Rotterdam CCUS project Porthos
Carbon Sequestration Leadership Forum

November 5th, 2019
Situation in the Netherlands

• Climate target Paris & Dutch government: 49% reduction CO$_2$ by 2030

• National Climate Agreement:
  • Industry 14.3 Mton reduction per year, 7 Mton CCS = 50%

• Debate on Climate Agreement is about:
  • CO$_2$ tax vs. bonus-malus incentive
  • Who pays? Industry vs. civilians
  • Cap on CCS: quantity and timeframe
Rotterdam ideal location

- Port of Rotterdam unique location for CCUS
  - ~ 16% national CO$_2$ emissions
  - Large industrial cluster
  - Relatively small area
  - Cost effective
  - Storage location offshore
  - Combination with other developments in the port, e.g. hydrogen
Rotterdam CCUS Project Porthos

- **What:** One-stop-shop for open access CO₂ transport and storage network
- **Why:** to help meet the Dutch and EU CO₂ reduction targets of The Netherlands
- **Where:** Rotterdam as CCUS nucleus with storage in offshore P18 gas fields
- **Who:** Initiated by 3 state-owned parties; EBN, Gasunie, Port of Rotterdam.
- **When:** Ambition: ready for FID 2021 and commissioning in 2023
**Porthos - overview**

**GENERAL DIAGRAM OF CCUS**

**STORAGE**

**Platform**

**SOURCE**

Industry CO₂

Industry CO₂

**USE**

**TRANSPORT**

**CO₂ pipeline**

**CO₂ storage**

**HP: 16” -> 80 tot 130 bar(g), T= 40 – 80 gr C**

**LP: 42” -> 24 tot 35 bar(g), T= 5 – 40 gr C**
Transport: Onshore pipeline

- In existing pipeline corridor
- Total length: 33 km
- Capacity: 5 Mton per year
- Diameter: 108 cm
Transport: compressorstation

- 3 locations: Edisonbaai, Europaweg, Aziëweg
- About 6 hectare
- Electricity
- Cooling installations (sea water)
- Measure- and control systems
Transport: offshore pipeline

- From the Maasvlakte (compressorstation) under the bottom of the North Sea to the P18 fields
- Diameter: 40 cm
- Total length: 21 km
- Capacity fields: 37 Mton
- Maasgeul: drilling (HDD)
- At sea: pipe laying ship
Storage

- (Almost) empty gas fields (appr. 20 bar)
- Natural closing through sealing layers
- Depth between 3.175 en 3.455 meter
- Re-use existing platforms and wells
Building a CCUS hub

- Porthos positioned as **hub**, in a next phase capacity for transport up to **10 Mton per year**
- More CCS potential anticipated in The Netherlands **beyond Port of Rotterdam**
- Longer term, possibly accommodating CO$_2$ from **Germany, Belgium**
- Potential to further **reduce CCS unit costs** and obtain valuable expertise on CCS hub development
Status of the Porthos project

- CCS included in preliminary Dutch Climate Accord
  - Subsidy support mechanism (SDE++)

- PORTHOS finalized Feasibility and Concept Select phases
  - Started Define Phase (Front End Engineering and Design)

- Expression of Interest process done
  - Industry expressed sufficient interest

- Started Environmental Impact Assessment (EIA) procedure
  - Public consultations in Rotterdam Industrial Area conducted
Challenges ahead towards a Final Investment Decision

• Business case
  • Close the financial gap: funding

• Regulatory
  • Allocating the storage liabilities and roles and responsibilities
  • Connecting the S(torage) and the U(tilisation)

• Technically
  • Developing a clear operating philosophy based on complex flow control

• Generally
  • CCS requires leadership and offensive policies, aimed at delivering projects in industrial clusters with high potential for CO2 reduction

⇒ Final Investment Decision in 2021
Thank you for your attention