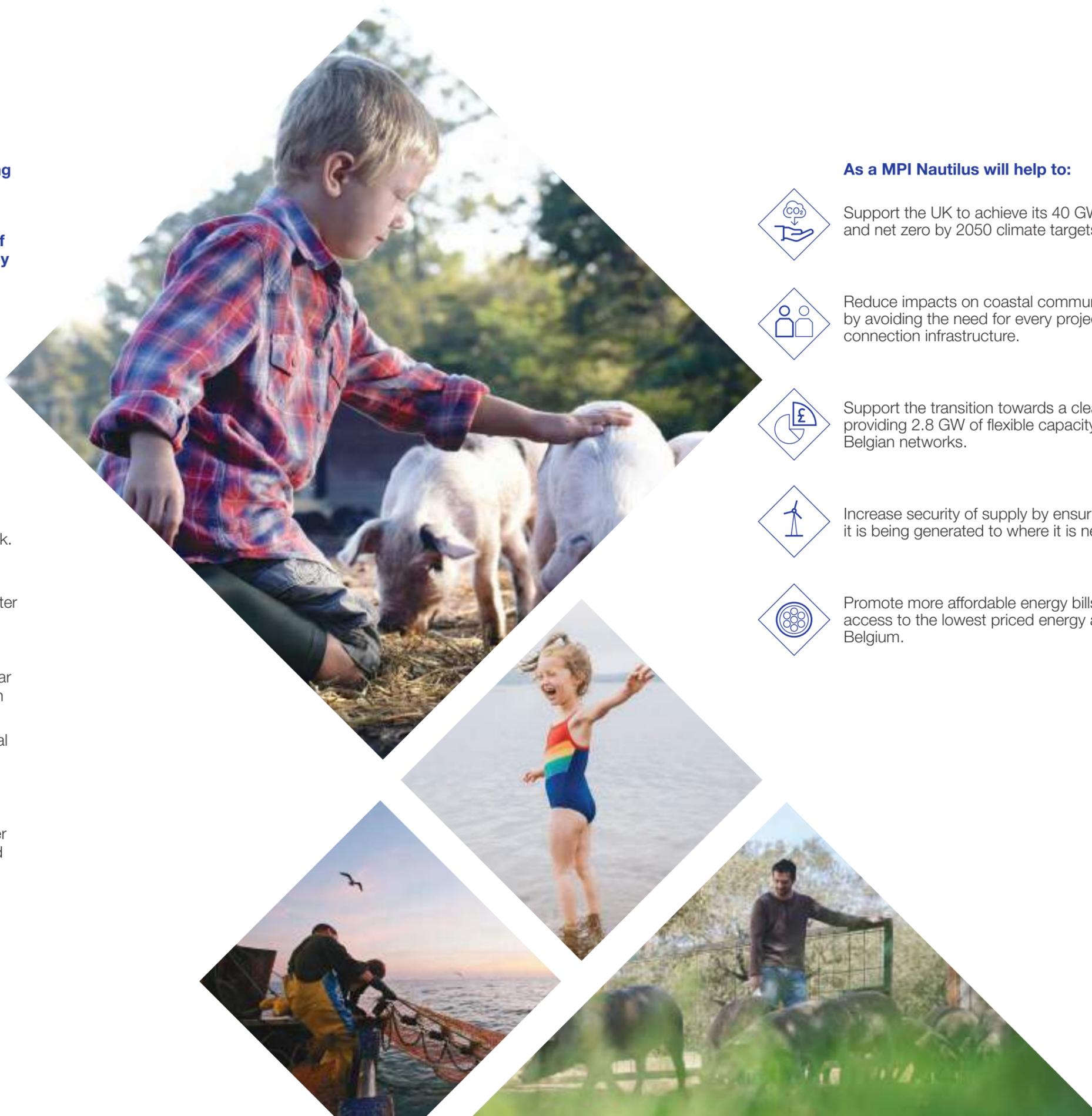
Building upon our experience as a world leading developer and operator of interconnectors, we have been working closely with Elia, BEIS, Ofgem and numerous non-governmental organisations to develop the next generation of interconnector and wind connection technology – multi-purpose interconnectors (MPIs).

MPIs are subsea electricity cables which travel between two countries connecting offshore wind farm/s to both markets. This technology marks an evolution from point-to-point interconnection and radially connected wind.

By combining offshore wind generation with interconnector capacity between GB and Belgium, Nautilus will reduce the amount of infrastructure required both onshore and offshore. In doing so we will be able to reduce the impact on the affected community and environment, as well as delivering a pathway towards a more integrated offshore network.

Since 2019 we have been engaging in the area with local councils, parish and town councils and community groups across East Suffolk to gain a better understanding of their interests and concerns. From this engagement it has been made clear that there is a need for greater coordination and cooperation between energy developers in the region, in particular relating to connections to the electricity transmission network.

Developing Nautilus as a MPI rather than a traditional point-to-point interconnector is our first step in responding to this feedback. Going forward, throughout the consenting, development and construction process we intend to coordinate as far as possible with other developers in the area in order to best address the interests of the environment and local communities.



As a MPI Nautilus will help to:



Support the UK to achieve its 40 GW of offshore wind by 2030 and net zero by 2050 climate targets.



Reduce impacts on coastal communities and the environment by avoiding the need for every project to have its own separate connection infrastructure.



Support the transition towards a cleaner energy system by providing 2.8 GW of flexible capacity between the GB and Belgian networks.



Increase security of supply by ensuring energy flows from where it is being generated to where it is needed most.



Promote more affordable energy bills in the UK by providing access to the lowest priced energy available between GB and Belgium.

What is Nautilus multi-purpose interconnector ?

The onshore infrastructure for a MPI is no different to that of a point-to-point interconnector. As shown in the figure below, Nautilus would connect offshore wind farm/s to an offshore converter station, potentially linking clusters of wind farms into a single connection point, before transporting this electricity to the onshore transmission systems of two connected countries through a subsea electricity cable.

These cables will come onshore at a point known as 'landfall' and will be buried underground. At the landfall very little will be visible once the works have been 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.

The cables will then be run underground connecting into an onshore converter station which will transform the electricity from high voltage direct current (HVDC) into high voltage alternating current (HVAC) so that it can be fed into the transmission network. From the converter station the cables will then again be buried underground before connecting to a NGET substation, which will provide access to the National Transmission System.

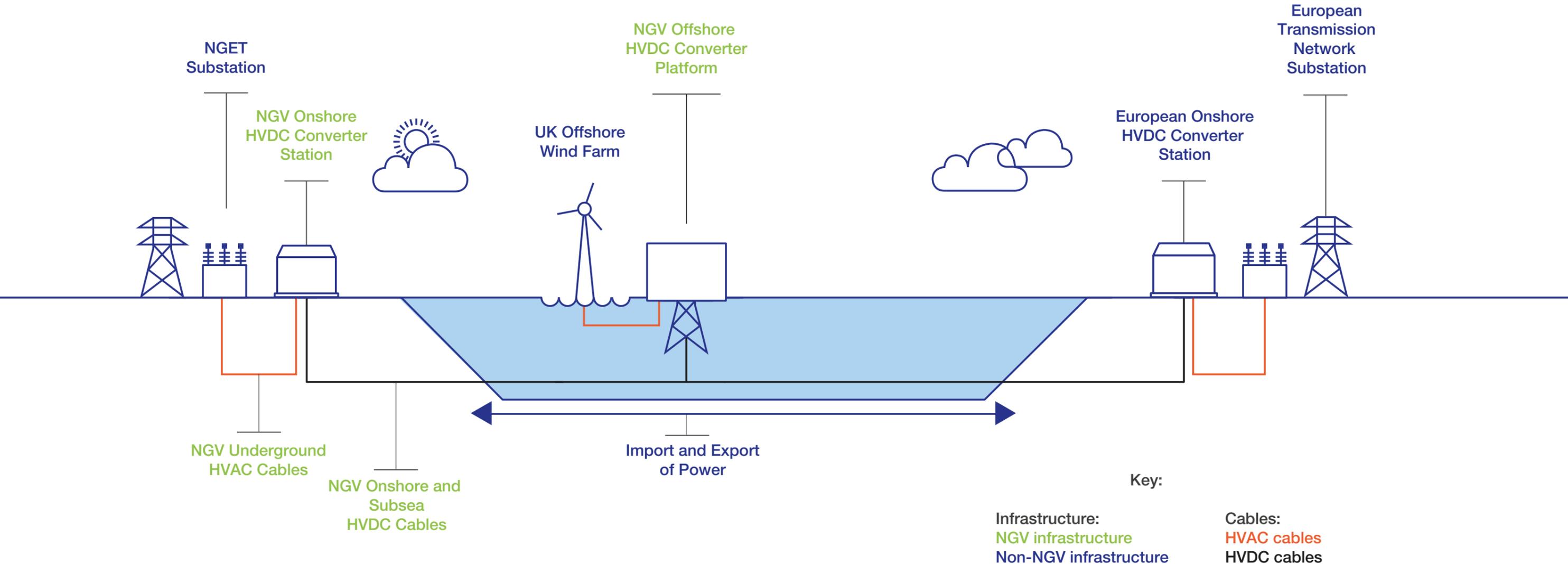


Figure 2: Indicative components of a MPI

Nautilus onshore

We began our site selection process with an initial desk-based appraisal and have since been undertaking assessments on siting and routeing options.

Our shortlisted converter station search areas, landfall and cable route options, are detailed on page 10.

For our Nautilus DCO application, we intend to narrow this down to:

- One converter station site of five hectares
- One landfall site
- One HVDC cable corridor from the landfall location to the converter station
- One HVAC cable corridor from the converter station to the NGET substation

Our connection location

This work has been based on the reasonable assumption of a potential connection location at the Friston NGET substation as proposed by ScottishPower Renewables (SPR). Our feasibility and assessment work based on a Friston substation connection continues and we are seeking your feedback on these options.

Converter station search areas, landfall site options and cable corridor options

We began with a search area for potential converter station sites within five kilometres (km) of the proposed NGET substation in Friston. We looked at all of the known environmental features in this five km search area to identify areas which featured constraints that we would want to avoid, if possible, such as environmentally designated sites, heritage assets, hydrology features, recreational areas, landscape designations, villages, towns, and existing and known infrastructure. For potential landfall locations our search area consisted of coastline adjacent to this five km search area in order to keep the cable route as direct as possible and to limit the potential impact. This process included desk-based research and a series of ecological surveys.

We undertook a further assessment of these locations to evaluate and identify a shortlist of the most suitable converter station search areas, landfall site options and cable corridor options. Key criteria used for selecting the most suitable options included:

- The potential to affect the Suffolk Coast and Heath AONB and Heritage Coast
- Visual impacts
- Proximity to Public Rights of Way and cycle routes
- Proximity to residential properties, existing infrastructure and future developments
- Impacts to local heritage and archaeological assets
- Ecologically designated sites and sensitive features
- Flood risk
- Conformance with Local Development Plan (LDP) policies

For our landfall site options, nearshore constraints were also considered including:

- Shipping and vessel activity
- Commercial fishing and recreational usage
- Marine archaeology

Considering different scenarios

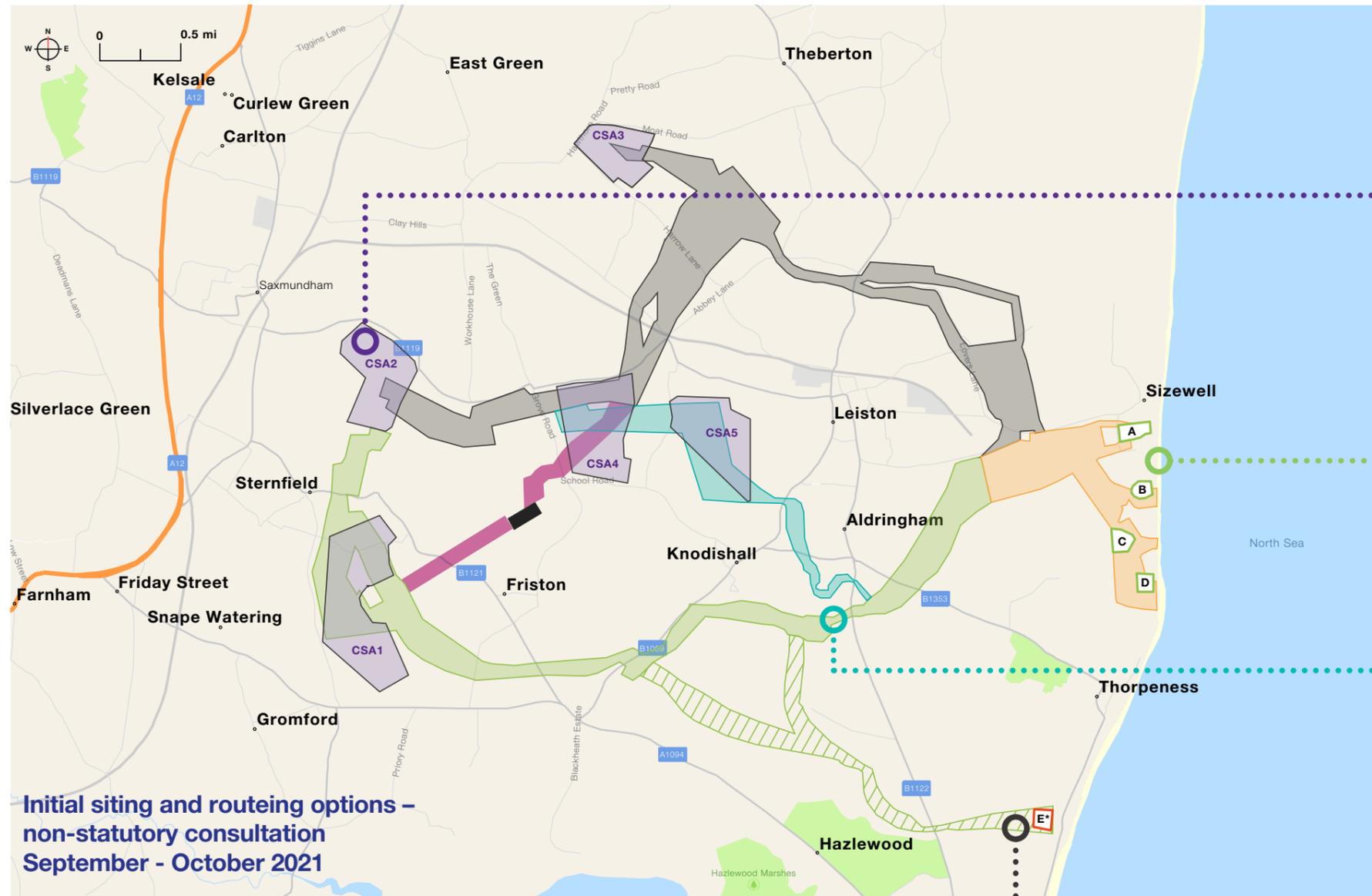
We recognise that the Friston substation has not yet been consented. We participated in the Development Consent Order (DCO) Examinations for East Anglia One North and East Anglia Two as an Interested Party and continue to monitor the outcome. Parallel to our siting and routeing work, we are continuing to consider the potential coordination opportunities associated with our connection area.¹

MPIs present the opportunity for coordination of multiple projects. For Nautilus this means both providing a connection opportunity for new offshore wind farm/s (integration) and exploring the ability to co-locate with projects to reduce potential impacts both onshore and offshore (collaboration). Currently, our work involves exploring different scenarios for potential coordination. This work is at a very early draft stage, and we are not able to share further details during this consultation. However, the feedback you provide now will help inform our work on this.



¹ Our connection agreement for Nautilus relates to a new National Grid Electricity Transmission (NGET) substation on the Sizewell 400 kilovolts (kV) network in the 'Leiston area'. The connection agreement therefore relates to an area rather than a specific location.

Initial siting and routeing options



Initial siting and routeing options – non-statutory consultation September - October 2021

Figure 3: Initial siting and routeing options

Key

- Landfall location options
- Landfall E - least preferred onshore*
- Northern cable route corridor
- Southern cable route corridor
- Shared route for Northern and Southern corridor
- Central cable route corridor
- Landfall E cable route corridor
- Converter station search areas
- Friston substation
- Cable corridors for grid connection

Converter station search areas

We have identified five shortlisted converter station search areas. A typical footprint for a converter station site covers an area of five hectares (12 acres). This includes space for construction lay down areas as well as the converter station building. The converter station will have a height of up to 24 metres. The exact size and height will depend upon the specific proposals for mitigation and construction.

Landfall options

The landfall location is the point where our cables come ashore and typically requires a working area of two hectares during construction. The cables will be buried underground at the landfall site. We have identified five landfall location options within the search area.

Cable route options

We have undertaken an initial screening of constraints to identify possible cable corridors between the emerging landfall options and converter station search areas, and between the converter station search areas to the proposed National Grid substation in Friston.

More detailed OS Maps will be available online and at our events.

*While Landfall E has not been discounted, it is heavily constrained from an onshore perspective. Landfall E is located within an Important Bird Area (IBA), RSPB reserve and Site of Special Scientific Interest (SSSI). It is also located close to a Special Protection Area (SPA) and County Wildlife Site. These ecological features present substantial siting and routeing challenges. As such, Landfall E is not preferred from an onshore perspective. However, due to environmental features and technical constraints in the marine environment we need to consider this Landfall options from an offshore perspective in order to confirm that one or more of the landfall options that have been identified are achievable. We will also consider any engineering measures which could reduce potential effects if it emerges that there is a need for Landfall E to be progressed.

Nautilus offshore

As well as developing our onshore proposals we are also progressing assessments of the project in the marine environment. Offshore components for Nautilus will include:

- Offshore converter station platform/s
- A submarine High Voltage Direct Current (HVDC) interconnector

There are a number of factors which will influence the infrastructure required in the marine environment including ongoing discussions with the supply chain, technical assessment and discussions with offshore wind farm developers.

Submarine HVDC interconnector

The interconnector will comprise of HVDC submarine cables. These will be installed between the two respective landfall locations in Belgium and East Suffolk and, where possible, will be buried within the seabed. Where it's not possible, it will be protected by non-burial methods such as the placement of rocks on top of the cable. Although the offshore interconnector route is yet to be defined, its total length between Belgium and East Suffolk will be approximately 200 kilometres (km).

Offshore converter station platforms

Offshore wind farm/s will be connected to the interconnector via an offshore HVDC converter station platform. The design and configuration of the offshore HVDC converter station platform is still in its early stages.

The approximate maximum dimensions for an offshore HVDC converter station could be 110 metres in length and 80 metres wide, with a height of 45 metres. Note that the converter station will be installed on foundations (jacket) elevating it above the water surface and the height of the jacket, and therefore total platform structure will depend on water depth at the chosen location.

If Nautilus connects more than one offshore wind farm then it may be necessary to have two separate offshore converter platforms in order to reduce the length of cabling connecting the offshore wind farms.

This would be subject to further engagement with stakeholders and relevant offshore wind farms.

Our engagement with engineering specialists is ongoing as we continue to discuss and refine what the detailed infrastructure requirements are in the offshore marine environment.

Offshore siting and routing

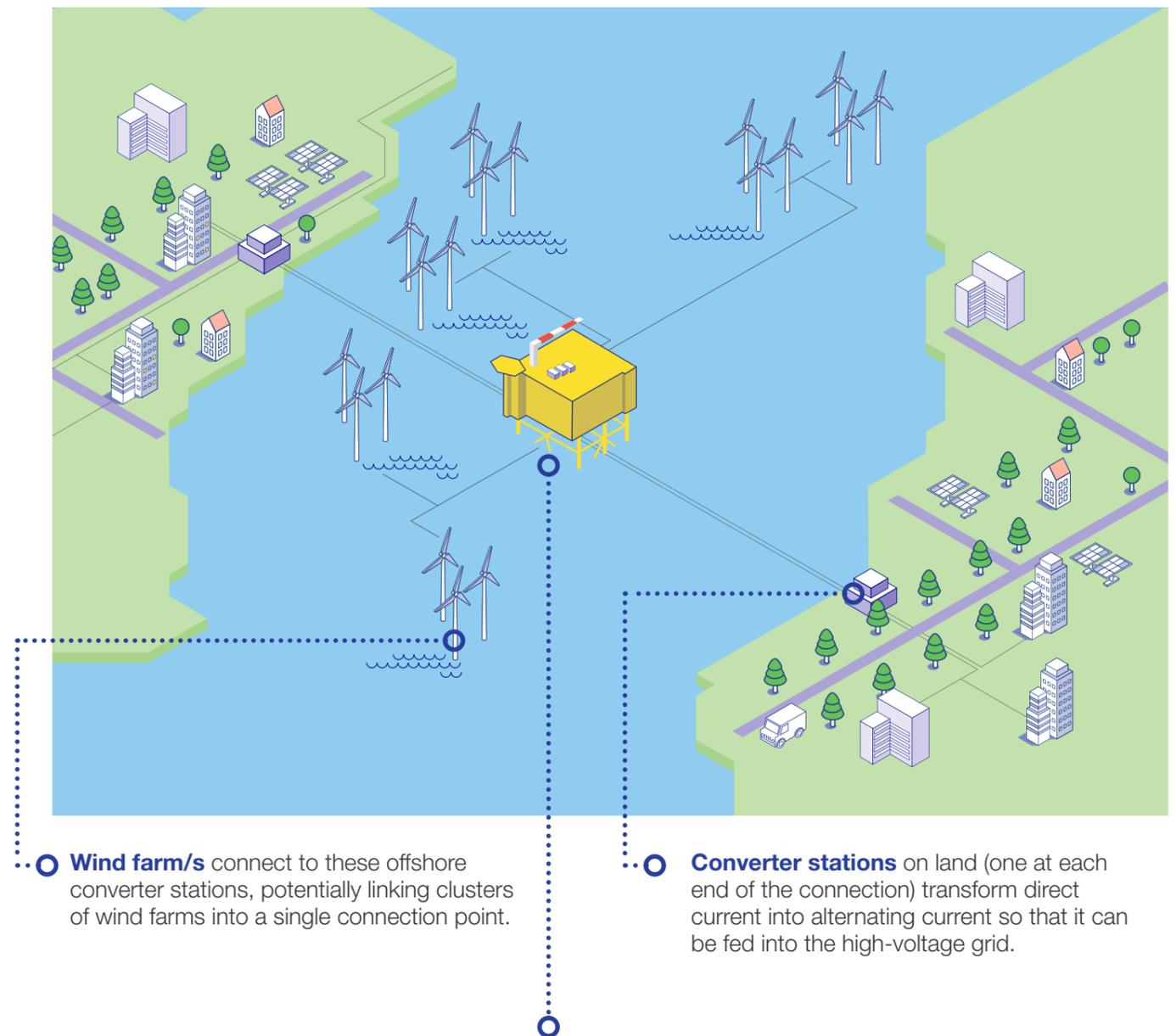
We are currently identifying potential cable route options and possible location options for the offshore HVDC converter station platform (and any additional infrastructure). As part of this process, we have mapped environmental, social and engineering information to gain a better understanding of the constraints and features that are present in the study area. Key criteria considered to identify routes and sites includes:

- Nature conservation designations and protected habitat areas
- Existing and planned infrastructure (cables, pipelines, wind farms), aggregate extraction areas and disposal sites
- Navigational features, anchorages, major shipping routes, commercial fishing grounds, wrecks
- Water depth, seabed sediment and other seabed features

Once we have identified potential options we will engage with relevant technical marine stakeholders and fisheries organisations to help inform the development and refinement of these options. The location of the offshore platform will be informed by the alignment of the interconnector cables and the proposed location of the wind farm schemes.

Tomorrow: offshore wind and Interconnectors in harmony

MPIs enable offshore wind and interconnection to work together as a combined asset.



• Wind farm/s connect to these offshore converter stations, potentially linking clusters of wind farms into a single connection point.

• Converter stations on land (one at each end of the connection) transform direct current into alternating current so that it can be fed into the high-voltage grid.

An **offshore converter** station transforms the alternating current into direct current, enabling it to pass through the HVDC cable.

Our consultation

Our consultation starts on Tuesday 14 September and will run for six weeks, closing on Tuesday 26 October. Our communication lines will still be open following this period and there will be more opportunities to comment on our proposals once these have been refined.

This consultation and our local information events are an important part of our pre-application consultation. Understanding what issues are most important for the local community is key, and the feedback gathered at these events will help us to shape our proposal going forward.

Community drop-in sessions

We are planning to hold public events at different locations across our consultation area. These events will complement our online consultation process and be a direct opportunity for you to view our plans, discuss them with members of the project team, and provide feedback on them.

Details of the local information events can be found below:

Tuesday 28 September - 4pm to 8pm -
Leiston Community Centre, King George's Avenue,
Leiston, Suffolk, IP16 4JX

Wednesday 29 September - 10am to 2pm -
Friston Village Hall, Church Road, Friston,
Suffolk, IP17 1PU

Thursday 30 September - 4pm to 8pm -
Thorpeness Pavilion, Thorpe Road,
Thorpeness, Suffolk, IP16 4FD

Friday 1 October - 10am to 2pm -
Saxmundham Market Hall, High St,
Saxmundham IP17 1AF

Community webinar events

We will also be holding community webinar events during our consultation period. You will be able to join by video call or phone to hear more from the project team and ask any questions you may have. These will be held on:

- **Thursday 7 October 2021**
from 10am to 12pm
- **Tuesday 12 October 2021**
from 6pm to 8pm

A detailed step-by-step guide for how to access our community webinars, along with webinar links and telephone dial-in details are available on our website: nationalgrid.com/group/about-us/what-we-do/interconnectors-connecting-cleaner-future/nautilus-interconnector

Virtual exhibition

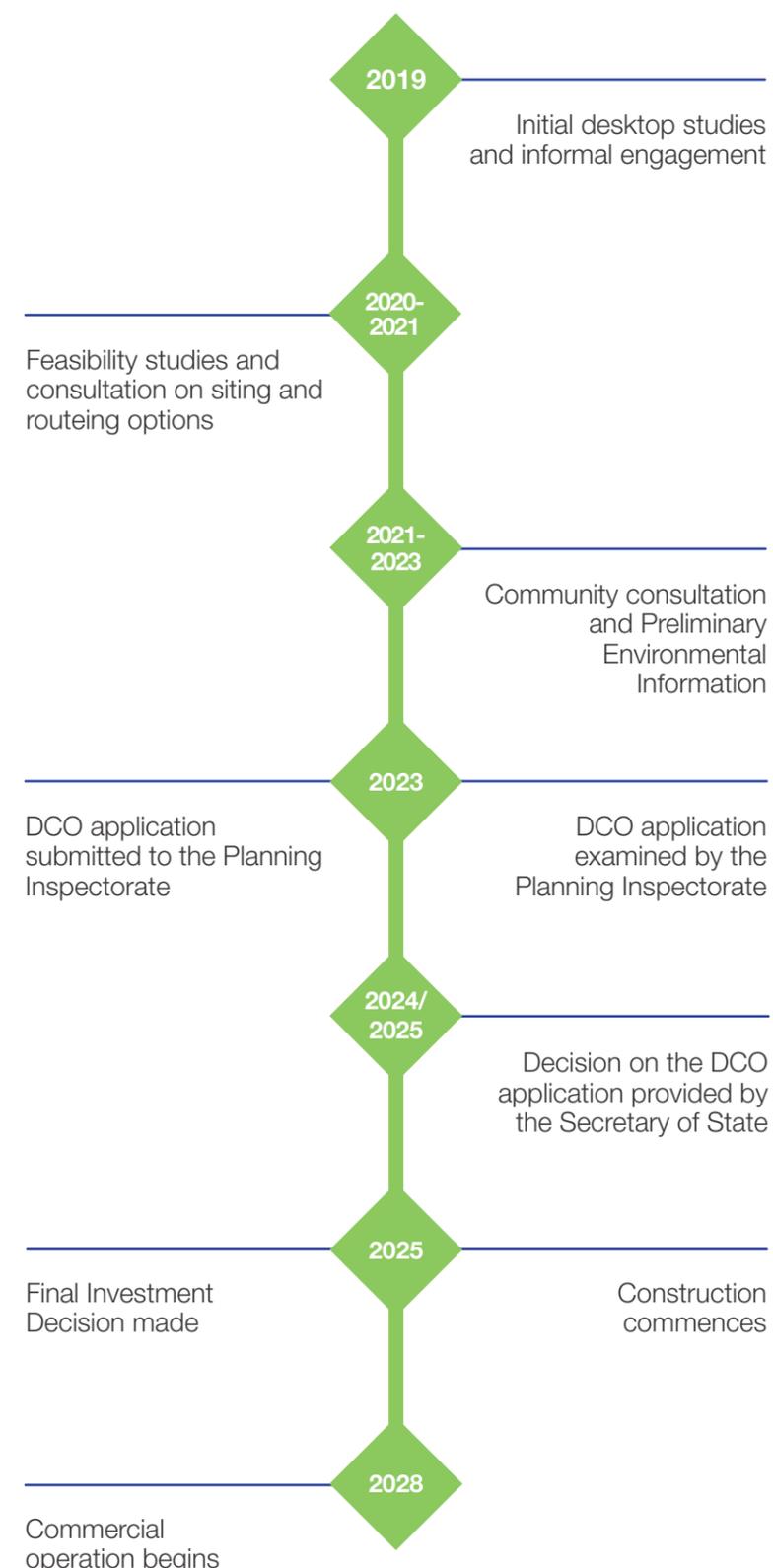
For anyone unable to attend our consultation events, we have created a virtual version which is accessible through our project website and contains the same information: nationalgrid.com/group/about-us/what-we-do/interconnectors-connecting-cleaner-future/nautilus-interconnector

Have your say

You can access our consultation material and provide your views in the following ways:

- In person by attending one of our events
- Online via our project website
- By post by writing a letter or completing one of our feedback forms and posting it back to us free of charge to our Freepost address on the back page of this leaflet
- You can also email us, call us or write to us using the details on the back page of this leaflet

Indicative Timeline*



*Please note, all dates are indicative.

Contact us

Please don't hesitate to get in touch if you would like to find out more information about Nautilus Interconnector.

You can contact a member of our Community Relations Team to find out more by using the details below.



Write to us at:

Freepost Nautilus Interconnector



Email us at:

info@nautilusinterconnector.com



Call our Freephone information line:

08081 699 822



For more information about Nautilus Interconnector please visit:

www.nationalgrid.com/group/about-us/what-we-do/interconnectors-connecting-cleaner-future/nautilus-interconnector

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