

# **Kingsnorth and the Carbon Capture Question**

**Jim Watson**  
**Deputy Director, Sussex Energy Group**

BIEE Parker Seminar, 19<sup>th</sup> Nov 2008

- **CCS is critical for global greenhouse gas mitigation**
- **But technical performance, economics and long term liabilities are very uncertain**
- **UK has been amongst leaders with commitment to demonstration plant – but detail disappointed many**
- **But has run into trouble on how to handle new coal plants before CCS is available; controversy over Kingsnorth**
- **Insisting new coal plants are ‘capture ready’ is an attempt by government to deal with the multiple uncertainties ...**
- **... but does it work?**

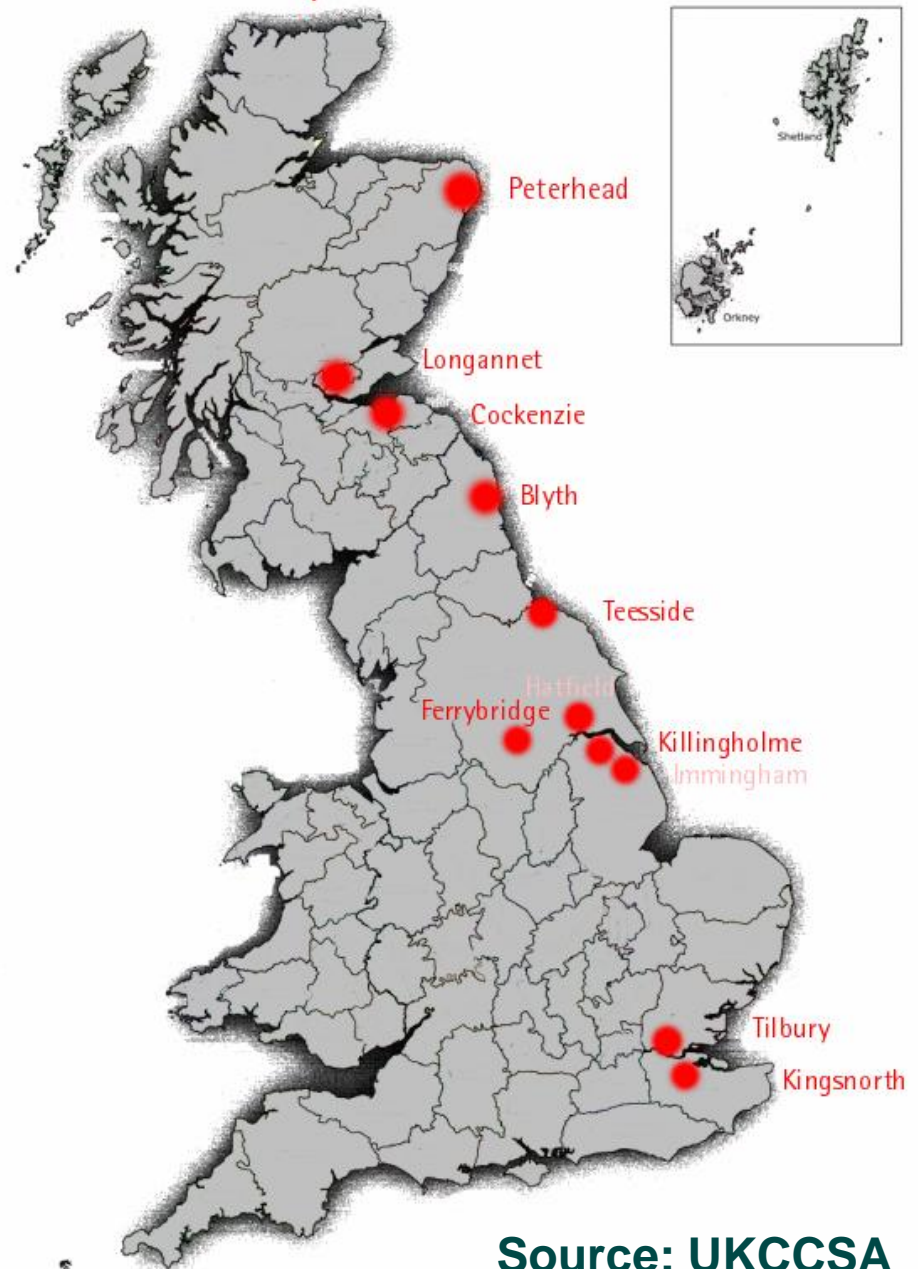
- **Uncertainty means all variants of CCS are up for grabs**
- **Some players emphasise pre-combustion**
  - Likely to be cheaper to build
  - Technically, it is ‘better’ with lower energy penalty
  - Flexible with potential link to hydrogen production
- **Strong support for post-combustion in the UK**
  - Good for retrofits and export opportunities
  - Supercritical power plant technology is proven

# Demonstrating CCS in the UK

- Many projects proposed: at least 6 post-combustion; 3 pre-combustion
- Government picked post-combustion for a 300MW coal-fired demonstration
- Three bidders now left in the competition: E.On, Scottish Power and Peel Holdings
- Operational by 2014?

Sussex Energy Group  
SPRU - Science and Technology Policy

## UK Proposed CCS Locations



Source: UKCCSA



**“For critics, there’s a belief that coal fired power stations undermine the UK’s leadership position on climate change. In fact the opposite is true. Developing economies need to be able to see by the actions that we are taking that it is possible to use indigenous energy reserves as you decarbonise your economy.**

**Substantial emission reductions can be achieved without having to make binary choices in the short term.”**

**Business Secretary, John Hutton, Mar 2008**



# The Kingsnorth controversy

Perhaps unabated coal doesn't matter?

**“The EU ETS caps the electricity generation industry's emissions across Europe so any new coal fired capacity would not add any thing to total carbon emissions.”**

**Energy Minister Malcolm Wicks, July 2008**

**“Emissions from large-scale electricity and a small part of the heat sector are covered by the EU Emissions Trading Scheme (ETS) ... Our Renewable Energy Strategy will therefore not reduce overall emissions in Europe in the large-scale electricity sector.”**

**UK Renewable Energy Strategy Consultation, June 2008**

- Consultation document *Towards Carbon Capture and Storage* published in June 2008
- It did not mention the controversy over E.On's plant at Kingsnorth (which was put on hold pending the outcome)
- It did not ask whether unabated coal should be ruled out as a matter of principle
- Instead it asks:
  - What more can government do to support CCS?
  - Many detailed questions about definition and interpretation of 'capture ready' for EU Directive & UK consents procedures



# The 'capture ready' consultation

## More than a spare car park?

**“Member states shall ensure that all combustion plants with a capacity of 300 megawatts or more ... have suitable space on the installation site for the equipment necessary to capture and compress CO<sub>2</sub> and that the availability of suitable storage sites, suitable transport facilities and the technical feasibility of retro fitting for CO<sub>2</sub> capture have been assessed.”**

**Draft EU CCS Directive**

# The 'capture ready' consultation

## More than a spare car park?

**“The Government’s understanding of Article 32 [of the EU Directive] is that the requirement for “suitable space on the installation site for the equipment necessary to capture and compress CO<sub>2</sub>” should be a precondition for any new plant caught by the scope of the Directive. The other three factors are to be considered ... but a negative assessment would not preclude such consent being given.”**

**BERR Consultation Document**

# The 'capture ready' consultation

## Economic dimensions missing ...

**“The concept of ‘capture-ready’ is not a specific plant design; rather it is a spectrum of investments and design decisions that a plant owner might undertake during the design and construction of the plant.**

**If carbon prices are high enough it is expected that any coal-fired power plant will be more economical to retrofit for CCS than to operate as is ...”**

**Bohm, Herzog et al, MIT, March 2007**

# The 'capture ready' consultation

## Some implications

- **Considerable ambiguity about 'capture ready': government was minded in June to take a minimal approach**
- **View that 'capture ready' studies would be theoretical: likely to be obsolete when decisions to retrofit are made**
- **Technical, economic and legal uncertainties reinforce this**
- **So perhaps a tougher policy is needed: e.g. mandatory standards for new power plants from a specified date?**

# Security vs climate change?



University of Sussex

**“If we were to have a moratorium on coal-fired stations ... we would therefore most likely become more dependent on gas.**

**I don't want to exaggerate, but gas comes from some fairly unstable parts of the world and some not readily associated with human rights and democracy.”**

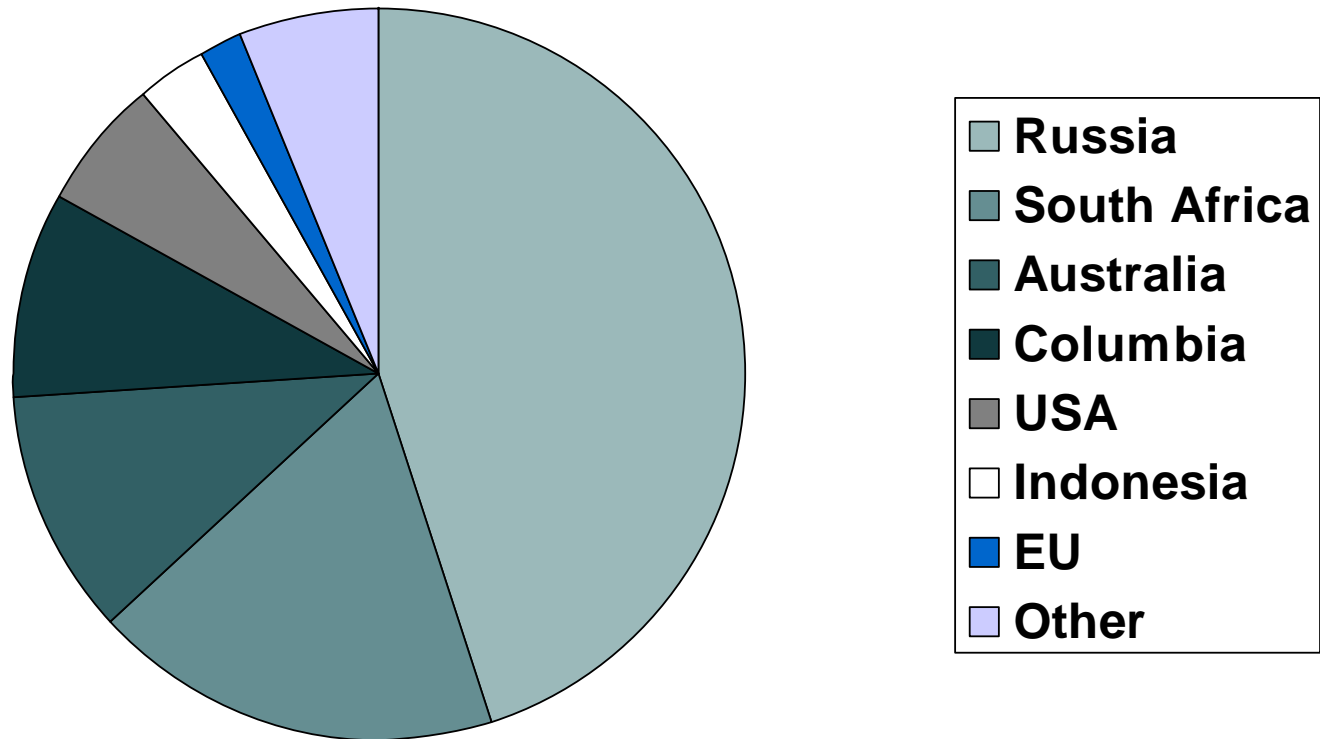
**Malcolm Wicks quoted in *The Guardian* Aug 2008**

# Security vs climate change?

## UK coal imports in 2007



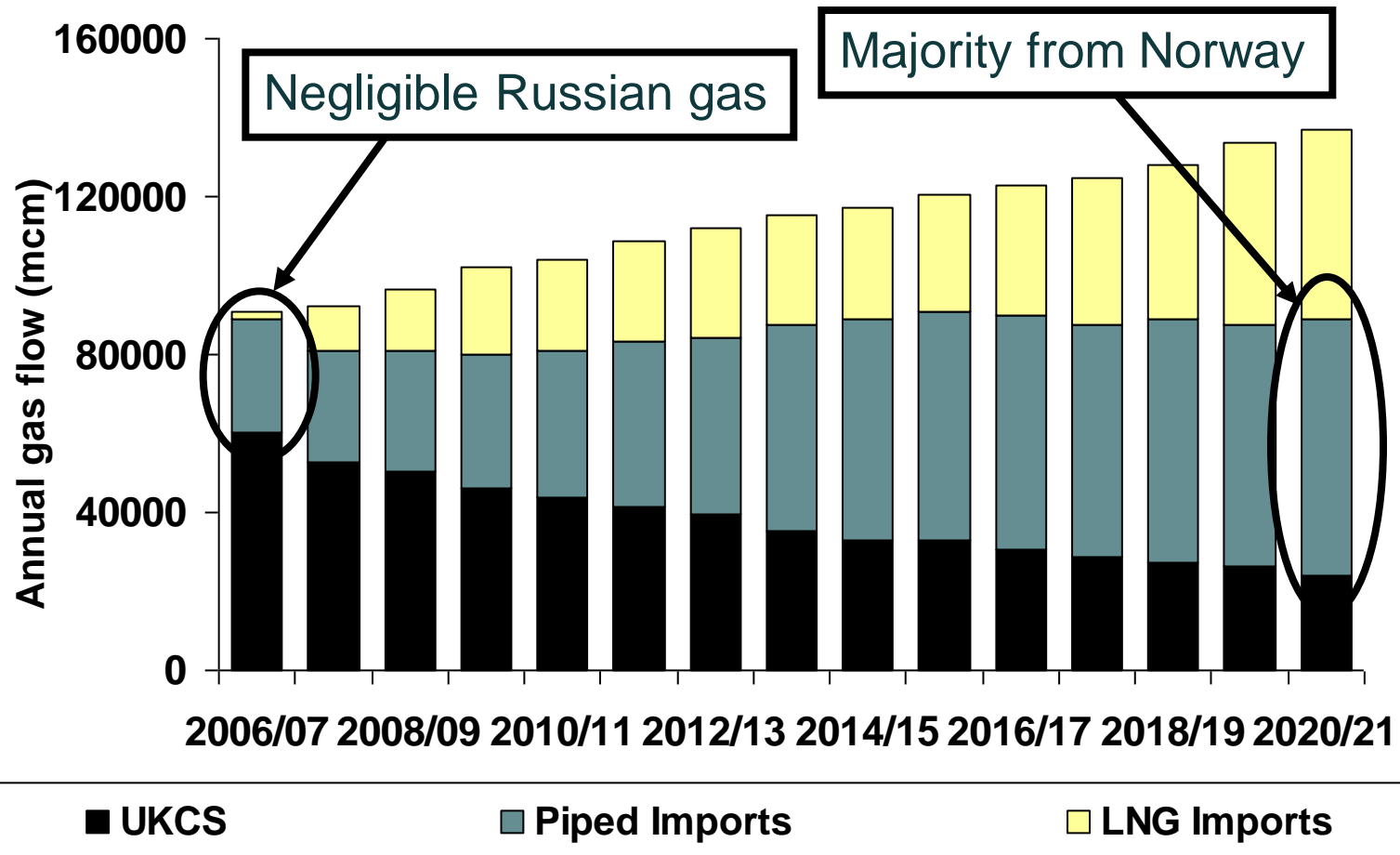
University of Sussex



**Total Imports: 43.9 million tonnes**  
**Total Demand: 62.9 million tonnes**

# Security vs climate change?

## Projected UK gas supply (Oxera)





# Security vs climate change?

## Gas storage



University of Sussex

- UK gas storage capacity was 4.3 billion m<sup>3</sup> in 2006; most of which is in the Rough facility (annual demand: 100 bcm)
- By contrast, Germany had an estimated 20 bcm of gas storage capacity in 2006; meets demand for ~2 months
- Planned UK facilities could increase coverage to a similar level (18 bcm) by 2013 if planning problems sorted out
- Need for more strategic storage likely to get more important over next few years

# Security vs climate change?

## Diversity



University of Sussex

- **Diversity a good energy security strategy: a property of *energy systems* not individual options**
- **Not just a matter of having ‘many energy options’; also:**
  - Balance (what shares these options have)
  - Disparity (how different are they from each other?)
- **Diversity can also be achieved *within* options, e.g.**
  - Locations of power plants using common technology
  - Sourcing fuels from diverse locations by diverse routes

- 1. UK is right to lead on deployment of CCS at home and abroad: a critical technology for China, India and the US**
- 2. New, unabated coal plants threaten UK's international climate leadership**
- 3. Energy security arguments are not sufficient to justify new, unabated coal. Gas storage investment required**
- 4. 'Capture ready' is not enough: Rationale understandable, but too many technical / economic uncertainties**
- 5. Stronger action required: Mandatory standard for new power plants by 2020 (e.g. 500g/kWh); funding for more than one CCS demonstration (including pre-combustion)**