Vattenfall’s Demo project at Nordjyllandsværket
Capture, Transport & Aquifer Storage of CO₂

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Vattenfall’s CO₂ free Power Plant Project

Steering Group

CO₂ Project Group

- Mongstad
- Capture R&D
- Storage R&D
- Environment R&D
- Schwarze Pumpe Pilot Plant
- Lignite Drying R&D
- R&D projects XXX

VRD
VPC
External

- Business Units

- Demo plant Germany
  - Lignite power plant
  - Black coal power plant
  - Retrofit
  - Altmark

- Demo plant Denmark
  - Black coal power plant
  - CHP
  - Retrofit

- Demo plant Wärme
  - CHP

- Demo plant Poland

IEA Greenhouse Gas R&D Programme
11th MEETING of the INTERNATIONAL POST-COMBUSTION CO2 CAPTURE NETWORK
20th-21st May, 2008, Vienna, Austria
On February 6, 2008 Vattenfall Nordic Thermal Power Generation announced the intention to develop a full-scale Carbon Capture & Storage (CCS) demonstration project.
The power plant - Nordjyllandsværket

High efficient 410 MW bituminous coal-fired power unit
1.8 million tonnes of CO₂ per annum
Possible Pipeline Route ~ 30 km / Ø 400 mm
The Vedsted geological structure

Geological storage structure has been investigated by two old oil exploration wells and regional seismic lines:

- Anticlinal closure within fault block
- Several sandstone reservoirs of good quality at depths 1200 - 2000 m
- Several thick claystone cap-rock intervals above the reservoirs, plus thick chalk section close to surface
- Expected storage capacity above 100 mil tons
Geology to be investigated for Vedsted

• The potential storage has to be investigated for
  – Structure (Is there a CO2 trap?)
  – Capacity
  – Possible injection rate
  – Tightness of cap rock

• The storage is proven in two steps
  – Seismic investigations (September 2008 to March 2009)
  – Test drillings (March 2009 to March 2010)
Nordjyllandsværket - Main Technical Data

- Electrical output gross: 410 MW
- Max. output of district heat: 420 MJ/s
- Total efficiency in back pressure mode: 91%
- Efficiency in condensing mode: 47%

Flue gas data before capture plant

- CO2: 13 – 14 v-%
- O2: 4.5 – 5 v-%
- SOX: 15 – 25 mg/Nm3
- NOX: 100 mg/Nm3
- Temperature: 52°C
Nordjyllandsværket – layout
Capture plant - important performance issues

• Low energy and capacity loss
• Ability to maintain same district heating capacity as today
• High flexibility
  – big operation range (35 – 100% load)
  – high load change rate gradients (4% pr minute)
  – possibility to shut of capture plant to produce more electricity at peak loads
Nordjyllandsværket Unit 3 - Load week 34 2007
Timeline

• Seismic surveys 2008
• Test drilling 2009
• Capture project preparation 2008 - 2010
• Investment decision and Contract Award 2010
• Start of Operation late 2013
Thank you for the attention