



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

NCCS

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

**Collaboration with the United States
2018 Bilateral Meeting
May 2-3, 2018**



Centres for Environment-friendly Energy Research (FME)

Objective:

To establish time-limited research centres which conduct concentrated, focused and long-term research of high international calibre in order to solve specific challenges in the field.





Centre for intelligent electricity distribution – CINELDI

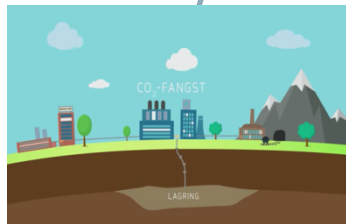
Centre for an Energy Efficient and Competitive Industry for the Future - HighEFF



Mobility Zero Emission Energy Systems MoZEES



Norwegian CCS Research Centre NCCS



Research Centre for Sustainable Solar Cell Technology

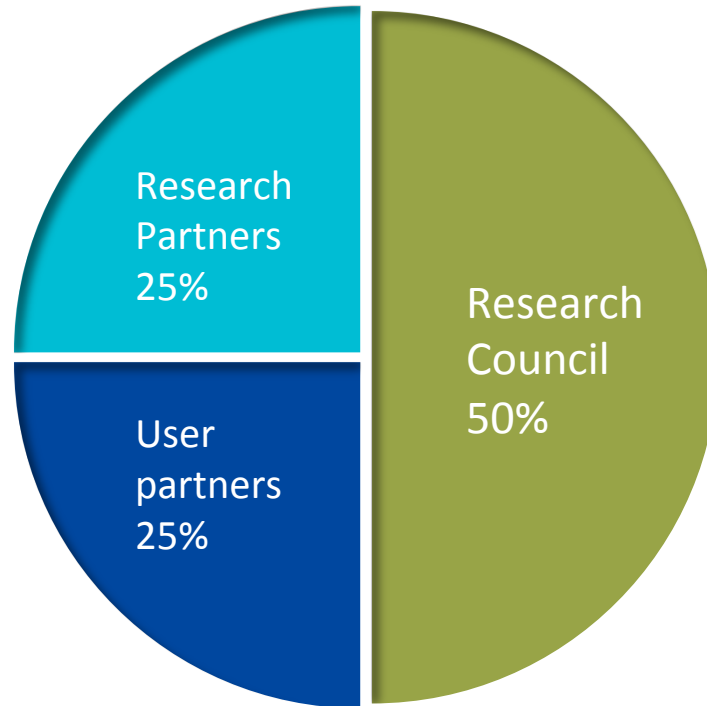
Norwegian Research Centre for Hydropower Technology



Norwegian Centre for Sustainable Bio-based Fuels and Energy NorSusBio

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

Funding model



- **Duration:** 8 Years (5+3 years) (2016-2024)
- **Budget:** 436 MNOK



- **23 MNOK** per year from the Research Council of Norway
- **3,75 MNOK** per year from larger companies
- Vendors and SMEs: Contribution will be decided according to the companies individual profile

About the Centre



48 millions



8 years



26 partners
7 associated partners

A world-leading partnership



users



vendor, in-kind



university



research inst.



associated



Norsk olje & gass



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



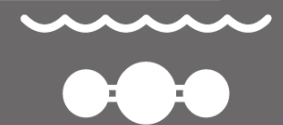
0,5 – 1,5 Mt/a



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

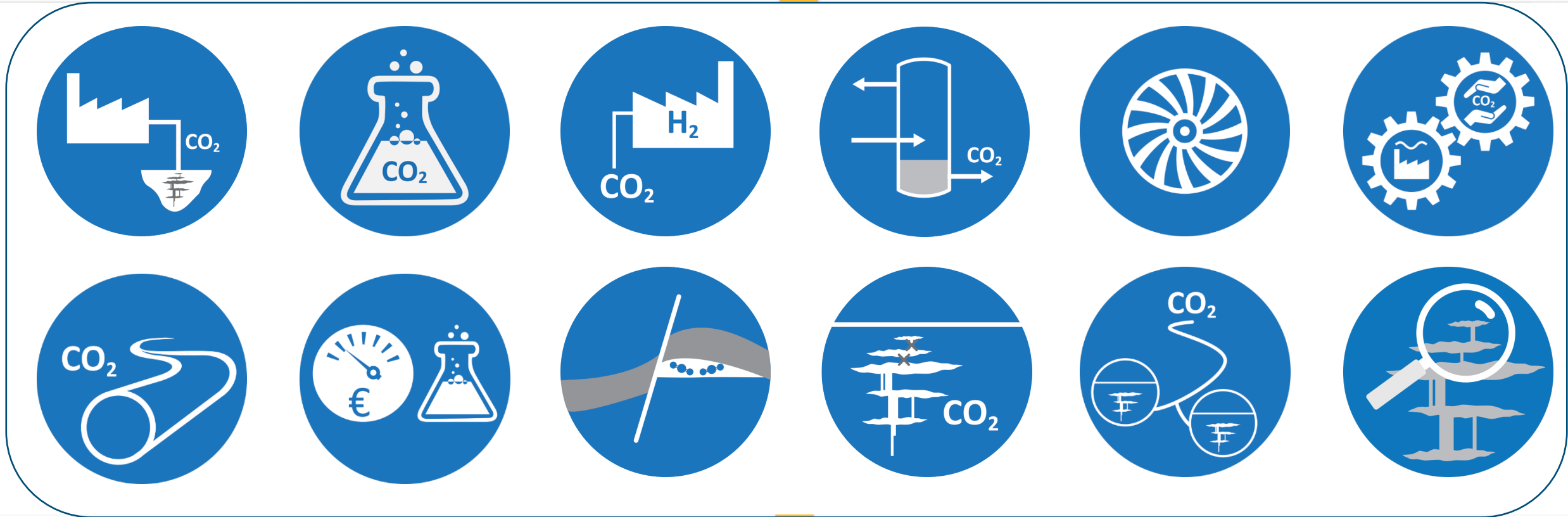


> 100 Mt/a



NCCS

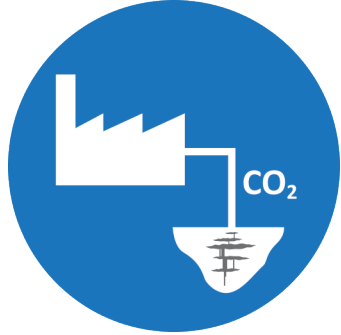
Deployment case 1: CCS for Norwegian Industry



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

Tasks in NCCS

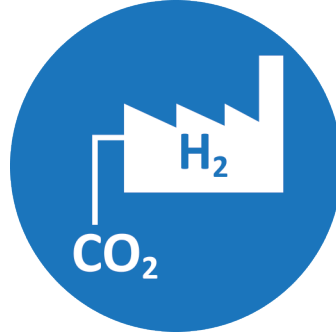
See www.NCCS.no



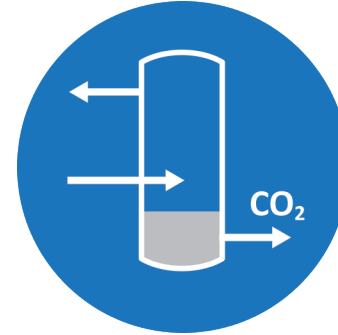
CO₂ value chain
and legal aspects



Solvent technology –
environmental issues



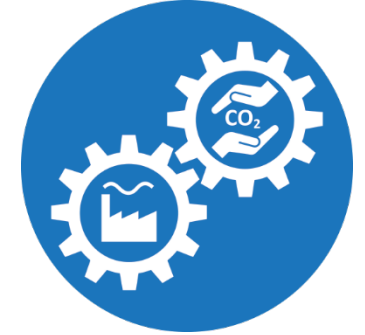
Low emission
H₂ production



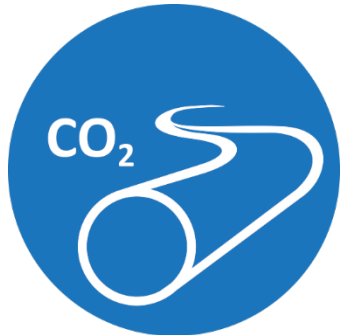
Conditioning
through liquefaction



Gas turbines



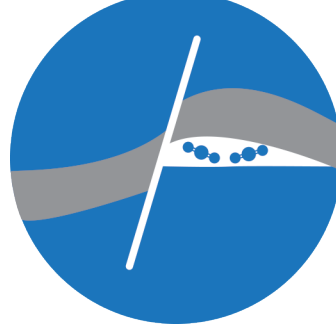
CO₂ capture
process integration



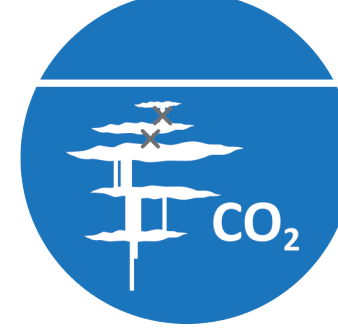
CO₂ transport



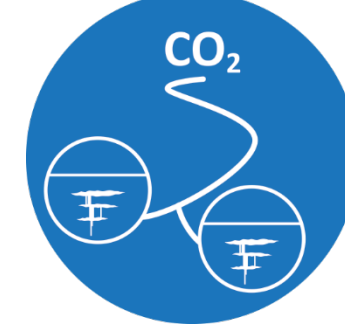
Fiscal metering and
thermodynamics



Structural
derisking



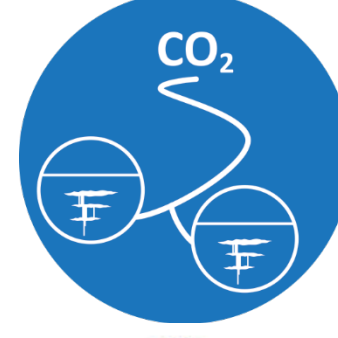
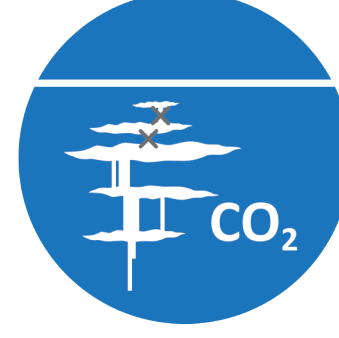
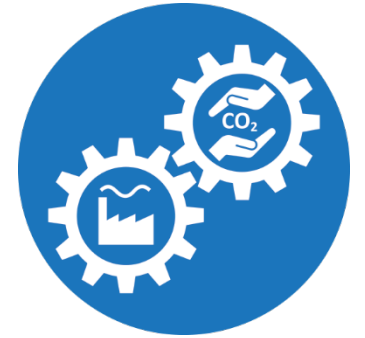
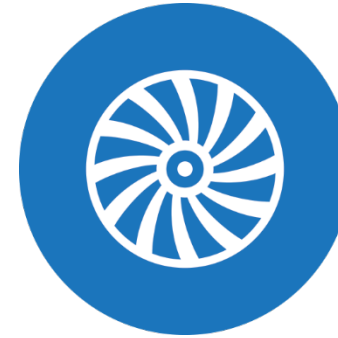
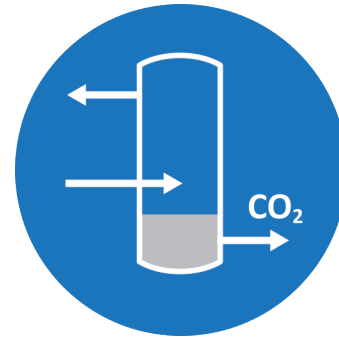
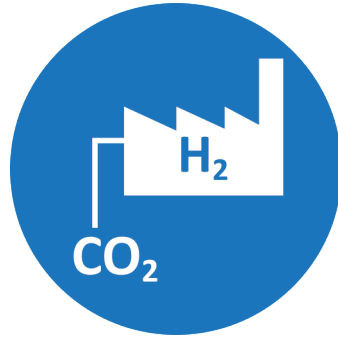
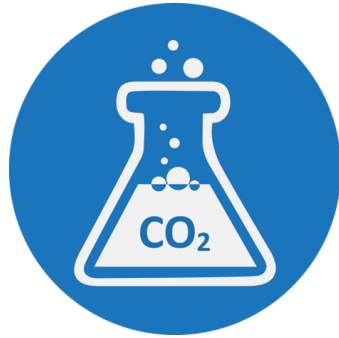
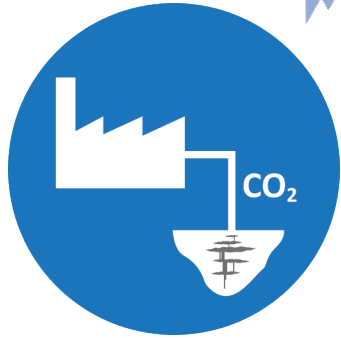
CO₂ storage site
containment



Reservoir
management and
EOR



Cost-efficient CO₂
monitoring technology



University of Pittsburgh



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
- Applied for INTPART funding to promote international collaboration (results Dec. 2018)