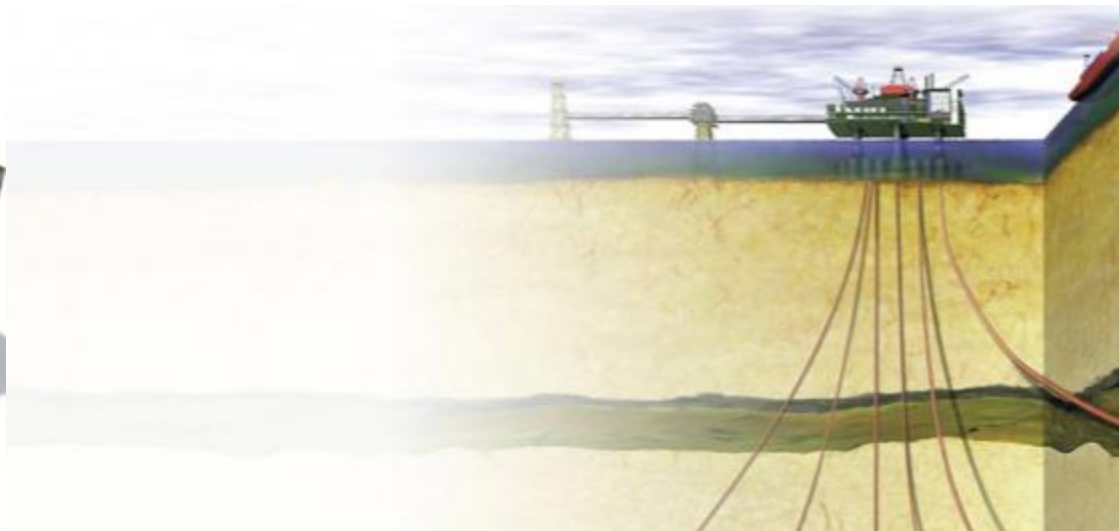


Closing conference of the programme CZ08, Prague 30 October 2017

CCS – Need and importance of international cooperation

Dr. Aage Stangeland
The Research Council of Norway, ast@rcn.no



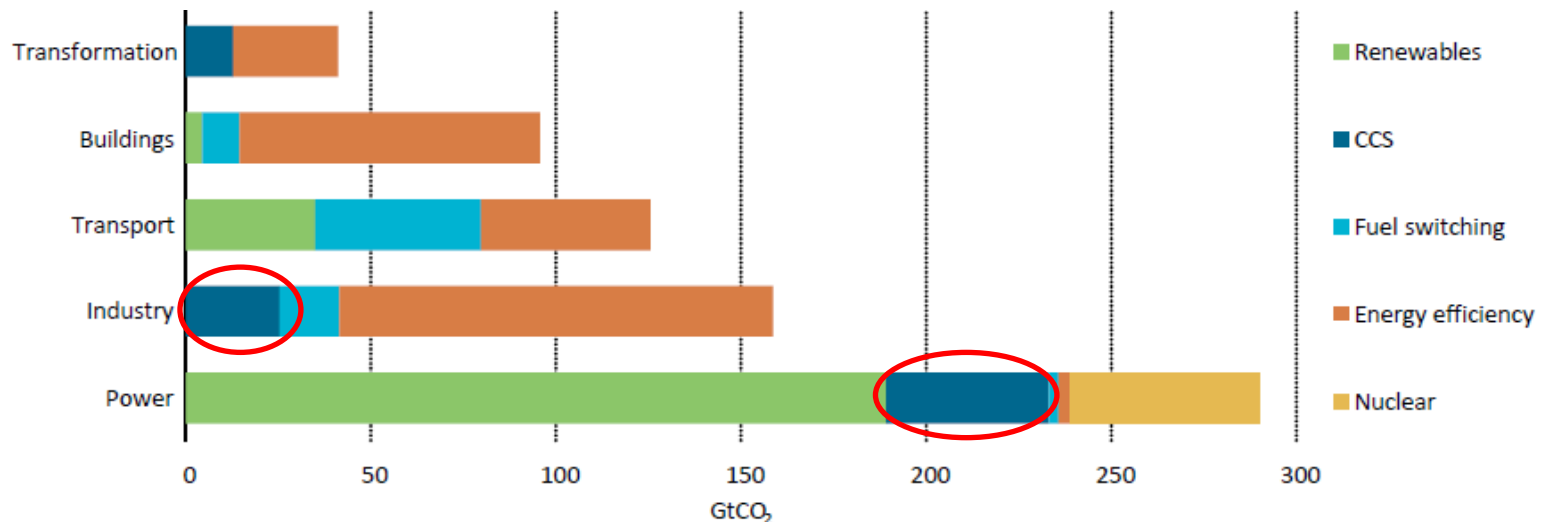
From minor incidents to climate change



CCS – new optimism

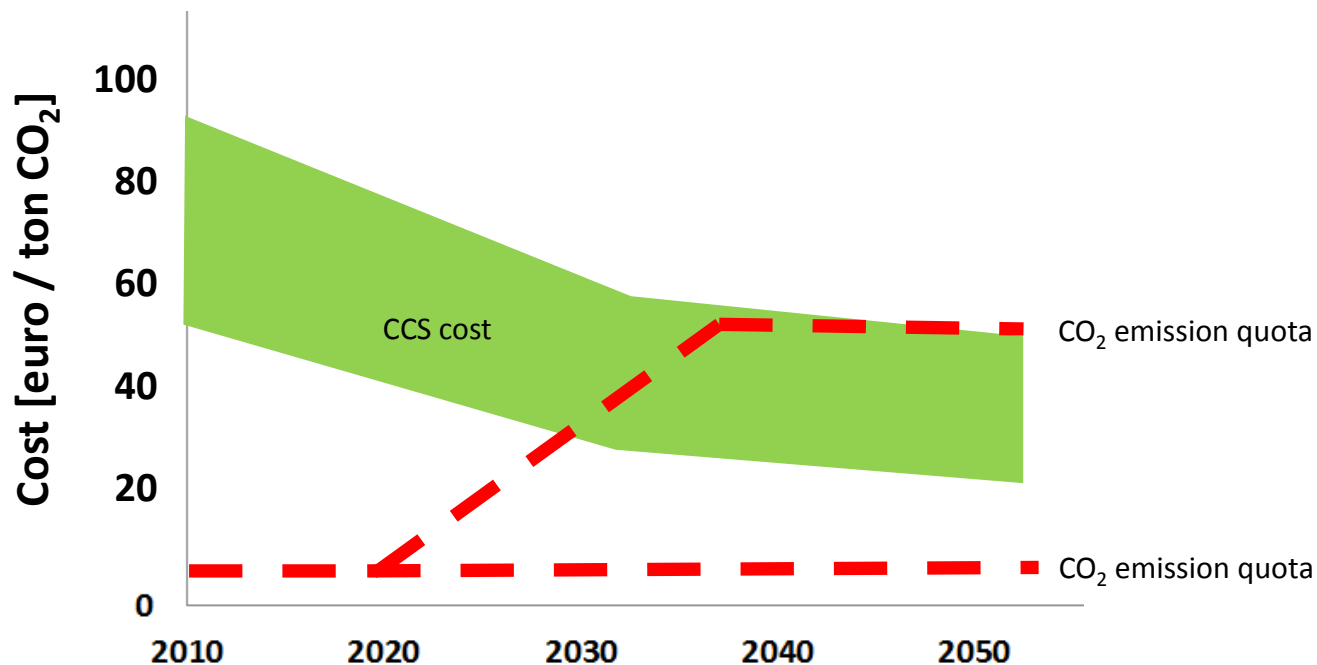
- **COP21 Paris:**
Limit global warming well below 2°C, towards 1.5°C
- **Consequence:**
Broad implementation of CCS is essential

Cumulative emission cuts within 2050 by sector and technology



Business model

- The technology is ready for full-scale demonstration
- Commercial CCS will come when the industry sees business opportunities
- Political decisions and financial incentives are needed



RD&D necessary to deploy CCS

Challenges

- CCS cost must come down
- Technical and financial risk must be reduced

Solutions

- RD&D essential
- Huge task! No country can fix it alone
- International cooperation needed

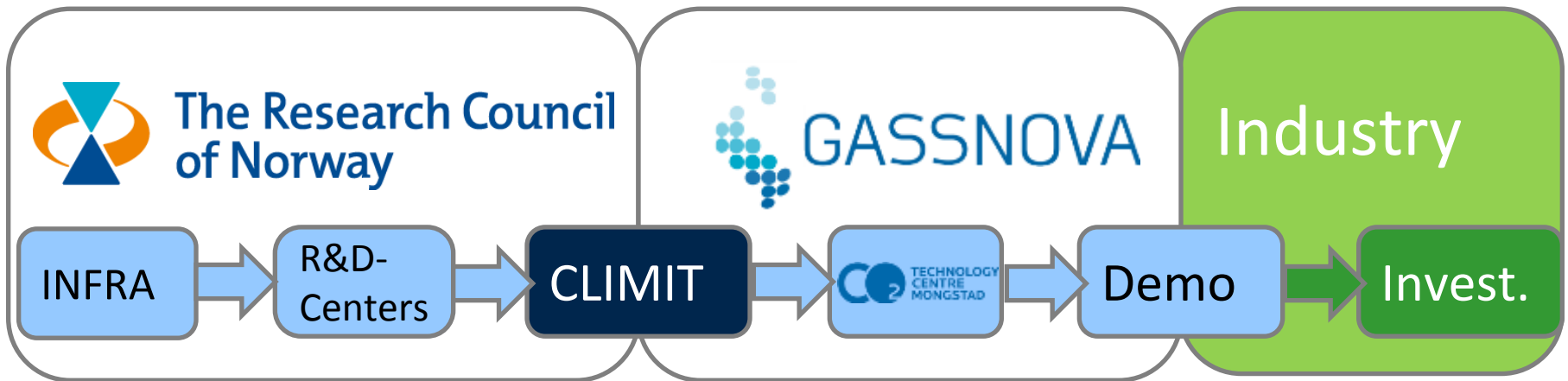


Illustration:
ProsjektLab & Bellona

Policy Instruments for CCS in Norway



Accelerated development of CCS technology



Full scale CCS in Norway

Ambition

- The Government has the ambition for full scale CCS facilities in Norway by 2022

Candidates

- Capture:
 - Norcem, Brevik – cement plant
 - Yara, Herøya – fertilizer plant
 - Klemetsrud, Oslo – waste incineration plant
- Transport
 - Ship
- Storage:
 - Smeaheia on the Norwegian continental shelf

Time schedule

- Feasibility studies completed 2016 with positive results
- Concept studies 2017
- FEED 2018
- Final investment decision 2019

Norcem cement plant, 0.8 MtCO₂/yr



Yara fertilizer, 0.56 MtCO₂/yr



Klemetsrud waste incineration, 0,4 MtCO₂/yr

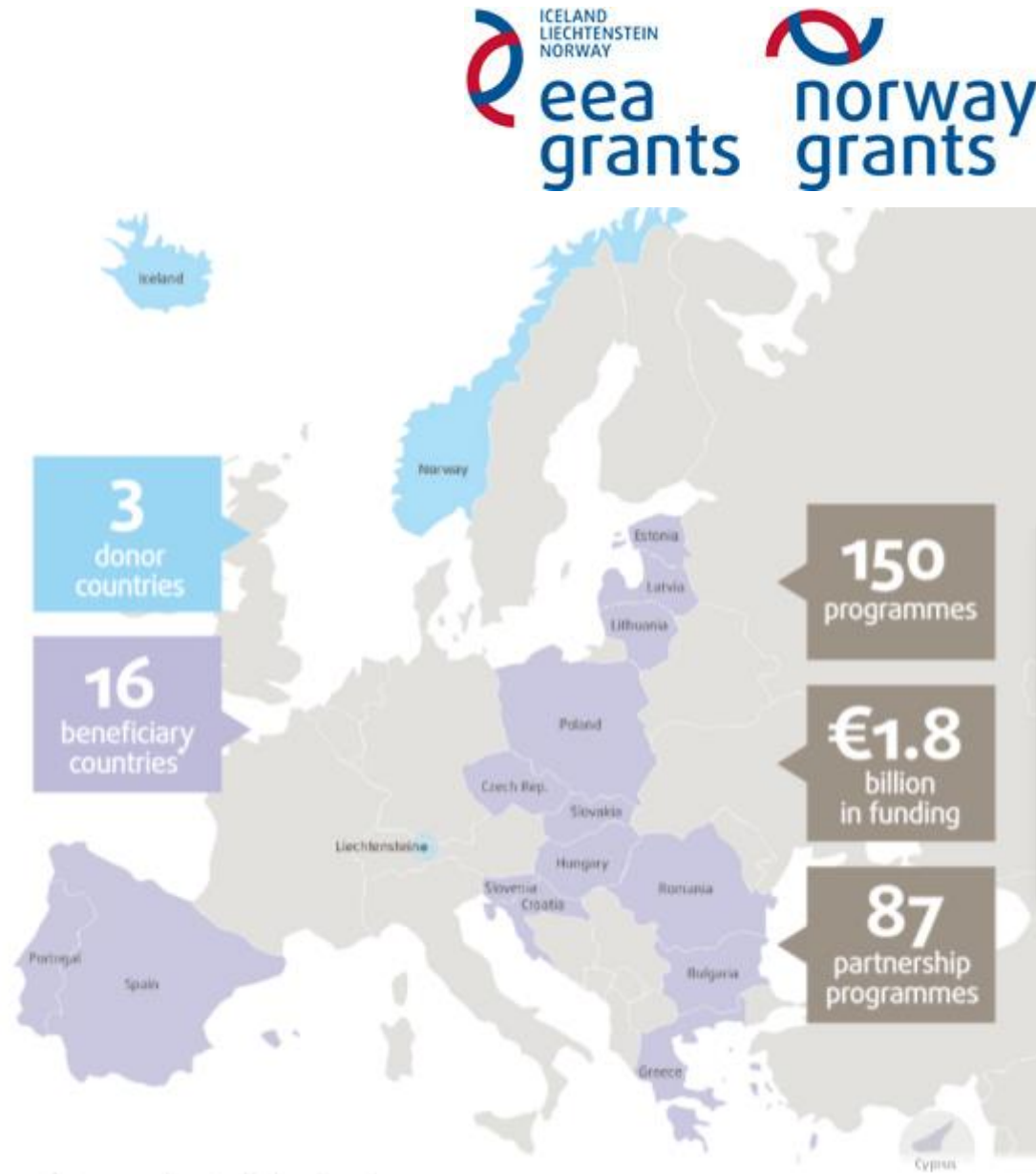


Large scale CO₂ storage in the north sea - the start of an international CCS cluster?



The value of CZ08

- Projects with high scientific merit
- Very good results
- Created new knowledge and competence
- Established a platform for international cooperation



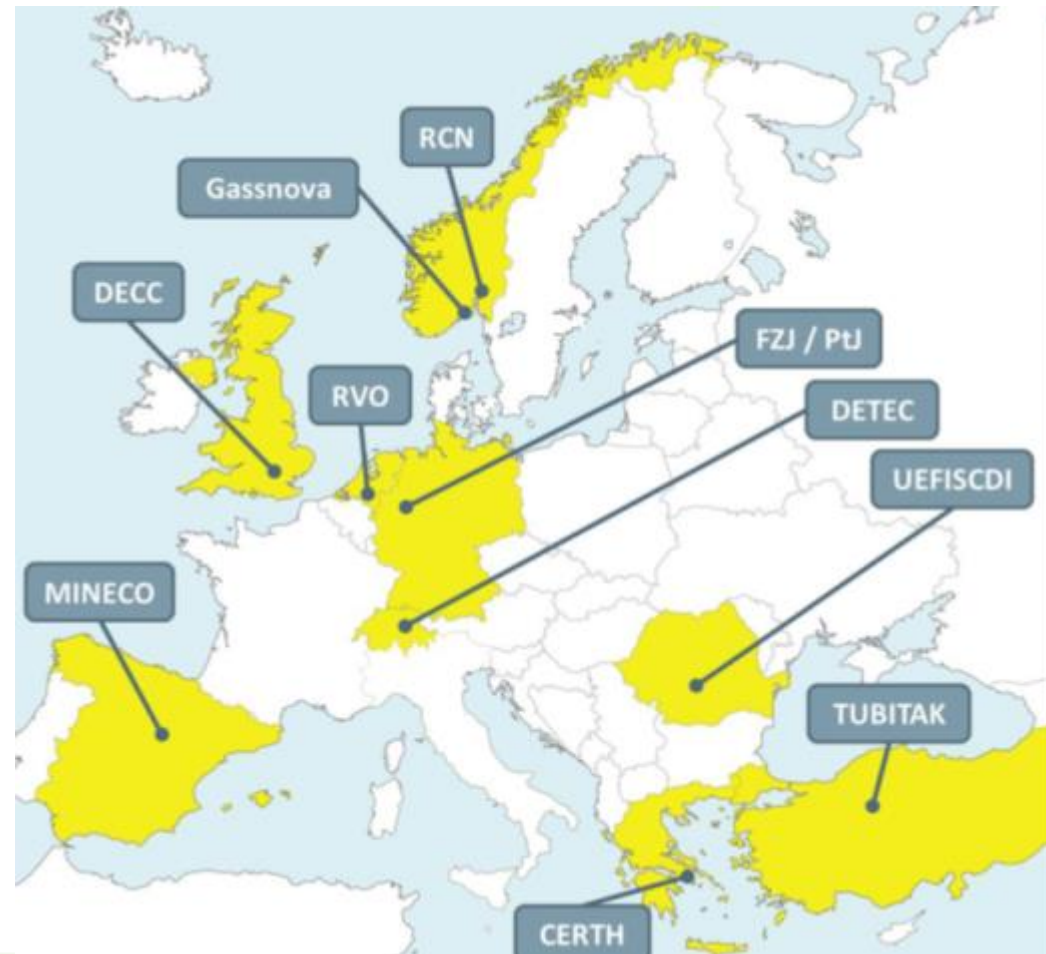
ACT – Accelerating CCS technologies

Ambition

- Accelerating deployment of CCUS in Europe

ERA Net Cofund

- Nine countries
- Common call: € 41 M
- Support from EC
- 38 project proposals received
- ACT Projects starting autumn 2017
- Ambition of new call in 2018
- ***New countries are welcome to join***



New European CCUS Implementation plan

R&I activities

1. Delivery of a whole chain CCS project operating in the power sector
2. Delivery of regional CCS and CCU clusters, including feasibility for a European hydrogen infrastructure
3. EU Projects of Common Interest for CO₂ transport infrastructure
4. Establish a European CO₂ Storage Atlas
5. Unlocking European Storage capacity
6. Developing next-generation CO₂ capture technologies
7. CCU Action
8. Understanding and communicating the role of CCS and CCU in meeting European and national energy and climate change goals



- European research infrastructure project
- Coordinator: NTNU
- Operate world class pan-European distributed CCS research infrastructure



CSLF Overview



Australia



Brazil



Canada



China



Czech
Republic



European
Commission



France



Germany



Greece



India



Japan



Mexico



New Zealand



Poland



Romania



Russia



Saudi
Arabia



Serbia



South
Africa



United Arab
Emirates



United
Kingdom



United
States

CSLF

- **International Ministerial-level climate change initiative**
- Focus on development of improved cost-effective technologies for CCS.
- Promotes awareness and champions legal, regulatory, financial, and institutional environments conducive to such technologies.



Italy



Korea



Netherlands



Norway

New Agreements on EEA and Norway Grants



Programmes for research cooperation
with Norway and Iceland:

- Joint Baltic programme
- Research in Romania
- Applied research in Czech Republic
- Blue Growth in Portugal
- Negotiations in Poland and Hungary



Summary

- CCS is essential in order to reach the ambitious climate targets
- The CCS technology is available
- Costs and risks must be reduced through R&D and large scale demonstration
- No countries can solve the challenges alone. International cooperation of high importance
- Very good results from CZ08
- New opportunities in the new agreement for EEA and Norway Grant 2014-2021

