

CO₂ SPICER Web Conference

Status of CCS in Norway: From research to full-scale

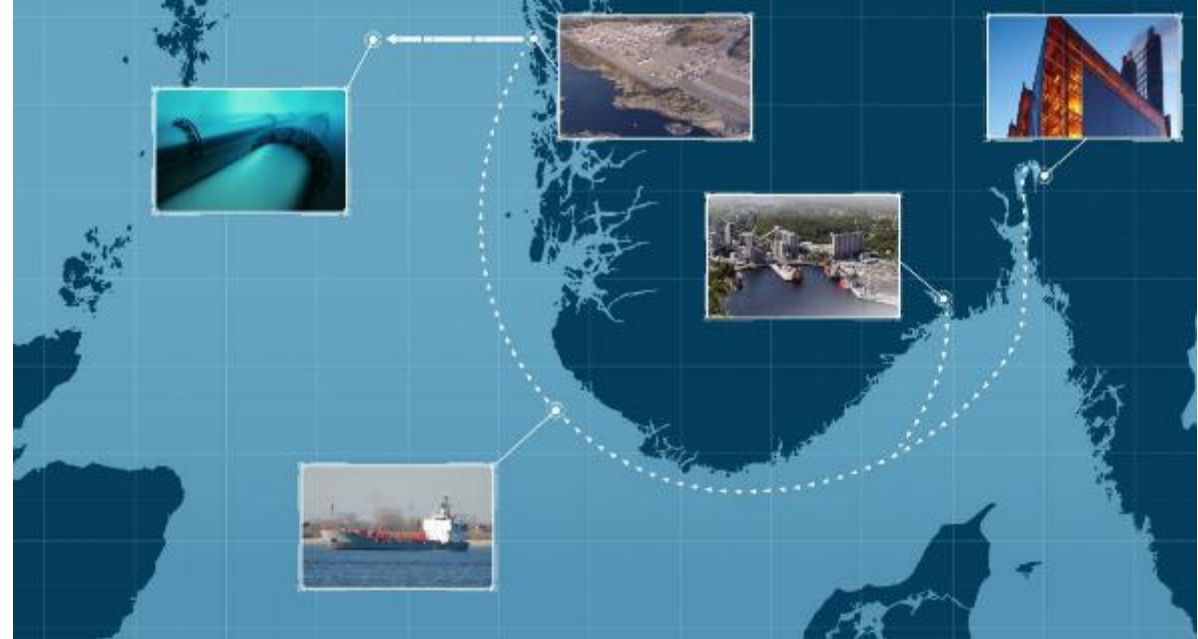
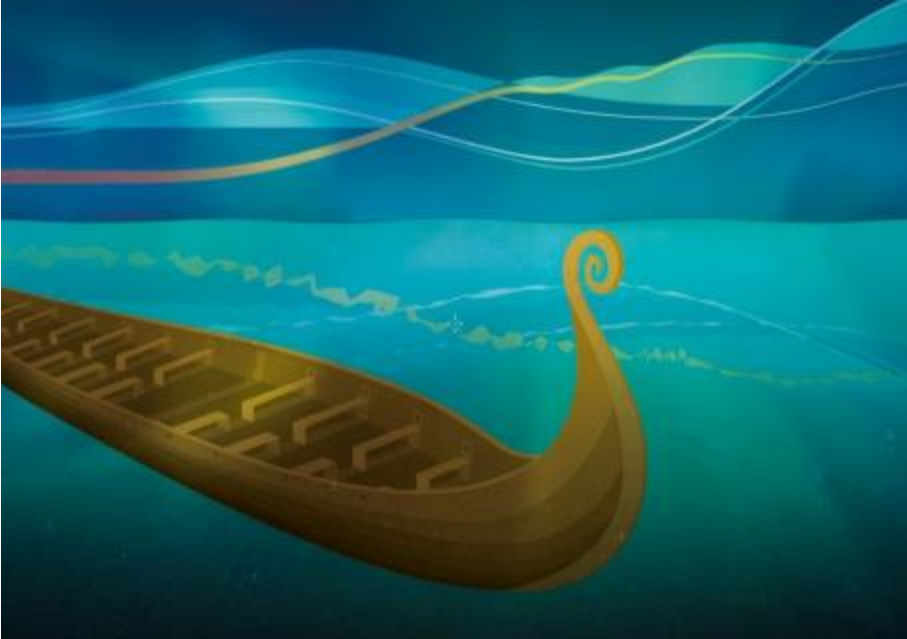
5 March 2021

Aage Stangeland, The Research Council of Norway

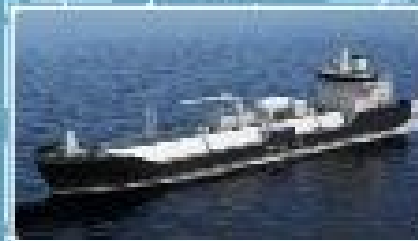
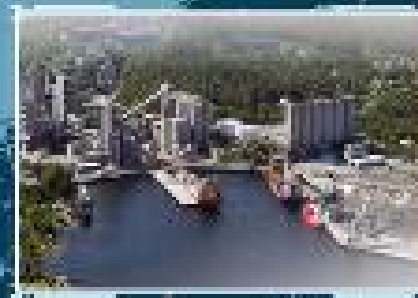
ast@rcn.no



Longship – The full-scale Norwegian CCS project



- The greatest climate project in Norwegian industry ever
- The Parliament has committed € 1.7 bn to Longship
- In operation 2024
- New volumes of CO₂ can be added to the infrastructure

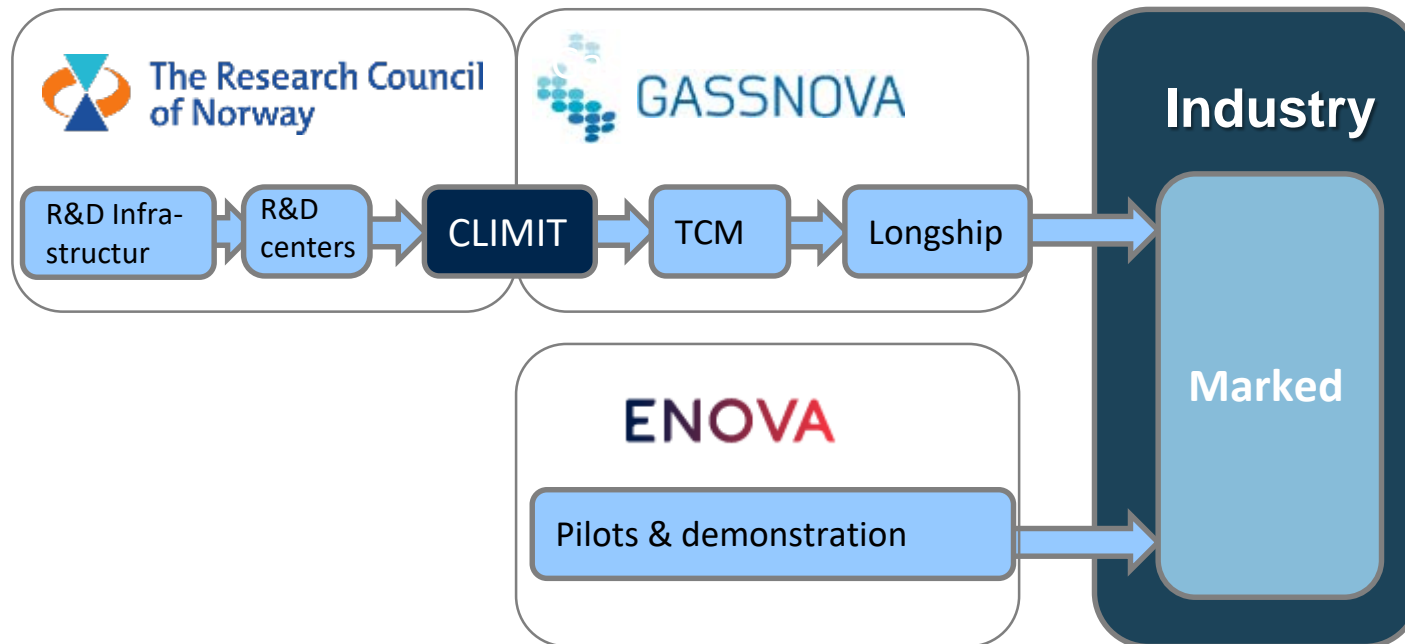


Longship – Phase 2





From research to commercialisation



Public budgets for CCS 2021

- Longship € 230 M
- RD&D € 40 M



RD&D instruments

- **CLIMIT**
- ACT
- ECCSEL
- NCCS
- EEA and Norway Grants
- TCM
- Horizon Europe
- Innovation Fund
- International cooperation



- **The Norwegian program for RD&D within CCS**
- **Budget 2021: NOK 180 M**
- **Close to 100 ongoing RD&D projects**
- **Focus areas**
 - A. Early full-scale CCS value chain in Europe
 - B. Large-scale storage of CO₂ on the Norwegian shelf in the North Sea
 - C. Future solutions for CCS



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ACT – Accelerating CCS Technologies

- **International partnership:** 16 countries and regions collaborating on joint calls and knowledge sharing.
- **Coordinator:** The Research Council of Norway.
- **Results:** International projects with high impact.
- **The European Commission** has stated that ACT is one of the most important CCUS tools in Europe.



Co-funded by the
European
Commission within
the Horizon 2020





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*European **C**arbon Dioxide **C**apture
and **S**torag**E** Laboratory
Infrastructure*

- **European platform for building and operating research infrastructure within CCS.**
- 22 partners from Norway, France, Italy, The Netherlands, UK
- Coordinator: NTNU
- Open access for research infrastructures



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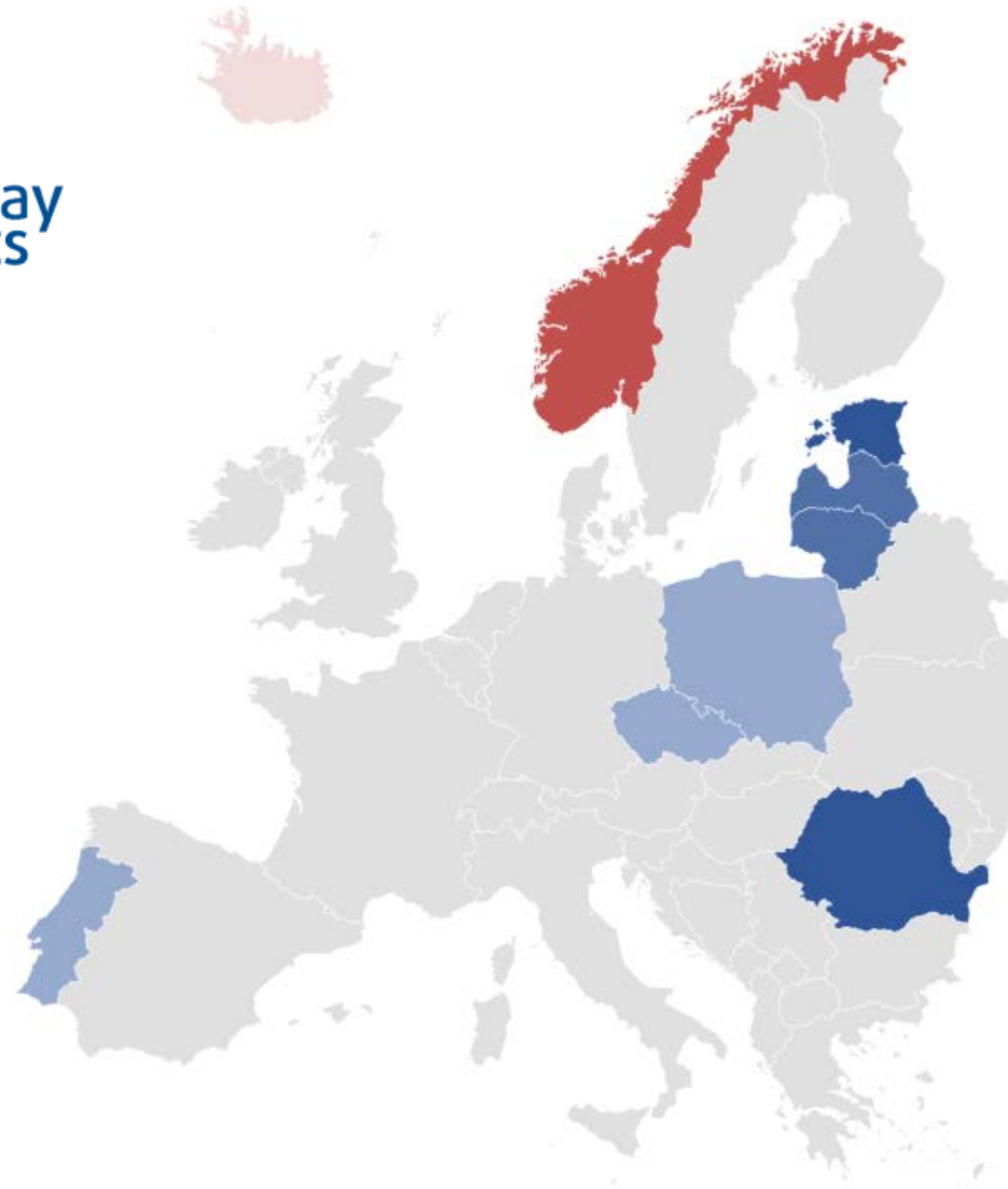


- Research Center led by SINTEF
- 8-year contract with the Research Council of Norway
- NCCS aims to fast-track CCS by working closely with the industry on research that addresses major barriers in making CCS happen in Norway, Europe, and the world.



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Technology Center Mongstad (TCM)

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TCM is a large and flexible pilot for testing CO₂ capture technology



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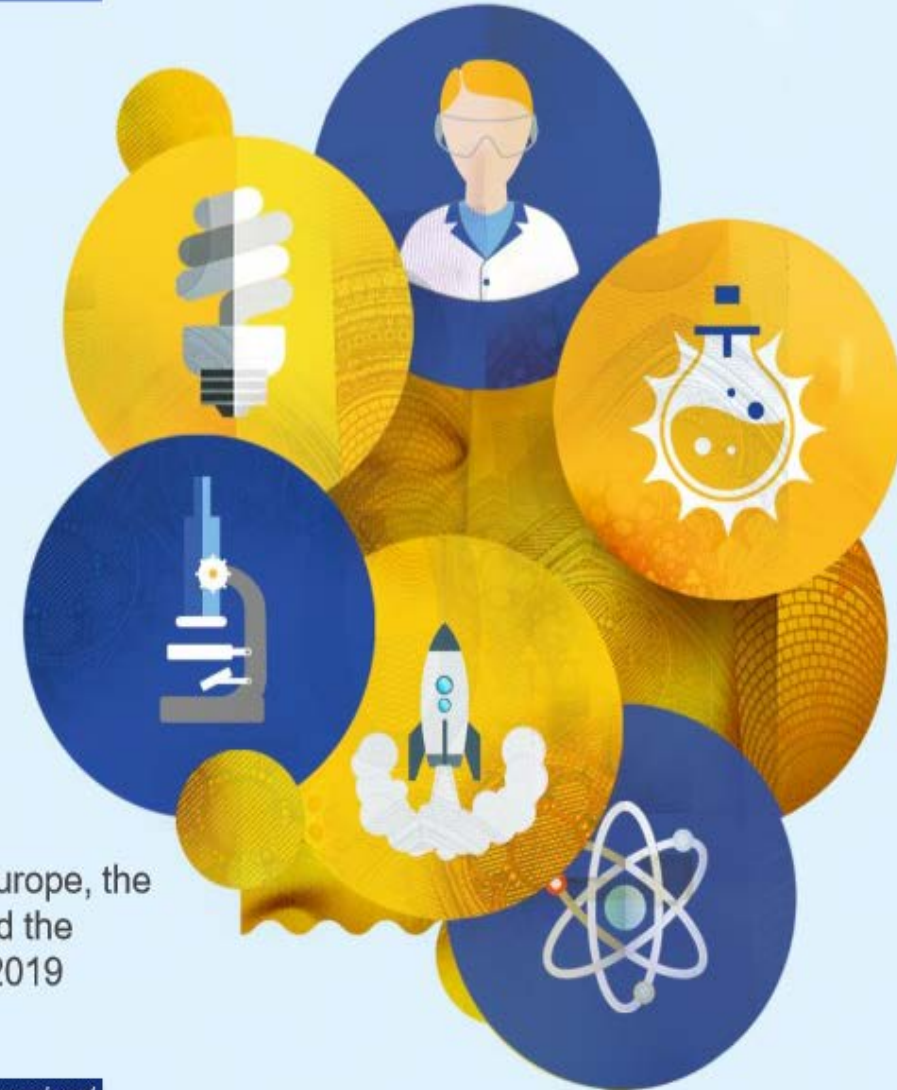
Horizon Europe

THE NEXT EU RESEARCH & INNOVATION
INVESTMENT PROGRAMME (2021 – 2027)

#HorizonEU

Based on the Commission Proposal for Horizon Europe, the common understanding between co-legislators and the Partial General Approach, both approved in April 2019

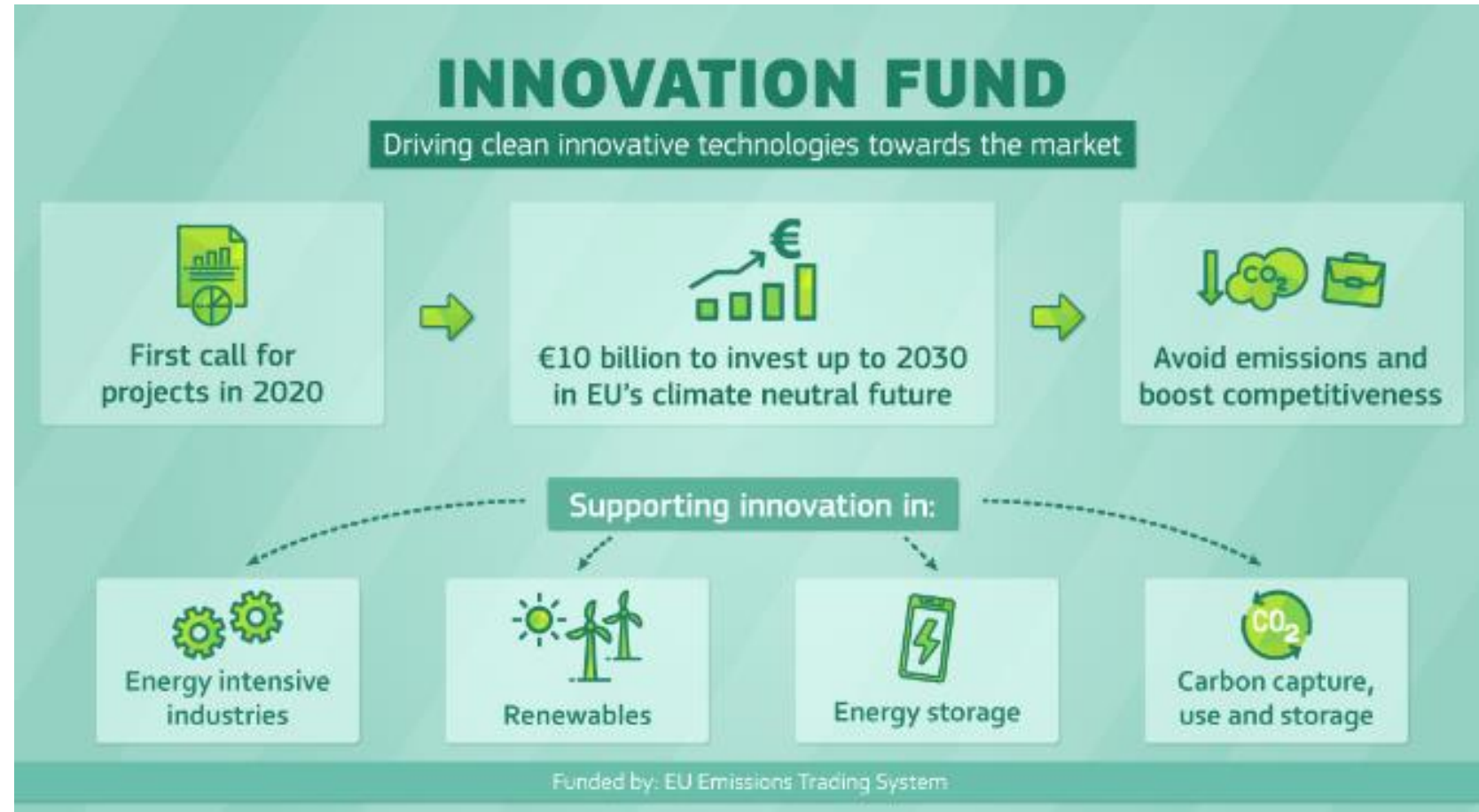
Research and
Innovation





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





CCS research objectives

- Demonstrate the full CCS value chain
- Cost reduction
- Infrastructure for transport and storage of CO₂, including hubs and clusters
- Safe CO₂ storage
- Business models
- Public awareness





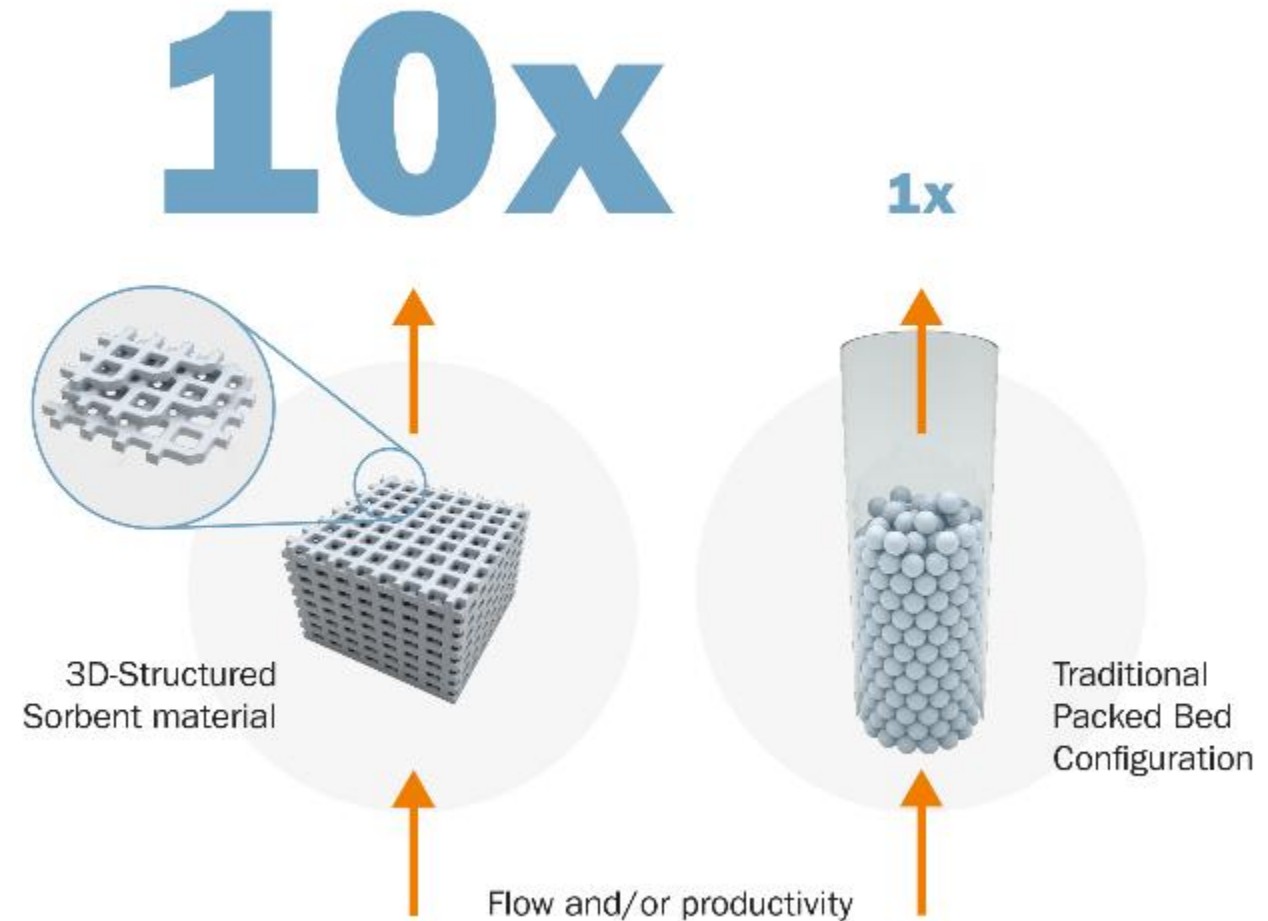
From research to full-scale

1. Bring forward new cost-effective technologies

The 3D CAPS project

- 3D printing of sorbents for CO₂ capture
- ACT project
- TNO and SINTEF together with several partners

**3D
CAPS**



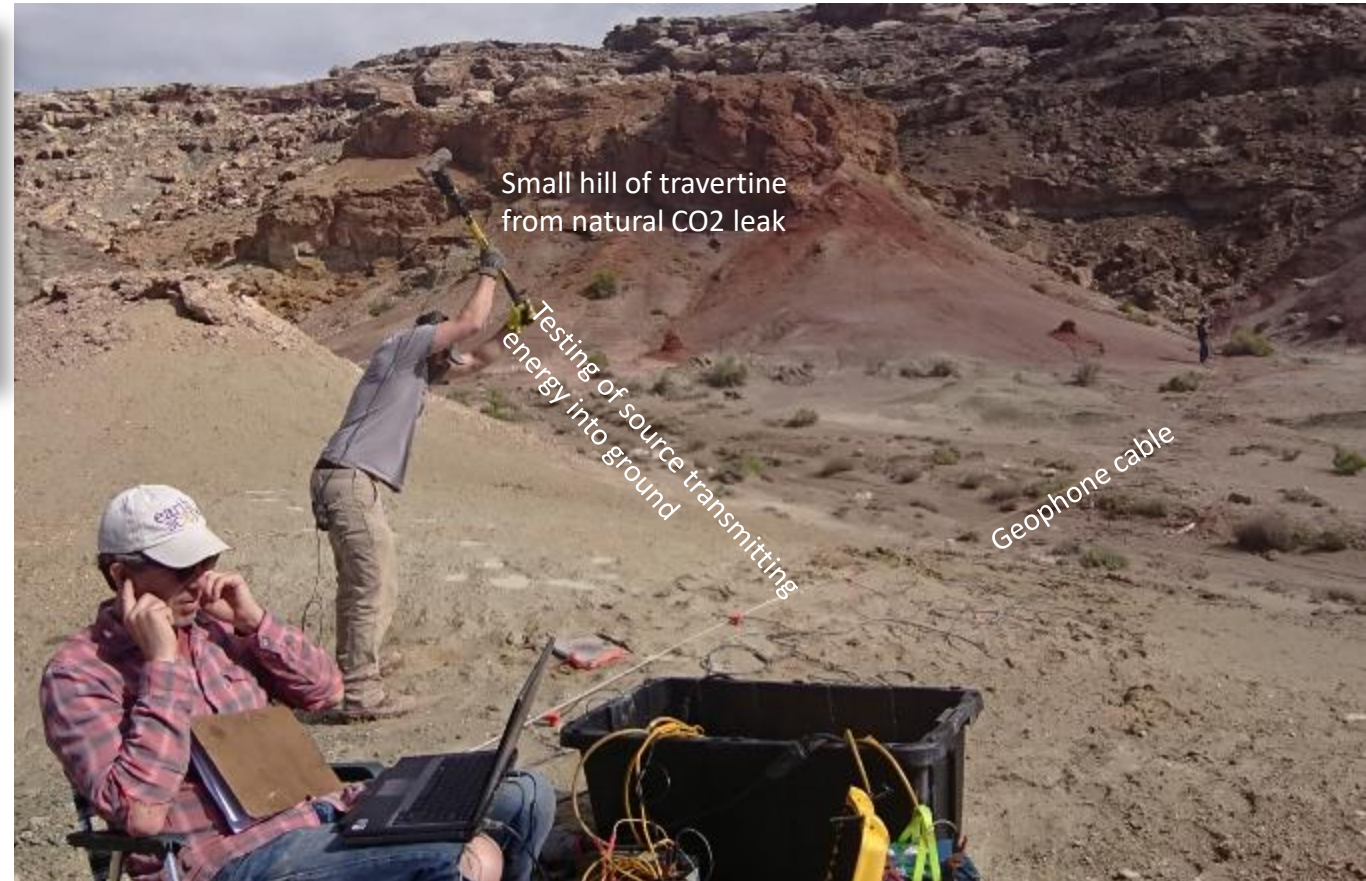


From research to full-scale

2. Ensure safe CO₂ storage

The COTEK project

- Determine CO₂ movement along faults
- University of Oslo together with partners from Norway and USA



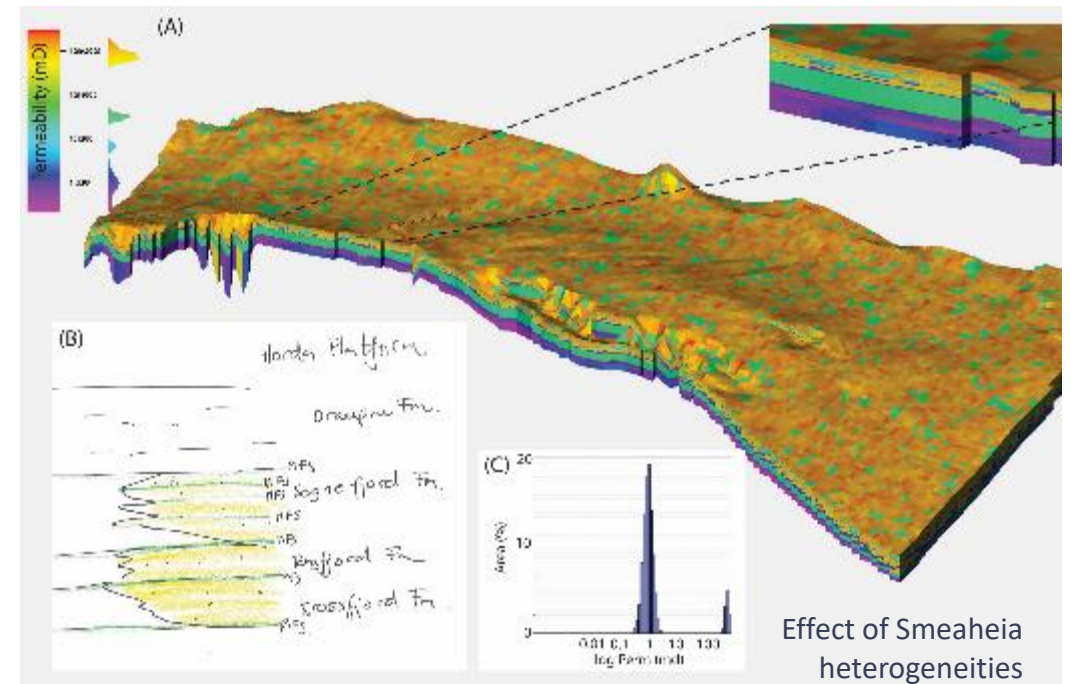


From research to full-scale

3. R&D to support large-scale deployment

The Pre-ACT project

- Developed workflows for pre-injection modelling, monitoring, conformance verification, and decision making
- SINTEF together with partners from Norway, Germany, the Netherlands, and UK





CCS trends

- CCS integrated in industrial facilities
- Hydrogen production combined with CCS
- CO₂ utilization
- Direct Air Capture (DAC)
- BECCS - Bio Energy with CCS





From research to innovation

Success criteria

- Deploying CCS is an iterative process with research and demonstration in parallel
- Cooperation academia and industry
- From basic to applied research
- International RD&D projects
- Combine social science and technical research

Research



Longship

