Presentation of the Hatfield IGCC Project

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The Generation Gap
…..the UK needs major investment in new generating capacity…. 
Reserves/Production Ratios

Source: BP, 2005
The case for coal fired power

• Abundance of coal
• Proven technologies for generation
• Wide choice of coal suppliers and geography (including UK!)
• Low cost
• Can be stored
• Can generate flexibly
• No major safety/waste issues
Stern Review – for HM Treasury

• Climate change risks to economic and social activity are similar to those associated with the great wars
• It is difficult or impossible to reverse them
• Climate change threatens access to water, food production, health, use of land etc
• The poorest countries and people will suffer earliest and most
• The costs of stabilisation at 500-550 ppm CO2 are ca 1% of GDP by 2050
• Power sector should be 60-75% decarbonised by 2050
• CCS allows continued use of fossil fuels without damage
• Establishing a carbon price is essential policy measure
• Policies are required to support low carbon technologies URGENTLY
.....there is a need for investment in coal power – with carbon capture......
The Opportunity for Gasification

- Greater diversity of fuels, and fuel sources
- Renewed interest in coal to liquids
- High CO2 concentration, pressure
- Proven carbon capture processes
- Offers hydrogen co-production
- Natural gas replacement possible
- Use of proven technology throughout
The Hatfield Power Project

- Owned by Powerfuel Plc
- New investment in colliery secured
- 51% shareholding from Kuzbassrazrezugol (KRU), Russia
- KRU – world top 10 coal exporter
- Powerfuel is first major acquisition for KRU outside Russia
Hatfield, South Yorkshire
The Hatfield IGCC Project

- Colliery in Yorkshire, NE England
- Access to potential 100 million tonnes coal
- Has planning permission and partial government consent to build IGCC power station – only UK coal station with consents in place
- 25 miles from North Sea (for CCS/EOR)
- Cluster of power stations in area
The Hatfield Power Project

Core Project
• Ca 900 MW (gross) coal fired IGCC
• Current target generation 2012
• Carbon capture from outset
• £1 billion project financing

Other features
• Hydrogen available for transport use
• Could supply syngas to CCGTs, (nat gas grid?)
• Bio-ethanol investment on site
Key Issues

• Engineering work
• Contracting strategy
• Development of CO₂ infrastructure
• Regulatory issues in North Sea
• Long term allocation of units in ETS
• Protocol for release of ETS units for CCS
• Government support framework
…..the issue of EU ETS allocations…..
## CO₂ Emissions and ETS Allocations

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Source – Clean Coal Task Group
Emission trading regime in Germany gives longer term certainty

Trading period 2005/07

Trading period 2008/12

New installations
Full allocation
installation-related benchmarks*

Section 10, NAP-G
(National Allocation Plan Act):

Kyoto

Post-Kyoto

14 years
Compliance factor 1
New plant

*(Benchmark Coal 750 gr/kWh; Insufficient for Lignite)

3rd Coal Dialogue, Figure 16
## CO₂ Emissions and ETS Allocations

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*Source – Clean Coal Task Group
....the CO2 transport infrastructure issue...
2003 Emissions from Power Sector

Peterhead (SSE) 3.03 MMTe CO2
Longannet (Scottish Power) 9.44 MMTe CO2
Cockenzie (Scot. Pow.) 3.21 MMTe CO2
Lynemouth (Alcan) 2.75 MMTe CO2
Ferrybridge (Keady) 7.412 MMTe CO2
Drax (Drax Power), 21.825 MMTe CO2
Eggborough (British En.) 6.21 MMTe CO2
West Burton (EDF) 7.06 MMTe CO2
Cottam (EDF energy) 4.678 MMTe CO2
Ratcliffe on Soar (EON) 10.27 MMTe CO2
Rugeley (Rugeley Power) 4.85 MMTe CO2
Tilbury (RWE npower), 4.678MMTe CO2
Kings North (E.ON), 8.38MMTeCO2

54.15 MMTeCO2 + industry (eg COP Humber refinery)

Defra Data (final allocation)
Clusters of sources

1. At and around Humberside
2. Thames estuary
3. Merseyside
4. Forth estuary
Sinks

- Oil fields
- Gas fields
- Gas/condensate fields
- Saline-water-bearing reservoir rocks (saline aquifers)
- Coal seams
Low Carbon Electricity for the UK

Miller CO2 line

Wind, Hydro and DF1

Future links to Norway

Brent Gullfaks area

Beryl area

Miller Kingfisher Brae area

Forties Nelson Howe area

Ekofisk Valhall area

Future links to Denmark

UK CO2 Northward Pipeline. Sized for max EOR demand from participating fields in all Phases. Needs to be optimised on phased demand. Phase 1: 460km; Phase 2: 120km; Phase 3: 90km; Phase 4: 170km.

Humberside CO2 gathering hub

Clean Fossil Power Area

SNS

Future link to NI?

Wind - London Array

Phase 1
Strong progress

- Gasifier licence agreement signed
- Shell technology selected
- Connection agreement with National Grid
- Prelim design package complete April 07
- Discussions re CO2 line continue
- FEED work being initiated
UK Base Load Price (£/MW)
Annual TWA - Nominal

Aug-06
Oct-06
Dec-06
Jan-07
Current big risks

- Lack of Government support framework
- Lack of CO2 disposal infrastructure
The Hatfield Vision

• To be the first commercial coal fired power station in the world to generate with carbon capture
Modelling the Hatfield Project

- Advanced modelling techniques
- Costs based on preliminary engineering
- Coal contract key advantage
- Market data subject to change
- Based on 2006 data – a robust project
- But ETS pricing is not bankable