Why are you building a new CCGT? Why do you need another power plant at Keadby?

As we increase the amount of intermittent renewable energy on the system, we know we'll still require flexible forms of generation to respond to market changes and ensure security of supply. We believe flexible and efficient gas-fired generation will play this critical role in the transition to Net Zero emissions, providing reliable back-up power to complement renewables and displacing older and more carbon-intensive alternatives.

Keadby 3 has been deliberately chosen in order to connect into the emerging proposals for the Humber Low Carbon Cluster which could kick start decarbonisation of industry and power generation in the Humber region.

Is the proposal for a new CCGT consistent with SSE's low-carbon commitment and 2030 sustainability goals?

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 carbon capture technology. Both approaches are consistent with our commitment to reduce our carbon emissions by 50% by 2030, based on a 2018 baseline. 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 have 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.

How big will Keadby 3 be?

The proposed development comprises the construction, operation, and maintenance of a 'Low Carbon CCGT' generating station with a capacity of up to 910MW electrical output. The CCGT element will be of similar scale and appearance to Keadby 2, with the largest features being the turbine hall and the stack. Additional equipment will also be required; the type of equipment will depend upon the technology chosen. 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.

What are the timescales for this project?

It takes several years to plan and develop this type of project and there are several factors which need to be clarified and confirmed before we would be in a position to take a Final Investment Decision (FID), including obtaining a Development Consent Order (DCO), a form of planning permission and related powers. The earliest a DCO would be granted is around two years away, and FID would be some months after that. Construction would take a further three years approximately.

[1] Net Zero Technical Report (CCC, May 2019: page 19).
[2] Net Zero - Opportunities for the Power Sector (National Infrastructure Commission, 2020: page 7)

When will Keadby 3 be operational?

As part of our commitment to a Net Zero future, we will not build any further gas-fired power stations unless they have a clear route to decarbonisation. A DCO will provide us with the option to construct a low carbon CCGT at Keadby. Following this, a final investment decision will be dependent upon prevailing market conditions and policy frameworks. We want to work with government, regulators, industry partners and other stakeholders to create the right policy framework to enable the development of both CCS and hydrogen.

Once a final investment decision has been taken, construction would take approximately 3 years. This would be followed by a commissioning period. On this basis, Keadby 3 could be operational by the mid-2020s.

Does SSE Thermal own all of the land needed for the project?

The 'red line' boundary that we have shown in the consultation documents and our recent Environmental Impact Assessment (EIA) scoping report is indicative of the extent of the land that could be required, and will be subject to appraisal and refinement between now and the submission of the application.

SSE Thermal owns the majority of the land within this boundary. Where third party land is required, temporarily or for permanent accesses and other forms of development, we will engage with the relevant landowners prior to the submission of the DCO application, in particular through the statutory Stage 2 consultation exercise planned for later this year.

What is carbon capture and storage?

Carbon capture and storage (CCS) is a technology that can capture at least 90% of the carbon dioxide emissions produced from the use of fossil fuels in electricity generation and industrial processes, preventing the carbon dioxide from entering the atmosphere.

The CCS chain consists of three parts; capturing the carbon dioxide, transporting the carbon dioxide, and securely storing the carbon dioxide emissions underground, in depleted oil and gas fields or deep saline aquifer formations. Planning for the deployment of CCS in the UK has been deemed a "necessity, not an option" by the Committee on Climate Change, if we are to achieve Net Zero by 2050.

What is hydrogen-fired generation?

Hydrogen can replace natural gas in flexible thermal plants; it is an energy vector which does not contain carbon. As a result, there are no carbon dioxide emissions at point of use. Instead, when burnt with oxygen, the by-product is water.

Both blue and green hydrogen can be used to generate low-carbon electricity. Blue hydrogen is produced from natural gas with the resultant carbon emissions captured and stored at this point. Green hydrogen is created through the electrolysis of water. This process uses renewable electricity and is therefore carbon-free.

The Committee on Climate Change has said "a significant low-carbon hydrogen economy will be needed" to achieve 2050 targets.

Why are you looking at two different technologies?

The final technology selection will be determined by various technical and economic considerations and we will undertake further analysis in these areas as we progress the DCO application. The design of Keadby 3 incorporates a necessary degree of flexibility in the choice of low carbon technology, to allow for selection of the preferred technology in the future in light of prevailing policy and market conditions.

Where will the hydrogen come from?

Keadby has been deliberately chosen to be able to connect into the emerging proposals for a carbon dioxide or hydrogen pipeline within the Humber region, being developed by National Grid Ventures and Equinor.

We have 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 part of this cluster initiative, we are working with partners to develop approaches to kick-start decarbonisation; we want to utilise emerging CCS and hydrogen solutions to create a clean power hub in the region and protect local jobs.

Are there safety issues involved in hydrogen generation?

Safety is our number one priority; if it's not safe we don't do it. As with all of our sites, appropriate measures will be in place to ensure safe operation.

Hydrogen is not inherently more dangerous than other fuel sources. Hydrogen is flammable and must be handled with care, just like other flammable fuels. To ignite, the hydrogen must be combined with an additional oxidising agent (air, pure oxygen, chlorine, etc.) in a specific concentration and an ignition source (a spark). Safety measures for hydrogen generation and transportation facilities therefore are designed to be permanently leak proof, with flange connections designed especially for hydrogen and the number of detachable connections minimised. Furthermore, in buildings a steady air exchange is ensured and facilities are equipped with safety valves and pressure reliefs.

Have you any experience with CCS or hydrogen technologies already? What's different this time?

On our experience:

We have a long history of CCS technology development. In 2007 SSE partnered with BP to explore the feasibility of an integrated hydrogen station at its Peterhead site in the north of Scotland. More recently, in 2014 SSE, together with Shell, reached the final stages of a UK Government competition in which the existing CCGT at Peterhead was to be equipped with post-combustion carbon capture technology. The captured carbon emissions were to be transported to the depleted Goldeneye oil field in the North Sea.

SSE's investment in this area over the past 20 years gives us a good platform of experience and skills to support similar projects in the future. To become a reality in the UK, carbon capture and storage (CCS) and hydrogen-fired technologies will need a sound commercial structure and financial incentives in the UK; SSE is advocating the UK government bring forward these measures. We welcome the government's work to develop routes to market for these technologies, alongside its commitment to establishing at least two industrial decarbonisation clusters by 2030.

On our current work:

We are currently working with leading manufacturer Siemens to build Keadby 2, one of the most efficient CCGT power stations in the world, with technology optimised for future hydrogen and CCS capability. In January 2019, Siemens, along with industry body EU Turbines, committed to gradually increasing the hydrogen-burning capability of gas turbines to at least 20% by 2020, and 100% by 2030. SSE and Siemens share a commitment to a Net Zero future. Through this industry-leading partnership, SSE is exploring opportunities to decarbonise its existing CCGTs and develop new power stations capable of operating with hydrogen or fitted with emerging CCS technology.

What is needed to progress these technologies? What is the government's role?

We've seen the UK take the lead in offshore wind and make major progress on climate action targets as a result, with government-backed mechanisms supporting this success. There's an opportunity to do the same for hydrogen and carbon capture technologies too, ensuring we're doing everything we can, as quickly as possible, to meet our net zero goals. As the Committee on Climate Change has said, planning for the deployment of CCS is a "necessity not an option" and a "significant low-carbon hydrogen economy will be needed" to achieve 2050 targets; actions to deliver them need to be accelerated.

To become a reality in the UK, CCS and hydrogen-fired technologies will need a sound commercial structure and financial incentives; SSE is advocating the UK government bring forward these measures. We welcome the government's work to develop crucial routes to market for these technologies, alongside its commitment to establish at least two industrial decarbonisation clusters by 2030.

How will you minimise the impact on local villages?

As a responsible developer, SSE Thermal endeavours to make a positive difference to communities in the areas it operates. We will undertake assessments in line with the DCO process to ensure that any impact associated with the potential development is minimised and mitigated. Results of assessments will be available for comment during the second consultation phase. These assessments will include areas such as traffic and transport, ecology and air quality and are identified in the scoping report submitted to the Planning Inspectorate.

Will Keadby 3 affect air quality in the area?

An Air Quality Assessment, which looks at existing air quality, the potential impact of the facility and associated traffic on local air quality, and any mitigation measures, will be undertaken as part of an Environmental Impact Assessment needed to accompany the DCO application. The height of the stack will be designed to ensure that there are no significant effects.

Will this plant create a lot more traffic in the area during construction, especially HGV's?

Construction would take around three years. As with the construction of the Keadby 2 project, traffic will use the nearby motorway and A18 to access the site. While road access

will be necessary, waterborne transport will be considered as an option to deliver abnormal indivisible loads (AIL). A crane is currently positioned on the land adjacent to the wharf to transfer components into the Keadby Power Station site. A construction environmental management plan, including construction traffic management proposals, would be prepared to accompany the DCO application and would then form a requirement upon the contractor.

Will the plant be noisy?

We have considered noise in the general layout of the project. The main sources of noise are the turbines themselves (generally housed within a building), the stack, and cooling equipment. We do not anticipate that there will be significant noise impacts from the operation of the plant.

Will the Keadby 1 Power Station keep running?

Keadby 1 Power Station has served the energy network since 1996 and has a generating capacity of up to 735MW. The gas-fired power station has a contract to provide capacity to the grid until September 2022 and will have opportunities to secure further agreements in future auctions. Our Environmental Impact Assessment work for Keadby 3 will make appropriate assumptions regarding the likely future running hours of Keadby 1.

What benefits will a new power station bring to the local area?

The proposal for Keadby 3 along with the current construction of the £350 million Keadby 2 power station, which will be fully operational in 2022, shows SSE Thermal's commitment to Keadby, Scunthorpe, and the wider region. The construction and operation of a new power station would bring millions of pounds in investment and significant employment opportunities to the area.

As part of the Humber Low Carbon Cluster, SSE is aiming to create a clean power hub in the area, which will protect hundreds of local jobs and support the decarbonisation of major industrial activity in the region.

How many jobs will it create (in construction, operation and through third party suppliers)? Will the project benefit the local economy?

It is anticipated that around 1,000 jobs would be created during the construction phase of the project. The operational phase will also create a number of long-term skilled jobs and the amount will depend on the technology chosen.

The local economy would benefit from additional business in the area, such as the use of local hotels, restaurants and other service providers.

As part of its Responsible Procurement Charter SSE is committed to supporting local economic supply chains, ensuring that real economic and social benefits flow to local businesses and communities as a result of our investment in new energy infrastructure. Ways in which this would be achieved include 'meet the buyer' events and committing in the DCO application to deliver an Employment, Skills and Training Plan.

How will you consult with local residents and stakeholders throughout the process?

Keadby 3 is classed as a Nationally Significant Infrastructure Project; to gain planning permission and other necessary powers it requires a Development Consent Order (DCO), as stipulated in the 2008 Planning Act.

The DCO process involves two stages of consultation for local stakeholders. Each stage will include a number of safe, convenient local or online events hosted by members of the project team where information will be shared, and feedback will be sought.

How are you going to be able to consult properly with the ongoing coronavirus situation?

Due to the ongoing Covid-19 situation, we are constantly assessing options in relation to stage one consultation. We are committed to carrying out a clear, informative and robust consultation process and will agree our approach with the local planning authority before proceeding.