

ALL-ENERGY CONFERENCE
ABERDEEN
23 MAY 2007

CARBON CAPTURE AND STORAGE:
WHAT THE OIL AND GAS INDUSTRY
IS DOING WORLDWIDE

by
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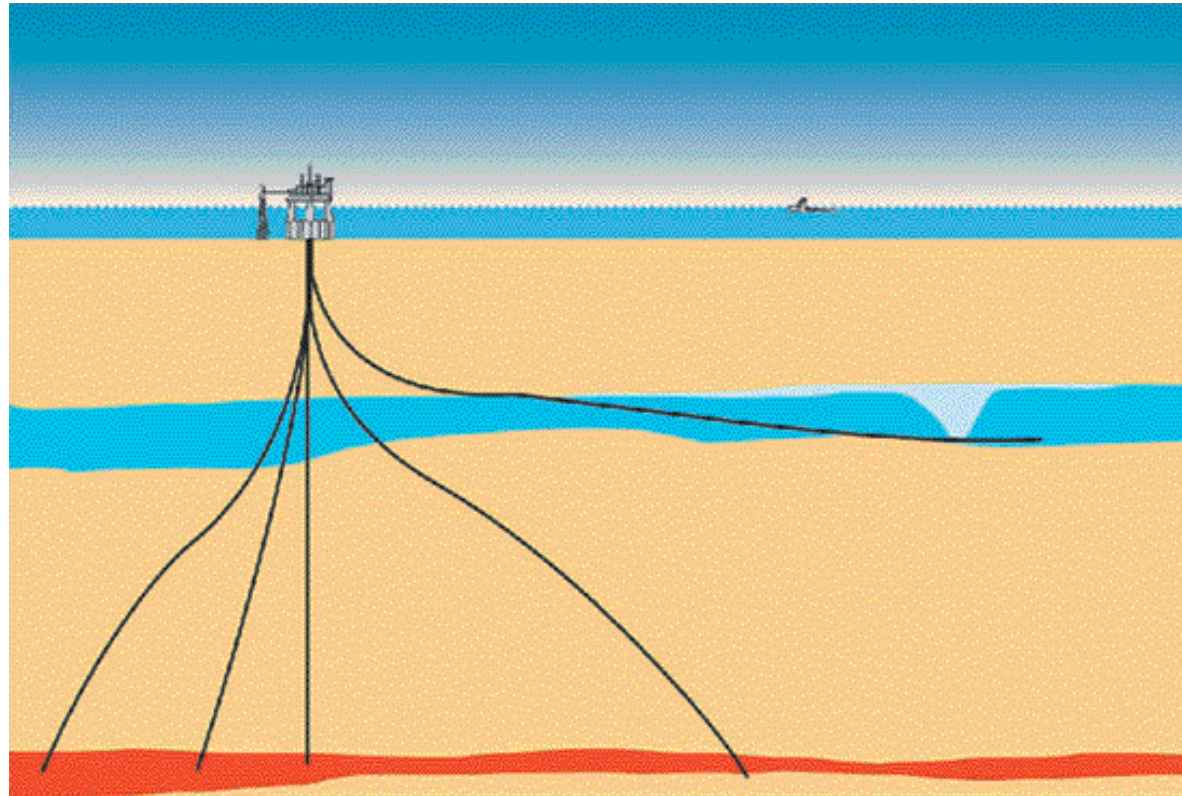
HISTORY

- Carbon Capture and Storage (CCS) not new
- Undertaken for over 30 years but on a small scale
- CO₂ injection for enhanced oil recovery (EOR)
- Scale of activity heavily influenced by level of oil prices
- New impact of climate change policies

PAST AND CURRENT PROJECTS

- Sleipner West (Statoil), Norway
- In Salah (BP), Algeria
- Snohvit (Statoil), Norway
- Miller (BP, SSE and partners), United Kingdom
- Carson (Occidental), California
- Draugen/Heidrun (Shell/Statoil), Norway
- Gorgon (Chevron), Western Australia

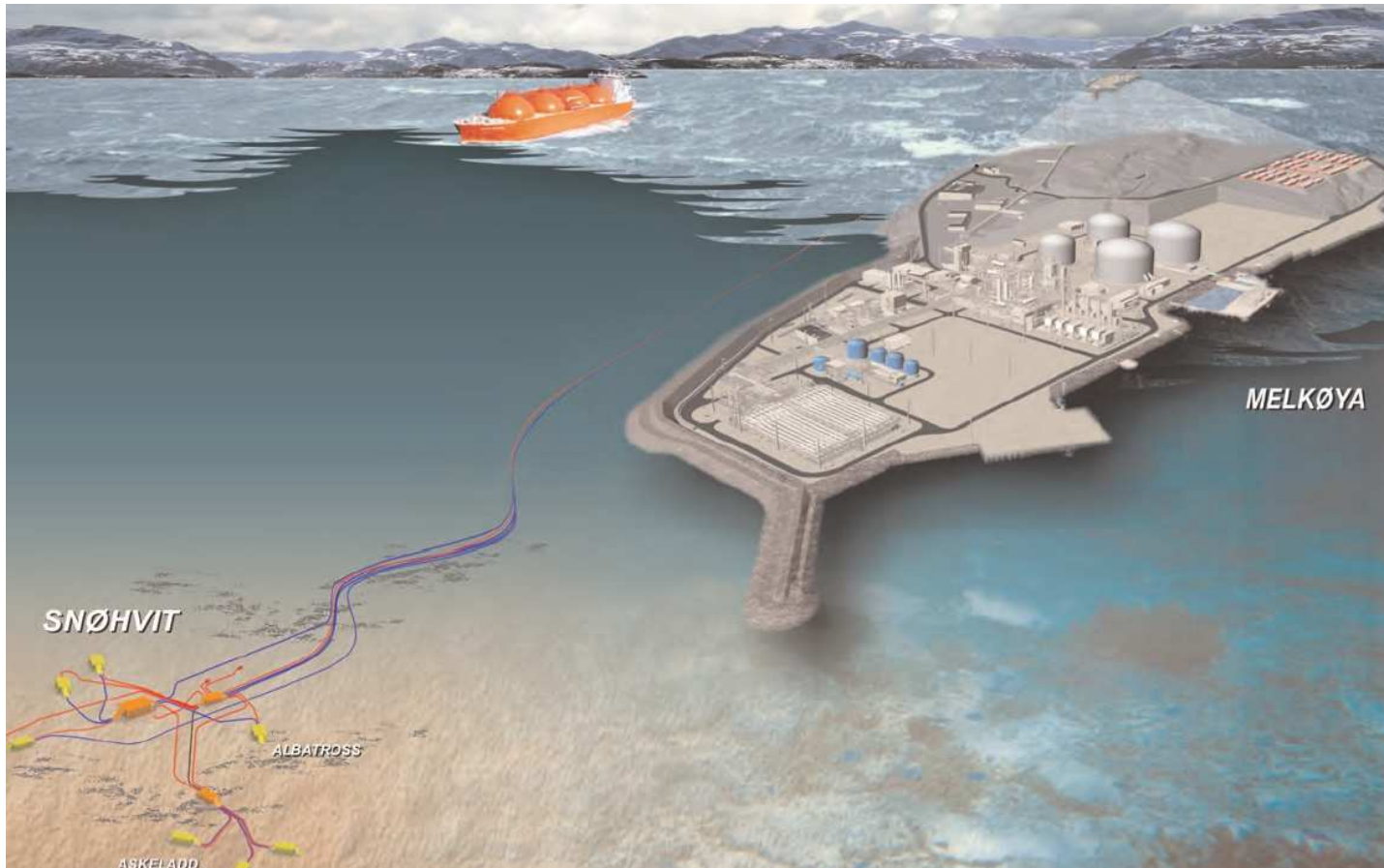
SLEIPNER WEST, NORWAY



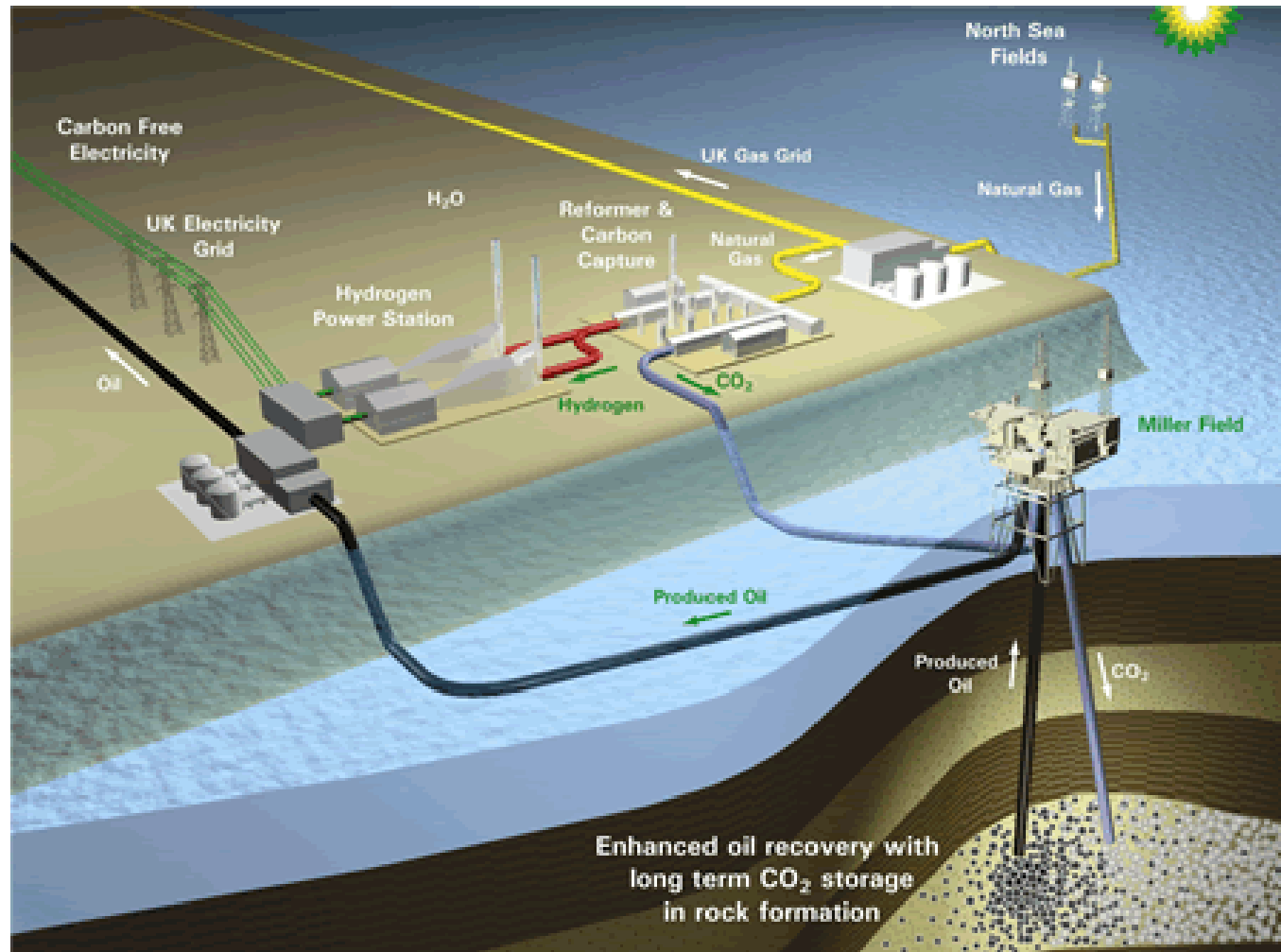
IN SALAH, ALGERIA



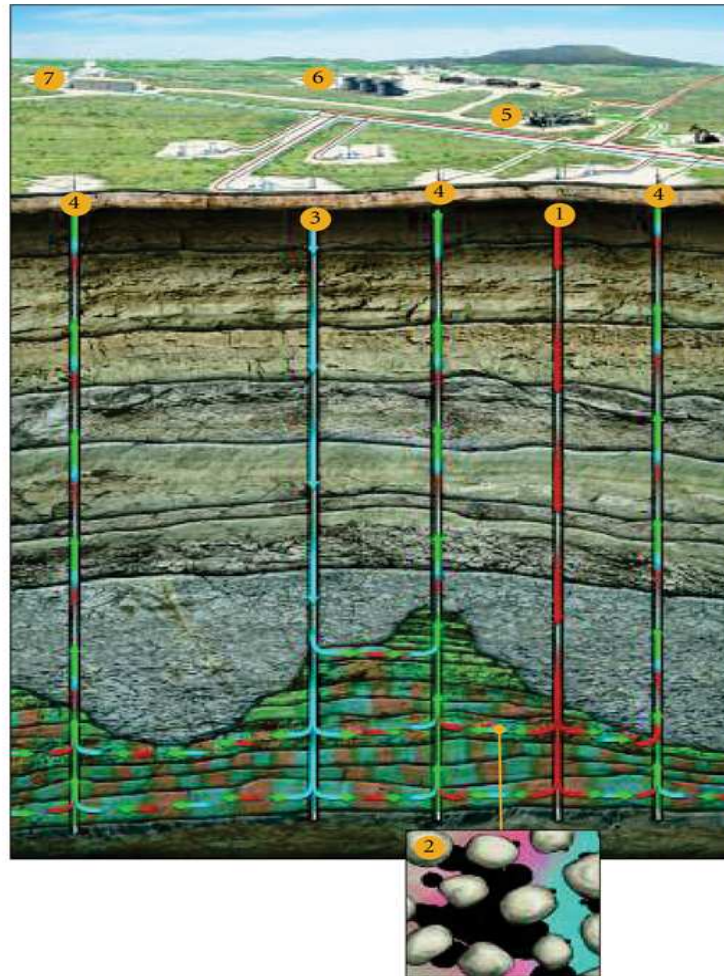
SNOHVIT, NORWAY



MILLER, UK



CARSON, CALIFORNIA



CO₂ Injection

- 1 CO₂ is injected into the reservoir via injection wells.
- 2 The CO₂ reduces the viscosity of the trapped oil so it flows more easily.
- 3 Water is injected in alternating cycles with CO₂ to sweep the oil to the producing wells.
- 4 Production wells pump the oil, along with CO₂, produced water and any associated natural gas to the surface.
- 5 The CO₂ and associated natural gas are separated at the production satellite facility and transported offsite for additional processing. Natural gas liquids are extracted and sold and the CO₂ is recycled for reinjection.
- 6 The oil and produced water are separated at the central tank battery. The oil is piped to holding tanks where it is metered and sold.
- 7 The produced water is transported to the central water injection station and is pressurized for reinjection.

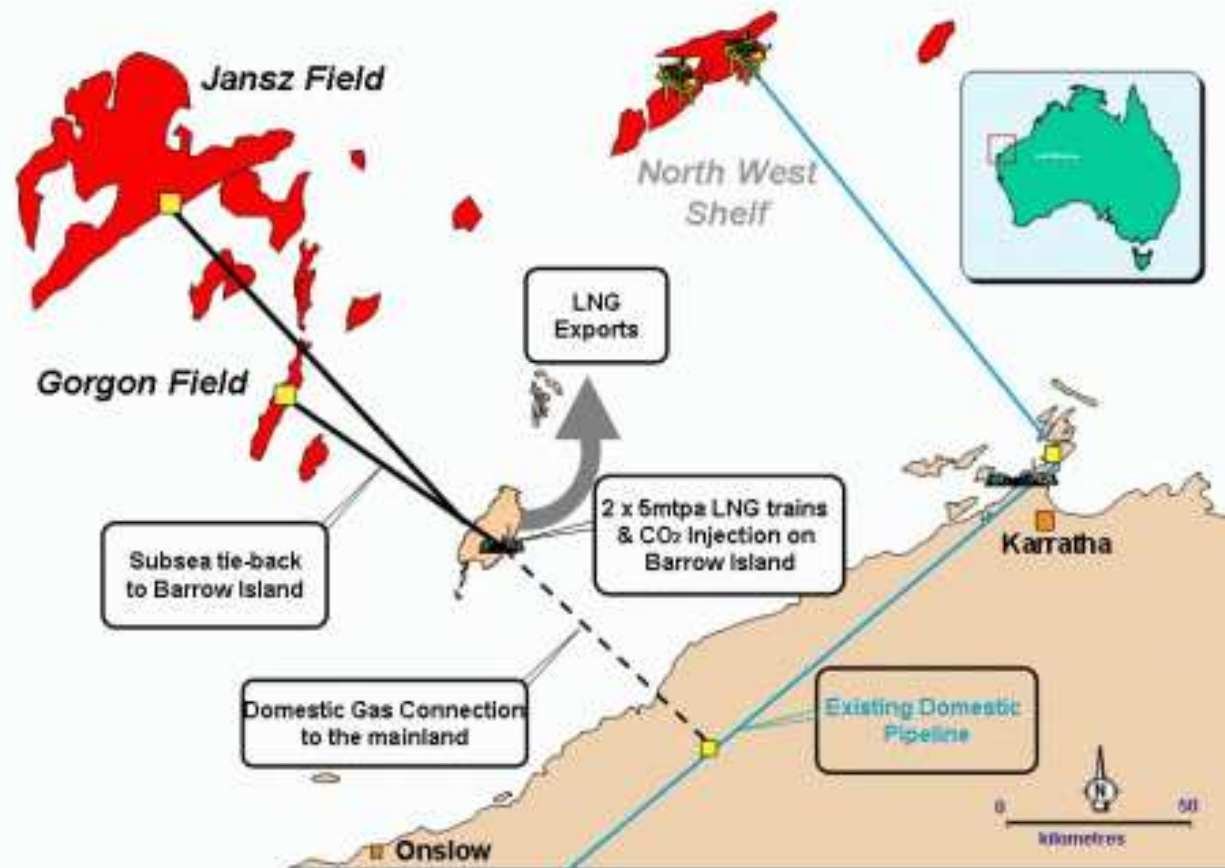
- Oil, produced water, CO₂ and natural gas
- Water
- CO₂

DRAUGEN/HEIDRUN, NORWAY



GORGON, WESTERN AUSTRALIA

Gorgon Project Development Plan



CONCLUSIONS

- Economics of CCS still uncertain
- Climate change policies, particularly carbon taxes, will be important determinants in future
- Oil prices need to stay at over \$50 per barrel
- Miller project may depend on government subsidy
- Statoil and Norwegian Government at the forefront