CO2 Highway 2024 – ongoing

Client: Equinor

The CO2 Highway is a CO2 transport and storage project intended to connect CO2 reservoirs on the Norwegian continental shelf to Northwestern European emitters via an offshore CO2 pipeline. The capacity will be 27 million tonnes of CO2 per year.

RENE is involved through the Equinor Framework Agreement, where RENE provide Engineering Support to Equinor's project team:

- Development of tender documentation
- Market screening
- Technical support in tender evaluation
- Follow-up of FEED contractors

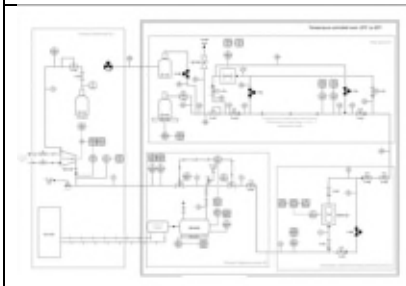
Stella Maris CCS 2023 - 2025

Client: Altera Infrastructure

Stella Maris CCS is a large-scale, flexible, scalable maritime logistics solution for captured CO2 from industrial sources, covering the whole chain – from collection to storage.
A single Stella Maris project will have the capacity to store 10 million tonnes per year.

REINERTSEN has provided Owners Engineer Services covering:

- Technical Authority for Process Design
- System design for Floating Injection Unit



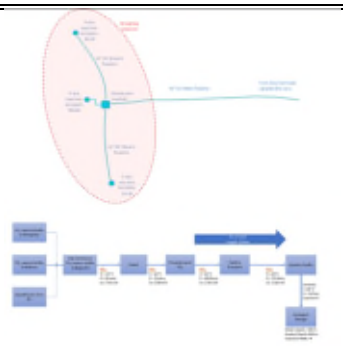
Test rig for flow metering of liquid/dense CO_2

Client: SINTEF 2023

SINTEF Energy Research is designing an experimental facility to be used in verification of CO2 flows, including CO2 rich mixtures.

REINERTSEN has performed Engineering design verification, cost estimation and preparation of execution schedule for establishing a facility for testing of flow metering technologies for liquid / dense CO2 service.

The rig's main components are a primary flow metering reference, two secondary Coriolis flow meters, and a meter under test. It will work as a "blow-down" system with flow going from one high pressure tank to a tank with lower pressure.



CO_2 injection pipeline system 2023

Client: Internal

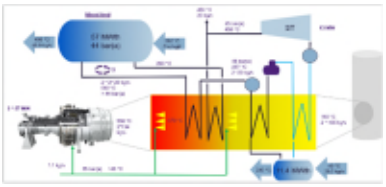
Study to investigate the possibilities of installing a CO2 pipeline with appropriate dimensions from a suitable location at Øygarden to the Smeaheia field. In addition, the necessary subsea facilities and structures at the field shall be evaluated.

An annual CO2 storage capacity of 20Mt/year will require:

- 24" main pipeline (OD 610 x 19.1 mm)
- 16” branch flowlines (OD 406 x 20.6 mm)

The following tasks were covered by the study:

- Flow Assurance
- Pipeline system design
- Field layout
- Electro/Instrument
- Material evaluations
- RFO and commissioning
- HSE and Risk assessment
- Cost estimation



Integrated Combined Heat & Power Concept

Client: Internal 2022

Conceptual study of a Co-generation power plant integrated with at Blue H2 production facility.

- H2 production = 36 tonnes H2/hour
- Power requirement = 130 MWe
- Process heating = 78 MWth

The study was performed in cooperation with Siemens.
The co-gen plant achieved a thermal efficiency of 79%, and an El-cost of 1 NOK/kWh, based on a normal gas price.

Blue hydrogen from LNG 2021

Client: Hoegh LNG

Study for production of blue hydrogen based on gasified LNG.

The HyProZero process for production of blue hydrogen with CO2 capture was described with PFD’s, MEL, layout and a rough cost estimate.

The possible benefits of integrating the LNG gasification process with production of blue hydrogen was also studied.

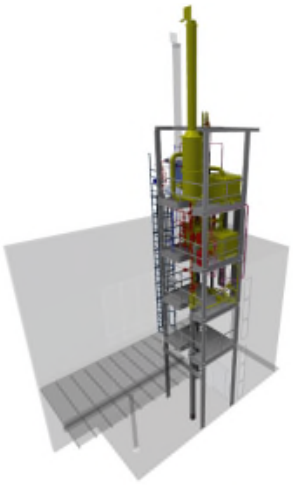
Blue Hydrogen production at Tjeldbergodden Methanol plant 2019

Client: Equinor

Feasibility study to describe a blue hydrogen production plant based on GHR- ATR technology from Johnson Matthey. The capacity of the pilot-plant was in the range of 1.5 t/hr.

The study included integration with the existing methanol plant as well as definition of all equipment. A preliminary layout was developed together with cost and schedule for the plant.

Large scale offshore and onshore blue hydrogen plants was also studied during same project.



CO_2 vertical flow test rig 2019

Client: SINTEF w/Equinor & Total

Engineering, procurement, construction and installation of a fully integrated test-rig of a vertical flow circuit to be used for verification and testing experiments with CO2.

The rig comprises an 80 m deep well with a U-tube made of two vertical tubes (large and small diameter) installed inside the casing. The U-tube outside temperature is controlled by circulating a heating fluid inside the well casing. The U-tube arrangement is connected to an existing horizontal test rig for supply and return of the CO2. Arrangements for heating and/or cooling of the fluid is included in the design.

TBO hydrogen production and CO_2 capture.

Client: Gasnor 2017

Small scale capture and production of hydrogen from existing systems at the Tjeldbergodden methanol plant.

The study described the hydrogen production value chain, identified available and suitable area for the H2 production plant and clarified the availability for syngas purchases.

Potential local H2 markets were defined together with a rough estimate of the CAPEX and OPEX.