Halten CO_2 Project

Industrial use of CO_2 - meeting the energy and environmental challenges of the offshore industry



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Brussels September 5. 2006

Björn Berger, Statoil

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The industry model - using CO_2 for value creation

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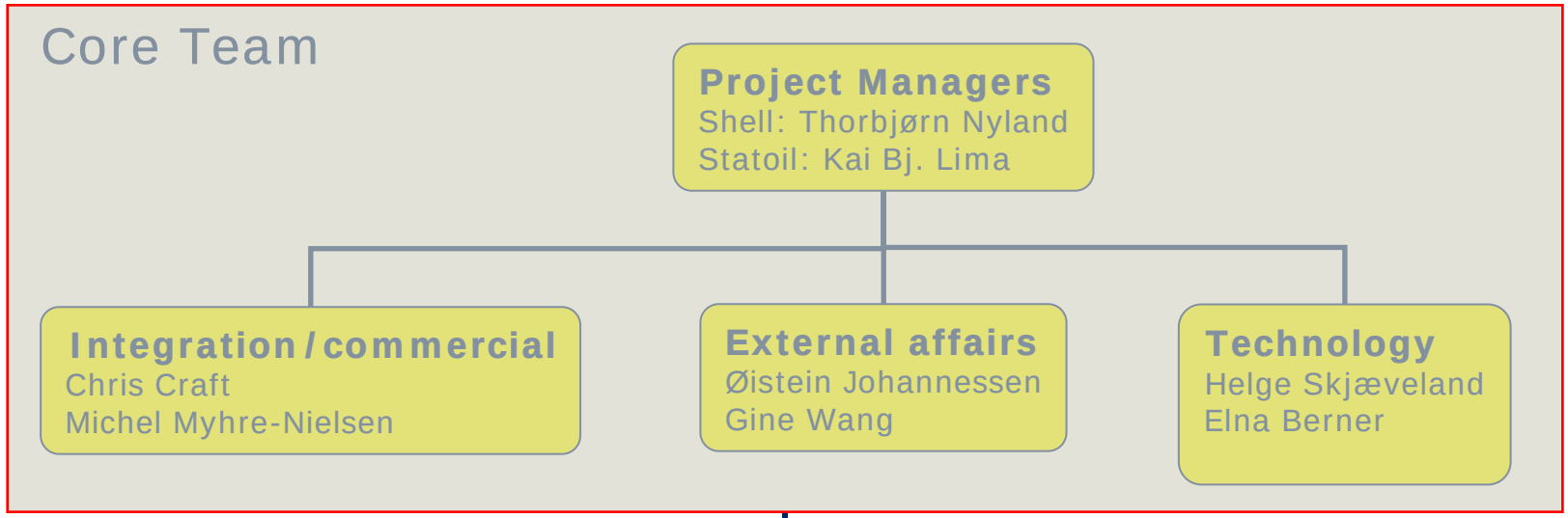
Project organisation cont.



Draugen
EOR studies
Topside mod.
Electrification
Etc.

Jonathan Crane (temp)

Heidrun
EOR studies
Topside mod.
Electrification
Etc.

Jon Bakken

Tjeldbergodden
Power plant
CO_2 capture
CO_2 compression

Elna Berner

Support Statoil/SGS:

Bjørn Veland/K.J. Li

CO_2 pipeline
Draugen
Heidrun

Jens Haugen

Offshore electrification
Draugen
Heidrun

Morten Sanderford

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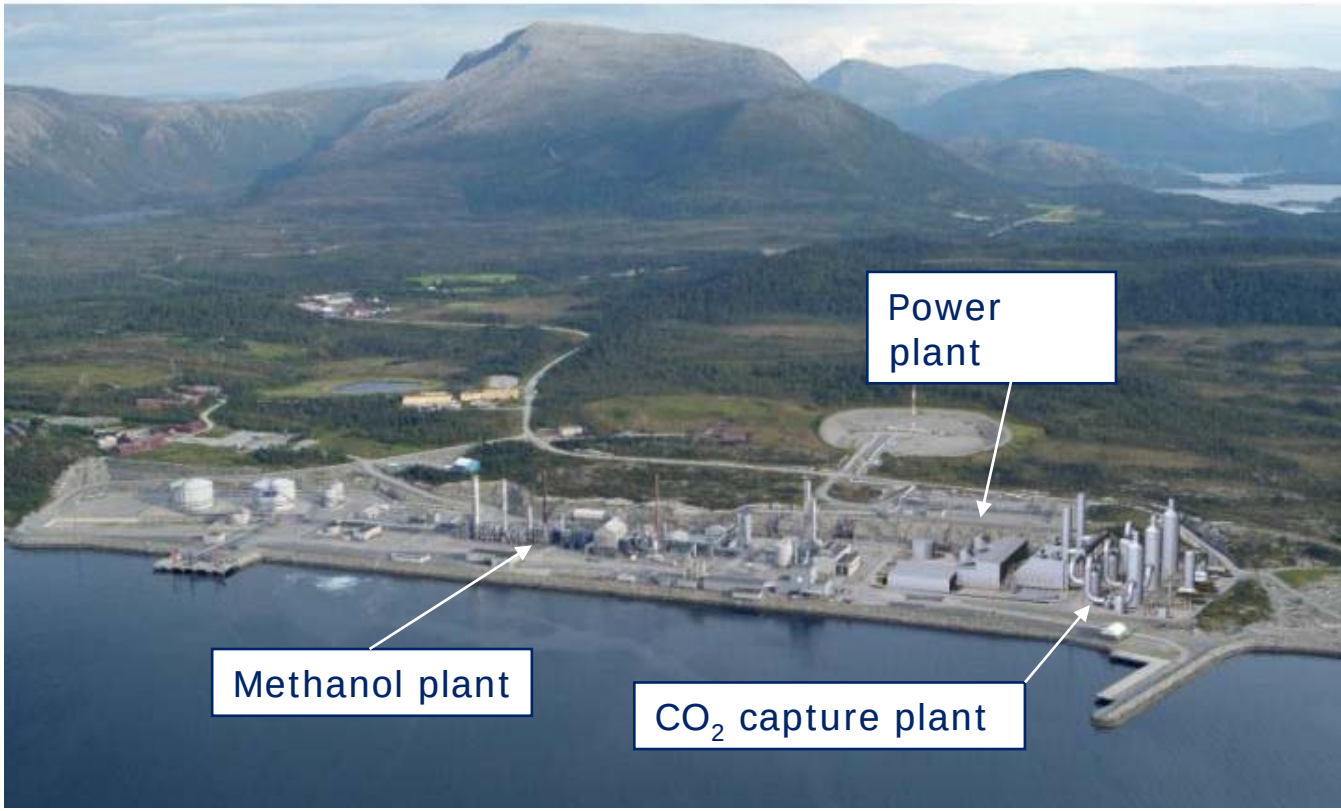
Gas power plant at Tjeldbergodden (TBO)

- the starting point for the value chain

- Integrated 860MW gas power plant with two gas turbines and one steam turbine
- The Power plant will need 1 GSm^3 gas annually
- CO_2 capture plant with compression integrated in the power plant
- The capture plant 20 times larger than any similar plant in the world today
- Electricity from the plant could be used at Draugen and Heidrun
- Tight time schedule, technology qualification critical
- State contribution critical



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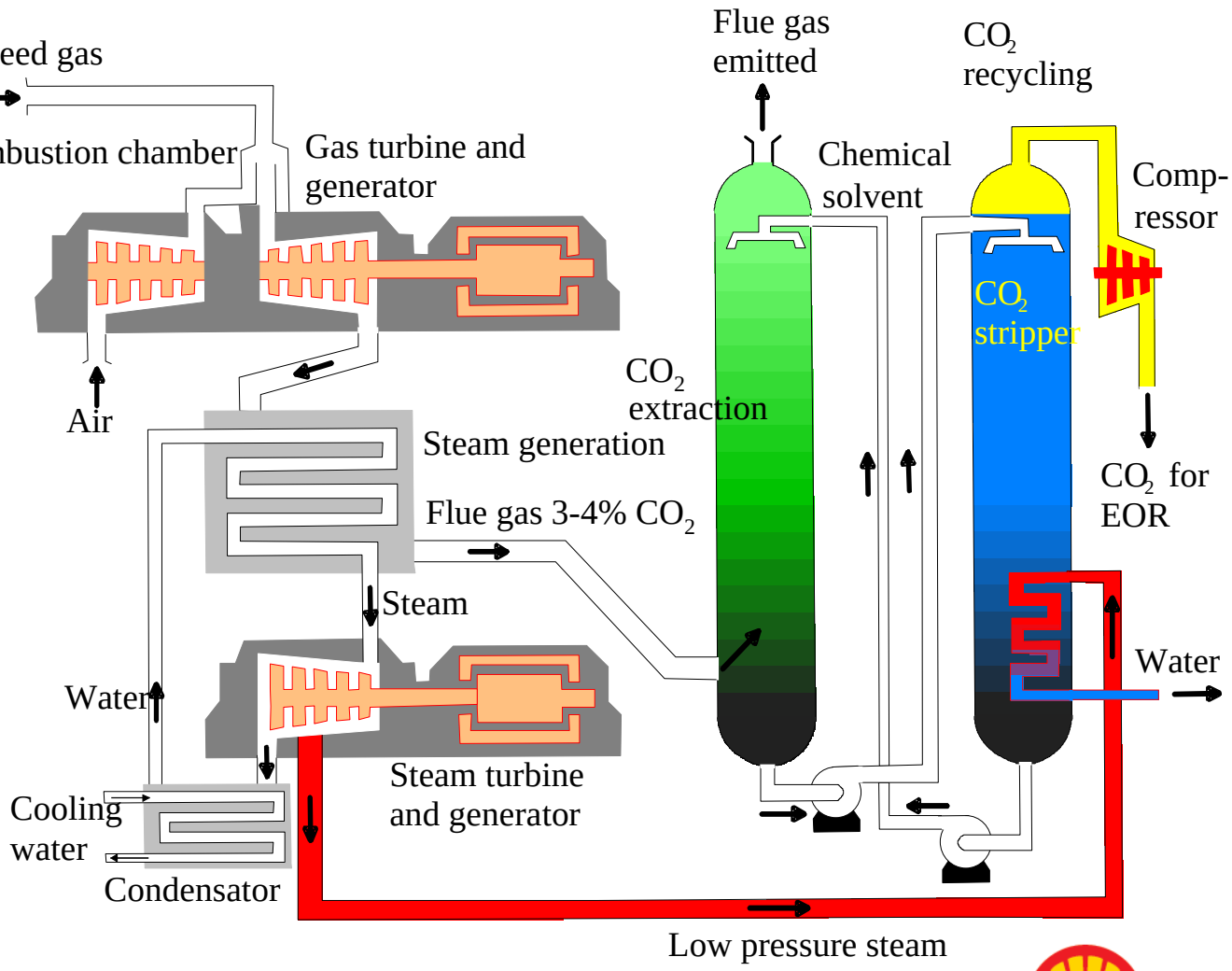
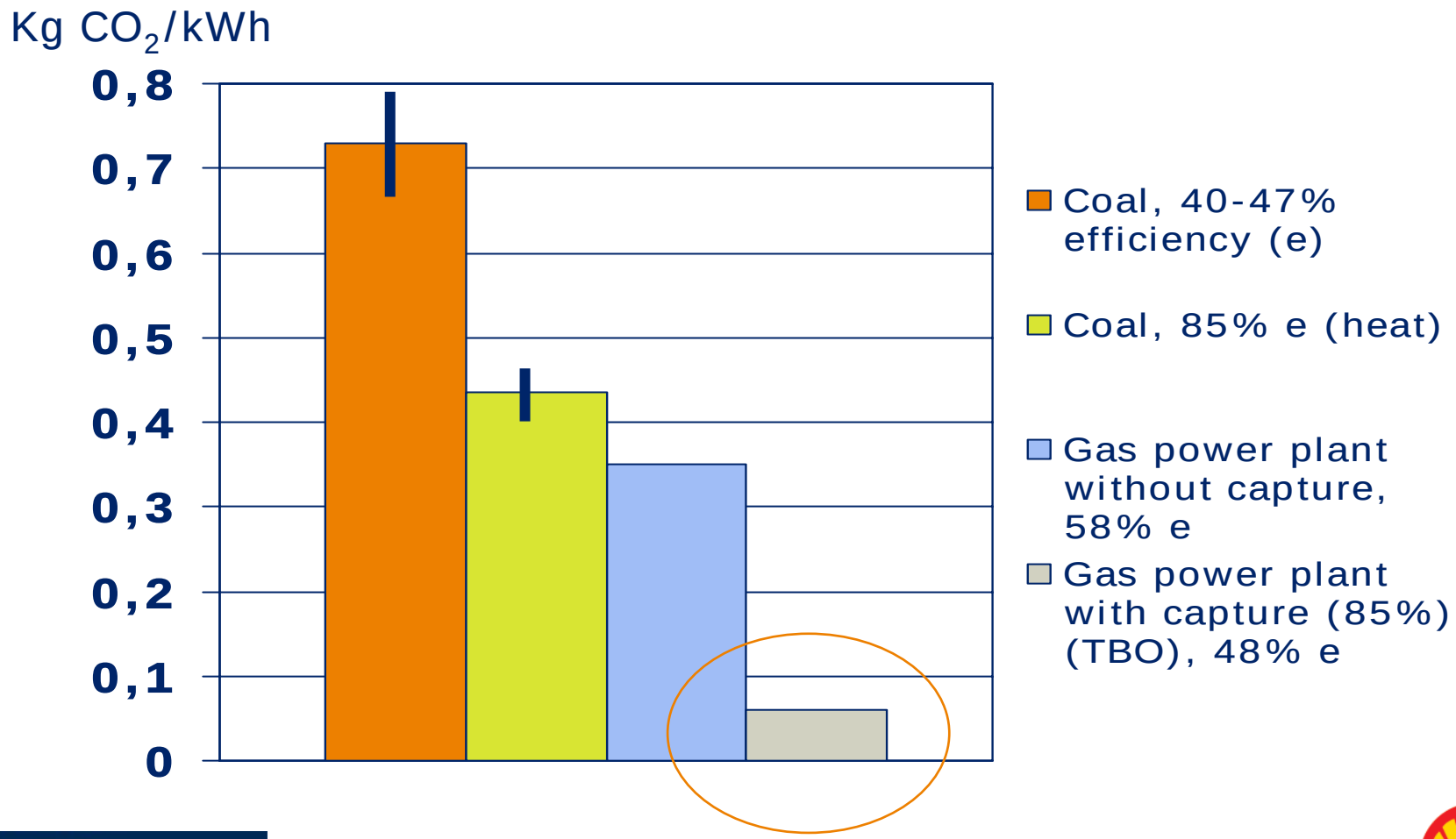
Gas power plant with post combustion CO_2 capture

- CO_2 capture by amines
- Mature technology, but challenges due to scaling up
- Capture at least 80 per cent of the CO_2
- 2,1Mt captured annually; 0,4 emitted
- 135MW of gross el-production will be used for capture and transport of CO_2
- Approximately 49 per cent efficiency
- Produce 7,1TWh/y (pre capture),
- 5,6TWh/y available for the grid (after Draugen electrification)



Source: Olav Bolland/NTNU

Power production with significantly reduced CO_2 emissions



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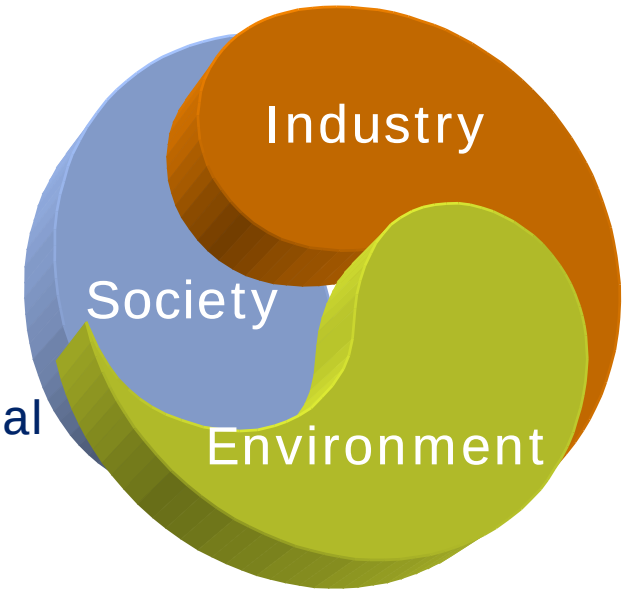
An industrial solution

A win-win-win for:

- Industry
  - Large-scale CO_2 for EOR
  - Improved security of supply
- Environment
  - Reduction of CO_2 and NOx emissions through offshore electrification
  - Industrial utilisation of greener fossil fuel technologies with a global market potential
- Society
  - Prolonged field life and increased oil recovery
  - National electricity grid benefits



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Main commercial challenges

- Agree on predictable commercial framework
- Participation/distribution of parties within the value chain
- State participation/contribution
- Sourcing of CO_2
- Power price vs gas price
- Rules/regulations including liability for stored CO_2
- Investing in power plants is not core business for Shell/Statoil
- High uncertainty when it comes to EOR and future oil prices
- High risk and uncertainty when it comes to technology, reservoir and top side modifications

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Execution plan

- Joint Shell/Statoil project team will work towards the following milestones:
  - Feasibility study — End of 2006
  - Concept select — End of 2007
  - Value chain investment decision — End of 2008

- Provided a satisfactory commercial outcome:
  - Start-up power plant and electrification of Draugen — 2011 – 2012
  - First CO_2 supply to Draugen for EOR — 2011 – 2012

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The End

Questions?

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