Carbon Capture at SEGAL Terminal – St Fergus

Project Value

CAPEX – £100Ms (Order of Magnitude)
CO_2 Reduction – 300,000te/yr

Project Scope

SEGAL Terminal sales gas to the National Grid, is compressed by gas turbine driven compressors, generating flue gas emissions which make up circa 94% of site carbon dioxide (CO_2) emissions of around 300,000 tonnes per annum. Work underway on the Acorn Carbon Capture and Storage (CCS) project creates an opportunity to significantly reduce the site emissions.

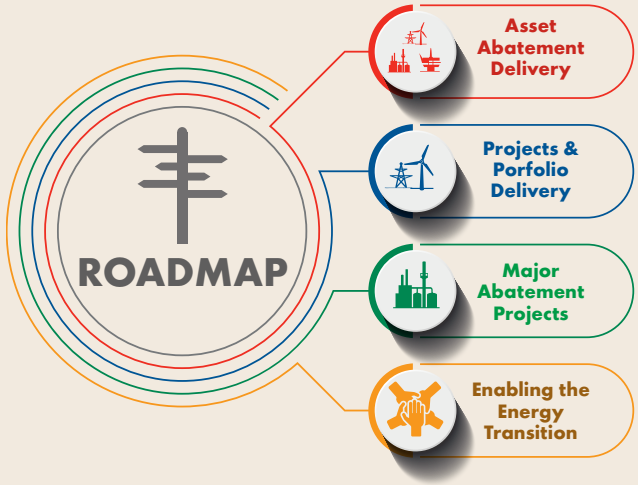
The proposed carbon capture project comprises three distinct processing modules: carbon capture, conditioning and compression, and transport & storage. The gas turbine flue gas is routed by ducting to the capture plant and stripped of around 90% of the CO_2 volume using an absorption process. In the conditioning plant the CO_2 is conditioned to remove water and oxygen required to protect the Goldeneye pipeline from corrosion. The CO_2 is compressed into dense phase for transportation and storage through the 102km Goldeneye pipeline to the Acorn store.

At the Acorn CO_2 Storage Site location, the proposed design would connect the Goldeneye pipeline with new sub-sea infrastructure to a new sub-seawell designed for CO_2 injection. The CO_2 will be injected into the Acorn store and will be monitored. The sub-sea infrastructure will be designed to accommodate additional wells to meet the demand from other companies seeking to reduce their CO_2 emissions.

The CO_2 export composition and injection-well material selection specification allow future flexibility to accommodate other CO_2 sources beyond the St Fergus terminals. This government supported CCS project is working with development and technology experts to ensure knowledge building for this new industry sector to enable further build out plans.

Good Practice:

Shell's target is to become a net-zero emissions energy business by 2050, in step with society's progress in achieving the goal of the UN Paris Agreement on climate change. Shell's Upstream business in the UK has developed a decarbonisation roadmap to create clarity on the decisions required in the next 2-3 years to achieve the UKCS emissions reduction target of 50% by the end of the decade and ultimately becoming a net zero basin by 2050. Within Shell's UK portfolio the SEGAL St. Fergus gas plant is one of the single biggest sources of emissions and plans are underway to decarbonise operations. When considering potential solutions Carbon Capture and Storage (CCS) is a clear front runner; CCS is a Government priority with associated financial support, CCS is a proven technology with improving cost competitiveness.



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For a large continuously operating piece of infrastructure for UK energy supply, reliability is critical and any new facilities must have little or no impact on plant availability and minimal interruption during installation. The capture of flue gas requires diversion of the low-pressure flue gases and tie-ins to ducting that carry the gas to the capture and transport plant. This will require a single shutdown for each train aligned with maintenance schedules. The future capture plant start-up and ongoing operation will be designed to have little effect on the existing site operations. The storage operation takes advantage of an existing pipeline and a well understood offshore geological store. Potentially this is one of the best available storage sites for UK CCS. The SEGAL St Fergus terminal is ideally located to take advantage of the Acorn CCS Project which will develop one of the first CO_2 sequestration stores in the UK. The project is working with government support and technology experts to assess the first phase of the Acorn Project and assess the full scale build out plans which will follow this first phase.

Shell as the SEGAL operator (on behalf of owners Shell/Exxon) are working with the Acorn partners as phase 1 of the Acorn project is developed. Phase 1 of the Acorn transport and storage project will then pipe and inject CO_2 at the offshore structure utilising existing infrastructure and new injection wells.

Successful demonstration of this low-cost CO_2 disposal facility for the St Fergus terminal emissions will help facilitate further development of the Acorn Project - looking to store emissions from across Scotland, the UK, and Europe, helping to establish the CCS industry and decarbonising vital industrial sectors.

The Acorn Project is being developed by partners Pale Blue Dot Energy, Harbour Energy and Shell with support from the UK and Scottish Governments, and the EU.