A composite background image showing a coastal city with snow-capped mountains, wind turbines, a large ship, and an offshore oil rig in the sea. The sky is blue with some clouds and a small airplane flying in the distance.

PilotCCS from SINTEF perspective: Lessons learned, achievements, sustainability, future perspectives

Simon Roussanaly

PilotCCS collaboration between Norway-Czech Republic – lessons learned

- Relation CCS front runner and power generation expert
- Czech Republic has one of the only IGCC plant in Europe
- Strong industrial involvement in the project
- CCS activities performed in the project relevant for both countries

- Small downside: Heavy administration and reporting...

PilotCCS - achievements

- Deeper technology understanding
 - CCS strategy for lignite-based IGCC plant
 - Pre-combustion part
 - Lignite specific challenges
 - Low-temperature capture
 - Impact of partial pressure and CO₂ capture ratio
 - Membrane-based capture
 - Polymeric H₂-selective and CO₂-selective membranes for post-combustion capture
 - Impact of impurities on CO₂ transport
 - Energy and cost performances for pipeline export
 - Removal of impurities and process design for train transport
 - Train-based transport
 - One of the first techno-economic analyse on train-transport
 - Understand of competitiveness of both transport options

PilotCCS - achievements

- Strong disseminations:
 - Several conference presentation (GHGT-13, TCCS, SCPPE, Friedberg conference...)
 - Several seminar (Oslo, Prague, Lausanne, Trondheim)
 - Several journal papers in high impact journals

International Journal of Greenhouse Gas Control 65 (2017) 235–250



Techno-economic evaluation of CO₂ transport from a lignite-fired IGCC plant in the Czech Republic



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Some of the activities performed in PilotCCS are to continue in other projects



Deployment case 1: CCS for Norwegian Industry

1) CCS value chain and legal issues

- 2) Solvent - environmental issues
- 3) Low emission H₂ production
- 4) CO₂ capture by liquefaction
- 5) Gas turbines
- 6) CO₂ capture process integration

- 7) CO₂ transport
- 8) Fiscal metering and CO₂ thermodynamics

- 9) Structural derisking
- 10) Containment
- 11) Reservoir management and EOR
- 12) Monitoring technologies

Deployment case 2: Storing Europe's CO₂ in the North Sea basin

Centre for intelligent electricity distribution – CINELDI

Centre for an Energy Efficient and Competitive Industry for the Future - HighEFF



Mobility Zero Emission Energy Systems MoZEES



Norwegian CCS Research Centre NCCS



Research Centre for Sustainable Solar Cell Technology



Norwegian Research Centre for Hydropower Technology



Norwegian Centre for Sustainable Bio-based Fuels and Energy NorSusBio



The Research Centre on Zero Energy Neighbourhoods in Smart Cities – ZEN Centre



Vision

NCCS will enable fast-track CCS deployment through industry-driven science-based innovation, addressing the major barriers identified within demonstration and industry projects, aiming at becoming a world-leading CCS centre



Deployment case 1: CCS for Norwegian Industry

1) CCS value chain and legal issues

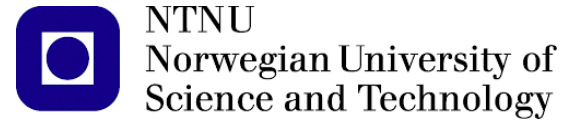
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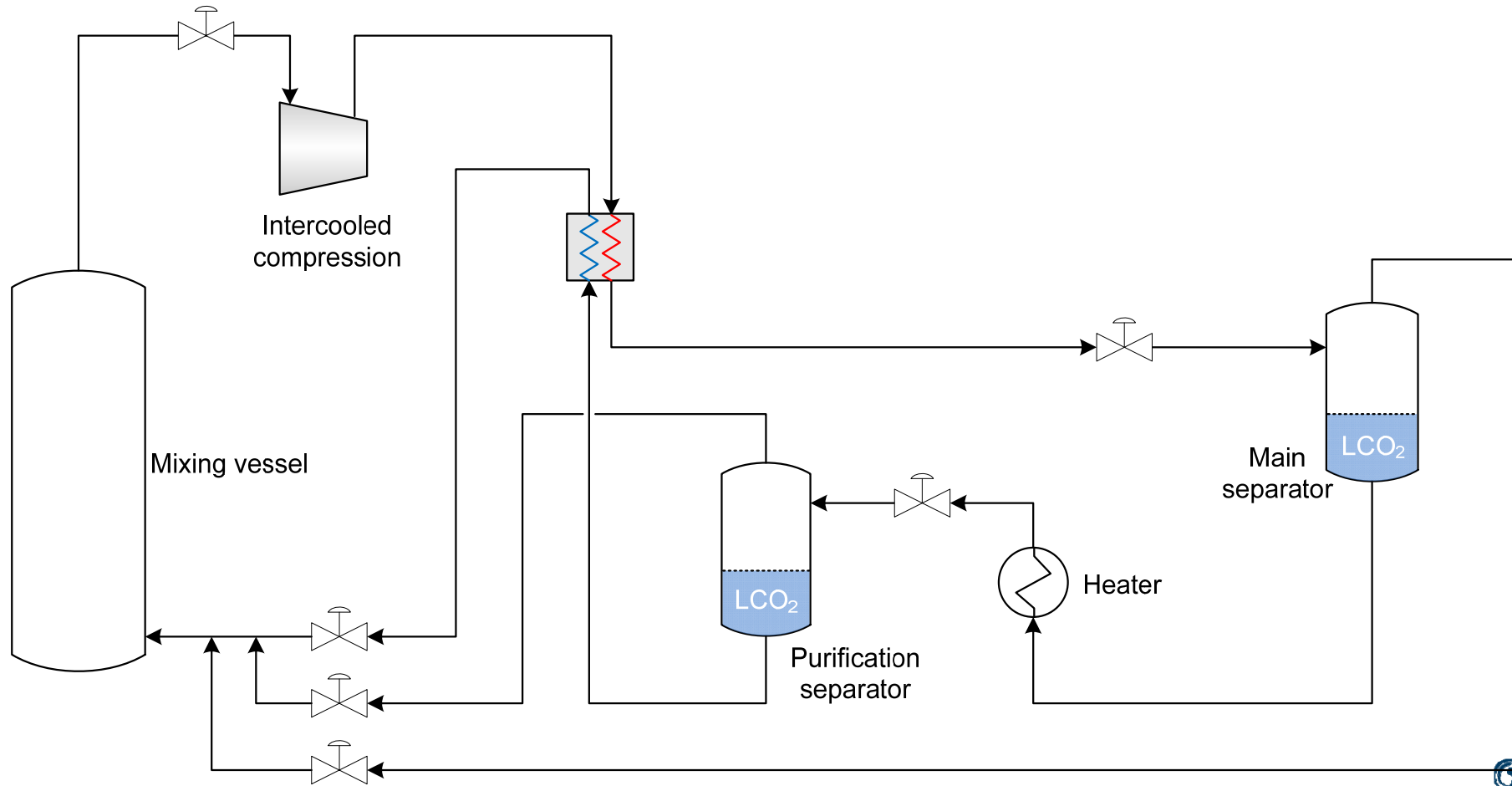
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Deployment case 2: Storing Europe's CO₂ in the North Sea basin

A world-leading partnership



Development of low-temperature based CO₂ capture



Development of low-temperature based CO₂ capture

- **Laboratory pilot testing of the CO₂ liquefaction and purification unit**
 - Test facility under commissioning
 - Experimental verification of CO₂ separation ratio and product purity
 - Comparison with theoretically obtainable performance
- **Gas mixtures in consideration:**
 - Short-term: CO₂ + N₂
 - Mid-term: CO₂ + H₂
- **Pressure levels:**
 - Up to 120 bar
- **Temperature levels:**
 - Down to -55°C
- **Capacity:**
 - Approximately 10 ton CO₂ per day





Teknologi for et bedre samfunn