

Acorn Hydrogen Project

One-of-a-kind project providing a clear pathway to support the UK's net-zero targets



T.EN TECHNIP
ENERGIES



Overview

In 2018, Genesis, a wholly-owned Technip Energies company, was awarded a contract to execute feasibility, technology screening and concept studies for a hydrogen plant in Scotland's industrial central belt.

- **Contract:** Feasibility, technology screening and concept select study phases
- **Award:** 2018
- **Delivery:** 2021
- **Client:** Consortium (Pale Blue Dot, Total)
- **Location:** St. Fergus, Scotland



**SOLUTIONS IN
MANAGEMENT OF
EXPORT FLUCTUATIONS**



**OPTIMIZATION OF
CONCEPT TO MINIMIZE
CARBON FOOTPRINT**



**IDENTIFICATION OF
CRITICAL PATH ACTIVITIES
IN EARLY PHASES**

Challenge

The UK government has committed to net-zero greenhouse gas emissions by 2050

The Acorn Hydrogen Project is an ambitious initiative being developed by Storegga (through its subsidiary Pale Blue Dot), Harbour Energy, and Shell to establish critical CCS and hydrogen infrastructure in North East Scotland to deal with industrial CO₂ emissions and other “hard to decarbonize” sectors. The project will provide a clear pathway to support the UK’s net-zero targets.

“Excellent project management and coordination of the various internal and external inputs required for this collaborative study, interfacing with the client, funding partners, vendors, licensors, authorities, site owners and other consultants to deliver on the study objectives.”

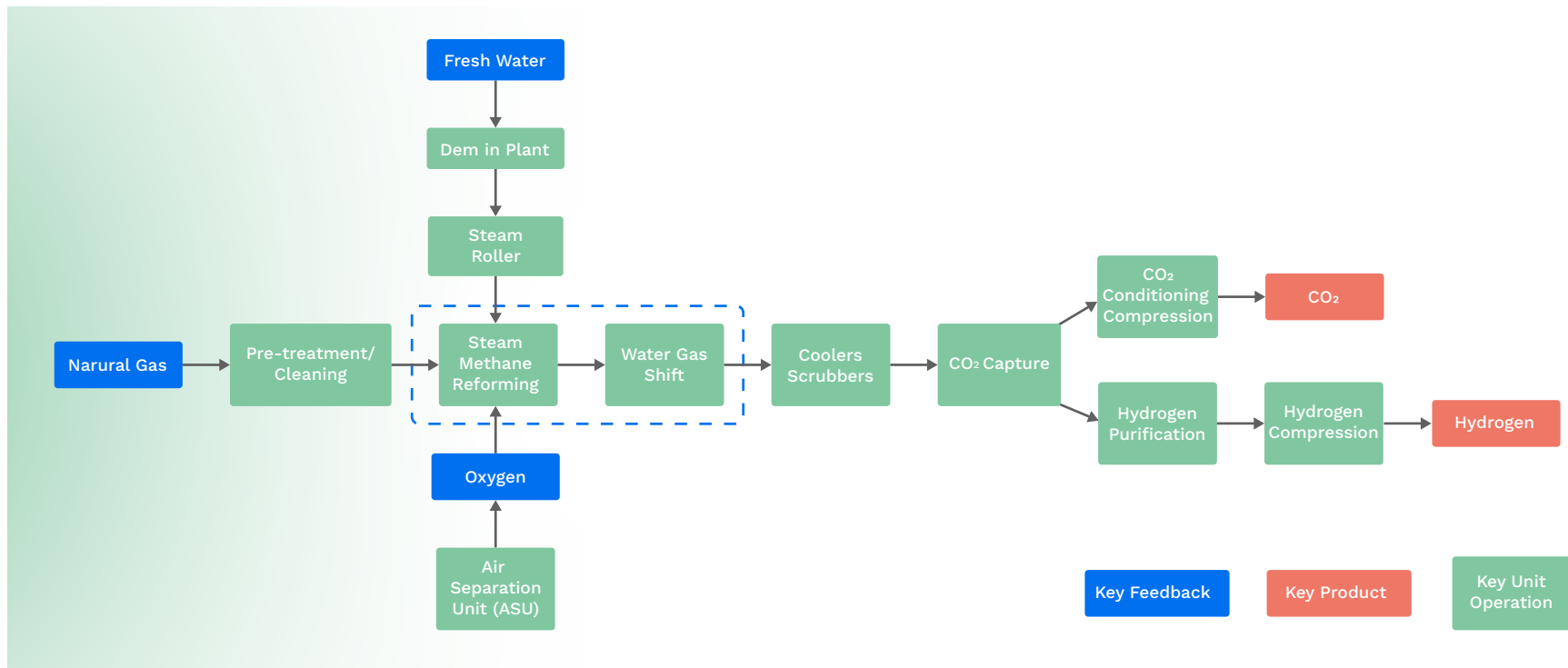
Client Senior Development Lead of the Acorn Hydrogen Project.



Understanding

The Acorn Hydrogen Project reforms North Sea natural gas into clean hydrogen, safely mitigating CO₂ emissions through the Acorn CCS infrastructure. The produced hydrogen is intended for a range of applications by using the existing gas grid and new hydrogen infrastructure to decarbonize heating in homes and industries.

The first-phase 200-megawatt hydrogen plant aims to reduce CO₂ emissions by about 400,000 tonnes per year. By the mid-2020s, Acorn Hydrogen could be the first operational clean hydrogen plant in Europe, demonstrating the successful integration of existing technologies for this new service.



Solutions

Genesis has been providing technical support to the Acorn Hydrogen Project for the past three years, most recently completing the engineering contract for the concept evaluation stage.

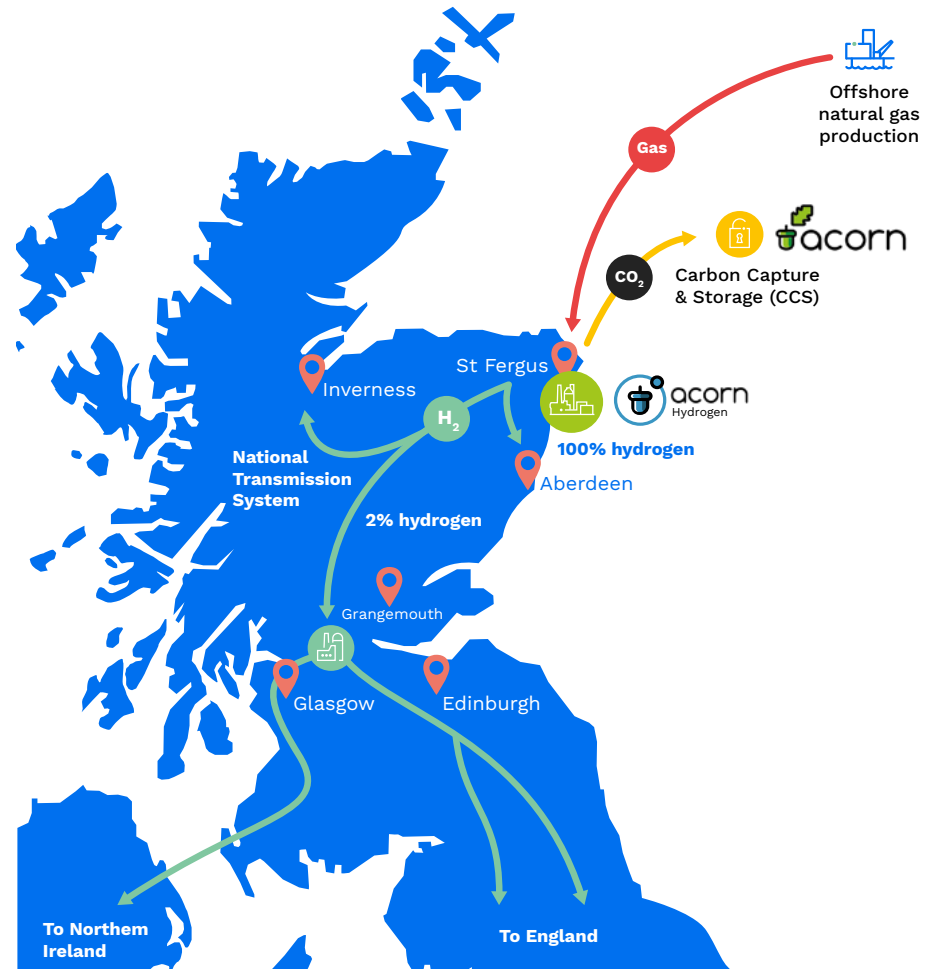
As a holistic advisory service provider, Genesis was tasked with supporting the Acorn partners in making technology and integration decisions to select a feasible and economic concept. The most recent work has been focused on evaluating and selecting a definitive concept for progressing to the Front End Engineering Design (FEED), including delivery of Class 4 costs (normalized CAPEX and OPEX estimates and levelized costs) and appropriately associated concept phase deliverables.

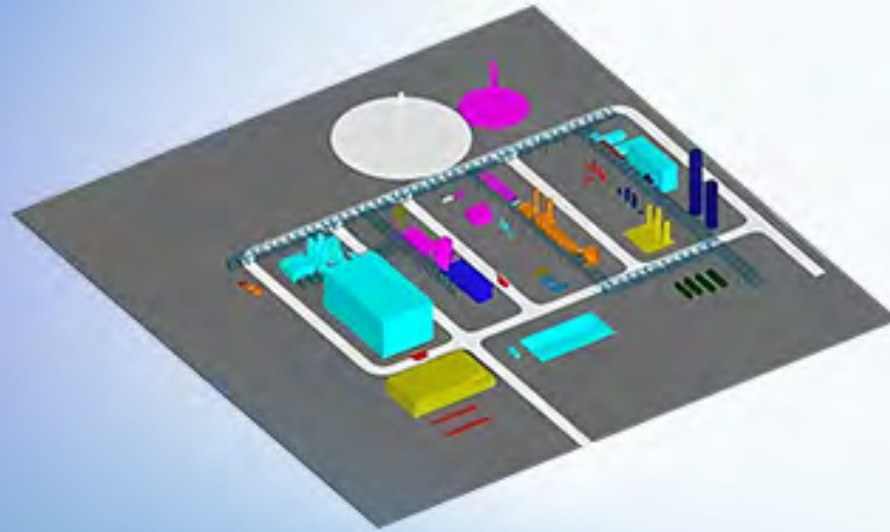
Having developed a general hydrogen plant energy model, Genesis was able to assess the overall plant performance for multiple concepts. The model was built to include numerous hydrogen purification and carbon capture technology options, power sources and steam, power and fuel balances.

Genesis also was responsible for investigating brownfield integration of the Acorn project with the St Fergus gas terminals (natural gas supply and export routes) and utility providers (import power and freshwater).

A primary challenge of blue hydrogen projects is how the plant will deal with fluctuations in hydrogen demand. Genesis evaluated options to handle daily and seasonal fluctuations, including optimal turndown operations, storage options and blending limits.

Overall, Genesis assessed key technical and safety performance criteria in conjunction with project economics to ensure the selection of an optimum concept to maximize economic performance and minimize the carbon footprint.





Results

Genesis successfully completed the feasibility and concept phases of the Acorn project, and provided input to the framing of the follow-on stages to continue the project to Final Investment Decision (FID).

“We are very proud to be involved in the development of the Acorn Hydrogen Project for the past three years. This demonstrates the expansion of Genesis’ decarbonization capabilities as a leader for advisory services in hydrogen, carbon capture, and energy transition.”

Christophe Malaurie, Senior Vice President of Genesis