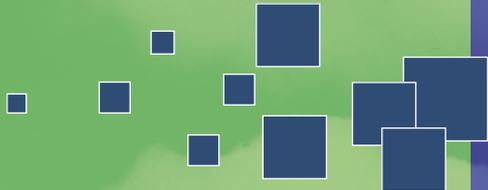




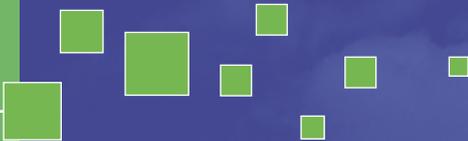
EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT  
DIRECTORATE C - Conventional Energies

**EURACOAL**

European Association for Coal and Lignite

A cluster of approximately ten dark blue squares of various sizes, arranged in a loose, abstract pattern on the green background.

# FOURTH COAL DIALOGUE

A cluster of approximately ten light green squares of various sizes, arranged in a loose, abstract pattern on the blue background.

29TH JANUARY 2008  
IN BRUSSELS

## INTRODUCTION

About 100 participants from EU Member States, the European Commission, the European Parliament and from the coal industry took part in the Commission's and EURACOAL's 4th Coal Dialogue on 29th January 2008 in Brussels. The event was chaired by **Heinz Hilbrecht**, Director, Security of Supply and Energy Markets within DG Energy and Transport and EURACOAL's Vice President, Petr Pudil.

In his introduction, **Heinz Hilbrecht** referred to the "Climate Action Package" the Commission adopted on 23rd January 2008, including inter alia the legislative proposals on the EU Emissions Trading Scheme after 2012, the Directive on the Geological Storage of CO<sub>2</sub> and the Directive on the Member States' Shares of Renewable Energies. In these proposals, the contribution of coal to security of energy supply in Europe is acknowledged, particularly with a view to deployment of Carbon Capture and Storage in demonstration projects in the next decade and further deployment after 2020.

**Ioannis Galanis**, Deputy Head of Unit, Coal and Oil, gave an overview on the current Commission initiatives with impact on coal utilisation. In addition to the Emissions Trading Scheme and the Directive on Geological Storage of CO<sub>2</sub>, he referred to the Communication on Supporting early demonstration of Carbon Capture and Storage (CCS) the Commission also adopted on 23rd January 2008.

In the Communication, the Commission has acknowledged the huge costs for R&D on CCS and particularly for demonstration; those costs are estimated to reach between € 10 and 20 billion. However, the potential benefits are assumed to be much larger; this would include the opportunity to cover 20 to 28 % of the achievable global CO<sub>2</sub> emission reductions by 2050 according to the International Energy Agency. CCS also provides an opportunity to manage future CO<sub>2</sub> emissions of dynamically developing coal users

like China and India. The Commission hopes to overcome the legislative hurdles by the proposed Directive on Geological Storage of CO<sub>2</sub>. It is suggested to overcome economical and technical obstacles also with the help of an European industry initiative directed to CCS. This would include a project network in the form of a joint platform for individual projects as well as additional instruments mentioned in the November 2007 proposal for a Strategic Energy Technology Plan. In order to finance the early demonstration of carbon capture plants and CO<sub>2</sub> transport systems, the Commission asks for clear, early and precise commitments by individual players on large-scale demonstration as well as Member States' involvement because EU level financing is only available to a relatively small extent.

Also on behalf of the European Commission, **Johannes Enzmann**, DG Environment, reported on the Revision of the EU Emissions Trading Scheme. DG Environment assumes that the sectors falling under the scope of the ETS will be able to take an over-proportional share of CO<sub>2</sub> emission reductions. The EU has to emit 14 % less in 2020 compared with 2005; the Emissions Trading sector is asked to reduce emissions by 21 %.

Mr. Enzmann emphasised that major objectives of the system review would be to come to a cost-effective contribution of the 20 % GHG target for 2020 and to establish a clear, long-term carbon price. He stated that in order to reach this objective, a single EU-wide cap would be needed as well as a linear decrease of the cap by 1.74 %. With the exception of free allocation to industries particularly vulnerable to international competition, the basic principle for allocation would be auctioning of certificates by Member States. 20 % of auction revenues should be ear-marked for combating climate change, promoting renewable energies and addressing social impacts.

The question how Emissions Trading could in the future be a driver for modernisation was discussed by **Petr Pudil**, Vice President of EURACOAL. He emphasised that in the decades to come, coal can make a major contribution, not only to the EU's security of supply and competitiveness, but also to the binding EU target of 20 % by 2020 concerning the EU greenhouse gas emissions.

Mr. Pudil reminded participants that coal has been the fastest growing fuel globally since the year 2000. With 39 %, coal is also the N° 1 fuel for global power generation. Concerning the EU, the average of 28 % of electricity production based on coal hides large discrepancies between the situations in different Member States. The challenges coal has to face, i.e. higher CO<sub>2</sub> emissions compared to natural gas, have to be tackled with continuous modernisation, Best Available Techniques, capture readiness for new plants as well as the development and -after 2020- deployment of Carbon Capture and Storage.

According to EURACOAL, an Emissions Trading Scheme also has to secure energy supply, ensure fair burden-sharing between Member States and encourage modernisation and investments in Best Available Technologies. Mr. Pudil presented case studies on the impact of fuel-specific benchmarks and load factors that can be determined statistically for different sectors and / or specific types of installations. It was shown that a system based on benchmarks with free allocation can effectively support investments in efficiency.

**Friedrich Seefeldt** of Prognos AG reported on the Study “The Future Role of Coal in Europe” conducted in cooperation with EURACOAL, a number of coal producers, power producers and in cooperation with power plant producers as well as a number of institutes. He stated that the highly competitive hard coal and lignite in liberalised power markets will remain competitive at CO<sub>2</sub> prices around € 15 / t even with moderate gas prices. High gas prices will lead to significant shares of coal in power generation, even at relatively high CO<sub>2</sub> prices of around € 30 / t. He assumed Carbon Capture and Storage to become economically feasible at CO<sub>2</sub> prices of around € 30 / t.

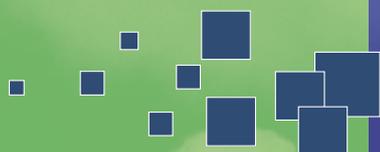
The panel discussion is summarised at the end of this booklet.





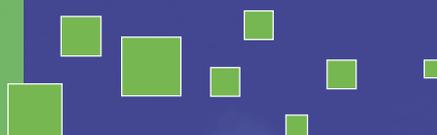


EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT  
DIRECTORATE C - Conventional Energies



## COMMISSION INITIATIVES WITH IMPACT ON COAL UTILISATION

IOANNIS GALANIS  
EUROPEAN COMMISSION  
DG TREN,  
DEPUTY HEAD OF UNIT C3  
DIRECTORATE C  
SECURITY OF SUPPLY AND  
ENERGY MARKETS





## ● Commission Initiatives with Impact on Coal Utilisation

4th COAL DIALOGUE on 29-01-2008 in Brussels

Presentation by Ioannis GALANIS  
DG TREN - Coal and Oil Unit

23/01/2008

## ● Background

- **2007 Spring European Council**
  - » target of 20 % cut in greenhouse gas emission by 2020
  - » target of 20 % renewable energy in energy consumption by 2020
  - » enabling low-CO2 power generation from fossil fuels by 2020
  - » up to 12 CCS demonstration plants in operation by 2015
- **Summer - Autumn 2007**
  - » Evaluation and Impact Assessment period
- **November 2007: Strategic Energy Technology Plan**
  - » R&D efforts to focus on low carbon technologies
  - » CCS one of strategic technologies:
  - » Large-scale CCS demos next priority
- **23 January 2008:** Commission adopts a set of proposals on environment and energy: the "January 2008 Package".

## ● Environment + Energy Package of Jan 2008 The Commission documents

- **A "Chapeau" Communication:**  
20 20 by 2020 – Europe's climate change opportunity
- **Legislative proposals** (proposals for directives):
  - » The Renewable Energy Directive on MS shares
  - » The ETS Directive for the post 2012 period
  - » The CCS Directive on the geological storage of CO2
- **Communications** to Council and EP:
  - » The CCS Communication on early demonstration
  - » A Communication assessing MS en. Efficiency plans
- **New Guidelines on State Aid to Environment Protection**

## ● Commission initiatives with direct impact on coal utilisation

- **The ETS Directive for the 2013 – 2020 period:**
  - » ETS is the market based instrument for low carbon
  - » CCS will be fully integrated in the ETS
  - » Safely stored CO2 will be considered as not emitted
- **The CCS Directive:**
  - » Only geological storage will be acceptable
  - » Safety conditions and rules are established
  - » CCS will become a properly regulated activity
- **The CCS Communication:**
  - » CCS technologies will be needed by 2020
  - » CCS demonstration is to be promoted now

## ● CCS Directive + CCS Communication: Questions and Answers (1)

- 1. What is carbon capture and storage?
- 2. How does geological storage work?
- 3. Why the need for CCS?
- 4. Is CCS technically mature?
- 5. How much will CCS cost?
- 6. When will widespread deployment happen?

For the full text of Questions and Answers:  
[http://ec.europa.eu/environment/climat/ccs/eccp1\\_en.htm](http://ec.europa.eu/environment/climat/ccs/eccp1_en.htm)

## ● CCS Directive + CCS Communication Questions and Answers (2)

- 7. Who will bear the cost?
- 8. Will CCS be made mandatory?
- 9. How will CCS be treated under the ETS?
- 10. How much will CCS contribute to reducing CO2 emissions in the EU
- 11. What type of sites will be selected and how?
- 12. Will storage be allowed outside of the EU?

## ● CCS Directive – CCS Communication : Questions and Answers (3)

- 13. What is the risk of leakage?  
What will happen if a site leaks CO<sub>2</sub>?
- 14. Who will be responsible for inspecting CO<sub>2</sub> storage sites?
- 15. How is the responsibility for the site ensured in the long term?



## ● Costs and benefits of CCS

- **Costs:**
  - » R&D (€1bn) and demonstration (€10-20bn) to reduce costs
  - » further investment to roll out CCS on a wide-scale
- **Benefits:**
  - » 20-28% of the achievable global CO<sub>2</sub> emission reductions by 2050 (IEA)
  - » solution for both power generation and energy intensive industries
  - » for managing future CO<sub>2</sub> emissions of dynamically developing coal users (China, etc.)
- **Policy goal = CCS commercially feasible by 2020:**
  - » CCS in retrofits and newbuild thereafter
  - » capture-readiness in the meantime



## ● Overcoming obstacles

- **Legislative hurdles**
  - » CCS Directive: a comprehensive regulatory framework
    - To ensure public confidence in CCS installations
    - To provide legal certainty to operators
  - » International regimes accepting CCS
- **Non-legislative hurdles**
  - » Economics
  - » General and industry awareness
  - » Public acceptance



## ● CCS Communication Key Points

- Focus on non-legislative issues
- Demonstration in power generation is next milestone
- Outlines initiatives to stimulate early large-scale CCS demonstration projects:
  - » an EU structure to support CCS demonstration projects
  - » catalyzing the finance for CCS
    - industry commitment
    - Member States' involvement
    - EU-level financing
  - » preparing infrastructure needed for wide-scale deployment



## ● CCS Communication An EU structure to support CCS demonstration

- In the SET-Plan, the Commission proposes to establish European Industry Initiatives (EII) in technologies needed for a decarbonized energy supply
- In the CCS Communication, the Commission proposes:
  - » Launching an European Industry Initiative on CCS
  - » At this stage, through the launching a support action under FP7 to establish a « project network »

The European industry Initiative can develop further, depending on the support received, also into a financial-support tool



## ● CCS Communication The « project network »

### Scope of the « project network »

- » A joint platform for individual projects in early, large-scale demos in power plants
- » For close inter-action with ZEP TP on projects

### Value to be generated through European approach:

- » Visibility and marketable identity (European logo) of project
- » Mechanism for sharing information, know-how/experience exchange
- » Common actions: general public, third countries



## ● CCS Communication Catalyzing the finance for CCS

- **Economics of early demonstration**
  - substantial capital requirements
  - increased operating costs
- **Sources of financing**
  - » **Industrial commitments**
    - ETP-ZEP: a vital initiative with commitments to the issue
    - still needed: clear, early and decisive commitments by individual players to concrete large-scale demonstration
  - » **Member States' involvement**
    - MS-level crucial given budgetary reality and size of challenge
    - Commission guidelines facilitate state aid to CCS
    - ETS revenues + structural policies hinted as suitable
  - » **EU-level financing**
    - limited availability for the time being
      - FP7 + EU structural funds
      - EU financial institutions for specialized cases
      - Communication on financing low-carbon technologies – end 2008



## ● CCS Communication Early start of CO2 infrastructure

- **Need to prepare wide-scale deployment of CCS**
- **New infrastructures will be built**
  - » storage of CO2
  - » transport infrastructure for CO2
  - » linking emission sources to CO2 sinks
- **European dimension of CO2 network**
  - » revision of TEN-Energy guidelines to include CO2 infrastructure



## ● Commission Initiatives on CCS Conclusions

- **CCS: a priority of strategic importance**
  - CCS can be commercially viable by 2020, subject to:
    - » Early effective demonstration
    - » Timely and bold industry and public investment
    - » Market-based stimuli to avoid CO2 emissions
- **Early demonstrations**
  - Will require major financial commitments
    - » decisive commitments from industry
    - » to trigger public contribution (national schemes by MS)
- **Continued R&D**



## ● Commission Initiatives on CCS Next Steps (2008-2009)

- **Commission / Council / EP Adoption / implementation of:**
  - » CCS Directive
  - » CCS in ETS
  - » Revised Community guidelines on state aid for environmental protection
  - » European Industrial Initiative on CCS
  - » Revision of TEN-E guidelines



## ● Commission Initiatives on CCS For more information

- [http://ec.europa.eu/environment/climat/ccs/eccp1\\_en.htm](http://ec.europa.eu/environment/climat/ccs/eccp1_en.htm)
- [http://ec.europa.eu/energy/climate\\_actions/index\\_en.htm](http://ec.europa.eu/energy/climate_actions/index_en.htm)

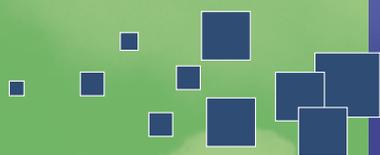
Thank You.





EUROPEAN COMMISSION  
DIRECTORATE-GENERAL FOR ENERGY AND TRANSPORT  
DIRECTORATE C - Conventional Energies

**EURACOAL**  
European Association for Coal and Lignite



**REVISION OF THE EU  
EMISSIONS TRADING  
SYSTEM**

**JOHANNES ENZMANN  
EUROPEAN COMMISSION  
DG ENVIRONMENT,  
POLICY OFFICER  
DIRECTORATE C  
CLIMATE CHANGE AND AIR**



## Revision of the EU Emissions Trading System

Johannes ENZMANN  
Policy Officer  
DG Environment  
European Commission

## Objectives agreed for 2020

- 20% GHG reduction compared to 1990
  - Independent commitment
- 30% GHG reduction compared to 1990
  - In context of international agreement
- 23% renewable energy in gross value added
- 10% biofuels in transport, with
  - production being sustainable
  - second generation biofuels commercially available

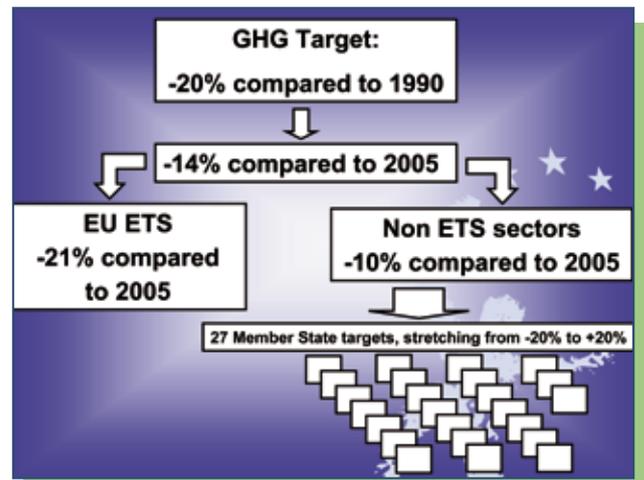
## Where do we stand today?

### In 2005:

- -6.5% GHG emissions compared to 1990
  - including outbound aviation
- 8.4% renewable energy
  - mainly through large scale hydro and conventional biomass

### Targets are ambitious:

- -14% GHG compared to 2005
- +11.5% renewable energy share



## Approach

Cost-effectiveness



Fair distribution

### • Solution:

Fairness: differentiate efforts according to GDP/capita

- national targets in sectors outside EU ETS
- national renewables targets (partially – half)
- redistribution of auctioning rights (partially – 10%)

Cost-effectiveness: introduce flexibility and use market based-instruments (EU ETS, transferability of Guarantee of Origin for renewables)

## Objectives of EU ETS review

- Cost-effective contribution to -20% GHG target for 2020, or to stricter target under international climate agreement
- Improvement of the EU ETS based on experience
- A clear long-term carbon price

**Climates Action**  
Energy for a Changing World

## Cap setting

- **New: single EU-wide cap instead of 27 caps set by Member States**
- **CO<sub>2</sub> allowances available in 2020: 1720 Mt**
  - 21% compared to 2005 emissions
- **Linear decrease**
  - predictable trend-line to 2020 and beyond (annual decrease by 1.74%)
  - can be adjusted to stricter target
  - possible review by 2025 at the latest
- **Aviation to be included in line with political agreement**

**Climates Action**  
Energy for a Changing World

## Figures on the Cap

**EU ETS cap and reductions**

Year	Allowances (Mt)	Reductions (Mt)
2005	2100	0
2006	2050	100
2007	2000	200
2008	1950	300
2009	1900	400
2010	1850	500
2011	1800	600
2012	1750	700
2013	1700	800
2014	1650	900
2015	1600	1000
2016	1550	1100
2017	1500	1200
2018	1450	1300
2019	1400	1400
2020	1350	1500

- Figures based on
  - NAP 2 decisions of the Commission
  - ETS scope as applicable in Phase 2
- Adjustments necessary:
  - Opt in Phase 2
  - Extended scope in Phase 3
  - No aviation
  - Norway, Lichtenstein, Iceland not included

**Climates Action**  
Energy for a Changing World

## Allocation principles

- **Harmonised allocation rules ensure level playing field across the EU**
- **Basic principle for allocation is auctioning:**
  - Eliminates windfall profits
  - Simplest and most transparent allocation system
- **Full auctioning for sectors able to pass on costs**
  - Power sector
- **Partial free allocation to industry as a transitional measure**
  - Phased out by 2020 for "normal industry"
  - Exception: higher levels (up to 100%) of free allocation to industries particularly vulnerable to international competition ("carbon leakage") to be determined in 2010
- **European Commission to report on 'carbon leakage' by 2011 and make a proposal, if appropriate:**
  - To review free allocation levels and/or
  - To introduce system to neutralise distortive effects
- **With international agreement: total cap + linear factor adjusted, increased access to CDM credits (half of additional effort)**

**Climates Action**  
Energy for a Changing World

## Auctioning and earmarking

- **Auctioning rights distributed to Member States**
  - Relatively more rights to MS with lower GDP/capita to balance high investment costs
- **Auctions must be non-discriminatory, open to everybody and will be carried out by Member States on the basis of harmonised rules**
- **20% of auction revenues should be earmarked for combating climate change, promoting renewable energies and addressing social impacts**

**Climates Action**  
Energy for a Changing World

## International aspects: JI/CDM, linking

- **Companies can already use credits from Joint Implementation and Clean Development Mechanism projects (the latter carried out in developing countries) for compliance**
- **"Left-over" credits from 2008-2012 can be used 2013-2020: total 1.4 billion tons for 2008-2020, one third of reduction effort over the period**
- **Greater certainty for participants on the type of projects from which credits can be used**
- **When an international agreement is reached, substantial additional use of credits will be allowed automatically, in order to meet a stricter reduction target**
  - Only credits from countries which have ratified the agreement
  - Important incentives for global climate agreement
- **Possible to link EU ETS not only to other national emission trading systems, but also to sub-federal and regional systems**

**Climates Action**  
Energy for a Changing World

## Scope

- **Cover all big industrial emitters: extension e.g. to chemical sectors and aluminium**
- **Extension to other GHG: nitrous oxide (fertilisers), perfluorocarbons (aluminium)**
- **Leads to new abatement opportunities, lower overall costs, and higher efficiency**
- **Potential "opt-out" of small emitters, if equivalent emission reduction measures in place (e.g. tax)**

- **More harmonised rules on**
  - monitoring and reporting of emissions by operators
  - verification of reports and mutual recognition of verifiers
- **This will enhance reliability and thus international credibility of the EU ETS**
- **Non-compliance penalties (€100/ton CO<sub>2</sub>) to increase by inflation rate to keep deterrent effect**

- **Emission reduction objectives of the Community require most efficient approach**
- **A more harmonised EU ETS can exploit the benefits of emissions trading to the full**
- **The proposal**
  - ensures significant contribution by ETS to overall targets
  - provides a predictable and reliable long-term perspective for industry to take the necessary investment decisions
  - is sufficiently simple to be attractive for other countries to join
  - credibly underlines EU leadership

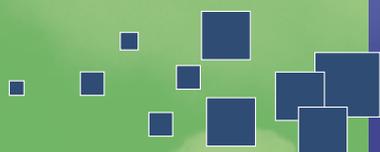
**YOU CONTROL  
CLIMATE CHANGE.**



TURN DOWN. SWITCH OFF. RECYCLE. WALK. **CHANGE**

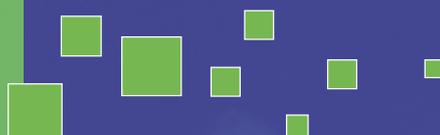
**EURACOAL**

European Association for Coal and Lignite



**EMISSIONS TRADING  
AS A DRIVER FOR  
MODERNISATION**

**PETR PUDIL  
VICE PRESIDENT  
EURACOAL**





## EMISSIONS TRADING AS A DRIVER FOR MODERNISATION

4<sup>th</sup> Coal Dialogue  
Brussels – 29<sup>th</sup> January 2008

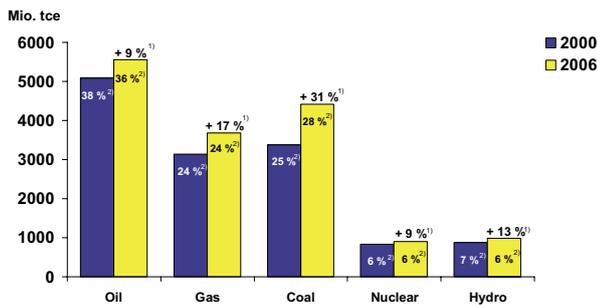
Petr Pudil  
Vice President

### Overview

1. Coal in the energy mix – global and EU levels
2. Power perspectives till 2030
3. Initial situation and demands on the EU ETS
4. How Emissions Trading can best drive modernisation – case studies on a benchmark system

4<sup>th</sup> Coal Dialogue,  
Brussels 29<sup>th</sup> January 2008, Figure 2

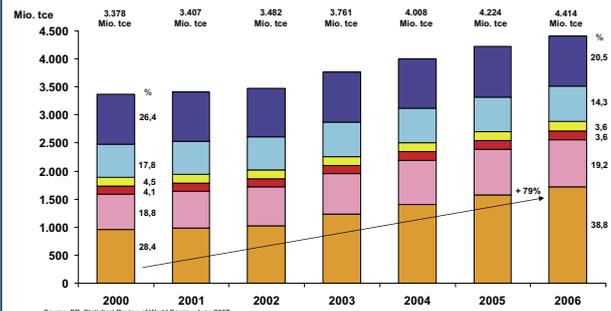
### World energy consumption\* by source of energy Increase 2000 - 2006



\* Primary energy consumption, 2000 = 13,3 Billion tce / 2006 = 15,5 billion tce  
Only sources of energy handled commercially – without wind, geothermal, solar and bio fuels  
1) Increase  
2) Market share  
Source: BP Statistical Review of World Energy – June 2007

4<sup>th</sup> Coal Dialogue,  
Brussels 29<sup>th</sup> January 2008, Figure 3

### Coal - Global consumption 2000 – 2006: + 31 % N° 1 fuel for global power generation: 39 %



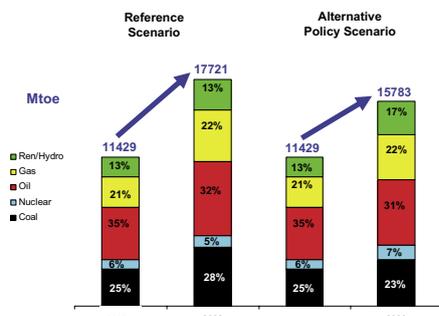
Source: BP, Statistical Review of World Energy, June 2007

China Asia & Australia Africa/Near East Russia Europe America

Whatever Europe decides, coal is an indispensable source of energy.

Brussels 29<sup>th</sup> January 2008, Figure 4

### Coal will remain a major component of the energy mix



Source: IEA World Energy Outlook 2007

4<sup>th</sup> Coal Dialogue,  
Brussels 29<sup>th</sup> January 2008, Figure 5

### Different structures of power generation in the EU influenced by energy policy decisions and resources available

- After oil crises, development of coal and nuclear power worldwide and in the EU, aiming to limit supply and prices risks.
- 90 % of power generation in the EU is based on coal (28 %), nuclear (30 %), large hydro (11 %) and gas (20 %).
- The average values hide discrepancies: share of coal in power generation > 1/3 in PL, CZ, D, GR, BUL, ROM, UK.
- The EU respects the decisions of Member States concerning their energy mix and their sovereignty concerning primary energy sources.

Diverse shares of primary energy in the electricity sector are a strength.

Brussels 29<sup>th</sup> January 2008, Figure 6

## Power market – Perspectives 2020/2030

- Power demand EU-27 - 2005 approx. 3.444 TWh + 1,2 %/a \*  
- 2020 approx. 4.119 TWh  
- 2030 approx. 4.641 TWh
- Nuclear till 2020 more or less constant (30 %), downward trend, e.g. nuclear power phase-out in Germany.
- Renewables: their share will increase, may cover 50 to 100 % of additional demand.
- Coal and gas have to cover approximately 50 % of demand in 2020.
- Market shares of coal/gas are determined by the relation of fuel prices and CO<sub>2</sub> cost.

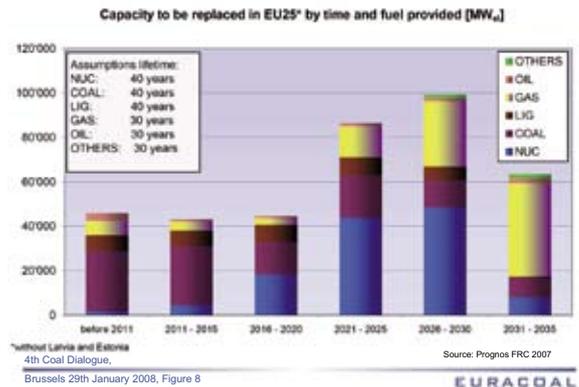
\* Source: FRC results 2005-2030, Prognos 07

**Conclusion: Only if coal remains in business, markets remain liquid and the supply secure.**

Brussels 29th January 2008, Figure 7

EURACOAL

## Replacing capacity



EURACOAL

## Summary Parts 1 and 2

- Coal is the fastest growing fuel in the world.
- Coal will be needed for decades also in Europe – no technology lock-in to be afraid of.
- In the medium-term, climate protection to be tackled with continuous modernisation, BAT, capture readiness for new plants as well as development and – after 2020 – step-by-step deployment of CCS.
- A lot of coal power plants to be replaced within the next years in order to avoid power shortages.
- Diverse shares of primary energy sources in EU Member States are a strength.

4th Coal Dialogue,

Brussels 29th January 2008, Figure 9

EURACOAL

## Initial Situation for future EU ETS

- Europe produces < 15 % of global CO<sub>2</sub> emissions – about 10 % in 2030.
- The aimed at – 20 % reduction of GHG for EU 27 by 2020 is an objective limited in time and content (GHG Emissions EU 27: 1990 – 100, 2005 – 92,8, 2020 – 80, i. e. ≤ - 1 % p.a.).
- Dealing with Emissions Trading is a learning process that has not yet been completed. So far, the EU stands alone. Coal will be used throughout the world, whatever EU 27 decides.
- If long-term objective for CO<sub>2</sub> are needed, how can we best reach them? Is the EU ETS an example for other regions and worth imitating?

4th Coal Dialogue,

Brussels 29th January 2008, Figure 10

EURACOAL

## Demands made on EU ETS

- Contribute appropriately to the GHG **objective** of a 20% - 30% reduction by 2020 (compared with 1990).
- Europe's **competitiveness** – energy is already expensive.
- Security of energy supply** – do not direct demand at scarce sources.
- Fair burden sharing** of Member States, GHGs and industrial sectors – require comparable efforts from everybody.
- Member States'** right to determine their **energy mix**.
- Make the EU's system become a blueprint for third countries' ETS.
- Encourage modernisation and investment in BAT.**

4th Coal Dialogue,

Brussels 29th January 2008, Figure 11

EURACOAL

## EU-ETS – Preparing the 2013/20 Period

- CAP – defines price of CO<sub>2</sub>**  
→ EU 27 decision – 20 % CO<sub>2</sub> in 2020, not questioned;  
2008 – 2020 another 12 % reduction to be achieved.
- Burden sharing – defines the amount of CO<sub>2</sub> Member States are allowed to allocate**  
→ Base 1990 and fair contribution of all Member States is essential.  
Who pays?
- Method of allocation – defines framework for fair and transparent allocation and determines the behaviour of operators and investors**  
→ EU defines framework for trade of CO<sub>2</sub>, monitoring and integration of CDM. Member States are free to maintain their energy-mix and responsible for reaching specific CO<sub>2</sub> targets.

**The EU Emissions Trading is an instrument, not the target. Its design must balance different situations and interests.**

Brussels 29th January 2008, Figure 12

EURACOAL

## Allocation of Certificates by Benchmarks

The benchmark is the yardstick for production capacity, but how will the quantity be allocated appropriately?

- Historical data to be exploited, e.g. individual installation or average of comparable power plants.
- Standardised load factor, e.g. according to fuel or type of power plant, e.g. lignite 8.000 h base load, hard coal 5.000 h to 6.000 h medium load, gas 2.500 h peak load. An ex post adjustment to the real load of the plant has to be discussed.
- Oriented to lifespan of the installations and typical load, e.g. 200.000 to 300.000 h for coal-fired power plants.
- Benchmark x Load Factor provides an appropriate allocation.

Standardised load factors have advantages and can be measured plausibly for short trading periods by means of comparative data.

Brussels 29th January 2006, Figure 13

EURACOL

## EU-Emissions Trading as from 2013

Case studies for a system benchmark – load factors:

- Benchmark geared to average emissions.
- Benchmark geared to average emissions and CCS.
- Elements for a hybrid benchmark system.
- Benchmark geared to emissions from BAT plants.

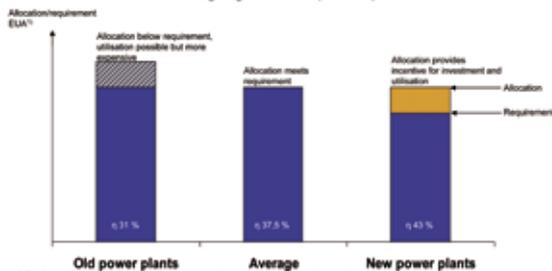
4th Coal Dialogue

Brussels 29th January 2006, Figure 14

EURACOL

## Impact of Benchmarks and Load Factors I

Case study: Benchmark geared to the average emissions of a specific class of installations, e.g. lignite-fired power plants\*



\* Can be applied to all fuels/power plant types and also processes e.g. steel, cement

¹ EUA = European Union Emissions Allowance

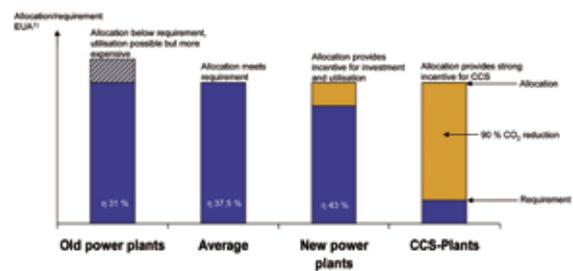
Allocation secures liquidity of power supply and provides incentive for investments, especially for newcomers. Electricity is produced in most efficient manner. Energy policy targets concerning energy mix are supported. No incentive to switch fuel.

Brussels 29th January 2006, Figure 15

EURACOL

## Impact of Benchmarks and Load Factors II

Case study: Benchmark geared to the average emissions of a specific class of installations and introduction of CCS



¹ EUA = European Union Emissions Allowance

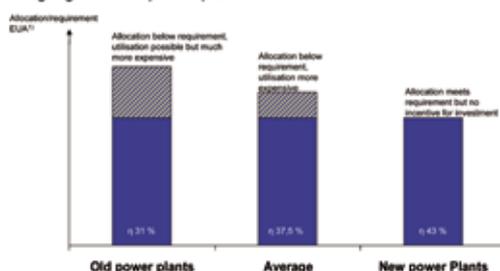
Allocation secures liquidity of power supply and provides incentive to develop workable large-scale CCS solutions as quickly as possible.

Brussels 29th January 2006, Figure 16

EURACOL

## Impact of Benchmarks and Load Factors III

Case study: Benchmark geared to the emissions of new installations, e.g. lignite-fired power plants.



¹ EUA = European Union Emissions Allowance

Allocation creates a structural CO<sub>2</sub> deficit. Liquidity of power supply clearly limited. Balance of demand and supply only possible with JI/CDM, no incentive for investments.

Brussels 29th January 2006, Figure 17

EURACOL

## Impact of Benchmarks and Load Factors IV

Appropriate Allocation of CO<sub>2</sub> emission allowances.

- Fuel specific Benchmark to create a level playing-field across EU.
- Load Factors can be determined statistically for different sectors and for specific types of installation, fair and need-oriented quantities.
- Load Factors can represent the energy policy targets of Member States, e.g. who want to keep a certain fuel.
- Balance between Member State and Sector CO<sub>2</sub> budget can be reached by a Compliance Factor.
- Hybrid system possible. Emission allowance can be allocated for free or partly auctioned. But auctioning reduces incentive for investment.

Allocation on the basis of Benchmark and Load Factors is transparent, long-term oriented, easy to handle, corresponds to Member States' energy policy priorities and provides incentive for investment in advanced power plant technology.

Brussels 29th January 2006, Figure 18

EURACOL

## Advantages of Benchmarking and Load Factors

- Modern installations are as a rule burdened by capital costs (coal-fired power plant depreciated e.g. in 18 years). Demand-oriented allocation gives a strong incentive for investments and an intensive utilisation of these most modern installations.
- Older installations make indispensable contributions to supply. A BAT benchmark, with identical load factors, leads to an under-allocation of up to 30 %. A strong impulse to invest occurs but operation remains possible, even if production becomes more expensive.
- In accordance with the EU Treaty, Member States can decide on the structure of their energy mix; this cannot be guaranteed with auctioning and an EU-wide cap.

4th Coal Dialogue  
Brussels 29th January 2006, Figure 19

EURACOAL

## Summary Parts 3 and 4

- Emissions Trading is energy and environment policy.
- Energy is very expensive anyway – there is a strong incentive to save energy and to reduce CO<sub>2</sub>.
- The use of electricity would become even more expensive because of the auctioning of CO<sub>2</sub>. This weakens Europe's competitiveness.
- A system based on benchmarks and load factors with free allocation can effectively support investments and efficiency. This will strengthen Europe's competitive position in modern technology.
- The EU will reach its GHG objective for 2020 with a benchmark approach.
- Member States have the right to determine their energy mix. Burden sharing guarantees that also in the future. With an EU-wide cap, Member States are put under pressure to switch fuels.

4th Coal Dialogue  
Brussels 29th January 2006, Figure 20

EURACOAL

## Key Messages of the Coal Industry

- Coal to make major contribution to the EU's security of supply and competitiveness in the decades to come.
- Protect coal resources and maintain access to deposits by balanced regulations.
- Continuous modernisation, capture-ready plants and CCS aim at saving resources and reducing CO<sub>2</sub> both in the short and long term.
- Research to focus on improved efficiency as pre-condition for CCS as well as on the development of CCS.
- EU ETS to help both continuous modernisation of power plants and CCS.

Coal – secure and competitive energy for Europe.

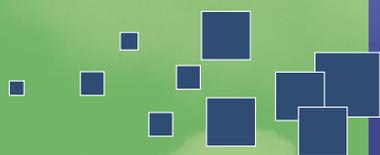
Brussels 29th January 2006, Figure 21

EURACOAL



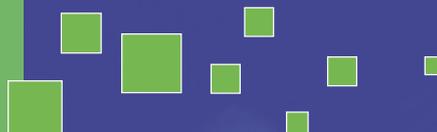
**EURACOAL**

European Association for Coal and Lignite



**THE FUTURE ROLE  
OF COAL  
IN EUROPE 2030 -  
KEY DRIVERS FOR COAL  
IN POWER GENERATION**

**FRIEDRICH SEEFELDT  
PROGNOS AG BASEL**



4th Coal Dialogue

### The Future Role of Coal in Europe 2030 Key Drivers for Coal in Power Generation

Friedrich Seefelt  
Marco Wlonek  
Prognos AG  
Brussels, 29.01.2008

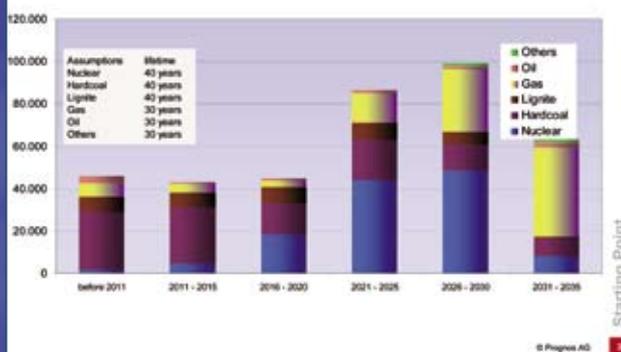
#### Agenda

- Future Role of Coal (FRC)...
- ...FRC: Starting Theses
- ...FRC: Model, Methods and Assumptions
- ...FRC: Results
- Some conclusions
- Discussion

Agenda

© Prognos AG

#### Starting Theses: Replacement of Capacities (EU 27): ... until 2020 predominantly coal capacities



Starting Point

#### Starting Theses: Present framework determines the future!

- + coal is (at a significant share) a domestic fuel (reduces import dependency)
- + coal is globally available at comparable low cost (predictable production- and transport cost)
- + coal price is comparable stable (there is a functioning and heterogenous world market)
- coal is the most carbon intensive fuel (hence mostly expounded to climate protection policy)
- future power plant investment revenues are hardly predictable (increasing risk in a liberalised market ask for higher return on equity)
- high political support for renewable energies in power generation (wind, hydro, solar & biomass with increasing shares)
- +/- future of nuclear energy is still unclear in important member states

Starting Point

© Prognos AG

#### Project Partners Future Role of Coal in Europe 2030

EURACOAL European Association for Coal and Lignite, Brussels (BE)		
Coal Producers	Power Producers	Cooperation
DEBRIV (DE) GVSt (DE) Czech Coal (CZ) ZSDNP (CZ) ZPGWK (PL) Poln. Lignite (PL)	RWE Power Vattenfall M&G eon Kraftwerke Maistra (HU) Public Power Corp. (GR)	<b>Power Plant Data</b> Siemens PG <b>Market Data</b> V&K (DE) NAPE (PL) Université Dauphine (FR)

Project Duration:  
July 2005 - June 2007

Project

#### The Future Role of Coal in Europe 2030 Definition of Scenarios

Models & Scenarios

© Prognos AG

### FRC Model Definition of Scenarios

CO<sub>2</sub>-Prices reflect different levels of climate protection policies

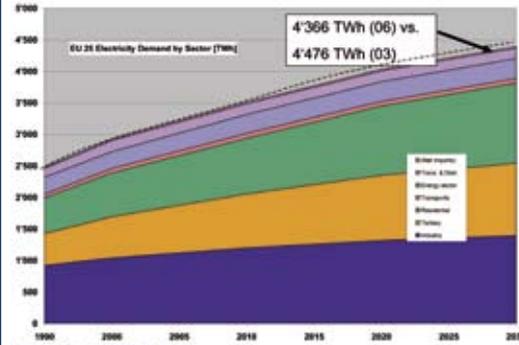
	Base 5	Policy 15/30/45	Low Price 15/30	Tech 30	Tech 45
Final Energy RES/RUE	EU-Trends	EU-Trends	EU-Trends	EU-Trends	EU-Trends
Energy Prices	EU-Trends (high)	EU-Trends (high)	Energy Report IV (moderate)	EU-Trends (high)	EU-Trends (high)
Climate Protection	EU-Trends	156/t mod. 306/t agr. 456/t high	156/t mod. 306/t agr.	306/t agr.	456/t high
Technology	economical logic	economical logic	economical logic	accelerated technology progress	regulatory policy

Models & Scenarios

© Prognos AG 7

### Development of Electricity Demand

Assumptions acc. EU Trends to 2030 ed. 06 [DG TREN/NTUA 2006]

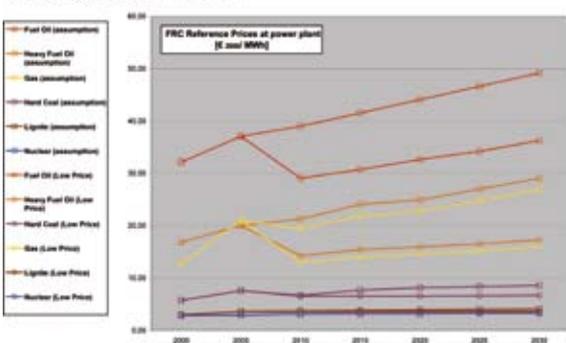


source: EU-Trends to 2030 - ed. 06

© Prognos AG 8

Model Input

### Fuel Prices (assumptions)



© Prognos AG 9

Model Input

### The Future Role of Coal in Europe 2030

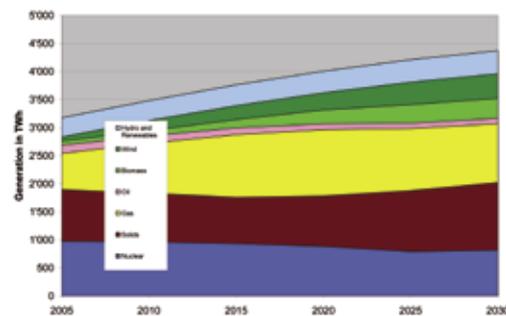
#### Results

© Prognos AG 10

Results

### Development of Power Generation (by fuel)

Projections by EU trends 2030 ed. 06 [NTUA 2006]



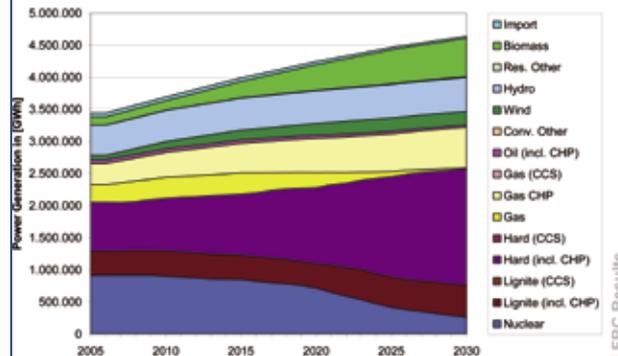
source: EU-Trends to 2030 - ed. 06

© Prognos AG 11

EU Base 06

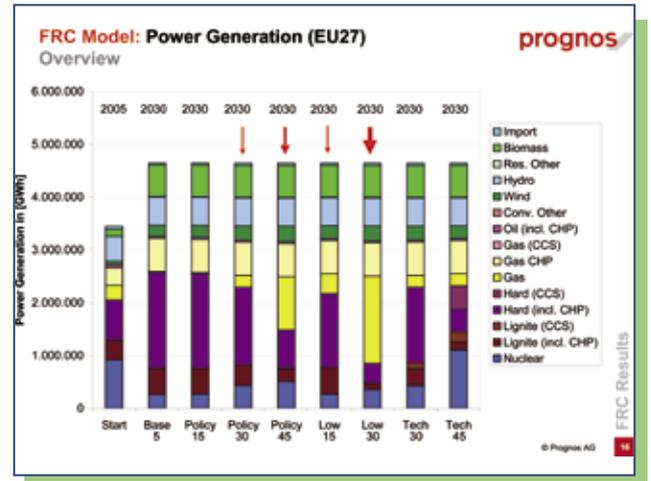
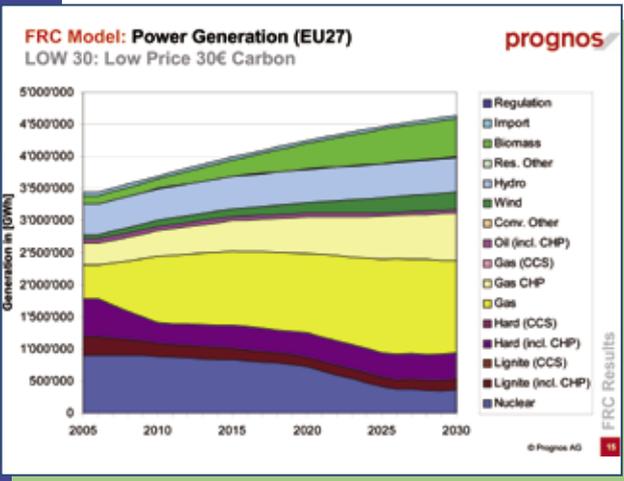
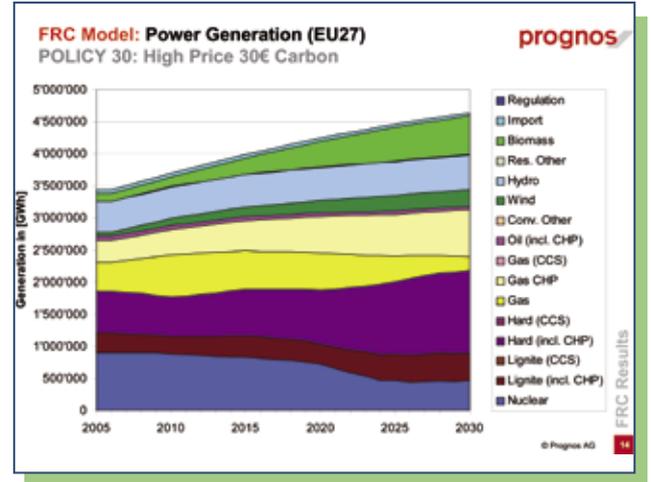
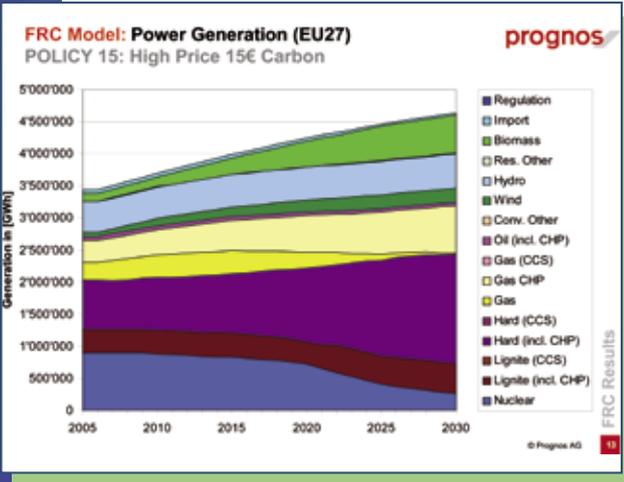
### FRC Model: Power Generation (EU27)

BASE: High Price 5€ Carbon



© Prognos AG 12

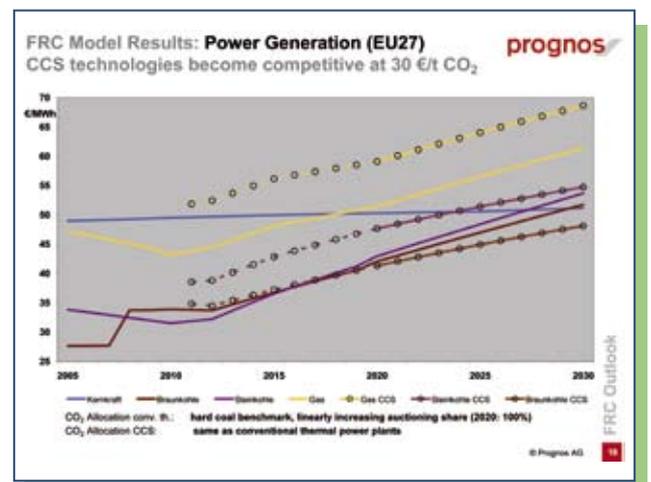
FRC Results

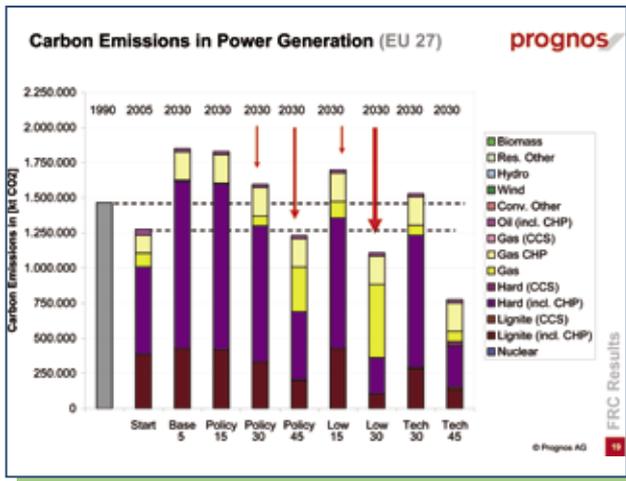


**The Future Role of Coal in Europe 2030**  
CCS as a technological option after 2020

Outlook & Conclusions

© Prognos AG





### FRC Model Results: Cost, Generation & Emissions (Overview II)...

EU27	Start	Base5	Pol15	Pol30	Pol45	Low15	Low30	Tech30	Tech45
	2005	2030	2030	2030	2030	2030	2030	2030	2030
CO <sub>2</sub> Price (EUA)	€ <sub>2007</sub> /t	5	15	26	45	15	26	30	45
Power Generation	TWh <sub>2007</sub>	3,444	4,642	4,642	4,641	4,641	4,642	4,639	4,640
Annual Change Rate	% p. a.		1.2%	1.2%	1.2%	1.2%	1.2%	1.2%	1.2%
CO <sub>2</sub> -Emissions	Mio. t CO <sub>2</sub>	1,275	1,849	1,829	1,596	1,231	1,098	1,107	1,528
Annual Change Rate	% p. a.		1.5%	1.5%	0.9%	-0.1%	1.2%	-0.6%	0.7%
CO <sub>2</sub> -Intensity	t CO <sub>2</sub> /MWh <sub>2007</sub>	0.370	0.398	0.394	0.344	0.265	0.266	0.238	0.329
Total Cost	Mrd. € <sub>2007</sub>	168	271	288	315	339	266	284	328
of which: Cost CO <sub>2</sub>	Mrd. € <sub>2007</sub>	0.0	9.2	27.4	47.9	55.4	25.5	33.2	45.8
of which: Cost w/o CO <sub>2</sub>	Mrd. € <sub>2007</sub>	168	262	261	267	283	241	251	282
Annual Change Rate	% p. a.		1.8%	1.8%	1.9%	3.4%	1.5%	1.8%	1.9%
Spec. Cost	€ <sub>2007</sub> /MWh <sub>2007</sub>	48.7	56.4	62.1	67.8	73.9	57.4	61.2	70.7
of which: Cost CO <sub>2</sub>	€ <sub>2007</sub> /MWh <sub>2007</sub>	0.0	2.0	5.9	10.3	11.9	5.5	7.2	9.9
of which: Cost w/o CO <sub>2</sub>	€ <sub>2007</sub> /MWh <sub>2007</sub>	48.7	56.4	56.2	57.5	61.9	51.9	54.1	60.2
Annual Change Rate	% p. a.		0.6%	0.6%	0.7%	0.9%	0.3%	0.4%	1.0%

© Prognos AG 20

### The Future Role of Coal in Europe 2030

#### Conclusions

© Prognos AG 21

### Conclusion: Influence of Fuel Prices

- hard coal and lignite are highly competitive in liberalised power markets
- even at moderate gas prices (20 €<sub>2007</sub>/MWh) coal power plants stay competitive at CO<sub>2</sub>-prices around 15 €/t
- high gas prices lead to significant shares of coal in power generation, even at relatively high CO<sub>2</sub>-prices
- high gas prices (at 28 €<sub>2007</sub>/MWh) lead to marginal costs at 60 €<sub>2007</sub>/MWh in power generation.

✓ EU Trend BASE scenario (high gas prices and low CO<sub>2</sub> prices) appears rather unlikely to happen.

© Prognos AG 22

### Conclusion: Climate Change & Introduction of CCS

- Coal has to tackle the challenge of climate change! (in order not to become victim of its high competitiveness)
- CCS becomes economical feasible at CO<sub>2</sub> prices at 30 €/t.
- Introduction of CCS before 2020 is not likely (except pilot & demonstration plants)
- because of high R&D effort and infrastructural investments: CCS requires an implementation concept

© Prognos AG 23

### Thank you!

Do not hesitate to ask in case of further questions:

<p>Dr. Michael Schliesinger Director/Chief Economist Prognos AG Aeschenplatz 7 CH-4010 Basel</p> <p>Telefon +41 - (0)61 - 3273 365 Telefax +41 - (0)61 - 3273 300</p> <p><a href="mailto:michael.schliesinger@prognos.com">michael.schliesinger@prognos.com</a> <a href="http://www.prognos.com">www.prognos.com</a></p>	<p>Friedrich Seefeldt Head of Department Prognos AG Goethestr. 85 D-10623 Berlin</p> <p>Telefon +49 - (0)30 - 52 00 59-236 Telefax +49 - (0)211 - 887 97- 84 89</p> <p><a href="mailto:friedrich.seefeldt@prognos.com">friedrich.seefeldt@prognos.com</a> <a href="http://www.prognos.com">www.prognos.com</a></p>	<p>Marco Winesch Power Plant Model Prognos AG Goethestr. 85 D-10623 Berlin</p> <p>Telefon +49 - (0)30 - 52 00 59-225 Telefax +49 - (0)211 - 887 97- 84 89</p> <p><a href="mailto:marco.winesch@prognos.com">marco.winesch@prognos.com</a> <a href="http://www.prognos.com">www.prognos.com</a></p>
--	--	--

© Prognos AG 24

## PANEL DISCUSSION

In the Panel Discussion, **Adam Gierek**, Member of the European Parliament, stressed the importance of security of energy supply. Europe should not be dependent of only very few major energy suppliers. It should also make sure that energy was available at affordable and predictable prices. The EU and its Member States should be aware that both the shortage of energy and high prices have a social dimension. Therefore, a competitive EU coal and lignite industry was needed also in the future. Mr. Gierek referred to the work of the UNFCCC and emphasised that for the time being he sees no evidence in dangerous climate change. Currently, climate change worries would be over-stressed.

**Christian Ehler**, Member of the European Parliament, referred to Carbon Capture and Storage (CCS) as well as to the Commission's Draft Directive to enable CO<sub>2</sub> storage. He underlined the significance of CCS for fossil fuels use in Europe and welcomed the objective to demonstrate the technology in the second half of the next decade. He stressed that the Commission had based its Draft Directive only on Article 175 of the European treaty (Environment). For the European Parliament to have dealt with the dossier quickly, it would have been useful to also base the Draft on the Internal Market in order to enable immediate consultation of all EP Committees.

Christian Ehler also criticised the distribution of funds in the 7th RTD Framework Programme. For CCS, there would not be enough EU funding compared to other energy-related subjects. He invited the Commission to correct the focus in its 7th RTD Framework mid-term review.

Concerning the power plant replacements to take place until Carbon Capture and Storage will probably be available on the market after 2020, Mr Ehler welcomed the proposal to build new plants capture-ready. However, this term must be

understood in a way that it will not be an obstacle for the construction of coal-fired plants on the basis of Best Available Techniques.

Among others, Messrs. **Yaxley, Hartung, Milojcic, Enzmann, Linkohr and Galanis** took part in the following discussion. During Questions and Answers, they particularly addressed the following aspects:

- Climate Protection must be seen in a global context. Europe should adopt an ET System as from 2013 that most other major fossil fuel users can accept.
- The EU ETS must positively influence investments. In this respect, risks have to be minimised. Industry representatives emphasised that the system should be developed step-by-step. Security of supply should not be weakened by items like a simple fuel switch from coal to gas.
- A benchmarking system is not only introduced by the coal industry; electricity consumers' associations favour it as well because it will have significantly less influence on electricity prices. DG Environment stressed that with auctioning, Member States would receive revenue from Emissions Trading.
- The design of the EU ETS as from 2013 should be further discussed in the Fossil Fuels Forum Working Groups.
- For CCS, realistic time frames have to be set. The legal framework should be adopted as soon as possible, also the 10 – 12 demonstrations plants should be operational by 2015. Transport networks may be needed soon after that; the North Sea being a probable major storage region.

**Heinz Hilbrecht** and **Petr Pudil** thanked the speakers for their participation and their knowledgeable contributions. They stressed that open and frank discussions on coal-related issues between all European institutions and stakeholders are a basis for sustainable solutions in order to reach a reliable contribution of coal to European energy challenges.



**EURACOAL**

European Association for Coal and Lignite

Avenue de Tervueren 168 Bte 11 BE-1150 Brussels · Belgium

Tél. : +32 (0) 2 775 31 70 · Fax : +32 (0) 2 771 41 04  
e-mail : [euracoal@euracoal.org](mailto:euracoal@euracoal.org) · web: [www.euracoal.org](http://www.euracoal.org)