

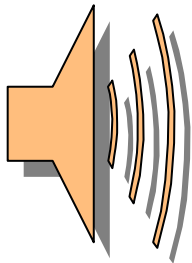


CO₂ for IOR – why and how?

NPF's CO₂ conference, Oslo 11.10.06
Kjell Pedersen, president and CEO of Petoro

Driving forces on the upstream side

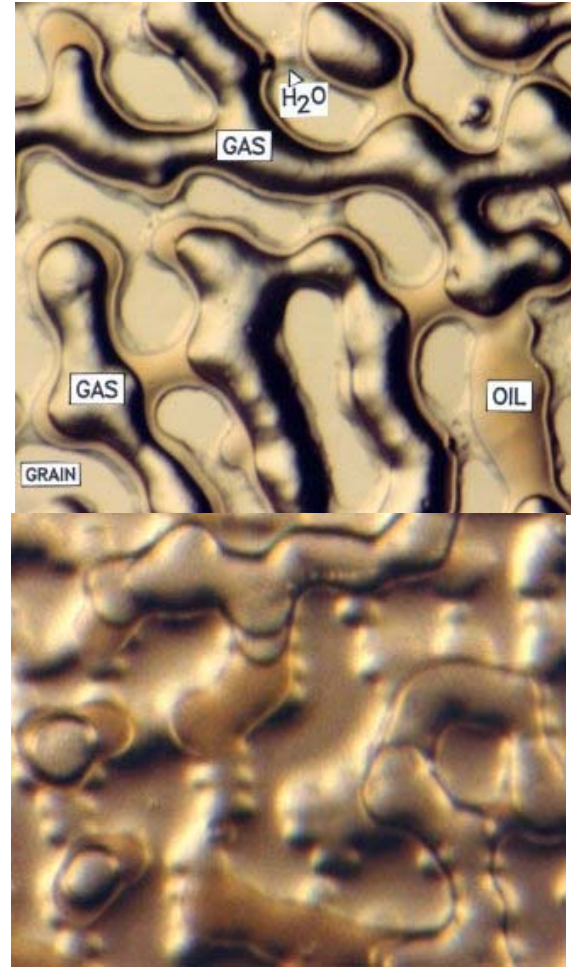
- Improved oil recovery
- Extending the producing life of fields
- Access to power for further business development
- Contribute through a CO₂ chain to sustainable industrial solutions for the environment



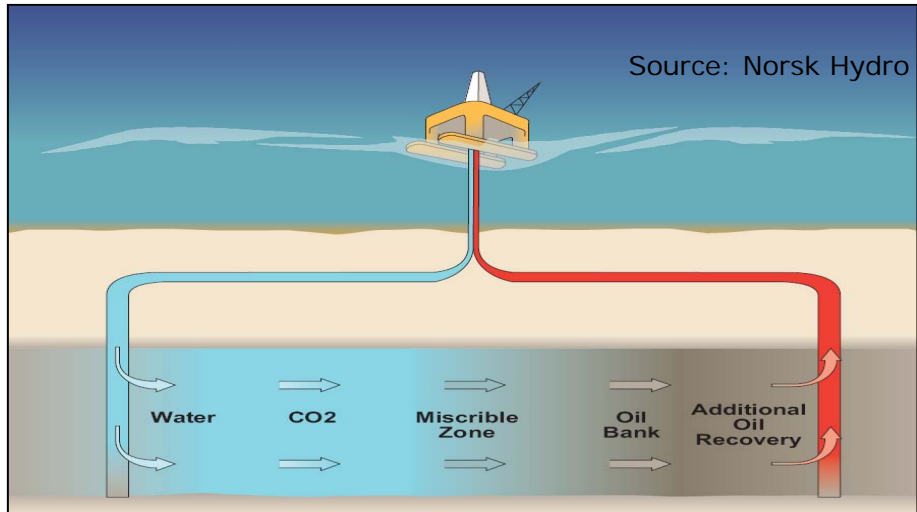
VALUE CREATION

How does CO₂ injection provide IOR?

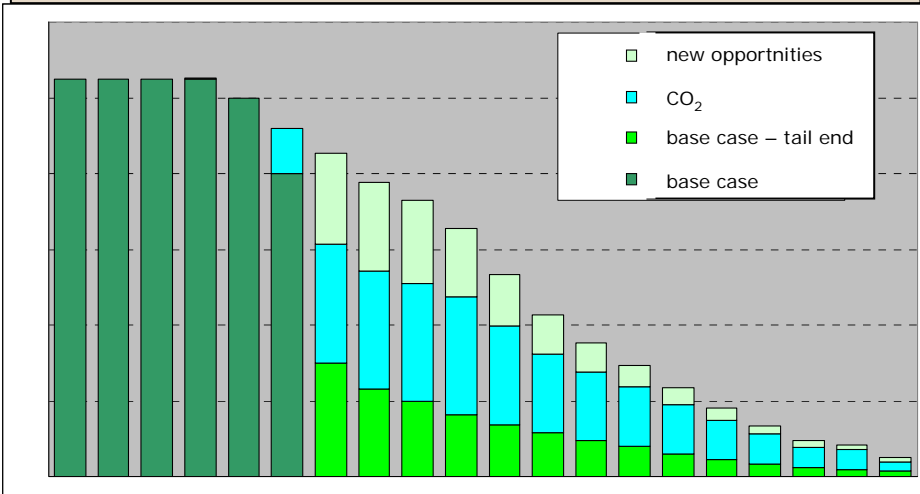
- The volume of the oil increases because the miscible gas dissolves in it and thereby causes the crude to swell
- Reduced surface tension means that the oil begins to move, and less is left behind
- The miscible gas has better flow properties, and improves those of the reservoir fluids (enhanced viscosity)



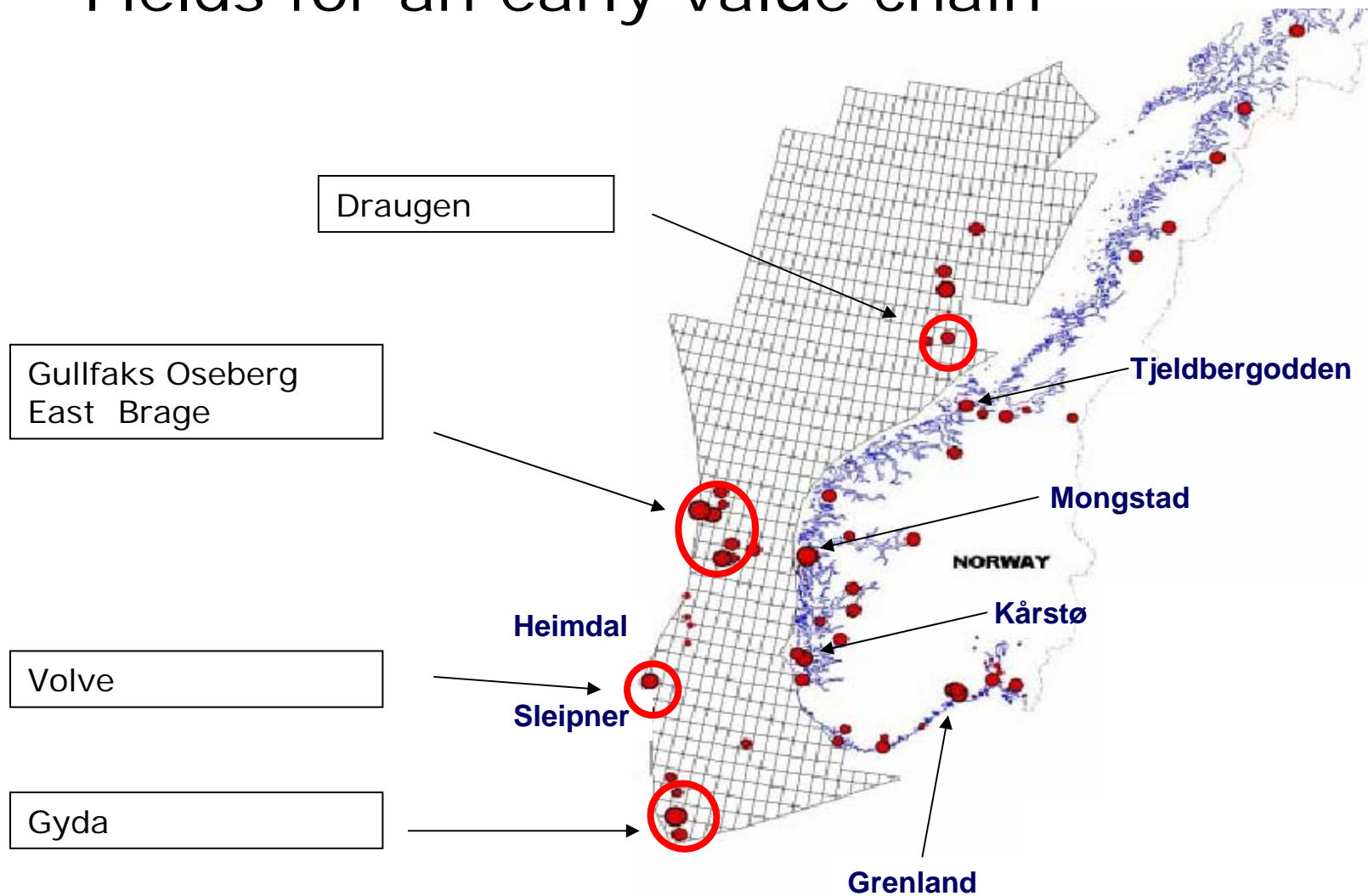
Assessments concerning CO₂ injection



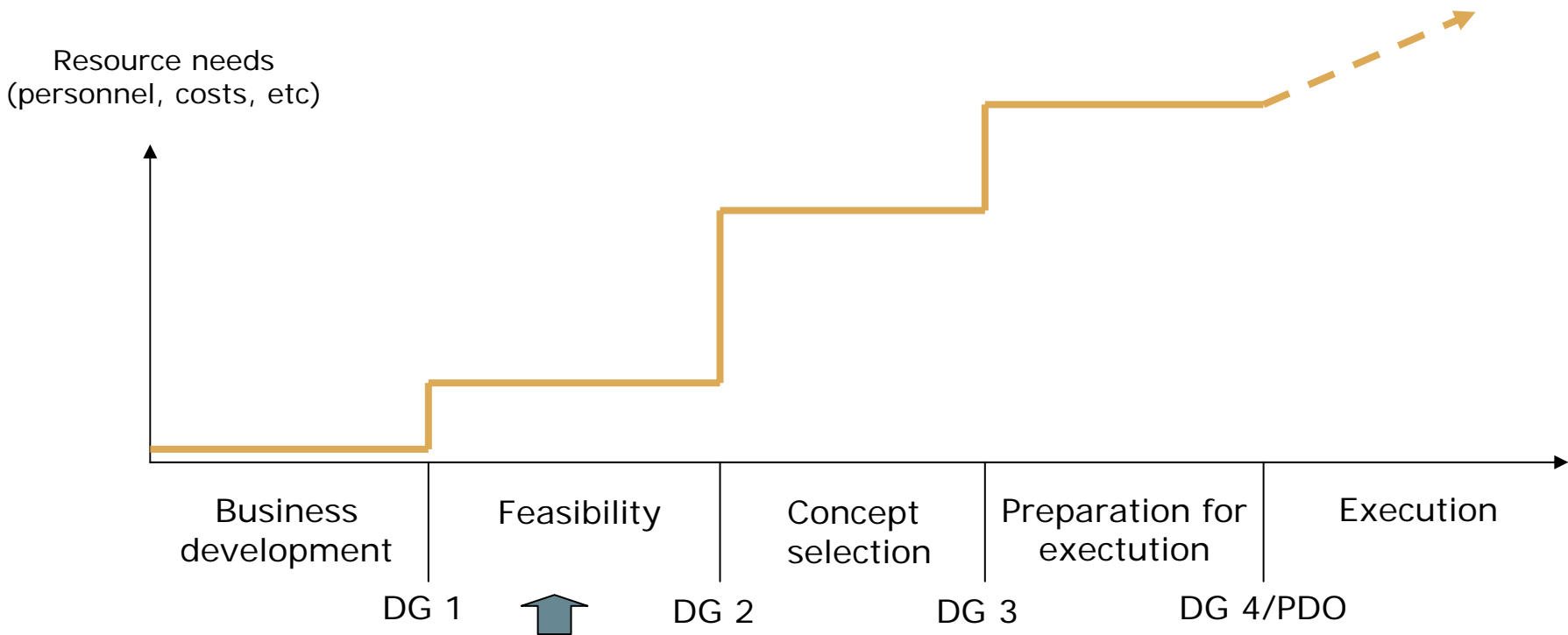
- CO₂ injection can yield technically large additional volumes
 - recovery up roughly 5%
 - extend the tail phase
- Costs driven by the need to deal with CO₂ returning up the wells
 - higher gas rates
 - corrosion
 - gas polluted by CO₂
- Profitability depends on the potential of other opportunities



Fields for an early value chain

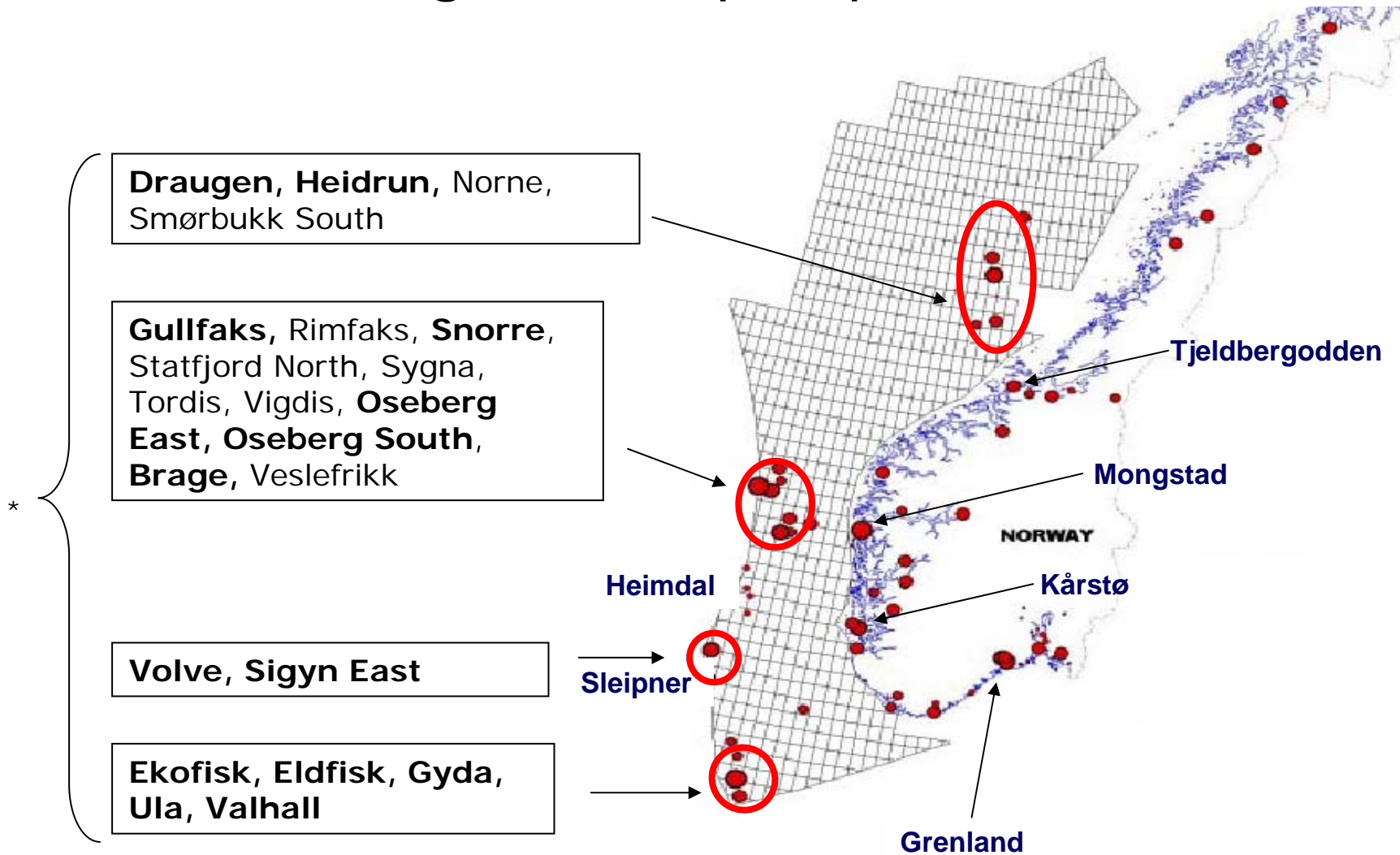


Challenges from a field perspective



- Technical assumptions must be verified
- More accurate production and cost estimates must be obtained
- Sources offering a secure supply of CO₂ at an acceptable price
- A commercial model for handling CO₂ must be put in place

The longer term perspective



* Fields which should consider CO₂ injection as an improved recovery method

Critical success factors

- Confirmation of technical viability of CO₂ injection as well as estimates for improved oil recovery and associated costs
- Availability of long-term CO₂ sources at necessary volumes and at an acceptable price in a complete value chain
- Selection of best value chain with a pragmatic view on start-up date.

Selection based on totality:

Economics, technology and the environment

