



**US - NORWAY  
COLLABORATION ON CCS/CCUS**

# NCCS

**NORWEGIAN CCS RESEARCH CENTRE**  
Industry-driven innovation for fast-track CCS deployment

**2018 Bilateral Meeting – Storage session**  
**May 2, 2018**

# A world-leading partnership



*users*

*vendor, in-kind*

*university*

*research inst.*

*associated*





# Deployment Cases - NCCS approach

We want NCCS to:

- Have strong industry ownership
- Overcome critical barriers identified in demo and industry projects
- Align research across disciplines
- Provide targeted research in areas that contribute to large-scale CCS deployment

Deployment Case 1:  
CCS for Norwegian industry



0,5 – 1,5 Mt/a



Deployment Case 2:  
Storing Europe's CO<sub>2</sub> in the North Sea basin



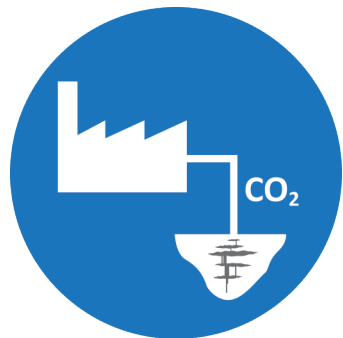
> 100 Mt/a



NCCS

# Tasks in NCCS

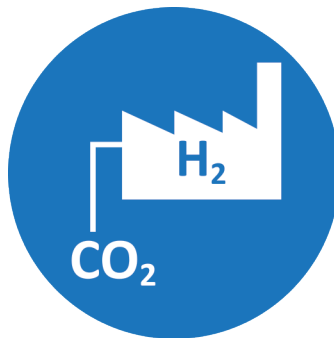
See [www.NCCS.no](http://www.NCCS.no)



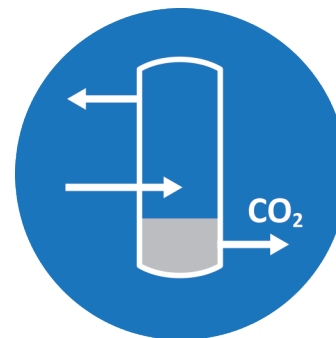
CO<sub>2</sub> value chain and legal aspects



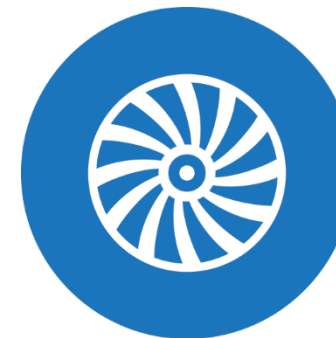
Solvent technology – environmental issues



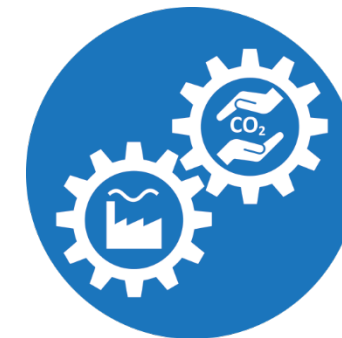
Low emission H<sub>2</sub> production



Conditioning through liquefaction



Gas turbines



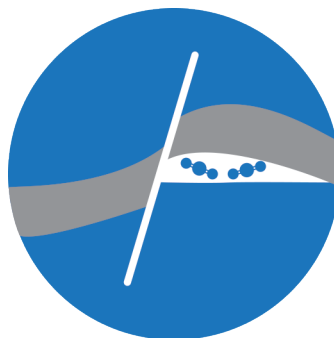
CO<sub>2</sub> capture process integration



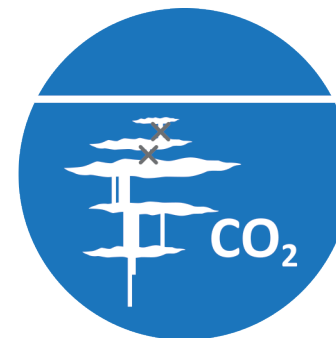
CO<sub>2</sub> transport



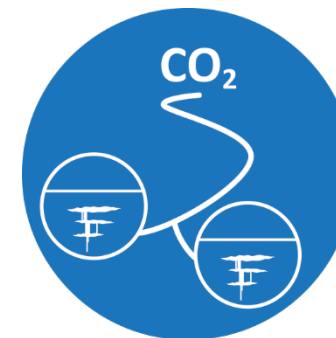
Fiscal metering and thermodynamics



Structural derisking



CO<sub>2</sub> storage site containment



Reservoir management and EOR



Cost-efficient CO<sub>2</sub> monitoring technology

# NCCS tasks on CO<sub>2</sub> storage and current partners



## • Structural derisking:

- Reduce risk related to injecting and storing CO<sub>2</sub> on the continental shelf
- Contribute to maximizing the injection volumes for the Smeaheia region
- Develop techniques to address fault-sealing and integrity

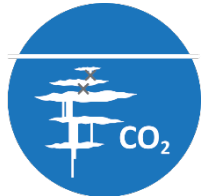


UiO: University of Oslo



SINTEF

INTPART  
application!



## • CO<sub>2</sub> storage site containment:

- Leakage issues affecting sub-sea wells and near-well area
- Maximise storage capacity with minimum risk of significant leakage,
- Establish an atlas with a check list of well integrity issues compromising safe storage



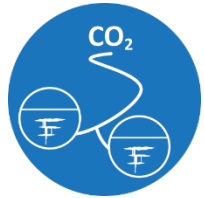
SINTEF



NTNU



Lawrence Livermore  
National Laboratory



## • Reservoir management and EOR

- Reduce net cost for overall CCS chain to enable EOR, through improved CO<sub>2</sub> mobility control and storage optimisation



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TNO  
innovation  
for life



UNIVERSITY OF  
CALGARY

University of Pittsburgh



## • Cost-efficient CO<sub>2</sub> monitoring technology

- Develop and demonstrate monitoring technology enabling safe operations in compliance with laws and regulations in the most cost-efficient manner
- Using seismic data alone and combination of seismic, CSEM and gravity data



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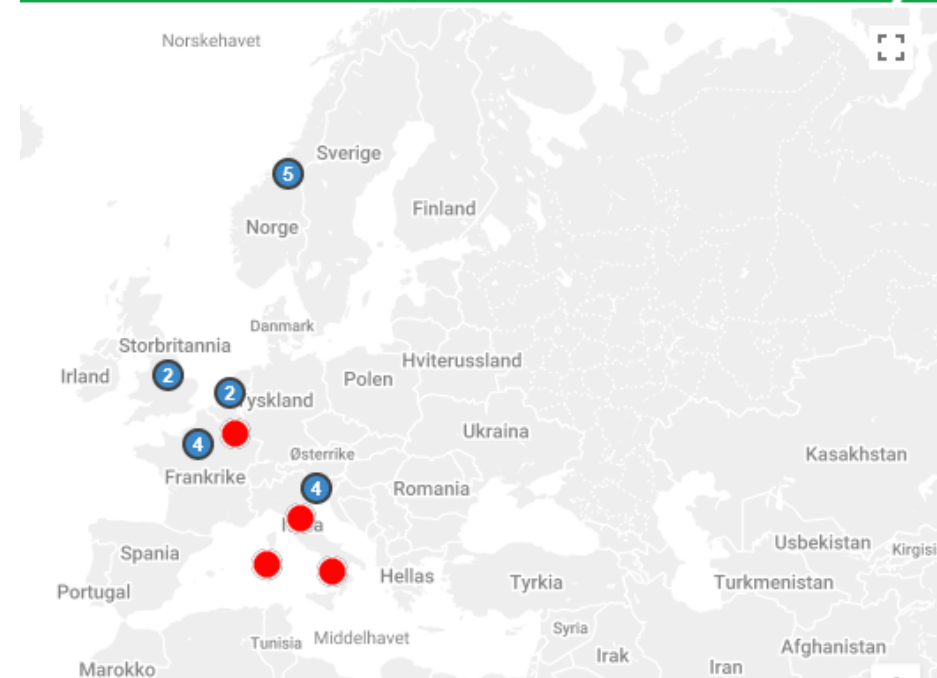
British  
Geological Survey  
NATURAL ENVIRONMENT RESEARCH COUNCIL





The mission of ECCSEL is opening access for researchers to a top quality European research infrastructure

## FACILITIES



### Norwegian facilities related to storage:

- SINTEF-NTNU Reservoir laboratory, including  $\mu$ -CT
- SINTEF Core Flood (SCAL) laboratory
- SINTEF Fluid (pVT) laboratory
- SINTEF-NTNU Well Integrity laboratory
- SINTEF Formation Physics laboratory



# Mechanisms for future collaboration

- Current funding:
  - Umbrella agreement with NETL - ongoing
  - NCCS Mobility Programme (direct costs) for Student, researcher, industry exchanges
- Additional funding possible through spin-off projects
  - 2 knowledge-building projects granted in 2017
- Applied for INTPART funding to promote international collaboration (results Dec. 2018)
  - 2017 application (not granted) can be basis for strengthened US-Norway collaboration on storage