

## Key conclusions

- Co-production of electricity and H<sub>2</sub> from coal and natural gas is feasible and deemed techno/economically viable
- Pre-combustion CO<sub>2</sub> capture will benefit from efficiency improvements in the gasification process and the power cycle (pioneering work)
- Pre-normative work suggests new requirements for CO<sub>2</sub> and H<sub>2</sub> (proper balance is key for the cost of CCS and H<sub>2</sub> production)
- Pressure build-up from CO<sub>2</sub> injected into deep aquifers can be obviated by new injection strategies

### DYNAMIS addresses two main dimensions:

- 1) near-zero emission power generation
- 2) large-scale dimension for H<sub>2</sub> deployment for early adopters (the European transport sector)

### This comprises, as an interim step aimed at realisation by 2012-2015:

- technology options
- gas handling, conditioning and transport of gas (H<sub>2</sub> and CO<sub>2</sub>)
- pre-selection of European production and storage sites using geological information
- societal issues

## Technical data of a DYNAMIS plant

### Capture:

- Plant: 400 MWe class facilitating co-production of 50 MW H<sub>2</sub> (HHV)
- Basis technology: Integrated coal gasification combined cycle with pre-combustion decarbonisation (IGCC-CCS) using a topping cycle fed with H<sub>2</sub>-rich fuel
- Optional technology: Natural gas combined cycle with post-combustion CO<sub>2</sub> capture (NGCC-CCS) with a parallel steam-methane reformer (SMR) for H<sub>2</sub> production
- CO<sub>2</sub> capture rate: 90%

### Handling of gas yields:

- Hydrogen purity: To comply with the specification of a (future) European H<sub>2</sub> infrastructure (notably the transport sector)
- Captured CO<sub>2</sub>: To be compressed and transformed into dense phase (supercritical pressure or cryogenic)
- CO<sub>2</sub> composition and impurity levels: Recommendations justified by technical verification and HSE concerns

### Storage:

- CO<sub>2</sub> injection rate: Around 3 Mtpa (mainly into aquifers or for EOR/EGR)
- Storage capacity: 100 Mt CO<sub>2</sub> (minimum)
- Modelling pre-qualifies sufficiency of storage sites in the vicinity of four (tentative) plant locations (two in the UK, one in Norway and one in Germany).

### Financing and bankability:

Modelling suggests that provided equitable revenues are secured the cost of CO<sub>2</sub> capture and storage may become lower than the typical pre-DYNAMIS level of €50-60 per tonne CO<sub>2</sub>

#### Dynamis Consortium

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[www.dynamis-hypogen.com](http://www.dynamis-hypogen.com)

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