



Experience of Sleipner CO₂ Storage

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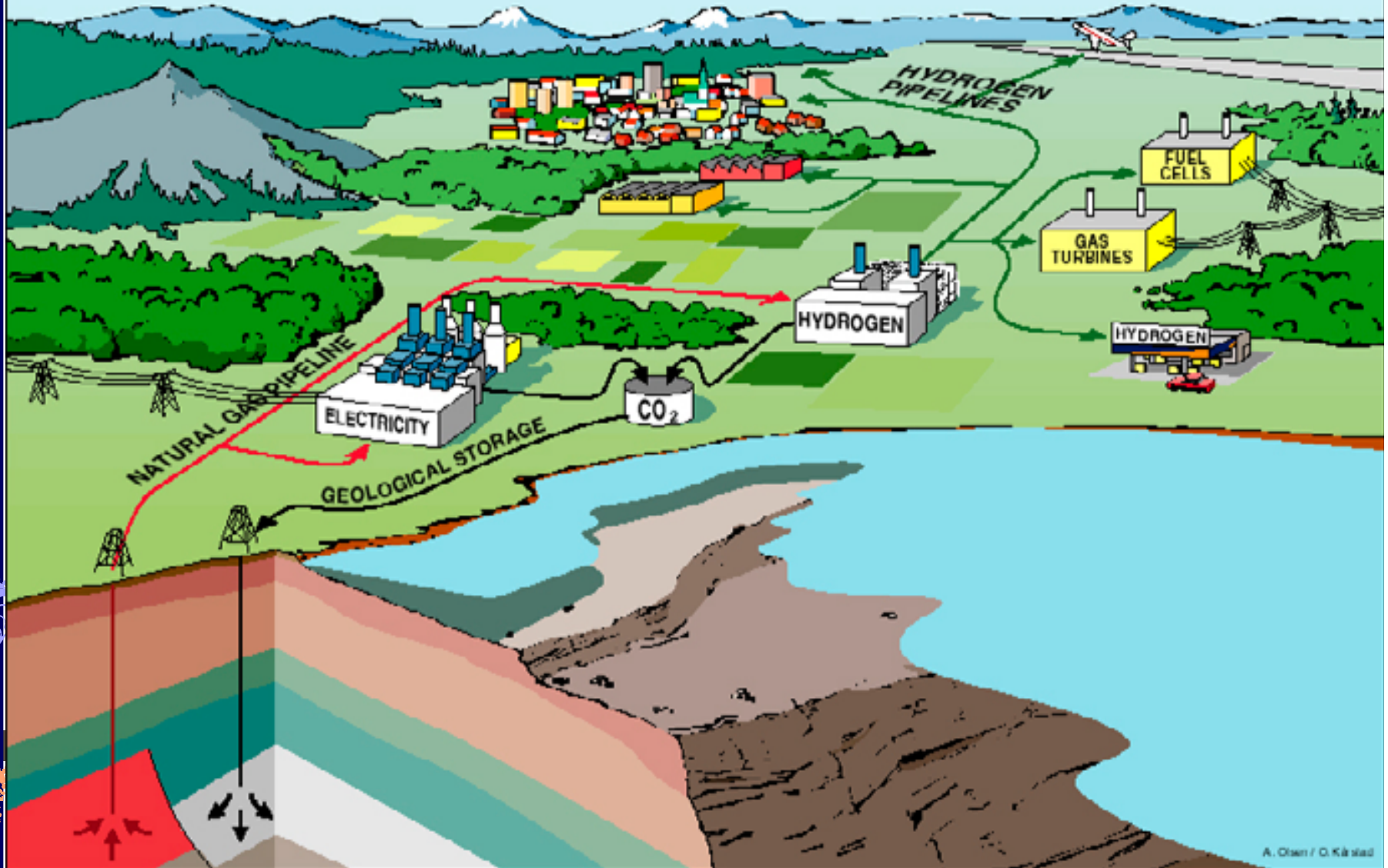
Adviser CO₂ Storage, StatoilHydro ASA, Norway

Experience with Sleipner CO2 Storage

CONTENT:

- **VISION & History**
- **Sleipner – What did we find?**
- **Why is it safe?**

DECARBONISATION OF FOSSIL FUELS TO ELECTRICITY AND HYDROGEN



The Sleipner field – CO₂ Treatment and Injection



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Sleipner CO₂ injection:

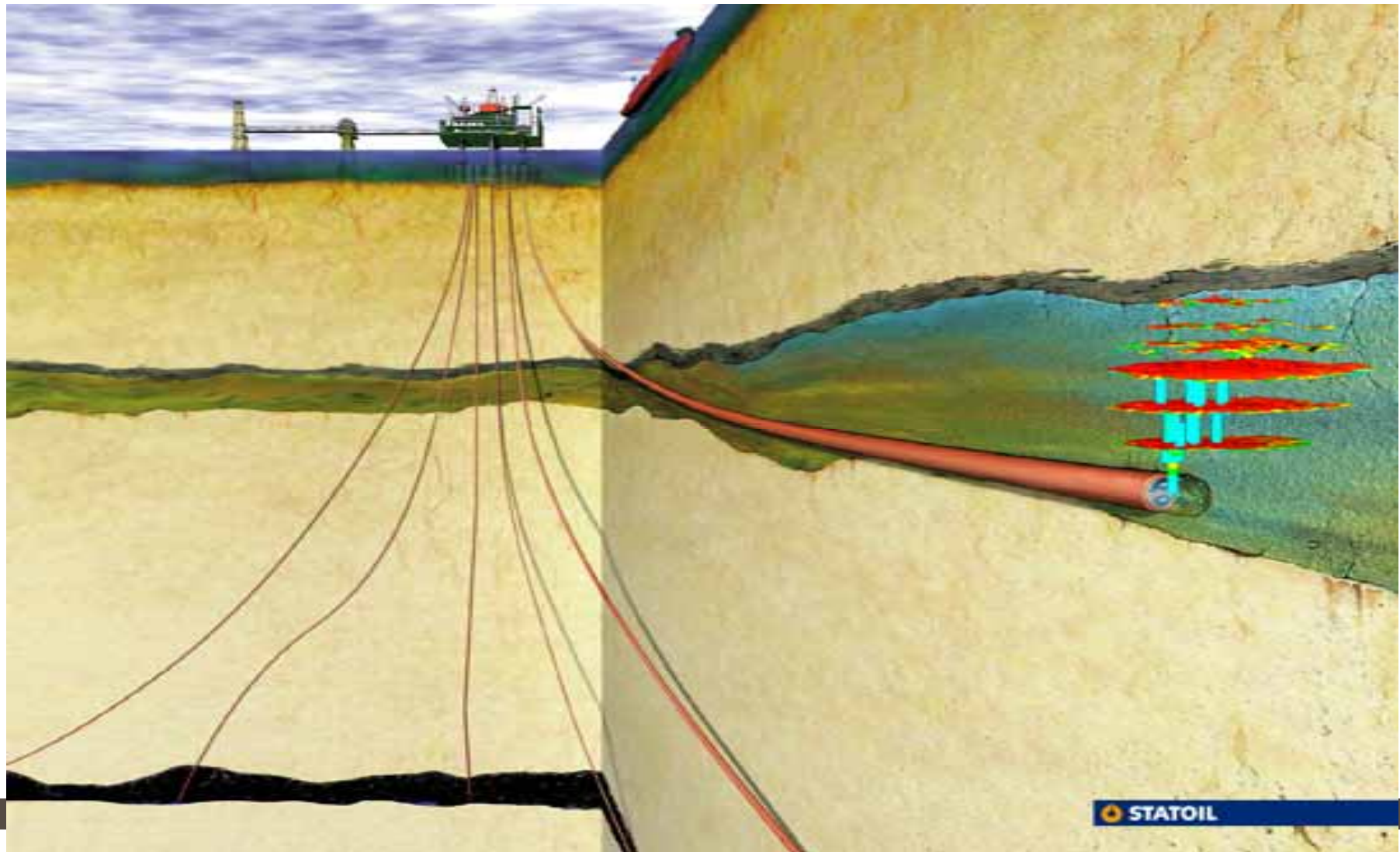
- Decided in 1992
- In operation since 1996
- 1 million tonne CO₂/år

Time Magazine,
17. May 2004

Yara CO₂-tankers, 1500 m³ capacity



Sleipner CO2 Injection



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The Utsira Formation



SAFETY STRATEGY

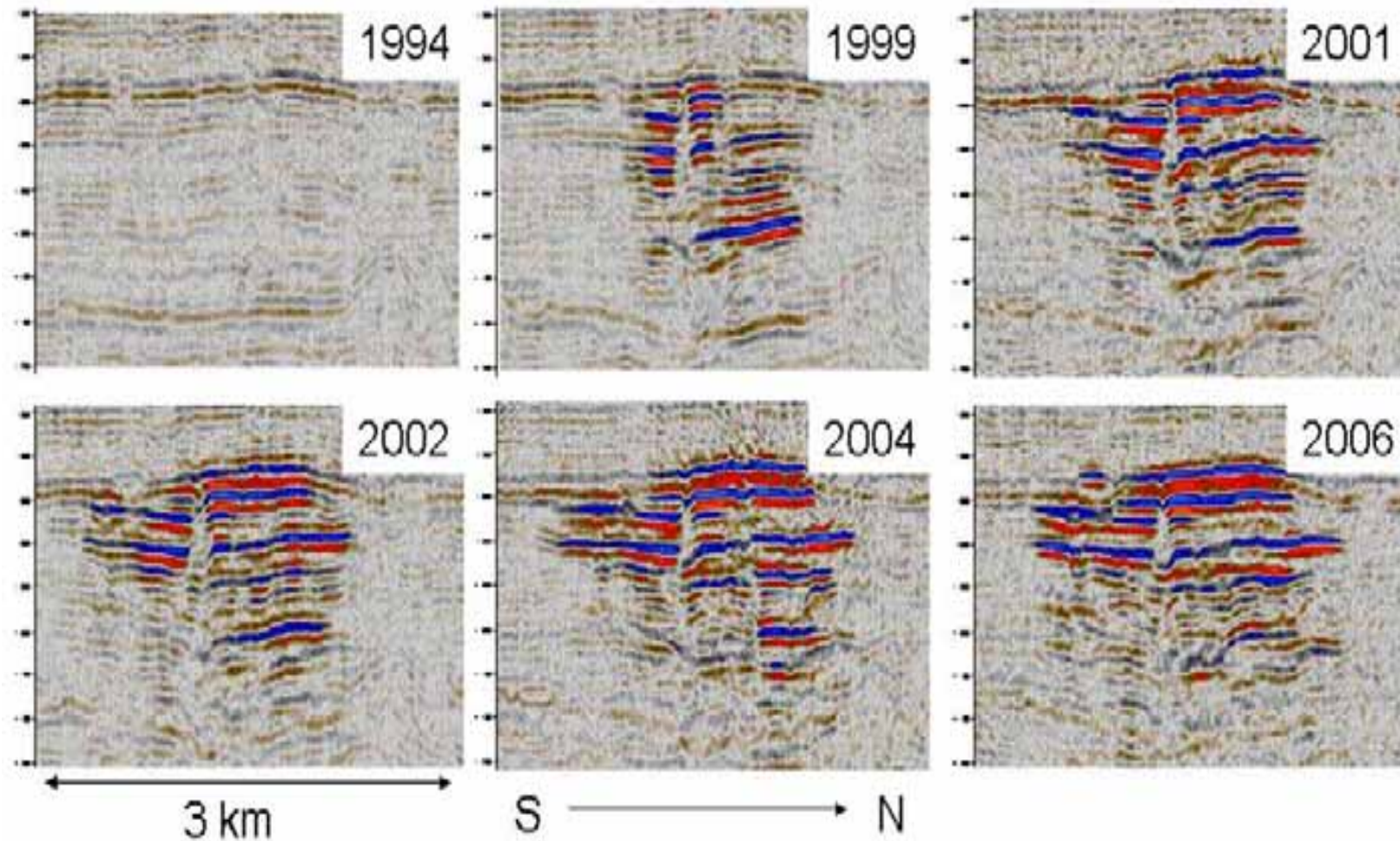
- **Prepare**
- **Detect**
- **Remediate**

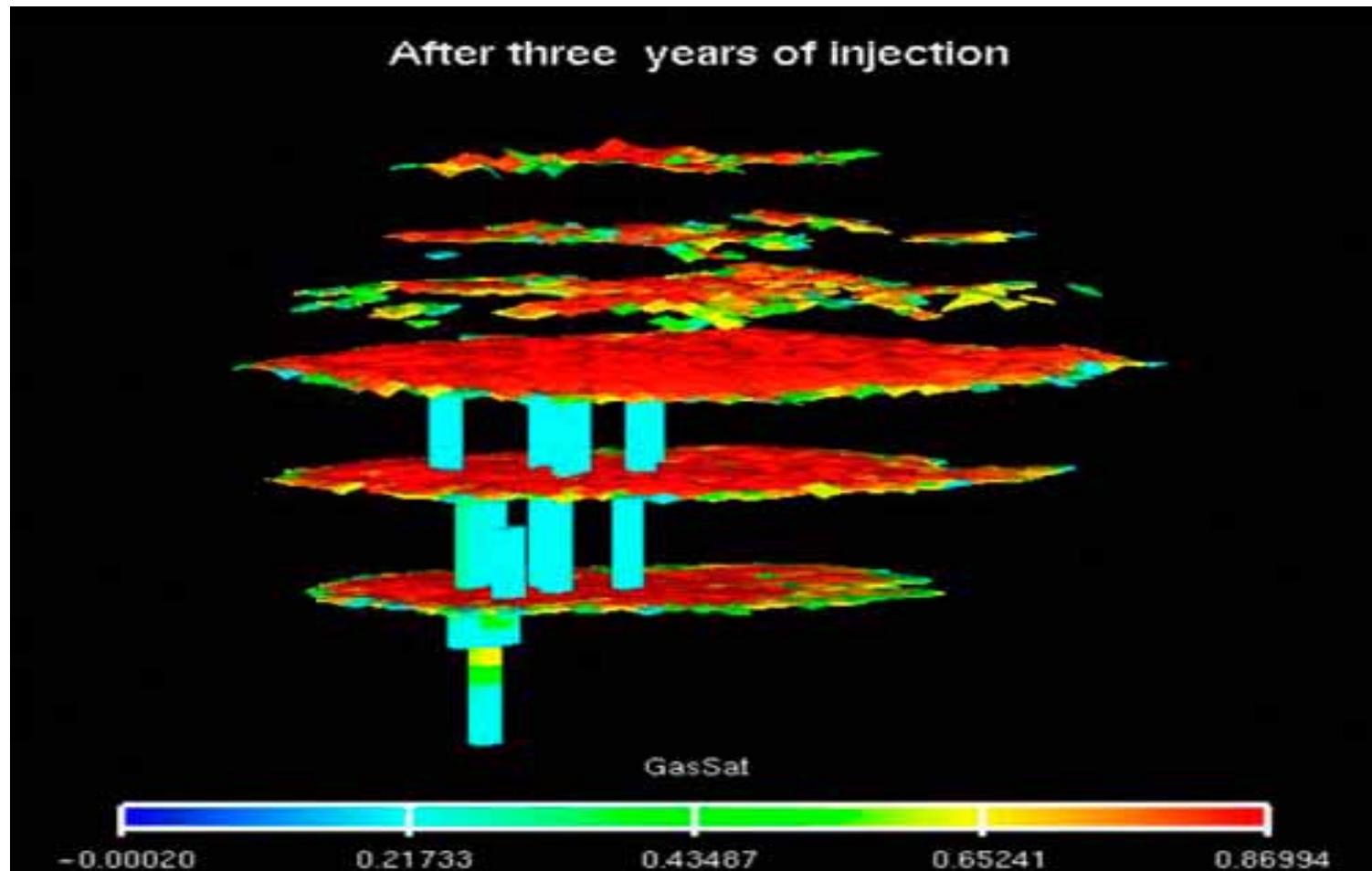
What is keeping the CO₂ down?

Trapping Mechanisms

- Closure - from day one – faults?
- Micro-pore trapping - during injection - lasting
- Dissolution in water - sinking to the bottom – centuries
- Mineral binding - precipitating solids – centuries/millennia

Time-lapse seismic datasets of CO₂ stored in Utsira formation

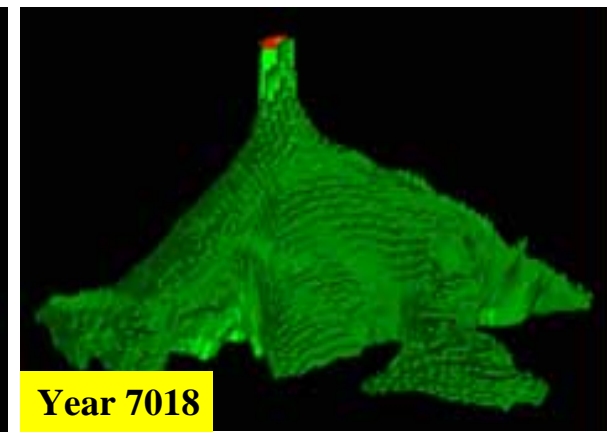
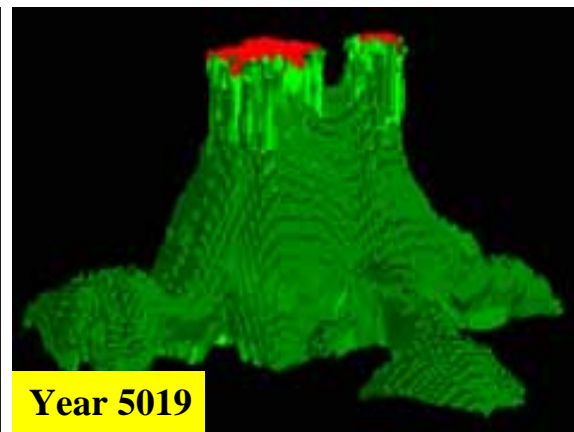
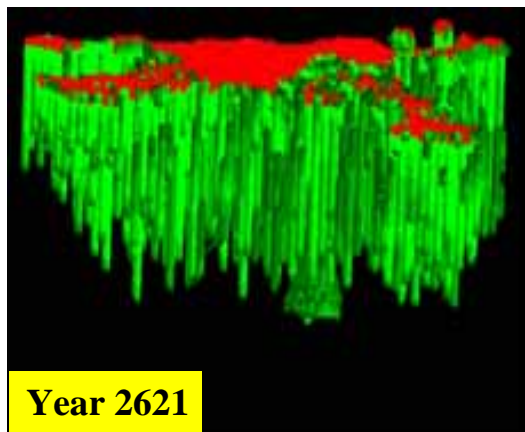
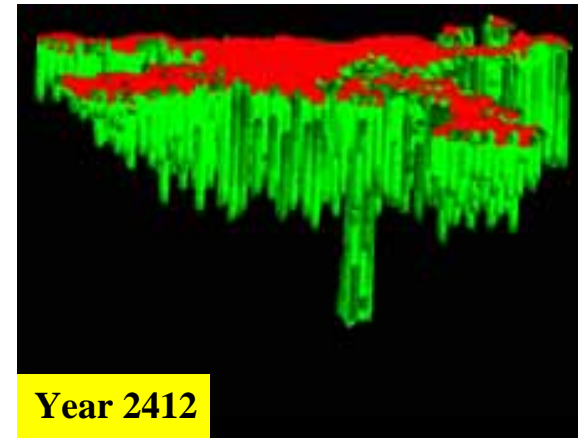
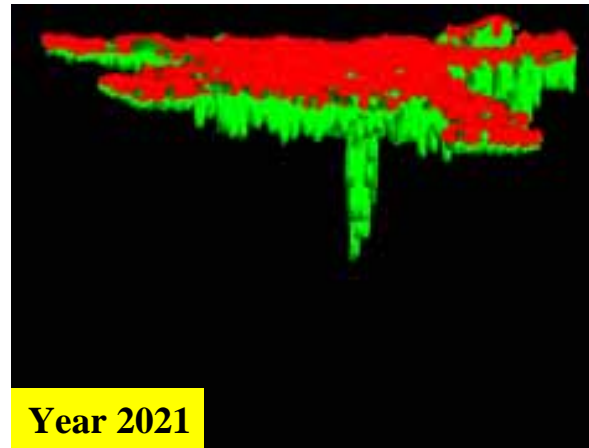




**Simulated picture of the distribution of CO₂ after three years.
Radius of largest bubble 800 m and the total plume 200 m high.**

Ref: SINTEF Petroleum 2001

Dissolution of CO₂ in the Utsira Brine



Source: Gemini No. 1, 2004 (NTNU and Sintef)

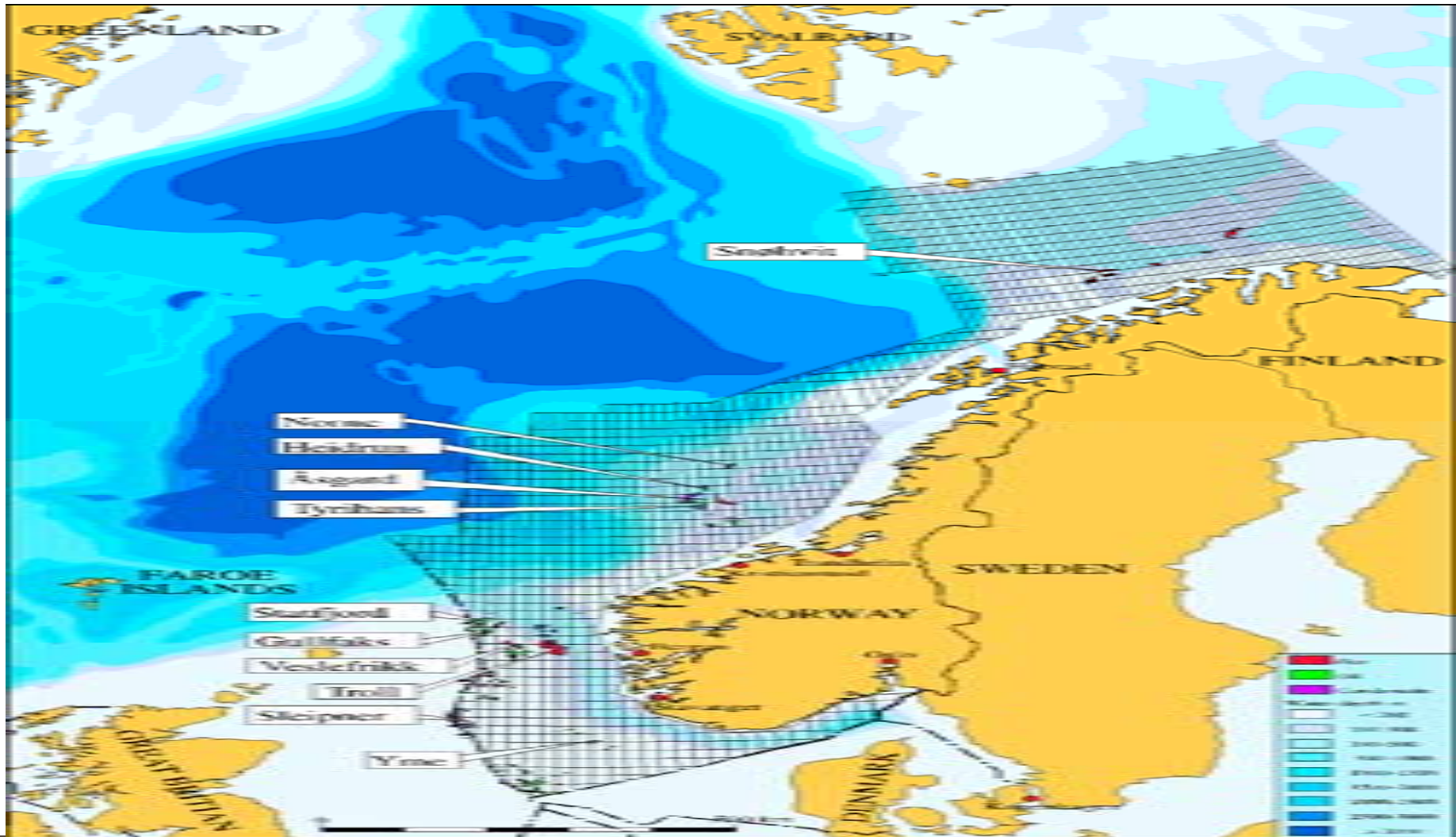
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Monitoring and safety over TIME?

- **Before start:** Site selection, Planning and Risk assessment => licence
- **During injection:** Monitoring – “Watch the barn doors” => report
- **Closure:** Monitoring and long-term risk => agreement
- **Post-closure:** Monitoring gradually less => hand-over

→ Safety against leakage will be better over time!

Snøhvit, the next field to implement CO₂ storage



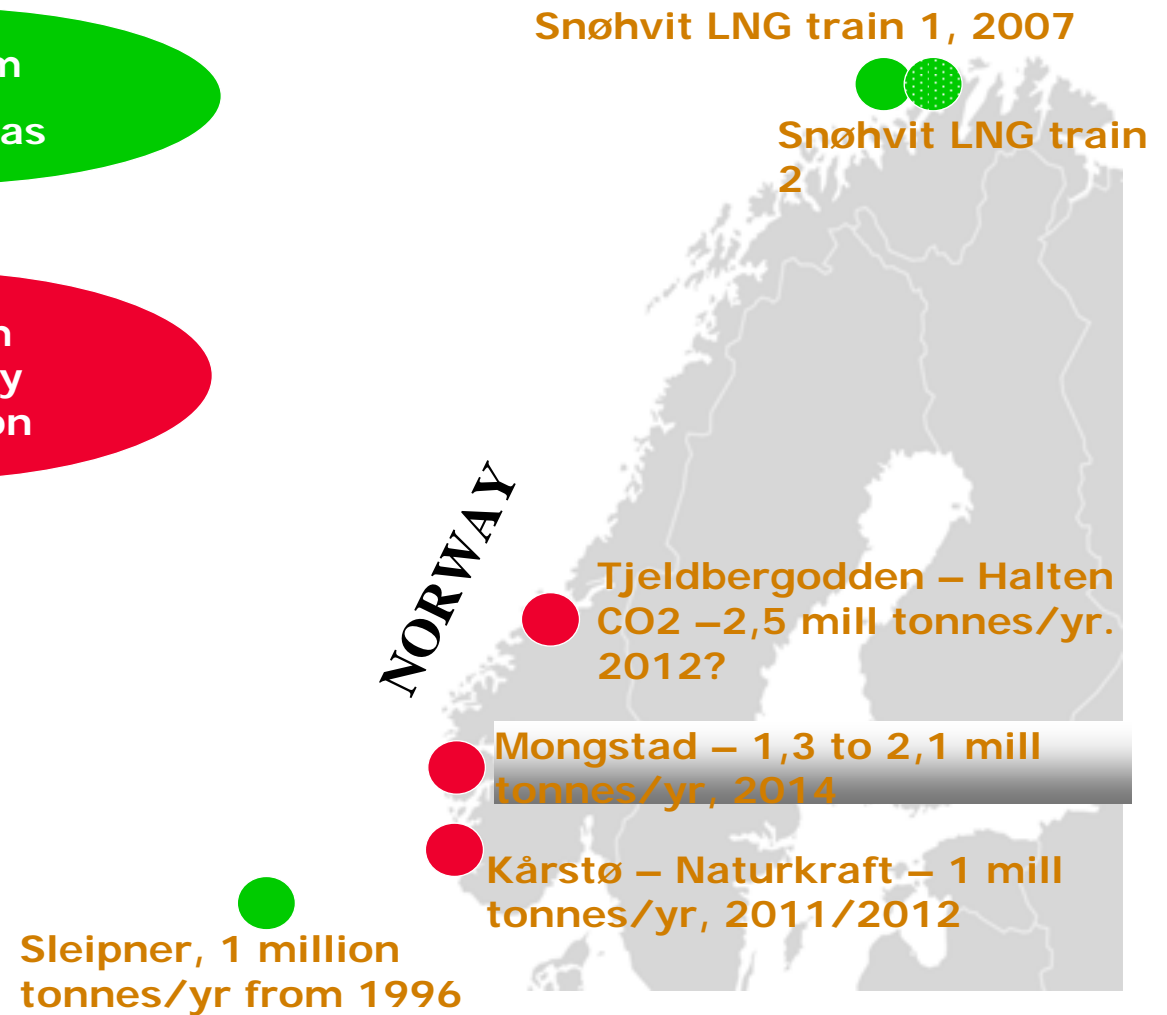
Norway as a "CO₂-laboratory"

Cleaning up
our operations

CO₂ from
natural gas

Cleaning up
our products

CO₂ from
electricity
generation



European map of CO₂ storage prospectivity



CO₂ Capture and Storage (CCS) needs two legs to walk!

Leg 1: **TRUST** in Storage

- Methods from oil and gas industry
 - Geology varies from place to place
- **More demonstrations**

Leg 2: **COST** of Capture

- Energy use
 - Costs
- **Better technologies**

Pace: CO₂ Transport

- Pipeline
 - Ship
- **Large projects**

Worst case scenario
is business as usual!

Need to get started now!



CO2 Storage Cooperation Poland – Norway

“**CO2NET EAST**” – EU supported 5 year project to make aware of CCS
CS, PL, HR, ES, HU, SLO, RO, NO+

- “CCS in Poland” – Polish-Norwegian R&D Fund with EEA support?
Universities: Gliwice, Krakow, Wroclaw, NTNU, +?
Industries: Vattenfall, PGNIG?, Turoszow?, Statoilhydro.
- “CO2ReMoVe” – Tarnow CO2-EOR – Proposal with EEA support?
- ACID GAS injection in ?

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THANKS for your attention!

QUESTIONS?