Keadby 3 Low Carbon CCGT Power Station Project

Stage One Consultation for new Low-Carbon Gas Fired Power Station

We are proposing to build a new gas fired power station at Keadby, North Lincolnshire. The project, known as Keadby 3, will have a generating capacity of up to 910 megawatts (MW) and will provide essential back up to renewable generation and reliable and flexible energy during the country's transition to Net Zero.

Keadby 3 will be a highly efficient gas fired power station. It will either use natural gas as the fuel and be fitted with a Carbon Capture Plant (CCP) to remove carbon dioxide (CO_2) from the emissions to air from the plant, or it will be fired on primarily hydrogen, with no carbon dioxide emissions to air from its operation. Both options are currently being considered, and government is also currently considering the roles of carbon capture and hydrogen in the power sector nationally.

Keadby 3 will require connections for natural gas and possibly hydrogen fuel, water for use in the process and for cooling and possibly for a pipeline to export the captured CO₂ into a gathering network being provided by others and from there to a permanent geological storage site. An electricity connection to export the generated electricity to the UK transmission system will also be required. The plant would be capable of operating as a dispatchable low-carbon generating station to complement the increasing role of renewables in supplying the UK with electricity.

The proposed location of Keadby 3 has been deliberately chosen to connect into the emerging proposals for the **Humber Low Carbon Cluster** – see details on **banner 3**.

Have your say

You can ask questions via the 'Live Chat' feature at the times listed below:

29 June 10am-1pm and 4-6pm; 1 July 11am-3pm and 5-7pm 9 July 4-8pm 10 July 9am-12pm

We particularly welcome written feedback that we can take into consideration in the development of the proposals. This can be provided by clicking <u>smartsurvey.co.uk/s/Keadby3</u> to a separately hosted web survey.

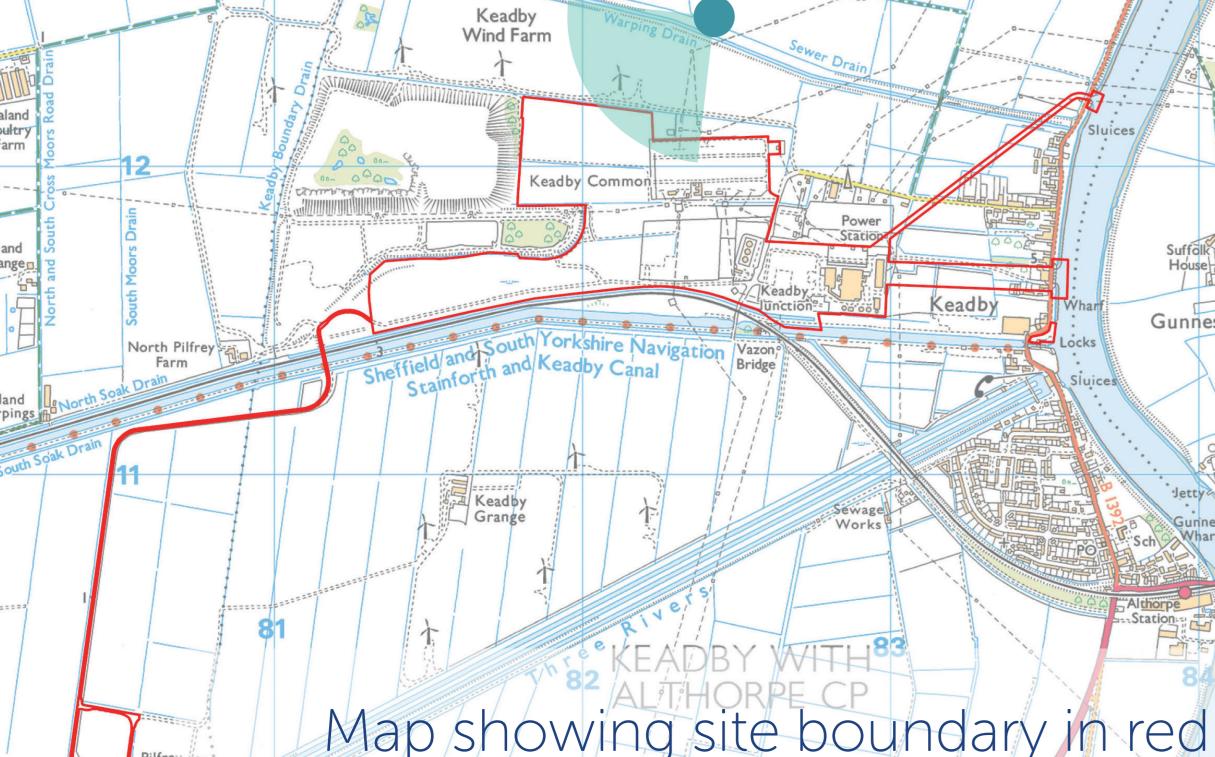
The exhibition works for all types of computer and smartphone, however you can also download all the documents if you prefer. An audio button is provided to read out any of the banners.

All feedback must be received before the end of consultation on 27 July 2020 at 5pm.

Indicative appearance of Keadby 3 in the context of Keadby 2 and the Keadby Windfarm



KEADBY 1 POWER STATION - Existing and operational



Map showing site boundary in red and camera angle of the illustration NATIONAL GRID SUB STATION



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What is Keadby 3?

Keadby 3 project is a Low-Carbon combined cycle gas turbine (CCGT) generating station with a capacity of up to 910MW electrical output, to be built on land in the vicinity of Keadby 1 and Keadby 2 near Scunthorpe.

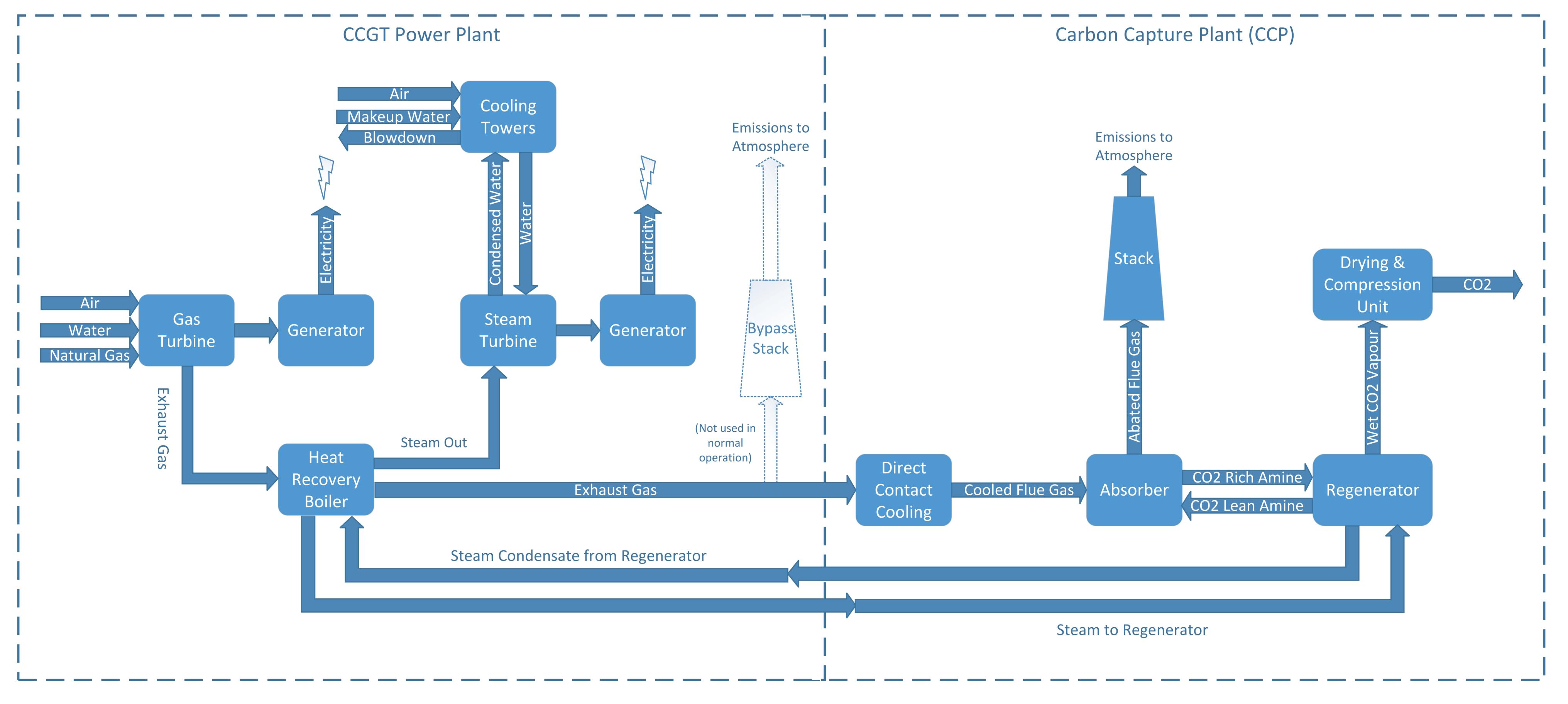
To develop Keadby 3, we must apply for a Development Consent Order (DCO) from the Secretary of State for Business, Energy and Industrial Strategy. This DCO, if granted, will permit the construction and operation of the project and specify what measures will be adopted to minimise its environmental effects.

The final technology selection will be determined by SSE Thermal in light of various technical and economic considerations. It will also be influenced by the prevailing policy and market conditions after the DCO is granted.

At this stage, the design of Keadby 3 therefore incorporates a necessary degree of flexibility, for example, in relation to the infrastructure to enable the CCGT to be fired primarily on hydrogen fuel or to enable CO₂ from a conventional natural gas-fired CCGT unit to be captured, compressed and exported for offshore storage.

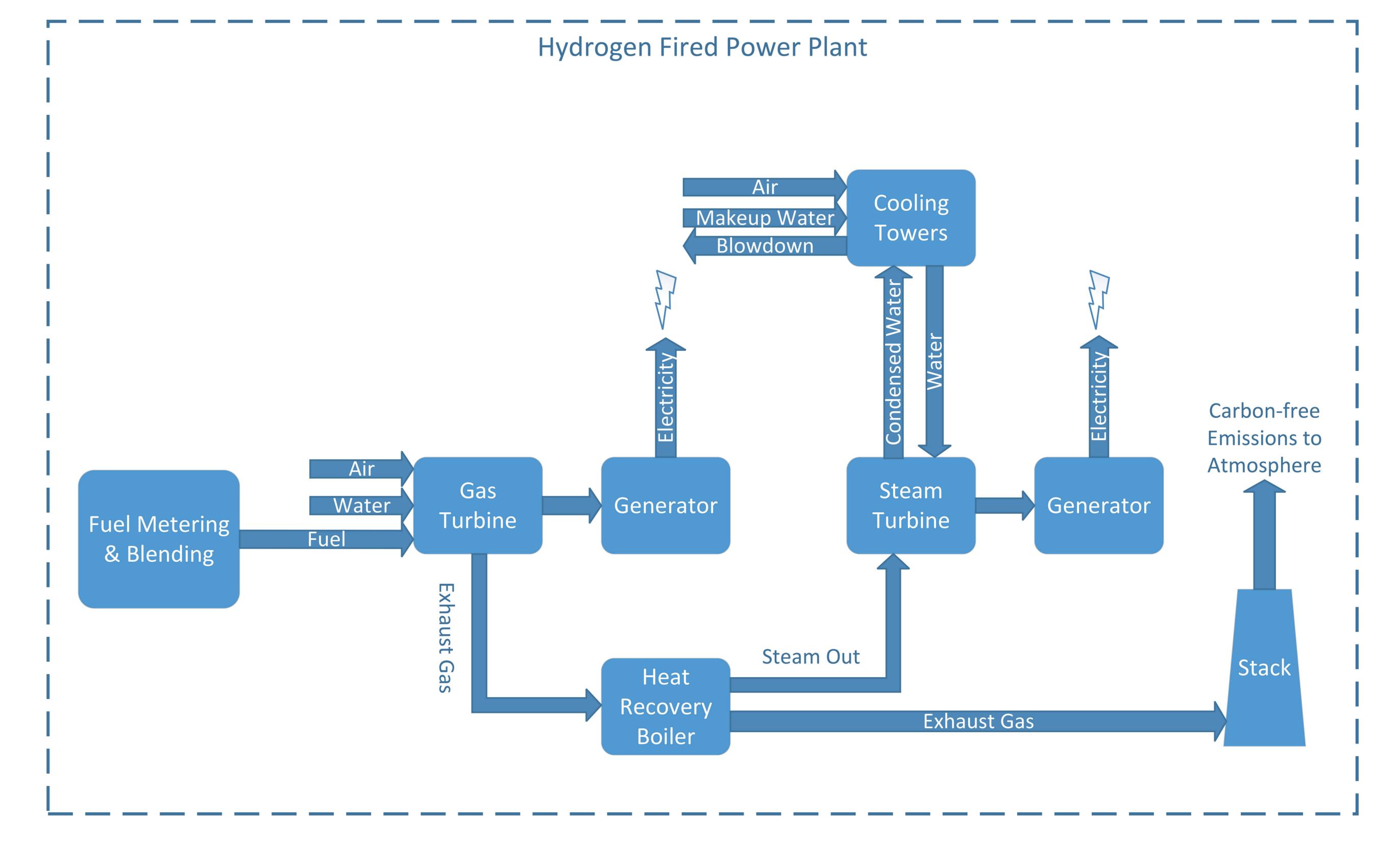
This flexibility is necessary to allow us to use engineering studies, environmental assessments and information from different technology providers to determine the most appropriate design for the project within agreed parameters.

As a low-carbon CCGT, Keadby 3 comprises one high efficiency gas turbine and associated steam turbine and either the infrastructure required to allow the CCGT to fire primarily on hydrogen gas, or inclusion of a post combustion Carbon Capture Plant (CCP) in a scenario where natural gas is used as the fuel. In the latter scenario, this is required in order that CO, emissions are captured and directed to an offshore geological store through the Humber Low Carbon² cluster pipeline network being developed by National Grid Ventures and partners. A diagram of these components, and optional components, is shown below.



Schematic of CCGT Power Plant and Carbon Capture Plant

Cooling would most likely be achieved through the use of hybrid wet/dry cooling towers using makeup water that is either abstracted from the River Trent or from the Stainforth and Keadby Canal to the south of Keadby 3. The decision as to which source is used for the cooling water makeup is being determined through engineering and environmental studies.



Schematic of Hydrogen Fired Power Plant



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About us

SSE Thermal is part of the FTSE-listed SSE plc, one of the UK's broadest-based energy companies. Over the last 20 years, SSE has invested over £20bn to deliver industry-leading offshore wind, onshore wind, gas generation, energy-from-waste, biomass, energy networks and gas storage projects, including investing millions of pounds to develop carbon capture and storage (CCS) projects. It operates six of the most flexible and efficient power stations in the UK and Ireland, jointly operates two of the most efficient energy-from-waste plants with Wheelabrator Technologies, and holds around 40% of the UK's conventional gas storage capacity.

Through projects like the 910MW Keadby 2 CCGT, which is in construction, older power generation is being displaced by newer and more efficient technologies which support the transition to Net Zero. When completed, Keadby 2 is expected to be the cleanest and most efficient gas-fired power station in Europe.

By building on established skills in asset management and project development, SSE Thermal's vision is to become the leading generator of flexible thermal energy in a zero-carbon world.

Need and benefits

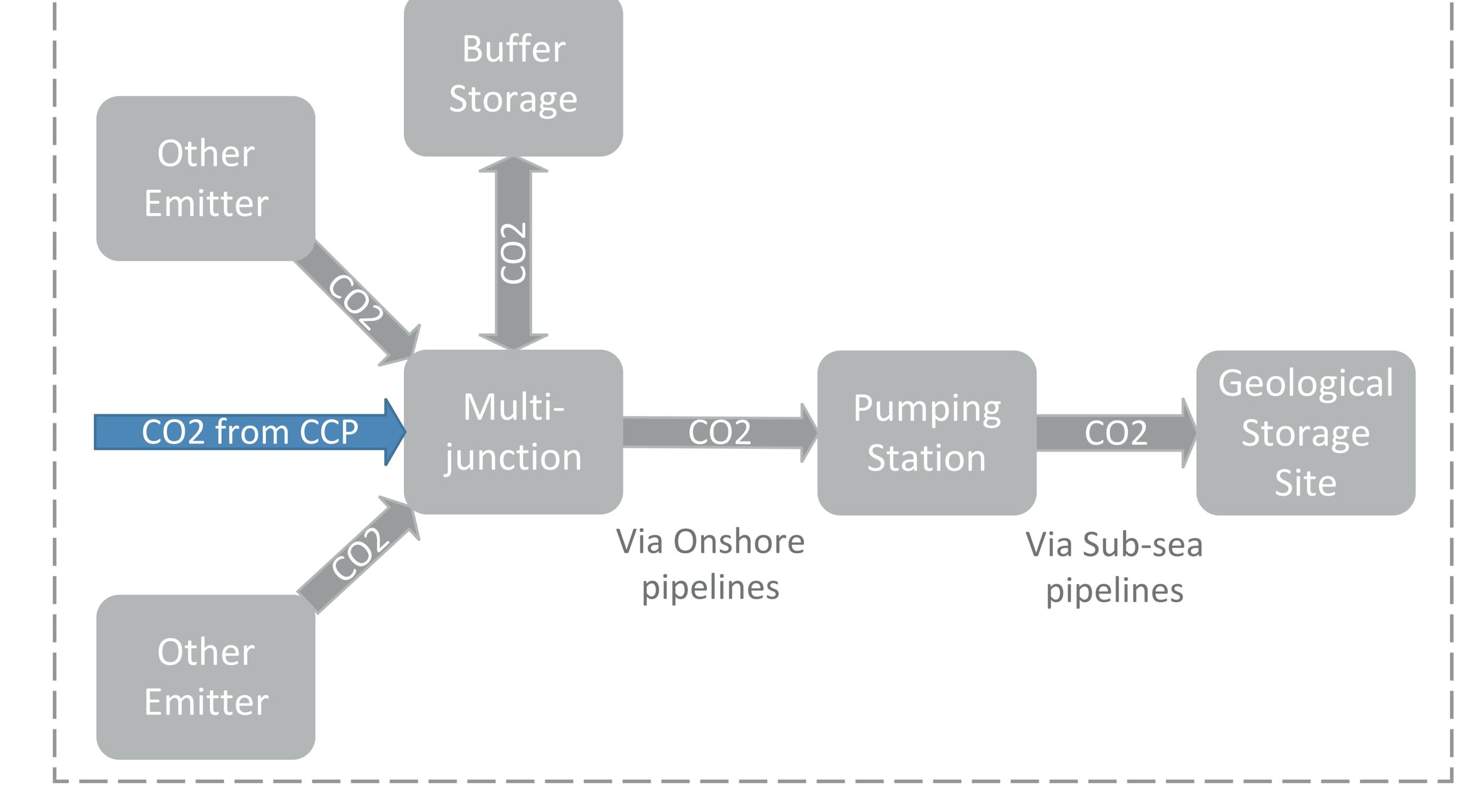
The UK has legislated to cut national carbon emissions to Net Zero by 2050. This will require a major transition in how we generate and use energy.

The Committee on Climate Change¹ (CCC) and the National Infrastructure Commission² (NIC) - have identified that flexibly operated thermal generation is needed to help the transition to Net Zero including decarbonised generation through the use of hydrogen fuel or the use of CCS.

We believe efficient gas-fired generation is essential to delivering Net Zero emissions by 2050, providing the flexibility needed to back up a system based on renewables. Stimulating investment in CCS and hydrogen technologies can also support and reduce the costs of industrial decarbonisation, through the use of shared infrastructure. SSE Thermal has signed an agreement, alongside 10 other leading energy and industrial companies, to transform the Humber region into the world's first 'zero-carbon cluster' by 2040, as described below.

Keadby 3 will only be built with a clear route to decarbonisation, either using hydrogen as a low-carbon fuel, or equipping it with post-combustion CCS technology.

It would support long-term direct and indirect local employment and also support the Humber Low Carbon Cluster proposals and the environmental and economic benefits these will bring to the region.



Schematic diagram of a regional carbon capture and storage cluster

About the Humber Low Carbon Cluster

The Humber Low Carbon cluster is a consortium of 11 energy and industrial companies, including SSE Thermal, that have agreed to work together to develop a joint plan to decarbonise industrial emissions and transform the Humber region into the world's first Net Zero carbon industrial cluster by 2040. The consortium is focused on using emerging CCS and hydrogen technology to decarbonise energy and industry in the Humber region. The initiative has the potential to capture and store around 10% of UK's CO₂ emissions per year by 2040.

The companies involved include some of the largest businesses in the region. The plan has the potential to contribute to the future prosperity of the UK's largest industrial hub, which contributes £18bn towards UK Gross Value Added (GVA), and to safeguard up to 55,000 jobs across the region, including Associated British Ports, VPI-Immingham and Phillips 66.

¹ The Committee on Climate Change (Net Zero Technical Report, page 19)

² National Infrastructure Commission (Net Zero - Opportunities for the Power Sector, page 7)



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What are you doing about environmental impacts?

As a responsible developer we aim to create a positive impact and add value to the local area through our projects.

We have begun to carry out on-site surveys of ecological interests, safely and in line with government requirements in relation to coronavirus. We also have a range of existing environmental information from our operation of Keadby 1 and the construction of Keadby 2.

In our Stage Two Consultation (Q3 2020) we will set out initial findings of environmental assessment work that is being undertaken along with proposals for mitigation of any likely significant effects identified.

An EIA Scoping Report for the Keadby 3 project was recently submitted to the Secretary of State. This will determine the topics that will be covered in the EIA work, and the methods to be used in the assessments. We expect to study the following topics:

- Air Quality;
- Noise and Vibration;

- Landscape and Visual Amenity;
- Cultural Heritage; Socio-economics; Climate Change and Sustainability Human Health; and Cumulative and Combined Effects.

- Traffic and Transportation;
- Ecology;
- Water Resources and Flood Risk;
- Geology, Hydrogeology and Land Contamination;

The detailed assessments for each of these topics will be undertaken in accordance with standard guidance and best practice and reported in an Environmental Statement (as part of the EIA) which will be included in the DCO Application. Where likely significant adverse environmental effects are identified, mitigation measures will be described where possible to reduce these effects.



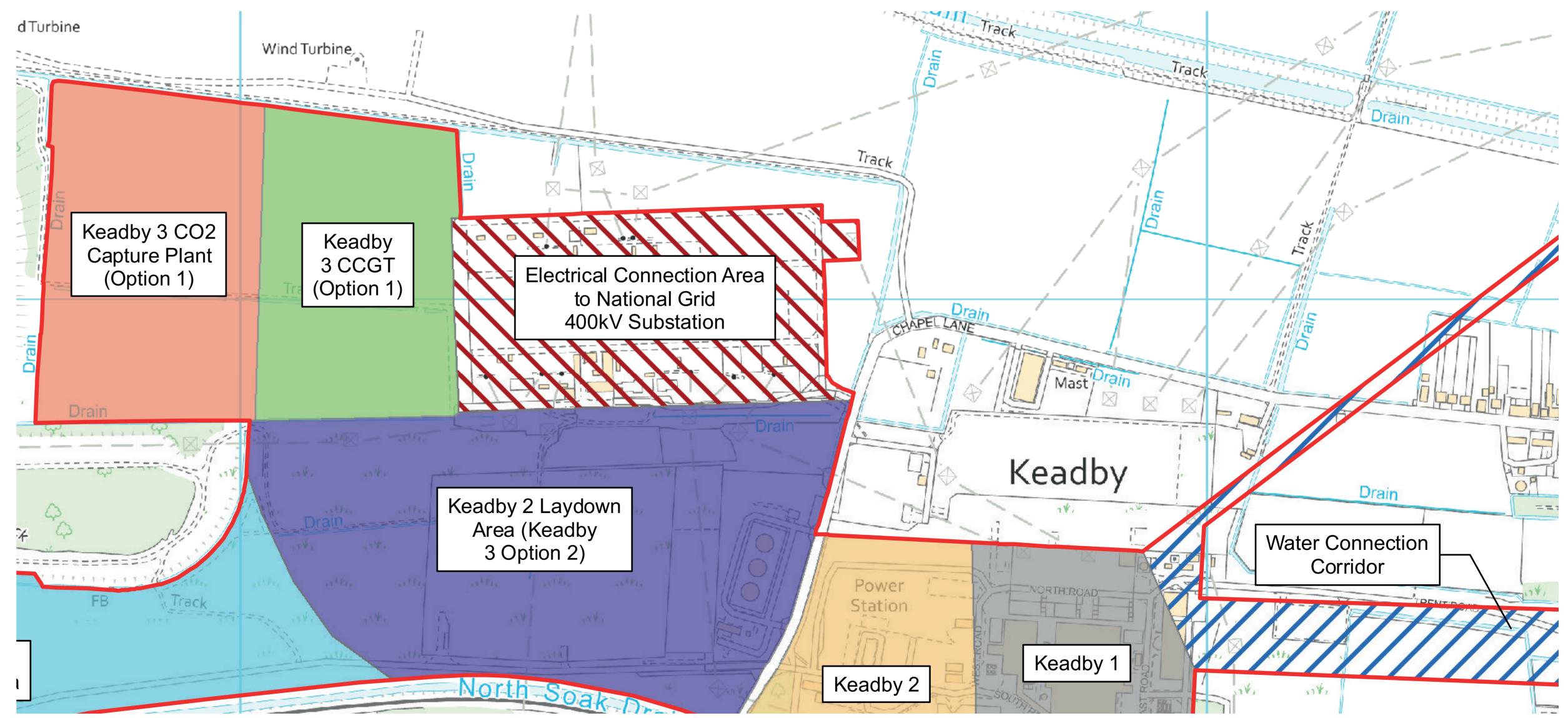
What might Keadby 3 look like?

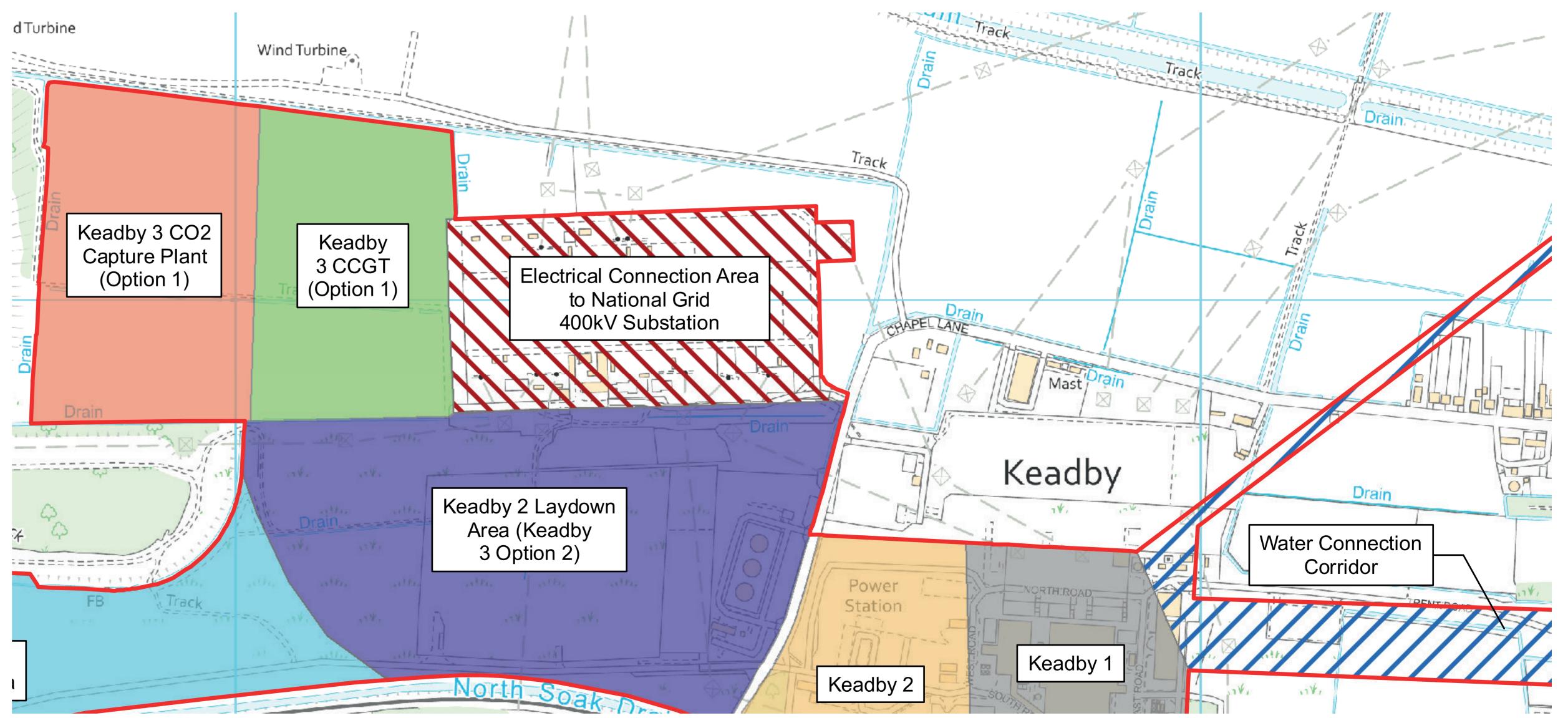
The CCGT will be of similar scale and appearance to Keadby 2, with the largest features being the turbine hall and the stack.

If natural gas with post combustion carbon capture is chosen, the CCP is likely to comprise a number of individual structures, storage tanks, pipelines and a stack.

If the plant is to be fired on hydrogen, this wouldn't require a CCP plant but instead there would be some additional storage tanks and pipelines.

Two options are currently being evaluated for the layout of these two





main components:

- location of the CCGT on the current Keadby 2 laydown area with the CCP co-located in this area or the former tank farm; or
- location of the CCGT and CCP on land to the west of the existing National Grid substation to the north of the Keadby 2 laydown area.

Main areas of the site (indicative)



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What will be included in your DCO application?

The application for the DCO would seek development consent for the power station, the hydrogen or carbon capture equipment, cooling and electrical infrastructure, and associated development, such as any new or modified access arrangements and any biodiversity provision. The DCO may, with the agreement of the Secretary of State, include other powers necessary to construct and operate the power station. A public examination would be carried out by the Planning Inspectorate on behalf of the Secretary of State to review the proposals against government policy and examine how the applicant has addressed impacts.

How can I find out more and provide my feedback?

SSE Thermal is committed to providing safe, convenient and clear information about the project in order to raise awareness and obtain feedback on the proposals.

We are publicising the Stage One Consultation by posting a newsletter to addresses in North Axholme ward, the parish of Gunness and Burringham and within 2.5km of the Keadby Power Station site; publishing notices in local newspapers; writing to local elected representatives; and online advertising.

- The online feedback form at ssethermal.com/keadby3
- e-mail at <u>consultation@keadby3.co.uk;</u> or
- Telephone 0800 211 8194 to request a free paper copy of the consultation materials including the newsletter and a paper feedback form.

Postal services may take longer at present due to coronavirus. Please observe all relevant precautions in relation to coronavirus, and use the alternative methods listed above if you are in an at-risk group. We cannot guarantee receipt of feedback provided via social media commenting and messaging, and therefore recommend you use the methods listed above.

Feedback must be received by **5pm on 27 July 2020**.

The feedback received at this stage will be taken into consideration during the refinement of the project proposals. A second period of consultation (Stage Two Consultation) is expected to take place during Q3 of 2020.

Can I access this virtual exhibition more than once?

Yes. The virtual exhibition opened on Thursday 25 June 2020 and you can log onto it at any time until the end of the entire consultation period and SSE Thermal will welcome additional feedback on the proposals throughout.

Will you be using the same kind of methods for your Stage Two Consultation?

We are committed to providing safe, convenient and clear information on the project. The methods which may be used for the Stage Two Consultation have not yet been decided. We will consider the feedback from Stage One Consultation and any specific feedback received from the community, and seek the views of the local authority, North Lincolnshire Council, as well as the evolving UK position on managing the effects of coronavirus.

I would like to know more about Keadby 2 – is this consultation for me?

This consultation is about the emerging proposals for Keadby 3. If you have any queries or comments about the construction or operation of Keadby 2, please write instead to jade.fearon@sse.com or telephone 01724 788236.

