

CCS IN NORWAY

ACHIEVEMENTS AND PROSPECTS



GASSNOVA

NCCS - Norwegian CCS Research Centre - Kick-off

Trude Sundset, CEO

CCS IS A PART OF THE SOLUTION!



A photograph of an industrial facility, likely a power plant or refinery, silhouetted against a vibrant sunset sky. The sky transitions from deep blue at the top to bright orange and yellow near the horizon. Several tall, slender towers and a large central structure are visible, some with lights glowing. The overall scene is industrial and atmospheric.

NORWAY CCS:

Gassnova SF - The Norwegian State Enterprise for CCS

- Manage the State's CCS interests
- Advise the Ministry of Petroleum and Energy
- Contribute to technology development and knowledge-sharing

**GASSNOVA IS SET
UP TO SUCCEED
WITH CCS**

RD&D

CLIMIT programme

DEMO

Test arena:
TCM

**FULL-
SCALE**



GASSNOVA



CLIMIT: FROM R&D – DEMO

More than 300 projects - Annual budget approx. 23 M€

- Norway is in the forefront of international research and technology development
 - Examples: SOLVit + Monitoring technologies + Next generation technologies
 - Technological basis for Norwegian full-scale CCS strategy
- Close international cooperation

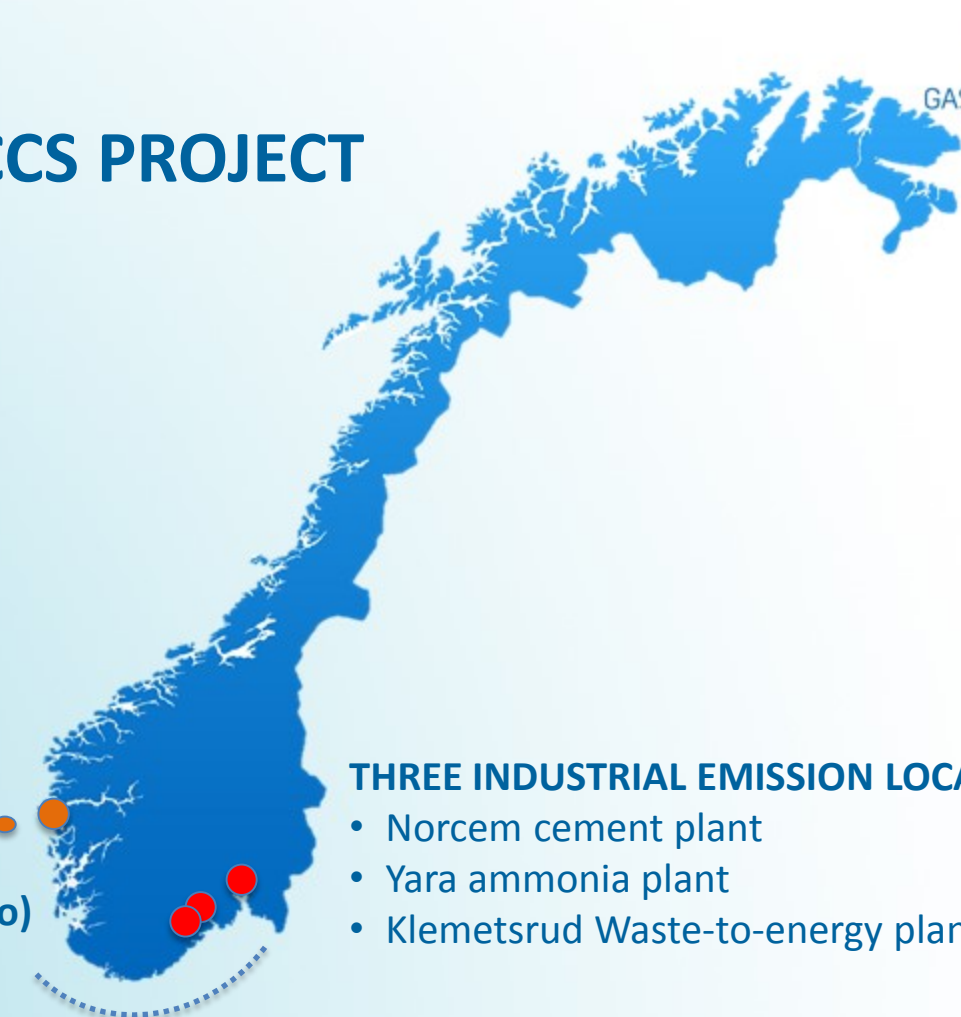
CO₂ TECHNOLOGY CENTRE MONGSTAD (TCM)

2012 → 2017 → 2020

- The world's largest and flexible facility for CO₂ capture technologies
- Testing and improving before full-scale operation
- 4 years of operation – next 3 years in planning

Owners: Gassnova (on behalf of the Norwegian state), Statoil, Shell and Sasol

NORWAY: FULL-SCALE CCS PROJECT



CO₂ STORAGE

- Intermediate onshore storage
- Offshore storage at Smeaheia

CO₂ TRANSPORT (Gassco)

- Ship transportation

THREE INDUSTRIAL EMISSION LOCATIONS

- Norcem cement plant
- Yara ammonia plant
- Klemetsrud Waste-to-energy plant

CCS VALUE CHAIN

Autumn 2016: Invitation to tender

First quarter 2017: Start-up concept phase

Autumn 2017: Concept select and initiate FEED

Spring 2019: Investment decision

In 2022: Full-scale CCS chain in operation

- CO₂ capture: The responsibility of the industry players
- CO₂ transport og storage: The responsibility of the Norwegian state
- Large storage capacity at Smeaheia aquifer (this project will only utilize < 1%)



NORWAY CCS: THE TIME IS NOW!

- CO₂ emissions from various industries
- Solutions with real potential for learnings and further deployment
- To stay competitive in a green economy: CCS essential for industry
- Necessary to achieve our climate goals