



Polska Grupa Energetyczna



## Belchatow CCS Demonstration Project

Carbon Transportation and Storage Solutions (CCS) Conference  
Warsaw, March 6-7, 2012



### Introduction



#### Challenge

Greenhouse gas emissions reduction requirements of the Climate and Energy Package are a challenge for Poland forcing the energy sector to invest in new, efficient power units and clean coal technologies.

#### Local considerations

Polish economy is based on fossil fuels – the key aspect is to modernize the national energy sector by investing in high efficiency and clean coal technologies, such as CCS.

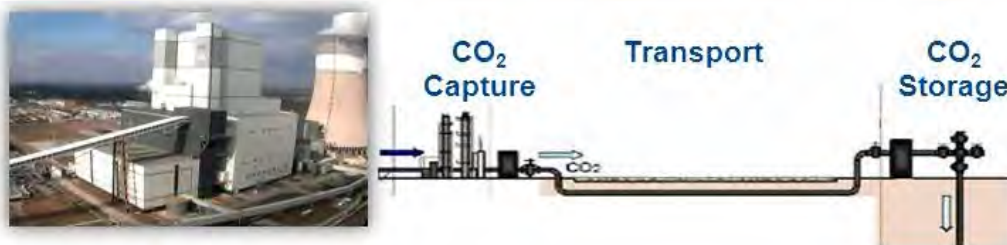
#### Role of CCS

Taking into account the Polish fuel mix and EU regulations, CCS technology is very important, but currently unprofitable. EU and Member State financial support is vital.

## Technical specifications of the CCS Plant (Basis for the Design )

### Key components

- The new power unit with the gross capacity of 858 MWe
- Carbon Capture Plant & Integration: an integrated post-combustion Carbon Capture Plant (CCP) with an installed capacity of 260MWe gross electricity output. The CCP will utilize an Advanced Amine Process with a CO<sub>2</sub> capture efficiency of at least 85%. This component will also include the modifications necessary to the base installation, i.e., the Power Plant, to make it capture-ready.
- CO<sub>2</sub> Transportation: this component will include a pipeline and associated infrastructure to transport the CO<sub>2</sub> captured and compressed by the CCP to the storage site
- CO<sub>2</sub> Storage: this will include the injection of pressurized CO<sub>2</sub> into a deep saline aquifer for permanent storage.



## Major elements of complexity of the Belchatow CCS Project

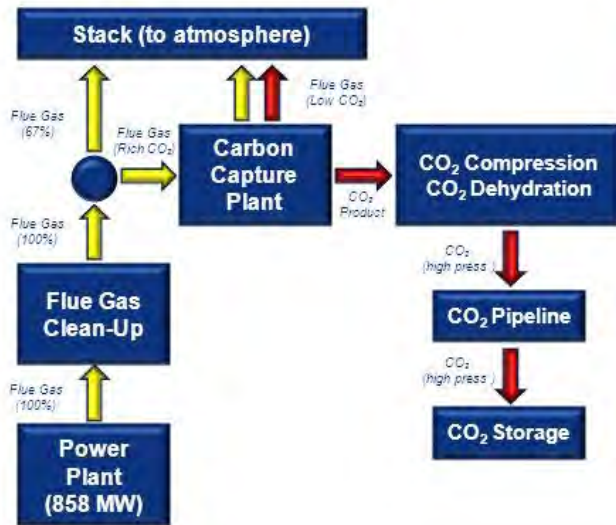
The new 858 MWe power generation unit was originally not designed to be “Capture Ready”. This means that some modifications to the installation needed to be implemented to ensure an integration of the CCP.

### Key modifications include:

- Re-engineering and re-location of the equipment from the area identified for the CCP
- Tie-in for off-take and return of cooling water required for the CCP
- Tie-in for off-take and return of flue gas to the main flue gas ducts
- Modification of IP/LP turbine crossover pipes

**Total Capex of „Capture Ready” amounts to EUR 8.5m**

The scope of work was completed on October 30, 2010 as a part of the EPC turnkey contract dedicated to the new 858 MWe power generation unit



## Current status

- **FEED for Carbon Capture Plant (CCP)** – works allow to start-up detailed engineering, procurement and construction within CCP
- **Process for updating CCP permits** – ongoing
- **New 858 MWe Unit** – completion of EPC including activities for „capture ready”
- **Phase I of the storage component** – completion of site selection works - site ranking report submitted, the final decision on the selected site made on 7<sup>th</sup> February, 2012
- **Prefeasibility study within the transport component** completed in 2009
- **Tender process to select contractor of preparatory work on transport component** ongoing
- **Tender process to organize Phase II on storage component** under preparation



## Closing CCS Financing Structure

### Necessary conditions

- **Positive NER300 award decision.**
  - Upfront funding of capital investments under NER300 – a government guarantee is a prerequisite.
- **Funding from the Norwegian Financial Mechanism**
- **Development of a CCS operating loss support programme – current and forecasted EUA prices do not cover the corresponding operating expenses during the expected 20-year operating life of the installation.**

**Reimbursement of operating losses is still subject of discussions with the Polish Government**

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## Challenges for all European CCS demonstration projects

### Legal aspects

Implementation of the CCS Directive into national legislation, Member States should provide the legal framework for CCS

### Financial structure completion

Significant support from the European and national public sources necessary to cover CCS investment phase as well as CCS operating losses

### Communications

Policy, industry, research and NGOs to communicate clearly the benefits and role of CCS in clean coal technology development and improve public perception to build confidence in the safety of CO<sub>2</sub> storage

### Public acceptance

Particularly concerning CO<sub>2</sub> transport and geological storage

**Difficulties with project implementation – many legal, technical, economic and social uncertainties.**

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***Thank you***