Humber Low Carbon Pipelines Project

Supporting the decarbonisation of the Humber

October 2021

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Agenda

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01

Introduction

Background and context

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National Grid Group

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nationalgrid UK

nationalgrid Electricity Transmission

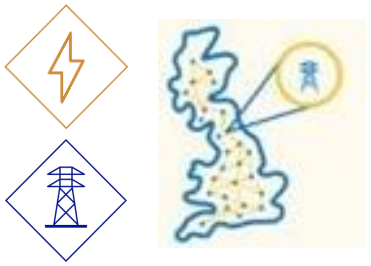
Transmission Owner

Own, build, operate and maintain the transmission assets.

nationalgridESO

System Operator

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 business

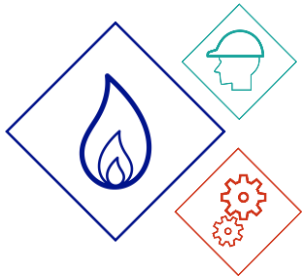
nationalgrid ventures

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

nationalgrid Gas

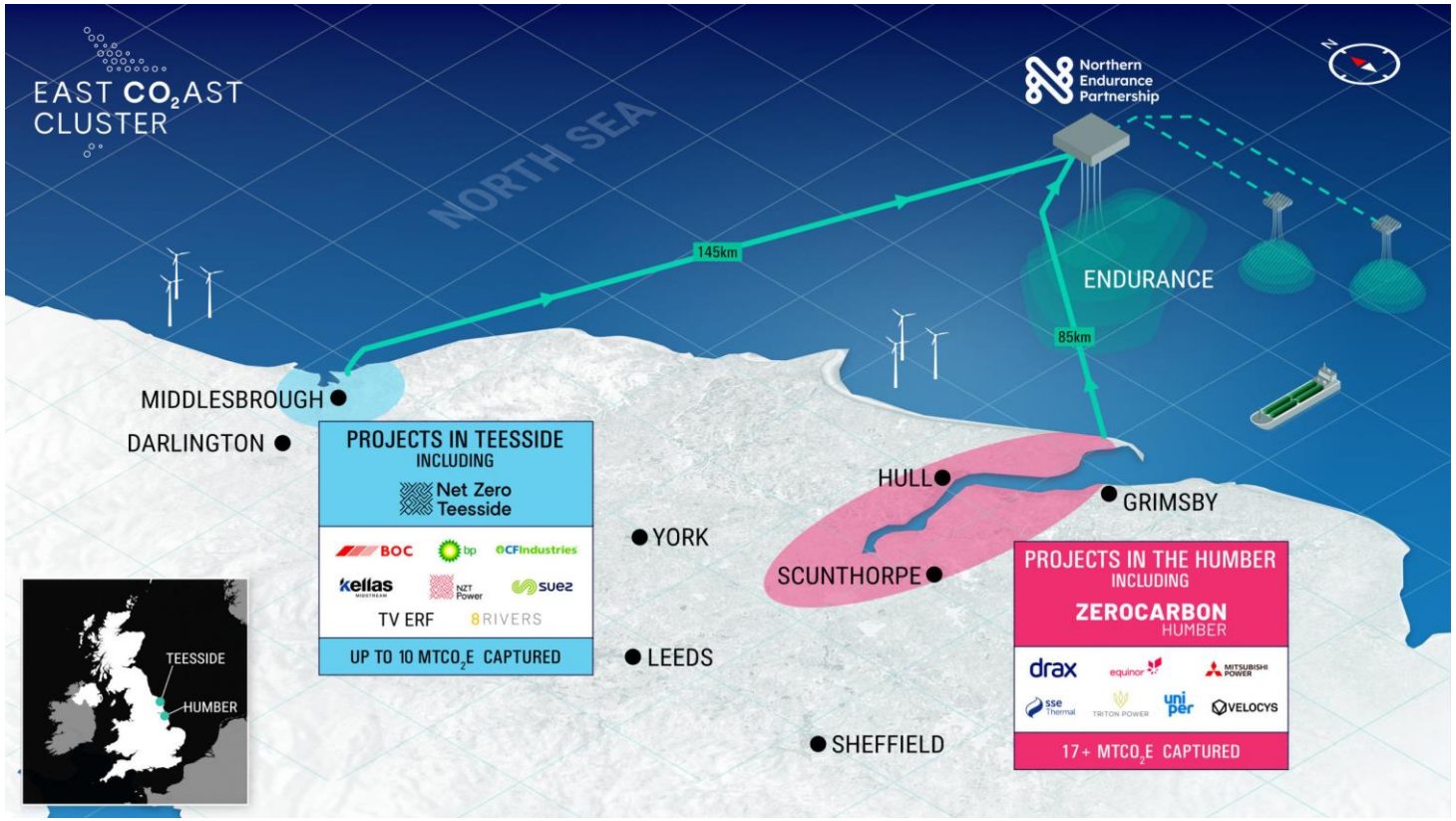
(NGG)

Manage and operate the national transmission network in Great Britain. Promoted Feeder 9 Project (River Humber)



Carbon Clusters - East Coast Cluster

The Government is committed to supporting the development of Carbon Capture, Usage and Storage (CCUS) and hydrogen technologies in the UK. Following consultation in February 2021, the Department of Business, Energy, and Industrial Strategy (BEIS) set out its approach to determine the sequence for locations to deploy CCUS in order to achieve this ambition.



The East Coast Cluster was created by the Northern Endurance Partnership

02

The Technology

CCUS and pipelines

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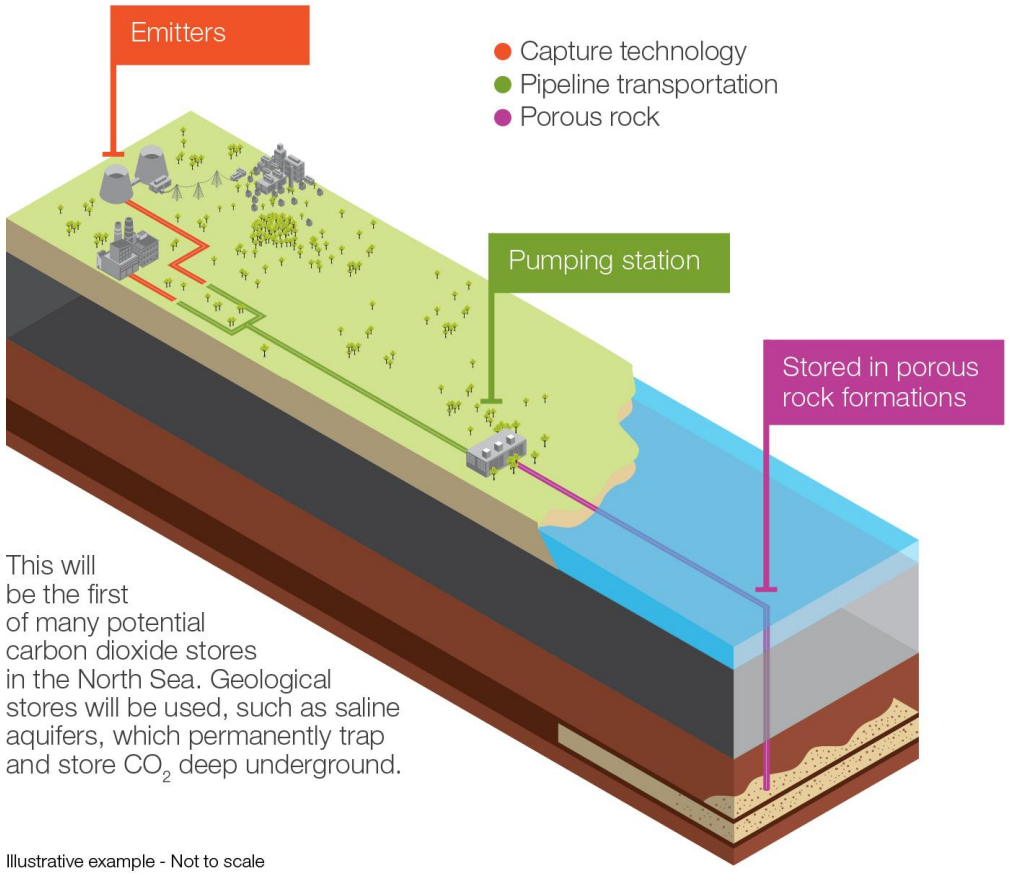
What is carbon capture, usage and storage (CCUS)

- Carbon capture, usage and storage (CCUS) refers to technology which captures harmful carbon dioxide emissions
- The carbon dioxide is then transported to be stored permanently beneath the seabed

How does CCUS work?



Capture

Carbon dioxide is captured via a filter system on a flue or stack at a fossil fuel power station or industrial facility.

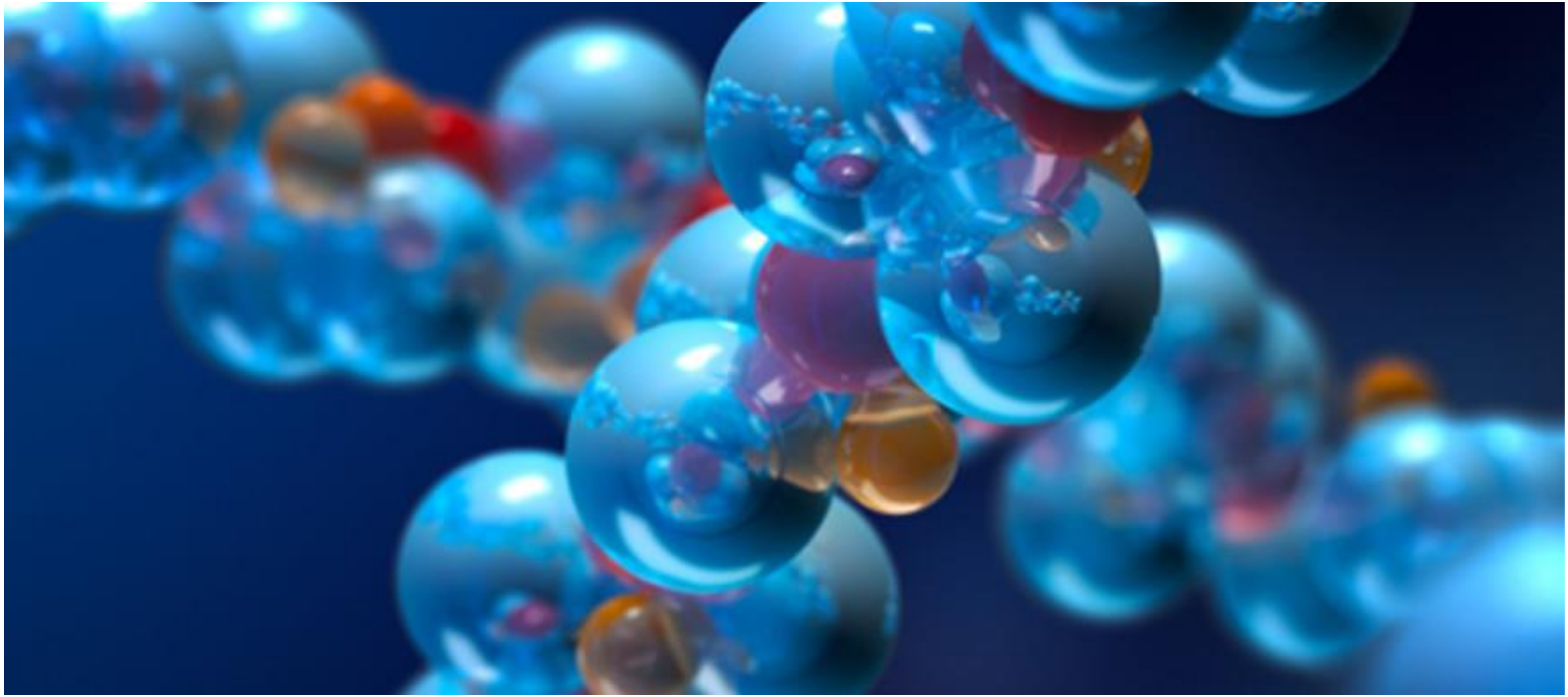
Transportation

Carbon dioxide is compressed and transported via onshore and offshore pipelines to a suitable storage location.

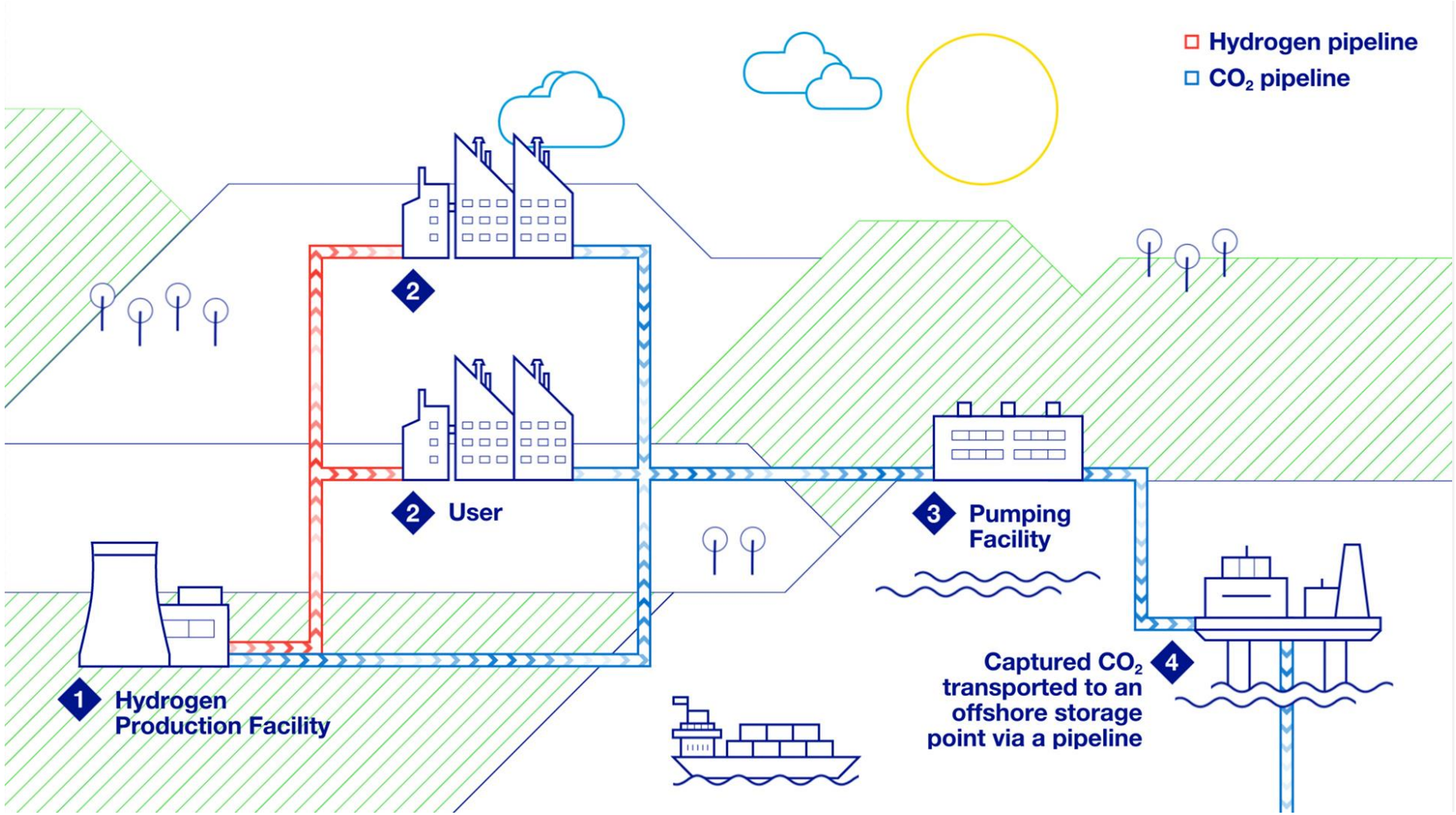
Storage

Carbon dioxide is injected into natural porous rock formations offshore where it will be stored permanently.

What is hydrogen



CCUS and hydrogen pipelines



03

The Humber

Reaching net zero

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The opportunity in Yorkshire and the Humber

The global energy revolution has begun. The Humber region can play a key role.

- The Humber region is the UK's largest industrial cluster. This means it can play a crucial part in helping the UK to transition to a low carbon economy
- Our proposed project aims to deliver a new onshore network of pipelines to transport captured carbon dioxide emissions away from the region's emitters
- It also aims to enable industries to fuel-switch from fossil fuels to low carbon hydrogen

Net zero by 2050

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The Project

Overview

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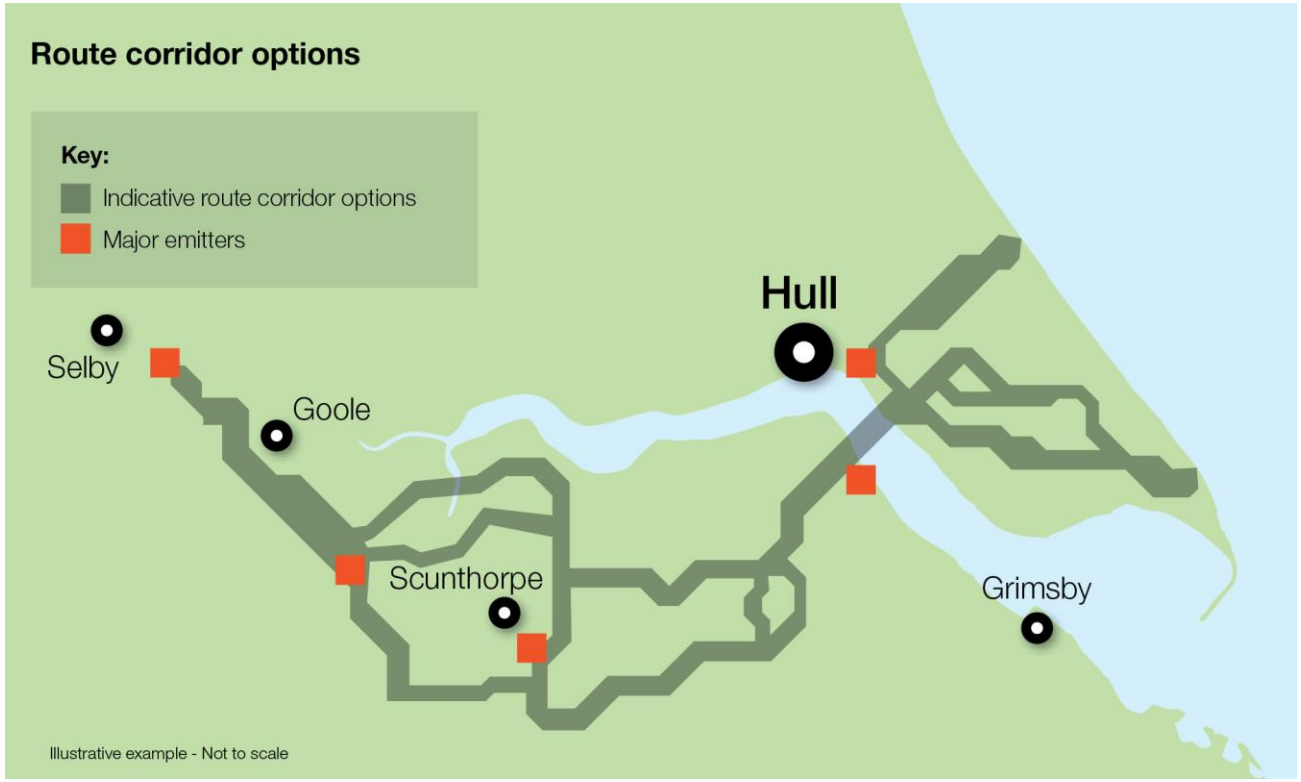
The Project

We aim to create an onshore network of underground pipelines to transport carbon dioxide and hydrogen

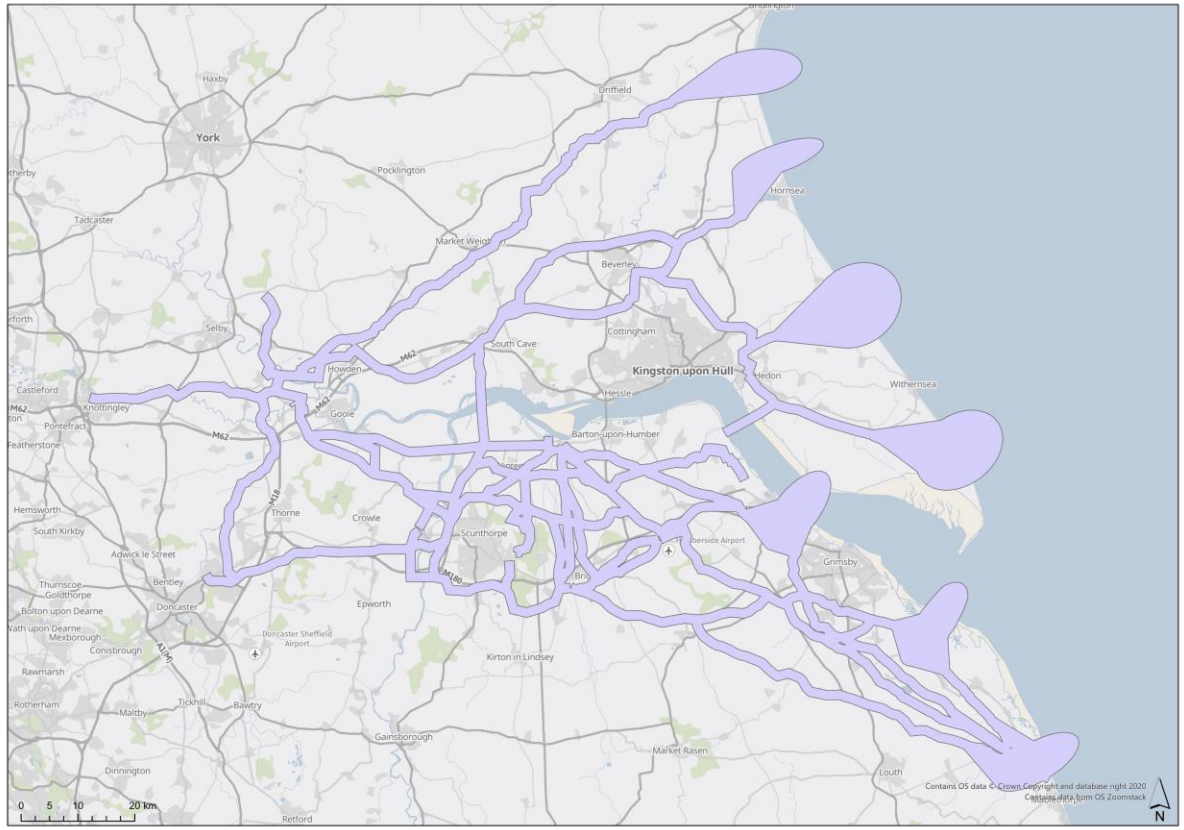
The pipelines are intended to connect to major industrial emitters (such as power stations) in the Humber region

The pipelines will then continue to a landfall point on the Holderness coast to allow the carbon dioxide to be taken offshore for storage and the project would include a new pipeline crossing under the River Humber

The project is classed as a Nationally Significant Infrastructure Project and will be consented by a Development Consent Order



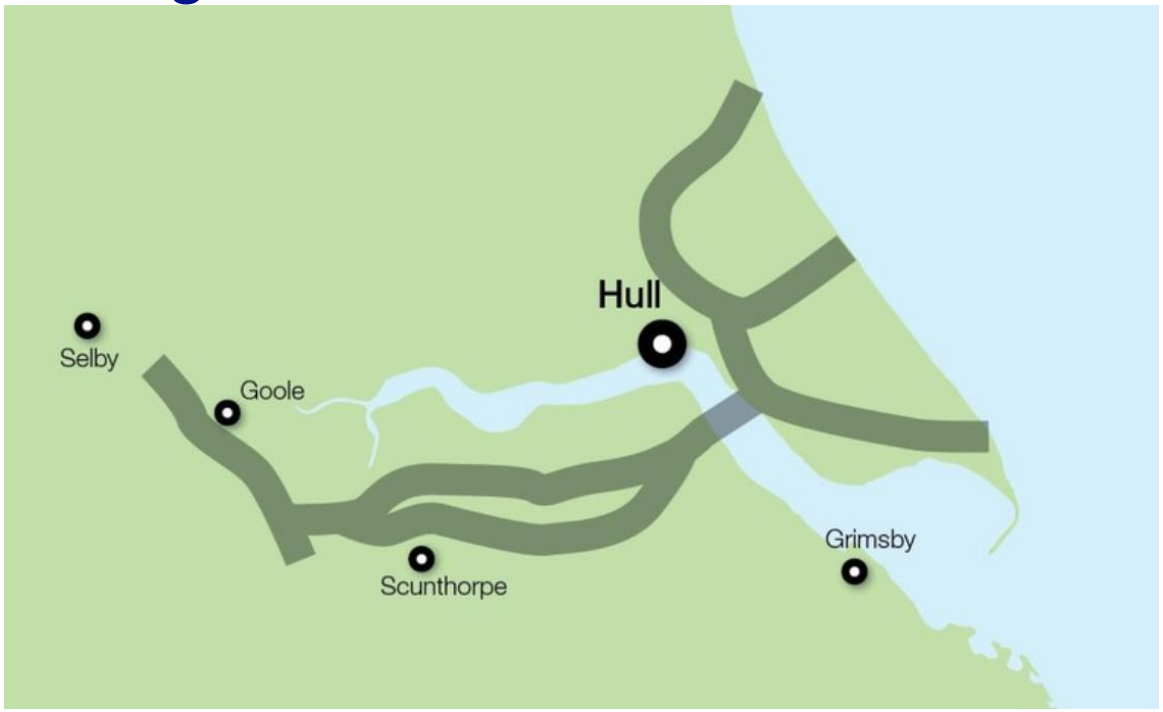
Route corridors- earlier options



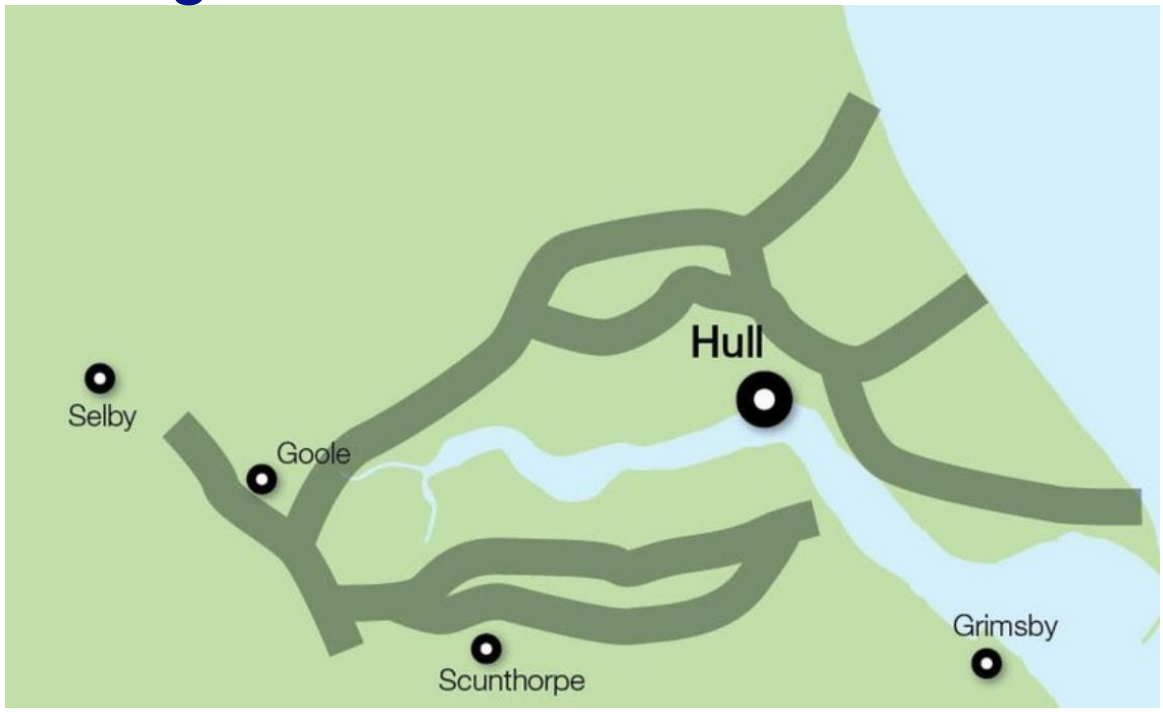
- Our initial appraisal identified several possible route corridor options
- Since then, physical, environmental and social factors have shaped possible routeing options. This includes the location of potential emitters along with physical, social and environmental factors.

Route corridors- earlier options

Configuration A



Configuration B

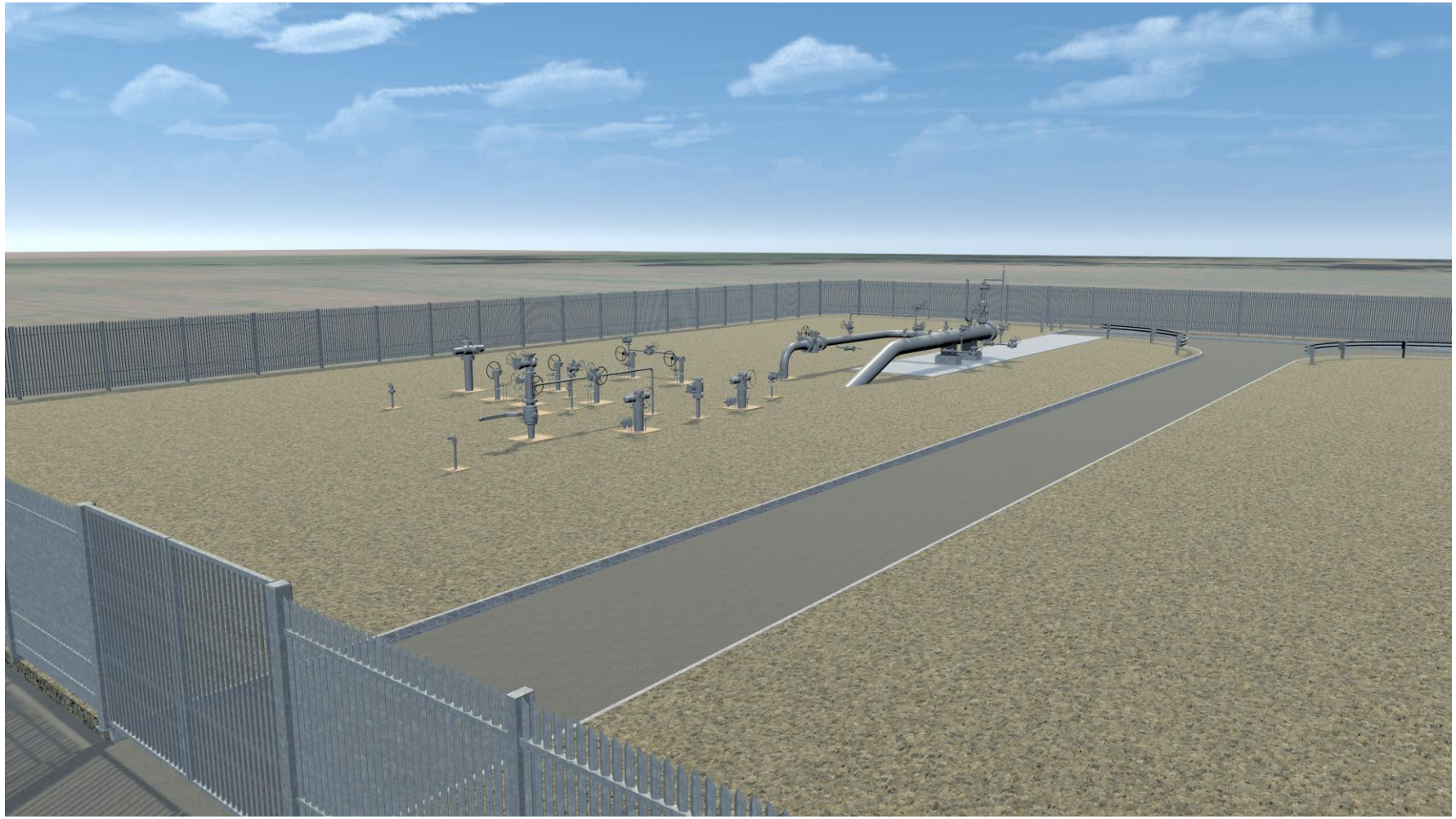


Route corridor options

We have developed broad route corridor options within which the underground pipelines and associated infrastructure could be located


Section A
Section B
Section C
Market Weighton
Beverley
Aldbrough
Cottingham
South Cave
Howden
M62
Kingston upon Hull
Hedon
Withernsea
Hessle
Goole
Barton-upon-Humber
Easington
Winterton
Thorne
M18
Crowle
Scunthorpe
Immingham
Humberside Airport
Grimsby
Cleethorpes
Brigg
M180
Epworth
A1
A2
A3
A4
A5
B1
B2
B3
C1
C2
C3
C4
C5
C6

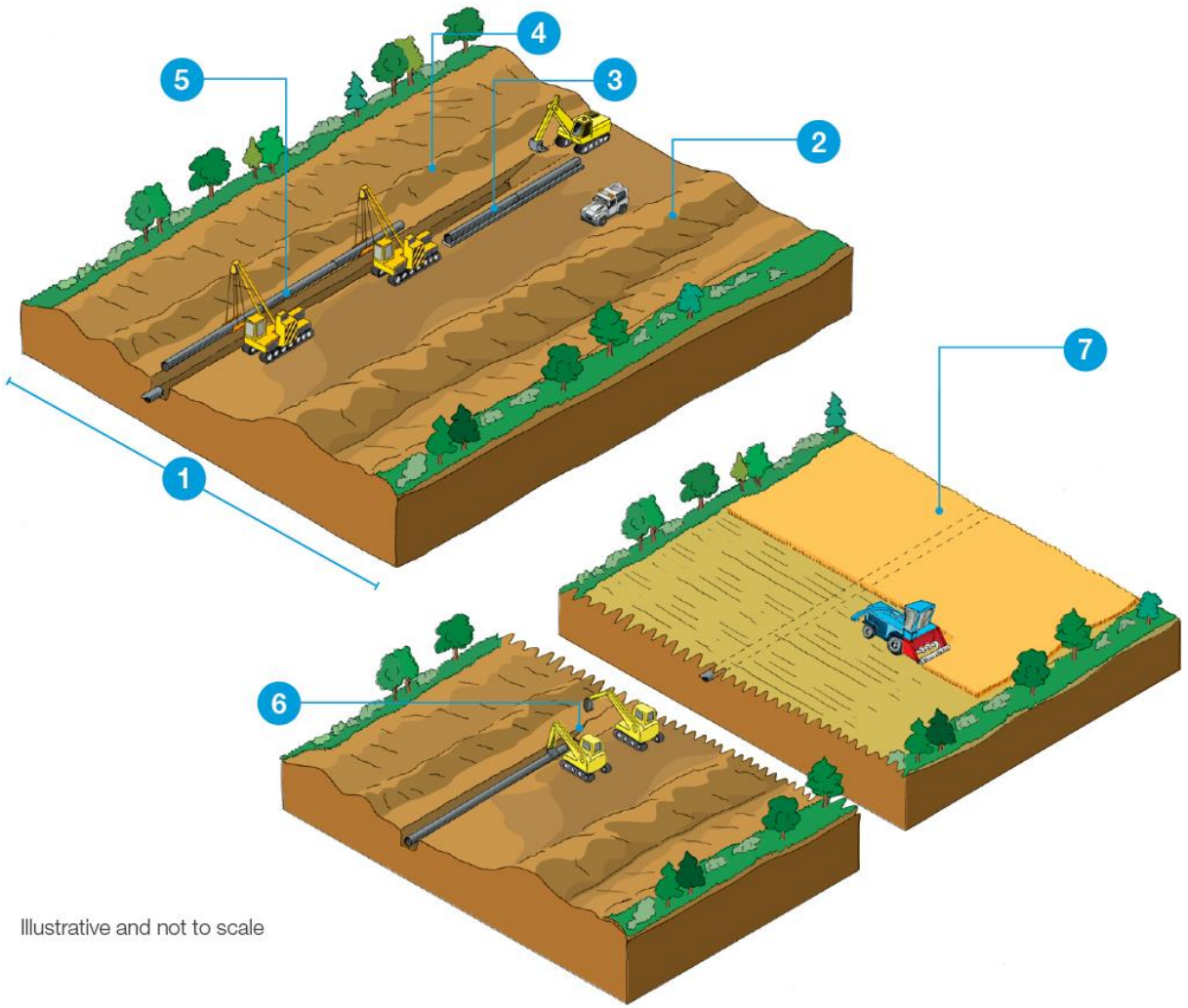
Above Ground Installations (AGIs)



- Additional detail in relation to Above Ground Installations will be available at future stages of consultation

**Illustrative image of a Pipeline Inspection Gauge (PIG) trap installation*

Constructing an onshore underground pipeline



Illustrative and not to scale

National Grid has extensive expertise in designing, building and operating safe and effective high-pressure gas pipelines

This is an illustrative diagram showing the construction process of an onshore pipeline. Please note, this image is based on a single pipeline. The Humber Low Carbon Pipelines project will involve two pipelines and will take a similar approach.

1 First, the working width – the total area within which construction work will take place – is marked out.

2 Next, the topsoil is carefully stripped and stored next to the pipeline route.

3 The pipeline is delivered in short lengths and placed on supports. These short lengths of pipeline are welded together into longer sections called 'strings'.

4 The pipeline trench is dug, with the excavated material being stored separately from the topsoil on the opposite side of the trench.

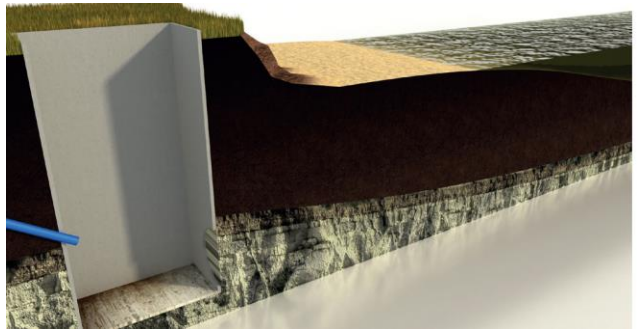
5 The pipeline 'strings' are lowered into the trench using special vehicles called 'side booms' and welded to the pipeline already laid.

6 The trench is filled in using the previously excavated material and the topsoil is replaced.

7 Once the land above the pipeline has been fully reinstated, it can be returned to its previous use, for example farming.

Constructing an onshore underground pipeline

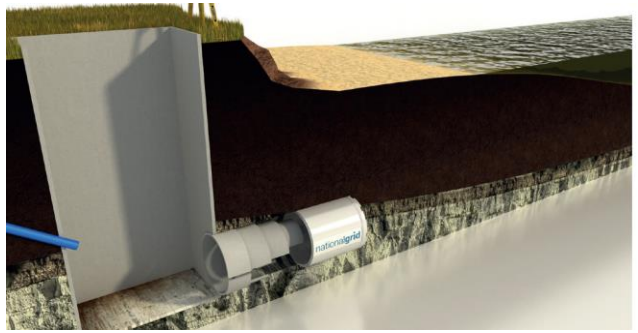
Going under the Humber



Shaft construction

Shafts are built on either side of the river.

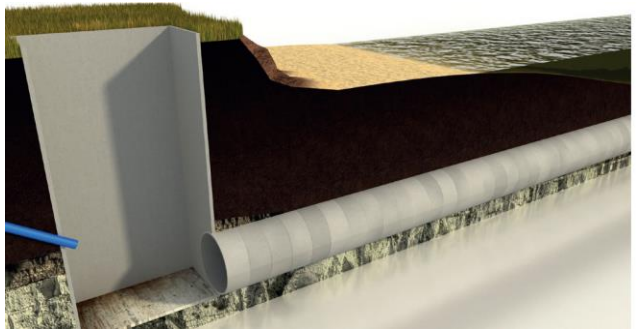
These can be vertical or sloped, depending on geological and engineering considerations.



Tunnel boring

A tunnel bore machine digs the tunnel beneath the river.

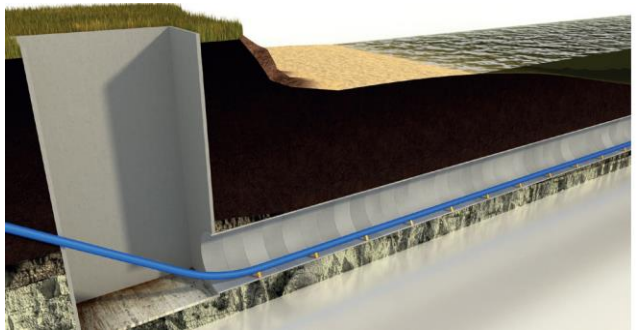
This can bore through anything from hard rock to sand.



Concrete lining

The tunnel is lined with concrete segments as it is dug.

The excavated material is transported for use or disposal away from the site. We are investigating options for its reuse.



String fabrication and pipeline pulling

The pipeline is pulled through the tunnel from the surface in 'strings' – long, welded sections of pipe assembled on-site on one side of the river.

Once complete, the tunnel shafts are filled and the land reinstated as close to its original condition as practical.

Landowners

The pipelines would primarily run through agricultural or industrial land and will not be routed through private gardens.

We will work with landowners over the coming months to undertake non-intrusive surveys.

As the route develops there will be further discussions with landowners and most likely more surveys.

Our land agents will always be the point of contact to ensure they have a consistent relationship.

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Next steps

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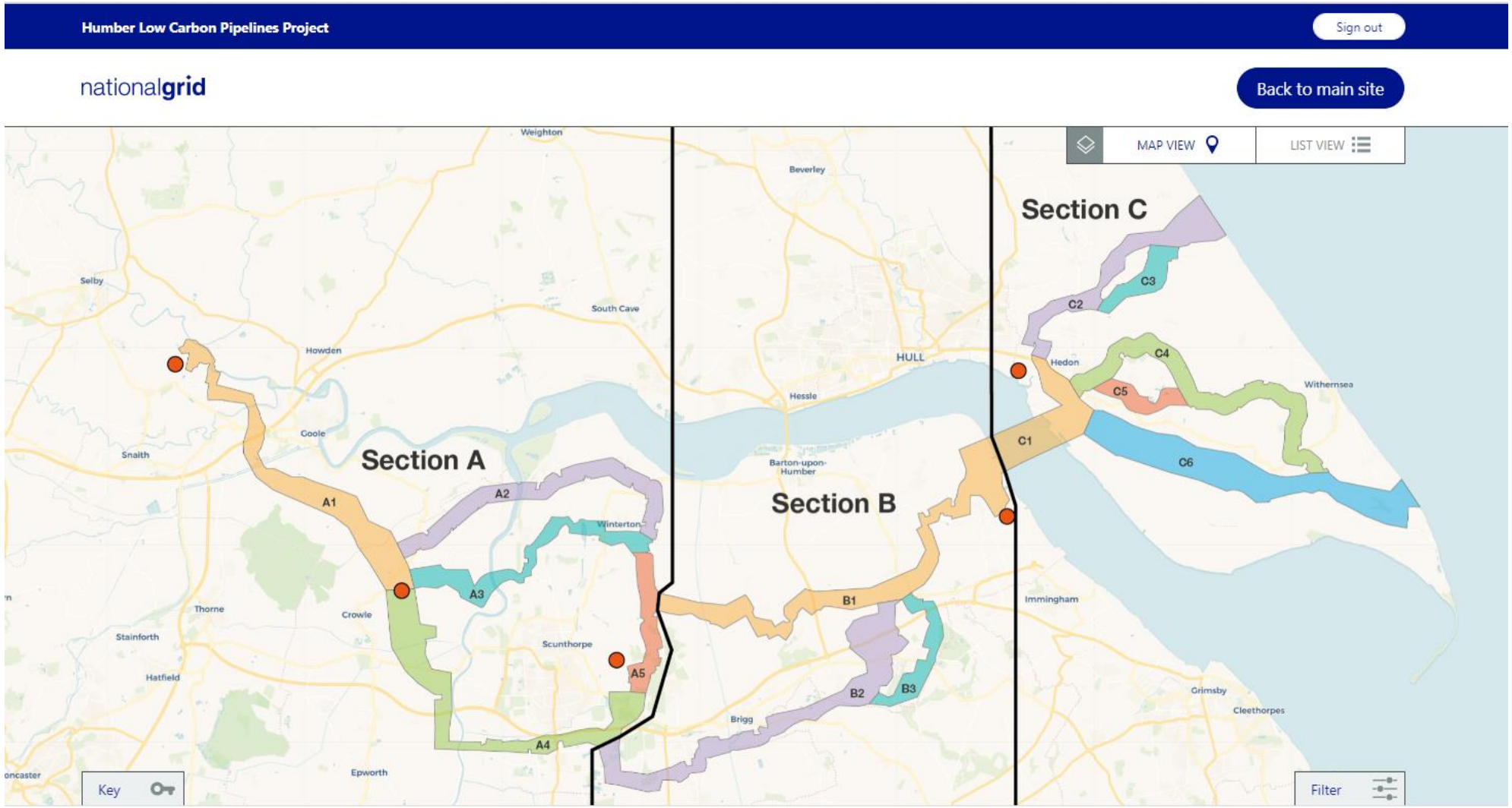
Consultation – have your say



Submit your comments online

Submit your comments in writing

https://nationalgrid.com/humberpipelines

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Timeline

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Timeline

Late Summer / Autumn 2021	Non-statutory consultation on preferred route corridors
Early 2022	Second non-statutory consultation on potential route corridors
Spring / Summer 2022	Statutory consultation on detailed project route proposals
Late 2022	Development Consent Order (DCO) application submission
2023 / early 2024	DCO examination and determination process
2024	Construction phase begins
2026	Earliest construction completion date

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Q&A

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08

Thank you

nationalgrid.com/humberpipelines

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Northern Endurance Partnership:
https://eastcoastcluster.co.uk/consultation/

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