



wintershall dea

CARBON STORAGE DIALOGUES

BUILDING A CCS BUSINESS IN NORTH WEST EUROPE

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WHAT AND HOW

Strategy Objective	<ul style="list-style-type: none"> • Assume responsibility for significant GHG emission reductions • Maintain license to operate in E&P; opportunity to develop a new business area in CCS & low carbon H2
Value Proposition	<ul style="list-style-type: none"> • Deploy existing competencies & assets to be part of the solution for energy transition • Support positive investor & public interest in WD going forward • Build a viable new business
Ambition Level	<ul style="list-style-type: none"> • Support global decarbonization efforts by building up a business to potentially abate 20-30 million tons of CO2 per annum by 2040 • Build a balanced CCS portfolio selectively accompanied by low carbon H2 projects
Activity Level Ramp-Up	<ul style="list-style-type: none"> • Phased ramp up: "Positioning phase" expected to last some 2 years to build a portfolio of CCS & low carbon H2 opportunities • Depending on external triggers - e.g. CO2 price, regulation & further carbon restrictions execute most attractive opportunities
Where to Play	<ul style="list-style-type: none"> • Initial focus 5 NW European countries i.e. Denmark, Germany, The Netherlands, Norway, UK • Identification of further potential opportunities in N. Africa & Argentina will be part of Positioning

KEY ACHIEVEMENTS 2022 IN EUROPE



United Kingdom

- **Bid submission** in 1st UK CCS bid round, Sep. 2022



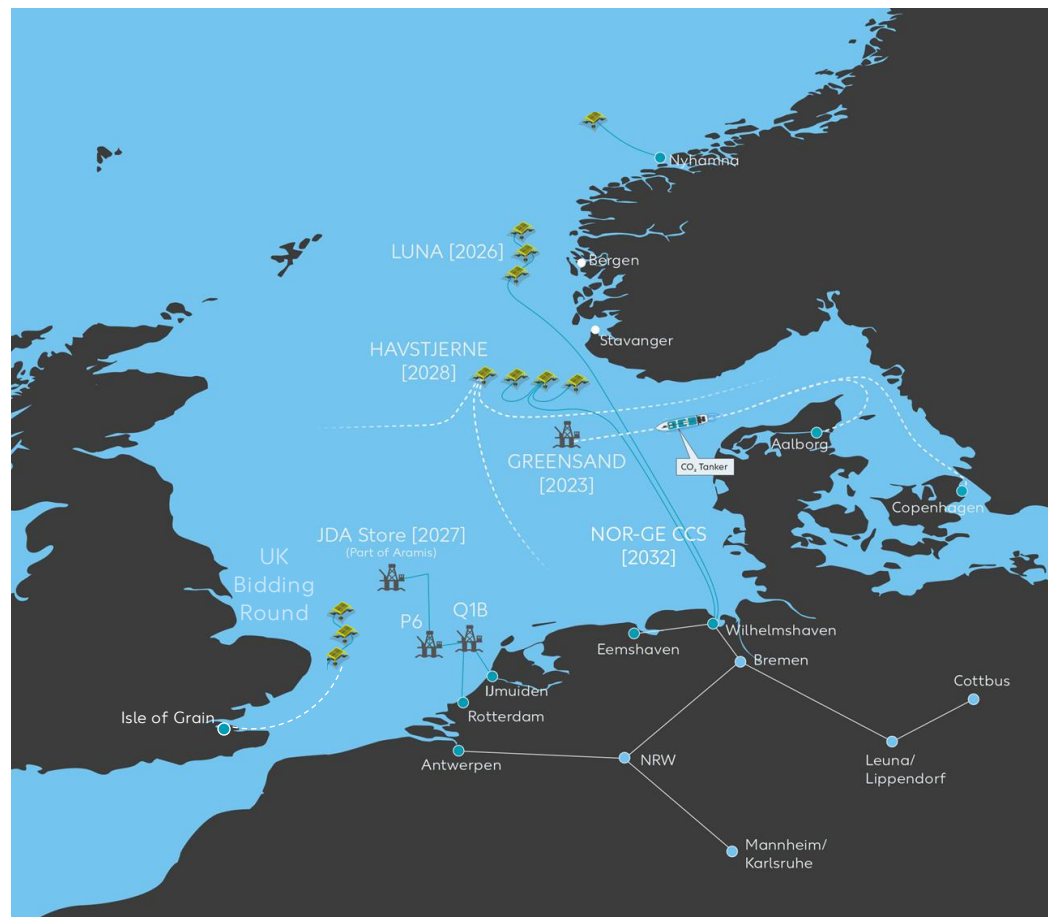
Netherlands

- **Established** new 100% WD entity, Carbon Management Solutions
- **Q1B & P6**: license application work and co-operation agreement
- **JDA CCS**: CO₂ storage project with Shell



Belgium

- **Chemical Companies**: CO₂ export to NOR



Germany

- **BlueHyNow**: Blue H₂ in Wilhelmshaven with NWO
- **CO₂nnectNow**: CO₂ hub at Wilhelmshaven with HES
- **Cement company**: MoU for CCS / LOI for CCfD



Norway

- **Luna**: CCS license award received in Oct 2022 (as operator)
- **Havstjerne**: CCS license application submitted July 2022
- **NOR-GE**: Collaboration agreement with Equinor, signed Sep. 2022, to evaluate large scale (up to 40Mtpa) CCS solution for German emitters

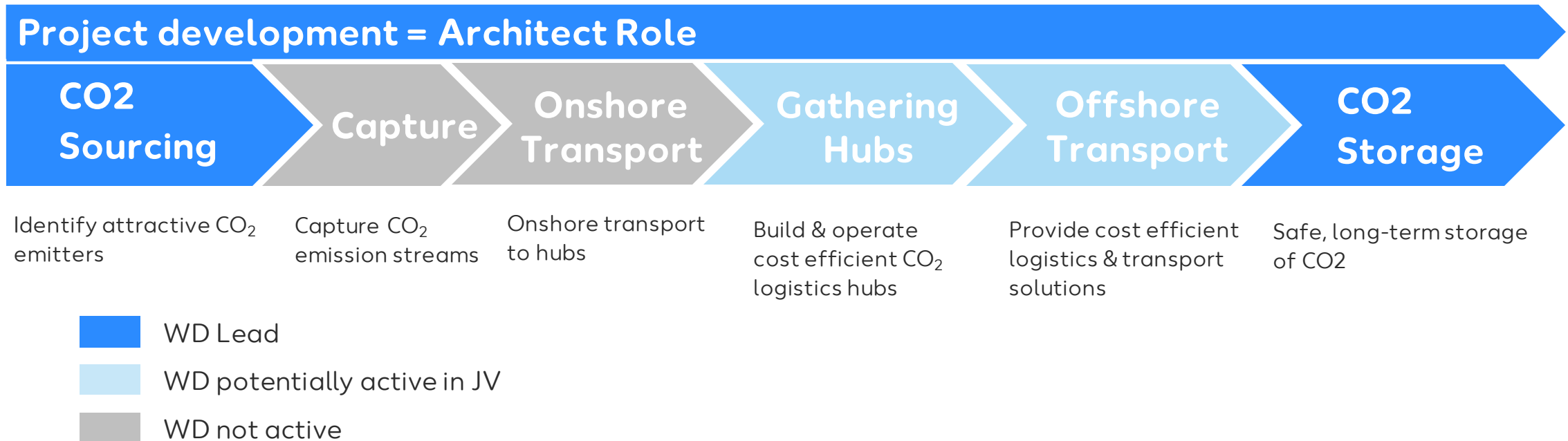


Denmark

- **Greensand**: Pilot Phase to start CO₂ injection in Feb 2023; CO₂ storage license award received in Feb 2023;
- Preparation for next year's CCS bidding rounds

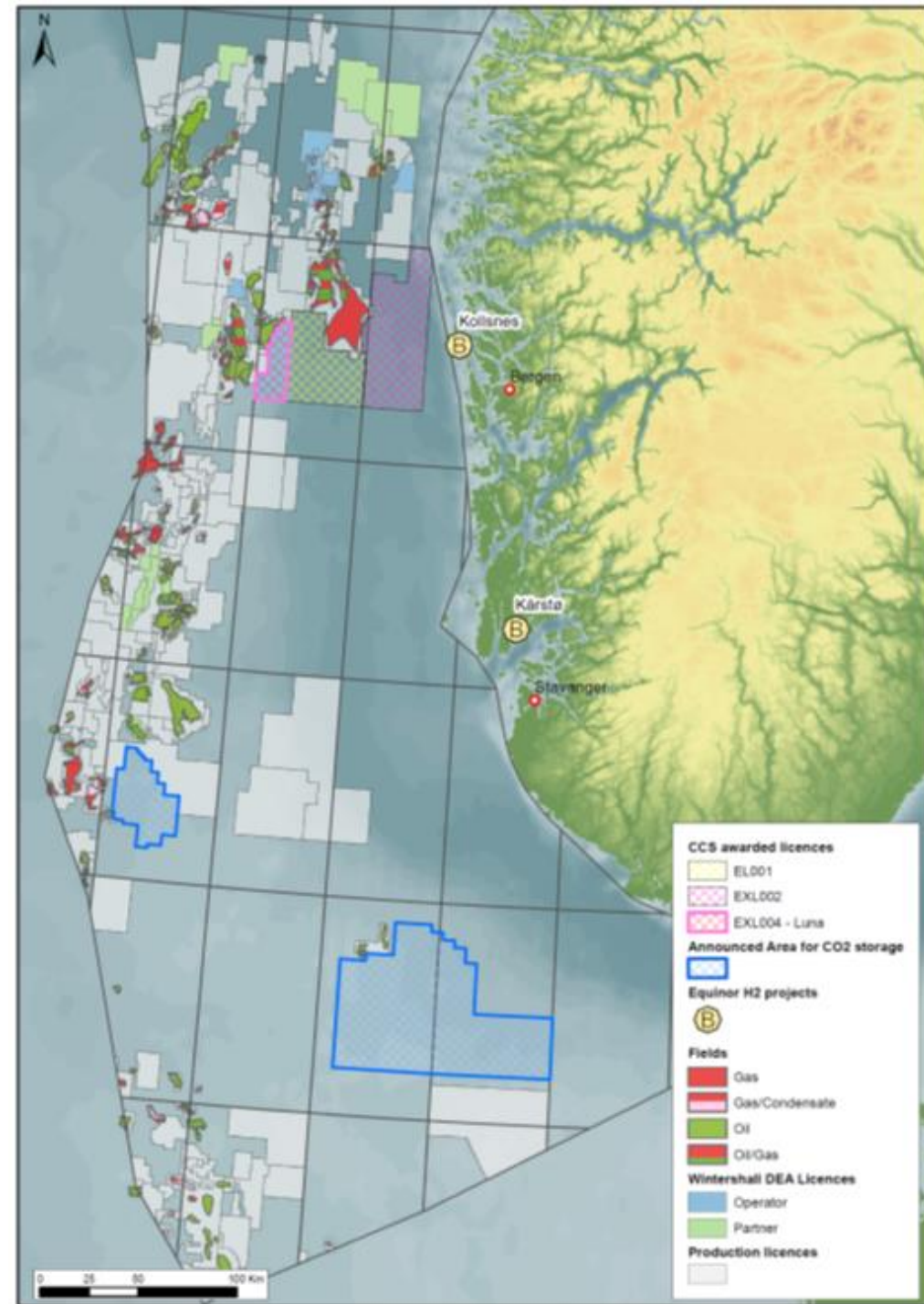
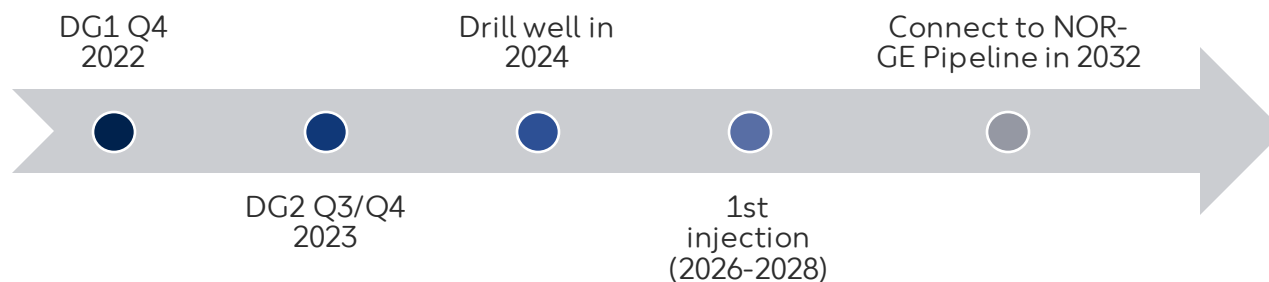
FOCUS IN THE CCS VALUE CHAIN

- Position is aligned with existing competencies & strengths
- WD will take the lead to initiate the first integrated projects in order to build the market
- Partnering is key to cover other components of the value chain



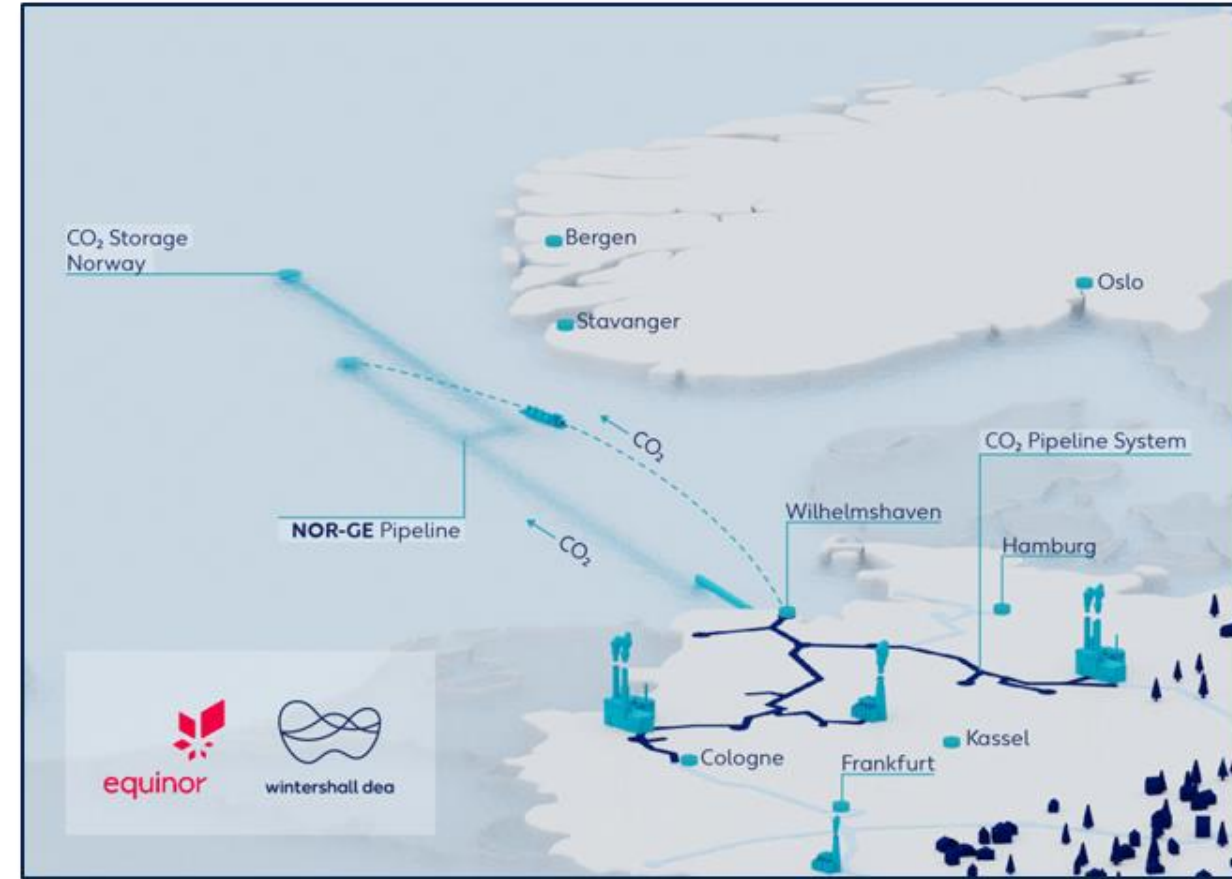
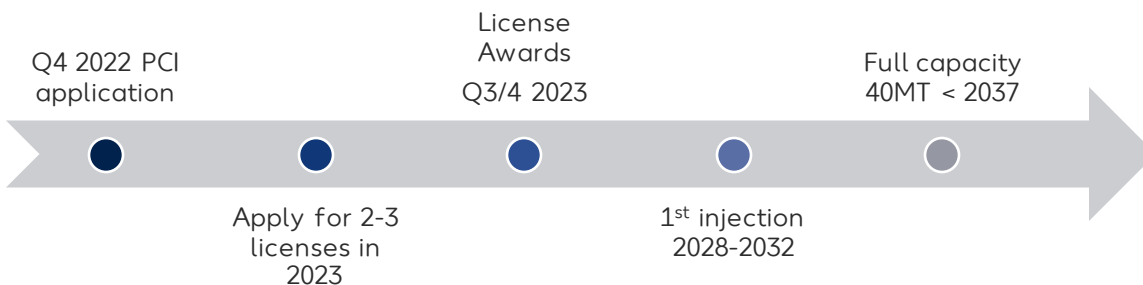
LUNA - STATUS

- First CO₂ storage license granted in Oct 2022; DG1 passed in Dec 2022.
- DG2 planned for Q3/Q4 2023.
- Appraisal well planned in 2024.
- First injection planned in 2026-2028.
- Ongoing negotiations with emitters for Luna storage capacity (likely fed by hubs in Antwerp and/or Wilhelmshaven).
- Phased development:
 - Phase 1: via ships
 - Phase 2: connection to NOR-GE CCS pipeline



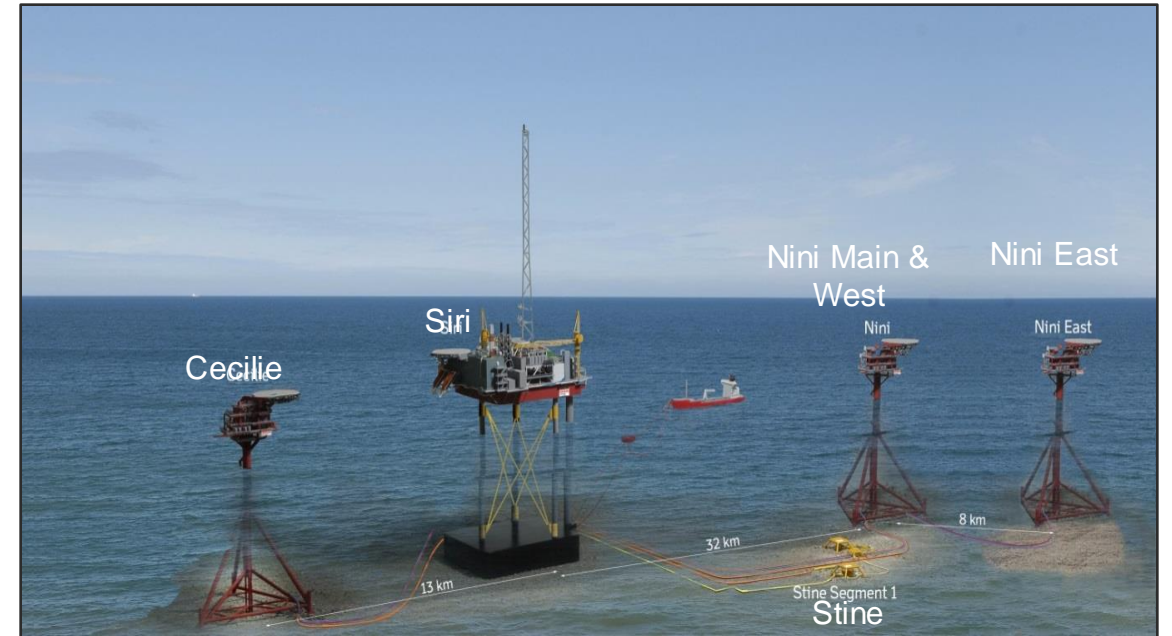
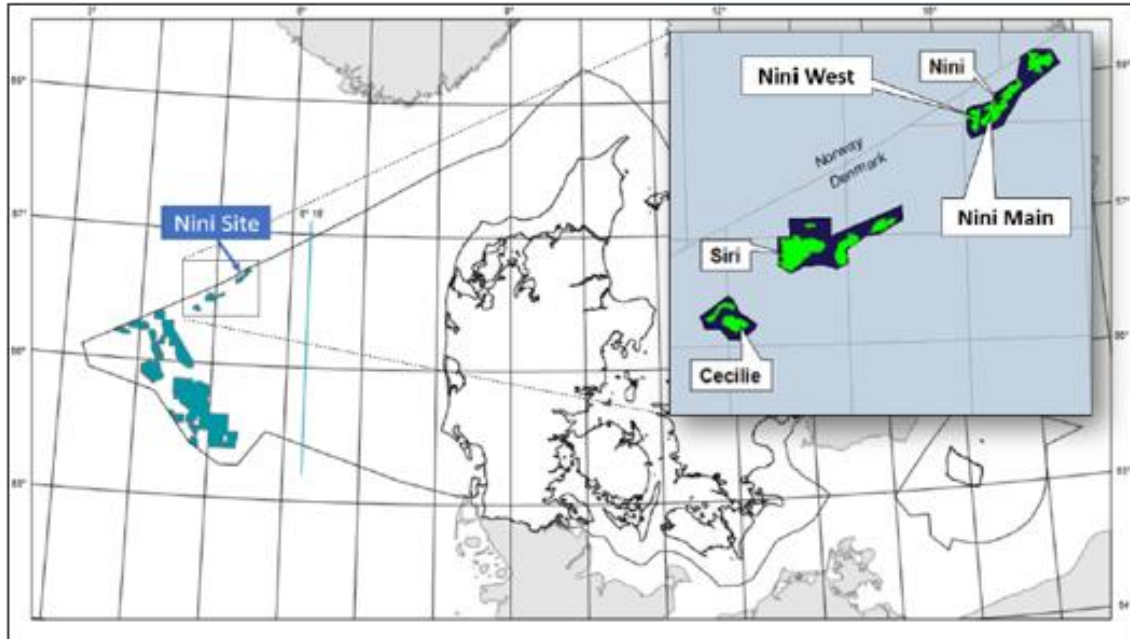
NOR-GE CCS

- › Pan-European full CCS value chain project that connects Germany and Norway initially via ship, later via an offshore pipeline.
- › CO₂ from Germany likely collected via Wilhelmshaven hub.
- › Joint application for Project of Common Interest status.
- › Joint license applications.
- › First injection < 2032 (10 MT/a). Full capacity < 2037 (up to 40 Mt/a).
- › Total volume of 1,000 Mt CO₂ sequestered assuming a 25 year injection period per well.



GREENSAND PROJECT

Location:



GREENSAND PROJECT

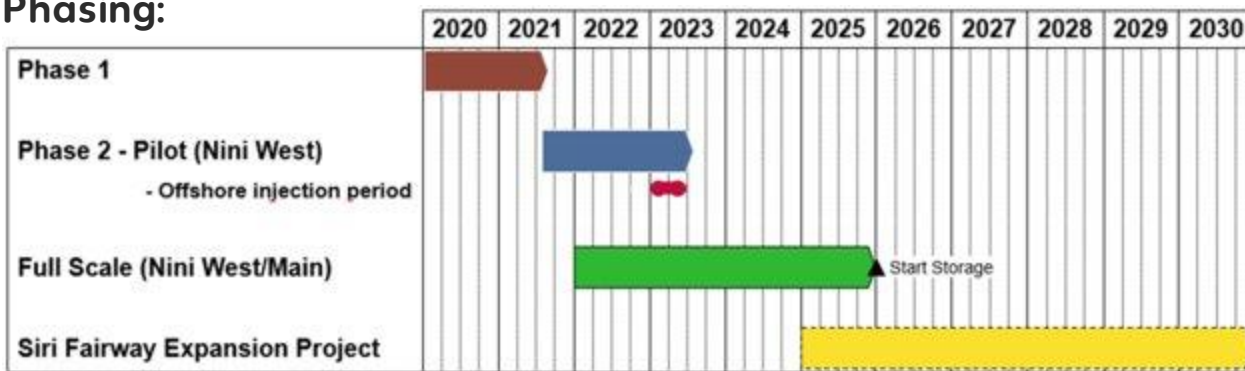
Objective of Greensand:

- › Establish a value chain for CO₂ transport & storage by end of 2025

Funding:



Phasing:



Partner set-up:



GREENSAND PILOT INJECTION



Objectives:

- > Test reservoir injectivity
- > Prove that existing infrastructure can be utilized
- > Verify applicability of monitoring technology

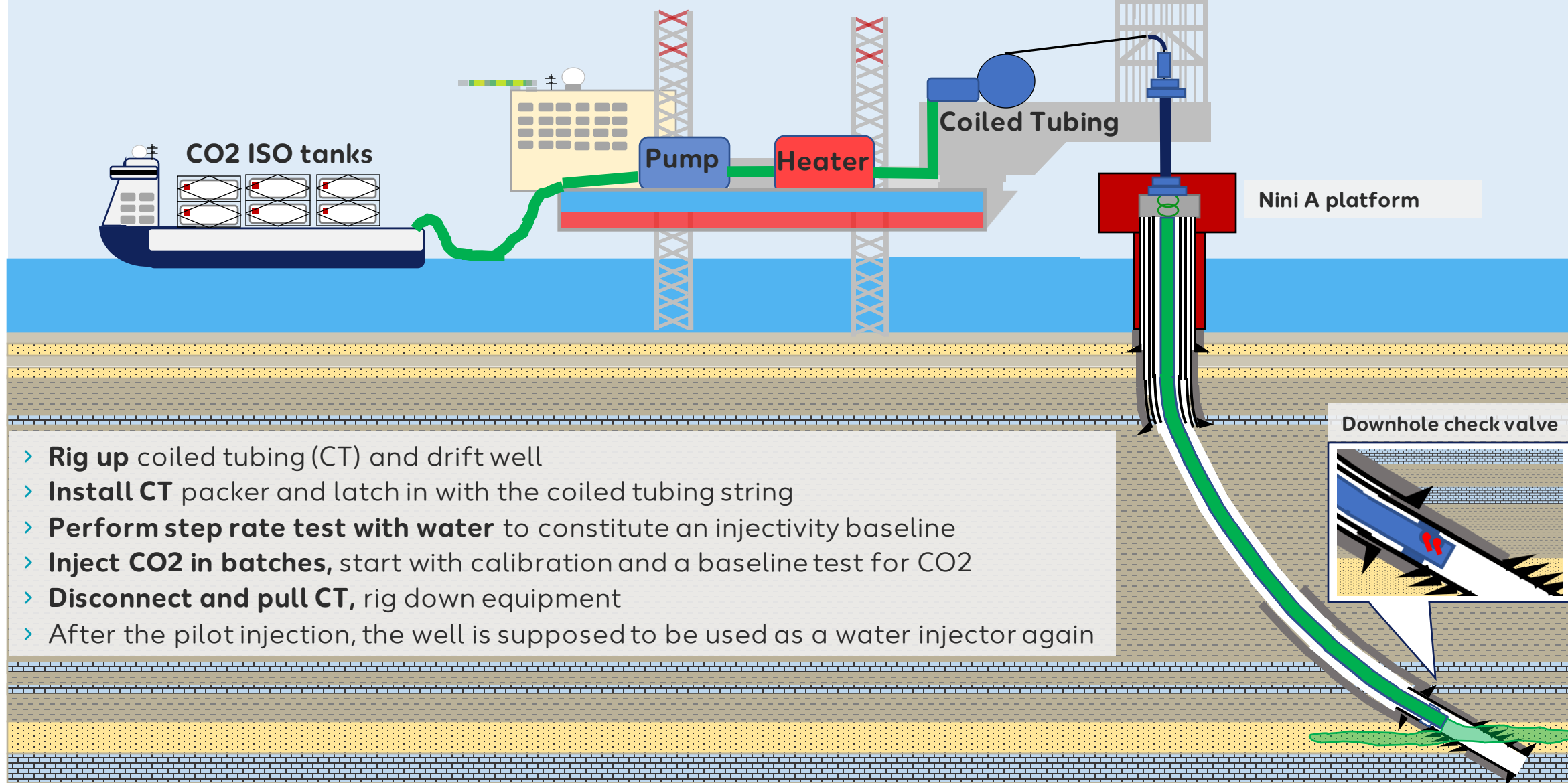
Scope:

- > Inject ca. 10,000 tons of CO₂ in several cycles into the depleted field of Nini West in Q1 2023

Operations:

- > **Load** ISO containers in Antwerp (80 vacuum insulated ISO tanks in the loop, i.e. 40 empty tanks will be filled while 40 are on the vessel).
- > **Transit** to the Nini platform (1 roundtrip takes about 4 days). ~ 14 shipments are planned in Q1/2023.
- > **Inject CO₂** (1 batch of CO₂: ~600 tons) via a coiled tubing into the NA-5 well (active water injector). A full cargo of CO₂ takes 12-24 hours.

CO2 INJECTION PLAN



SUMMARY – BUILDING A CCS BUSINESS

- › Focused strategy
- › Be aware of differences between oil & gas and CCS business
- › Trust within value chain is important
- › Significant regulatory topics still to be developed
- › Involvement of political stakeholders and general public is key



Let's inject



into the ground

