INTRODUCTION

Best use of indigenous coal resources, investments in coal production and use, as well as the CCS demonstration projects were the subjects of the presentations and discussions at the 6th Coal Dialogue. Furthermore, panelists emphasized long-term CCS research needs and the prospects for coal-to-chemicals.

The 6th Coal Dialogue was organised as a joint event by DG Energy and EURACOAL and took place on 17th May 2010; it was attended by approximately 80 participants from EU Member States, the European Commission, the European Parliament and the coal industry. The event was chaired by Heinz HILBRECHT, Director for Security of supply, Energy markets & Networks within DG Energy and EURACOAL’s President, Petr PUDIL.

In his welcome, Mr. HILBRECHT referred to the need of combining indigenous energy and coal production with best practices – a principle that is mentioned in the Second Strategic Energy Review. He underlined the existence of working groups with third countries; such as China, to discuss best practices and technologies enabling energy-efficient use of coal and minimising its environmental impact.

Mr. HILBRECHT confirmed that security of energy supply will remain important in future Commission energy policy papers and recalled that several key documents are in preparation, such as the Energy Strategy 2011-2020 and the Energy 2050 decarbonisation roadmap, which may have implications for coal.

Eero AILIO, Deputy Head of Unit B3 Coal and Oil presented DG Energy’s work on the subject of the Best Use of Indigenous Coal. The plenary of the Fossil Fuels Forum in Berlin in 2009 had welcomed the recognition of the role of indigenous fossil fuels in the Second Strategic Energy Review; a working document on the subject is under preparation. In order to further proceed with this process paper, DG Energy especially emphasised the need to identify possible areas and methods for sharing best practices; it invited the coal industry to contribute during the second half of 2010 with concrete suggestions. The best practice discussions could, for example, focus on land use planning, on environmental management, on health and safety as well as corporate social responsibility. DG Energy also intends to look at new methods of utilising coal, such as underground coal gasification, coal bed/coal mine methane or coal-to-chemicals.

The key issues presented in a current draft working paper are shown in slides 7 to 12. A better networking of geological surveys could lead to a map of EU coal basins, if possible based on a harmonized classification of lignite and hard coal. With regard to land access for mining and environmental impact management, best practices have to be looked at. At the same time, security of supply, a balanced and diversified energy mix as well as the degree of import dependency should be promoted as factors in impact assessments. Public awareness and acceptance could be raised by ensuring that the coal sector receives due recognition for its contribution, especially to securing energy supplies, in policy actions and publications. Research and innovation, as well as the education of a skilled workforce, are also important items that could be further developed.

The Commission intends to broaden the process that has started on the best use of indigenous coal to other fossil fuels, i.e. gas and oil. Currently, the idea is to work on one document with a modular structure in order to be able to clearly point out similarities and differences between coal, oil and gas.

Chris BOLESTA, DG Energy, Unit B3 Coal and Oil, presented the Commission’s work on making CCS commercially viable by 2020. The Commission has already removed legislative hurdles by adopting the CCS Directive, which focuses on CO₂ storage, enabling Member States to determine whether and where CCS can be deployed, and to enable companies to apply for CCS-related permits.

EU financial resources for CCS demonstration have also been mobilised. In addition to the 7th Research Framework Programme financing for clean coal and CCS, the European Economic Recovery Package earmarked € 1 billion for up to 7 large-scale CCS demonstration projects. Six operators of the awarded projects from 6 different Member States have already signed the grant agreements (Lanschwalde, Hatfield, Belchatow, Rotterdam, Porto Tolle and Compostilla). Now the Commission is working on the call for proposals that will invite projects to bid for support from another financial mechanism - the NER 300 – embedded in the revised Emission Trading Scheme. The call should be published in the 3rd quarter of 2010 and the winning projects should be selected by the end of 2011.

The Commission recognises the need for CO₂ infrastructure in the future. It has started to develop a complete and integrated database of European CO₂ sources and sinks. With this, it wants to identify the main outline of a future CO₂ transport infrastructure for different scenarios. For the time being, it remains to be determined to what extent the CO₂ infrastructure issues will be included in the Commission’s Energy Infrastructure Package foreseen for November 2010.

The challenges currently facing coal producers and operators of coal-fired power plants with regard to their investments were detailed by Phil GARNER, Chairman of the Confederation of the UK Coal Producers (CoalPro). He recalled the advantages of indigenous coal, namely, its availability, proximity and flexibility, but also the quality customer relationship and the service; both are valued by the market.

Continuing necessary investment for coal mining has, however, become very difficult to ensure during recent years. Increasing uncertainty about energy policy and the regulatory framework in the EU and in the Member States as well as decreasing public acceptance of coal-related projects has contributed to this situation. Another risk factor is, of course, the economic downturn that has impacted on manufacturers and made investors more averse to risk.

In the UK, the challenges relate to investments in both surface and underground mines, with planning consent obstacles being the major issue with regard to surface mining and the long development lead times and significant long-term market uncertainties with regard to underground mine investment. Investors closely observe European environmental legislation, for example the Industrial Emissions Directive, but also the tightening of carbon emission caps and all developments of CCS. Coal demand is not very clear for the future and therefore it is hard to know what returns can be expected from investments. CoalPro’s perception is therefore that major coal projects in the UK will only be financed with the support of the EU and / or UK government in the medium term. Mr. GARNER requested that coal mining investment be given a higher priority within European institutions.

Miroslav KUGIEL, Chief Executive Officer of Kompania Weglowa, the largest hard coal company in Europe, and Chairman of the Polish Hard Coal Association ZPGWK, was not able to present his slides personally in Brussels due to a short-term flight cancellation. His slides are included in this brochure, showing the strength of the coal sector in Poland with 31 operating mines that produced approximately 77 Mt coal in 2009. The Polish coal industry strives to be competitive. However, there was a lot of pressure in 2009 due to approximately 10 Mt of coal being imported mainly from Russia. Since the fall of the Iron Curtain in 1989, the number of active longwalls and the average length of the extraction front have been considerably reduced; however, the average daily output from one longwall has tripled from about 860 to 2 640 tonnes.
**Best Use of Indigenous Coal**

*Overall goal: ensure safe, secure, sustainable, and affordable energy for all*

*Means to this end: competitiveness, sustainability and security of supply*

*2nd Strategic European Energy Review: value of indigenous fossil fuels for security of supply*

*Competitiveness and sustainability?*

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**Indigenous Fossil Fuels in European Energy Policy**

- Overall goal: ensure safe, secure, sustainable, and affordable energy for all
- Means to this end: competitiveness, sustainability and security of supply
- 2nd Strategic European Energy Review: value of indigenous fossil fuels for security of supply
- Competitiveness and sustainability?

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**3) Possible Key Activities and Areas**

- Transparency of the EU coal inventory
- Best practices in land access and environmental impact management
- Public awareness and acceptance
- Research and innovation
- Continuing availability of a skilled workforce

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**Transparency of the EU coal inventory**

- Encouraging further exchange and sharing of experience and better networking between national geological surveys or related institutions
- Analysing the differences in reserve and resource classification in the MSG to approach an EU-wide system taking into account all characteristics and potentials of coal
- Formulation of a harmonised classification for coal resources in the EU and creation of a map of EU coal basins based on this

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**Best practices in land access and environmental impact management**

- Experience exchanges in the area of land use planning, environmental management and administrative procedures
- Promoting and tracking the use of existing guidelines that provide clarity on how to reconcile mining activities in or near Natura 2000 areas and species whichTG regards the position of the EU and Member States
- Monitoring regular stakeholder dialogue focused on identifying specific limitations and processes applicable to small mining where simplifications and reduction of administrative barriers could optimize compliance
- Promoting the use of security of supply, interconnection/diversity of energy mix, and degree of import dependence as factors to be analyzed in impact assessments

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**Public Awareness and Acceptance**

- Ensuring that coal mining and utilization receives due recognition in its contribution to securing energy supplies and meeting essential economic and social needs
- Facilitating an informed and effective dialogue between public authorities, municipalities, NGOs, and industry
- Exploring the issue of energy education in schools, with a view to sustainable coal mining and cleaner technologies to ensure cheap, reliable energy and jobs
- Initiating information campaigns to communicate and address the concerns of different audiences on the implications of new coal projects and technologies with special focus on CO2 and its contribution to mitigating climate change

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**Research and Innovation**

- Encouraging further exchange and sharing of information and experiences on coal-related R&D and cooperation between governments, universities and research institutes and industry
- Promoting RD&D on innovative and environmentally friendly exploration, small mining operations, conversion technologies, unconventional uses of coal through MSG and Community instruments
- Promoting RD&D activities in and between EU coal industry clusters and centers of competence in mineral resources extraction and utilization

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**Continuing availability of a skilled workforce**

- Encouraging more cooperation partnerships on mining-related educational programs between universities, polytechnic schools, and professional bodies in the fields of EU and MSG
- Improving the teaching and research capabilities for mining-related engineering and other technologies at European universities and relevant institutions
- Promoting actions in the field of coal mining and related processing technologies as well as efficient power generation (CCS)
- Attracting more students in mining-related degrees and other qualifications
- Exploring strategies for sustaining mining know-how in areas/regions of declining coal production
Key update on CCS demonstration in Europe

Chris BOLESTA
European Commission, DG Energy, Unit B3 Coal and Oil

Thank you for your attention

Sharing Best Practices
- Limited stakeholder input to date!
- Open question to stakeholders:
  - Areas / examples of best practices?
  - Sharing format and instruments?
KEY UPDATE ON CCS DEMONSTRATION IN EUROPE

**Background**
- Fossil fuels will remain important part of the EU and global energy mix.
- The use of fossil fuels in power generation leads to approximately 40% of all CO2 emissions in the EU.

**HANCE for COAL SURVIVAL**
Technology present - but not scalable.

**EU Policy goal**
Prove CCS is commercially viable by 2020.

**EEPR projects**

**Emission Trading and NER 300**
- In revised ETS directive (2009/28/EC)
  - 300Mt allowances available until 31 December 2012.
  - Development of a range of CCS technologies in geographically balanced locations – 6 projects with up to 3 projects in one country.
  - Award shall be dependent upon the verified avoidance of CO2 emissions.
- NER300 Decision agreed – now call for proposals in preparation.

**Obstacles to CCS / EC Action**

**Legislative Hurdles**
- Long-term economic viability.
- Recovery Package.
- Emission Trading System.

**Non-legislative Hurdles**
- Public意识/acceptance.
- International cooperation.
- CCS project networks.
- Infrastructure needs.

**CCS Directive**
- Enabling Framework
  - Member States' reference system for monitoring the effectiveness of the CCS.
  - Operators deciding whether to use CCS on the basis of conditions in the carbon market.

**Objectives and Principles**
- Legislative framework for managing environmental risks.
- Underwriting logistics barriers.
- Intra- and extra-regional cooperation.

**Focus on Storage**
- Capture regulated under IPPC Directive.
- Transport regulated as for natural gas transport (by geographical impact assessment and at Member State level).

**NER 300 basic portfolio**
- 8 CCS projects, of which:
  - 1-3 in the following categories: pre-combustion, post-combustion, oxy-fuel and industrial applications.
  - Mix: 3 with saline aquifers storage & min 3 with depleted hydrocarbons reservoirs storage.
  - Min size threshold: 250 MW, Min capture efficiency 65%.

**NER 300 Timeline**
- NER300 Decision: 11 May 2007
- Approved by Climate Change Committee: 11 May 2007
- Commissioned projects:
  - June 2010: Formal Agreement by Contributors
- First Call (200 M €)
  - 28/04: Notification of extension for submission to ETF
  - 07/06: Deadline for submitting proposals
- Second Call (100 M €)
  - 31/10/2008: Deadline for Award Decision

**Financial resources for CCS demonstration**
- €1 bn for large scale CCS demonstration – 13 projects eligible – 6 selected (in 6 countries).
- Up to €160 million per project for incremental investment costs (CCS-related).
- Money to be committed by the end of 2010.
- All 8 agreements signed (Gelsenkirchen, Harwood, Porto Tolle, Rotterdam, Belchatow, Compostela).

**Recovery Package – European Stimulus**
- €1 bn for large scale CCS demonstration – 13 projects eligible – 6 selected (in 6 countries).
- Up to €160 million per project for incremental investment costs (CCS-related).
- Money to be committed by the end of 2010.
- All 8 agreements signed.

**CCS Demonstration Project Network**
- Provide first mover with a means of coordination, exchange of information and experience and identification of best practices.
- 3 Goals:
  - Knowledge sharing.
  - Public engagement.
  - Facilitate development of a cross-cutting research project.
- Co-operation with 3rd parties.
- Facilitate global CCS knowledge sharing, across exemplar networks, according to common principles.
- Promote European demonstration efforts.

**Time Table and next steps**
- 28/20 April 2010:
  - First knowledge sharing meeting held.
  - May 2010:
    - Complete signatories for EEPR projects.
    - Establish Steering Committee and Chair.
  - June/July 2010:
    - Applications from additional projects.
    - Next knowledge sharing event.
  - May 2010:
    - Knowledge sharing meeting.
    - Advisory Forum meeting.
**Deployment of CO2 Infrastructure**

- New infrastructures needed in Europe to facilitate a successful transition towards a low carbon energy system.

**First (by 2010):**

- COM to develop a complete and integrated database of European CO2 sinks and sources, and identify the main outlets of CO2 transport infrastructure for different scenarios.

**As a result:**

- Revision of TEN-E possible with inclusion of CO2 pipelines.

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**New challenges for EU energy Infrastructure policy**

- EU energy infrastructure is aging and not suited to match future demand for energy, allowing further losses during integration and ensure security of supply.

- Energy infrastructure is key for the implementation of the EU’s targets on greenhouse gas reduction and for large scale deployment of energy from renewable sources.

- Massive investment is needed in the coming years. Not all of it will be taken up by the market alone.

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**Energy Infrastructure Package**

**Nov/2009**

- Political communication on energy infrastructure development and priorities for 2020/2030.
- Communication on the contribution of the six priority infrastructure actions to the 2030 Demand Strategic Energy Review supported as needed by Commission Staff Working Paper.

To be followed up in Spring 2011 by legislative proposal for an EU Energy Security and Infrastructure Instrument.

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**Conclusions**

- To prove CCS can be part of the solution, we need demonstration plants asap.

- Commission set aside substantial financing for demo plants but more still needed – from private sector and national budgets.

- CCS for the coal industry – security of demand.

- Coal industry could contribute to CCS deployment not only in financial terms.
Indigenous coal has a vital part to play in EU energy mix
- Provides security and diversity
- Can compete with imports
- Quality customer relationship and service valued by the market
- Removes variability associated with long distance transport movements, with the benefit of substantially lower carbon transport footprint

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Financing investment in coal production and use
Phil Garner
Chairman
Confederation of UK Coal Producers

Coal market within the UK much larger than indigenous production

Mining equipment investment
- Economic downturn impacts on manufacturers as well
- Equipment companies willing to provide flexible payments to help finance some projects
- UK CEAL has worked with companies to help provide new fine equipment at Thornaby and Kellingley collieries

Mineral needs continual investment
- Extractive industry
- Easier reserves already worked
- However financing risks increasing
  - Market
  - Environment
  - Planning
  - Operational

Sources of finance
- Internal cash resources
- Banking facility
  - Scottish Resources recently increased debt facility to £17.5m
- Share issue
  - UK CEAL raised £300m in Q3 2009
- Venture capital
- European Investment Bank
- Government?

Perception of mining projects within the City
- Coal mining projects are high risk (underground mining significantly more risky geologically than surface mine projects)
- Both underground and surface projects have significant planning, environmental and legislative risks
- Long term market decline
- Coal mining has low environmental stature in spite of the possible development of CCS

UK coal market uncertainty
- European environmental legislation on SO2 and NOx will close coal power stations over the next 24 years with realizable reduction in coal demand
  - 80% of coal plant retirement due to closure by 2015 under EC30
  - RRP requires further emissions station or closed by early 2030s
- Tightening carbon emission caps pricing downward pressure on coal burn
- Coal generation to raise 50% of UK’s aluminium from 2013
- UK Government policy to reduce GHG emissions by 80% by 2050 from 1990 baseline
- Interim target to reduce 10% by 2030
- No new coal built without partial CCS with obligation to fully retrofit at a later stage

Deep mine investment
- Long development lead times, especially in deep mines, increases pressure on financial decisions and adds to supply uncertainties
- Potential investors want the certainty that they will get a deposit which could be 10-15 years away
- Significant long term market uncertainty
- Harworth Colliery - mothballed UK deep mine project - SAWT in Top Hard seam. Cost around £200m

Surface mine investment
- Lower start up costs, but can still be significant
- Operationally less risky
- Less market uncertainty to relatively short duration
- Planning consent can be a major obstacle, with potentially a long judicial process before permission is obtained
European Investment Bank
• Furthers the objectives of the EU by providing long-term finance
• Corporate Operational Plan 2009-11 – Support sustainable, competitive and secure energy
  – However, maximise the proportion of its projects associated with low carbon technologies
• Result to funding available for projects involving fossil fuel extraction
• Needs new direction from Board of Governors to change this approach

How to break the investment loop?

Summary
• Coal important for security of supply within Europe
• Mining finance difficult to obtain especially for new deep mine projects
• Traditional sources of finance now more risk averse
• Investment emphasis more on renewable energy
• Major coal projects will only get financed with the support of EU / Member States in the medium term
• Coal mining investment needs to be given a higher priority within European Institutions

Miroslaw KUGIEL
President Kompania Weglowa S.A.
**HARD COAL MINING IN POLAND**

**Poland – the largest hard coal producer in the EU.**

- Production of hard coal in Poland is more than 50% of hard coal production in the EU, in which it is more than 25% in steam coals and about 39% in coking coals.

**Energy from Hard Coal in Poland**

- Energy from hard and brown coals constitutes in total
  - 26% of final energy
  - 43% of primary energy
  - more than 90% of electric energy, in which more than 55% is generated from hard coal.

Hard coal is the only indigenous energy carrier that can be a stabiliser of energy security of Poland and is a guarantee of its energy independence.

**HARD COAL RESOURCES IN POLAND**

In total, there are 136 proven deposits; in which:
- 96 with balance reserves
- 38 with extra balance reserves

**Durability of Hard Coal Reserves in Individual Mines – in years**

**Employment in Hard Coal Sector as of 31.12.2009**

**Basic Indices of Polish Hard Coal Mining**

<table>
<thead>
<tr>
<th>Year</th>
<th>No of mines</th>
<th>Output (mil ton)</th>
<th>Sales (mil ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>70</td>
<td>147.4</td>
<td>144.9</td>
</tr>
<tr>
<td>2009</td>
<td>31</td>
<td>77.4</td>
<td>73.0</td>
</tr>
</tbody>
</table>
HARD COAL MINING IN POLAND

BASIC TECHNICAL INDICES - 1990/2009

- Number of active longwalls: 766 / 117
- Average length of extraction front: 112.6 / 26.2 km
- Mean daily output from one longwall: 663 / 2637.1 ton/day
- Index of development works' intensity: 6.9 / 4.6 m/1000 ton

ORGANIZATIONAL STRUCTURE OF POLISH HARD COAL MINING

Natural hazards in Polish hard coal mining

- Coal dust
- Gas and water inflows
- Rock bursts
- Mud flows
- Landslides
- Groundwater

Areas of activity focused on improvement of work safety and hygiene in hard coal mining:

1. Combating of natural hazards
2. Exchange of machinery
3. Improvement of conditions at a work site
4. Protective devices, groups and individual protective equipment
5. Upgrading of technical conditions of mine-rescue teams in the mines
6. Employment policy
7. Skills upgrading trainings.

PRODUCTION OF HARD COAL IN 2008 AND 2009

- Production - mln ton
  - Total production: 83.6 / 77.4 - 8.2
    - Steam coal: 71.6 / 68.9 - 2.7
    - Coking coal: 12.0 / 8.5 - 3.5

SALES OF HARD COAL IN 2008 AND 2009

- Sales - mln ton
  - Total sales: 82.9 / 72.9 - 10.0
    - Steam coal: 74.6 / 64.2 - 10.4
    - Coking coal: 8.3 / 8.7 - 0.4

COAL RELATED TECHNOLOGIES

- MBH Technologies: the first power plant in the world to use MBH Technologies technology to generate electricity from brown coal with fluidized air suspension (FAS) in its air suspension. Fluidization of coal in air suspension, used in this technology, allows for a significant reduction in the amount of flue gas emissions, which is an important factor in terms of the environment. This technology is used in the power plants of the Polish Energy Holding.

SWOT ANALYSIS FOR POLISH COAL MINING

- Strengths:
  - Power sector adapted to generation on the basis of coal
  - Faster depletion of alternative energy sources (gas, oil)
  - Possibilities of use of coal for zero-emission combustion

- Weaknesses:
  - Dependence on coal extraction
  - High level of mechanization and automation of coal extraction

- Opportunities:
  - Scientific and technological backup institutions

- Threats:
  - Coal related technologies

COAL RELATED TECHNOLOGIES

- Underground coal gasification (UCG) - a method of energy obtaining from coal, directly on the site of its bedding (in situ), by supplying of a gasifying agent to its ignited topcoat and receipt of produced gas on the surface.

- MBH Technologies: the first power plant in the world to use MBH Technologies technology to generate electricity from brown coal with fluidized air suspension (FAS) in its air suspension. Fluidization of coal in air suspension, used in this technology, allows for a significant reduction in the amount of flue gas emissions, which is an important factor in terms of the environment. This technology is used in the power plants of the Polish Energy Holding.

COAL RELATED TECHNOLOGIES

- Despite many years of experience in various parts of the world, underground coal gasification technology has not been yet ready for industrial scale applications. However, industrial scale projects in the area of underground coal gasification are underway, as many countries in the world, including Poland, are facing a lack of energy resources. This technology allows for the extraction of natural gas from coal seams, which are often deep and located far from the surface. A very important aspect of the underground coal gasification process is the mitigation of its environmental impact, which is achieved by the development and implementation of innovative technologies. The process of underground coal gasification is considered as a promising solution to the energy crisis, as it can help in the shift to a clean and sustainable energy mix.
Long-Term R&D

R&D Challenge for CCS:
- Include learning from demos
- Capture technology
- Geographical location
- Type of CO2 infrastructure
- Public perception
- Key stakeholders
- Technical readiness
- Total cost considerations

This demonstration project will generate an extensive knowledge base.

CCS R&D targeted at 2020+ to start now!

2030+

TODAY

1st generation CCS technology

2020

2nd generation CCS technology

3rd generation CCS technology

R&D Areas of Focus for 2020+:
- CO2 Capture
  - Integrating components in pre-combustion capture and oxy-fuel, e.g.,
  - solvent ash handling and separation
  - ash separation
  - gas separation
  - gas electrolysis
  - Membrane separation
  - Plant integration in post-combustion capture, pre-combustion capture and oxy-fuel combustion
  - Increasing oxygen production for pre-combustion capture and oxy-fuel
  - Improving oxy-fuel combustion, flue gas treatment, CO2 cleaning
  - Innovating and applying procedures, H2 gas storage, CO2 capture
  - CO2 compression
  - Any novel capture process approaches

R&D Areas of Focus for 2020+:
- Transportation & Storage
  - Develop a full transport/storage network in the industry
  - Develop saline aquifer storage to its full potential
  - CO2 related well technologies
  - CO2 storage reservoir capacity assessment
  - Monitoring & modeling the storage reservoir and geology
  - Management of the CO2 storage complex
  - Mitigation and remediation
  - Assessment of environmental impacts
  - Land planning and infrastructure

Conclusion

CCS R&D targeted at 2020+ needs to start now!

- The R&D challenges for CCS beyond 2020 are:
  - Reduction of land and infrastructure
  - Reduction of energy consumption in the CO2-CO2 chain
  - Improved overall performance
  - Improved injection capabilities
  - Quaternary aquifer storage technology
  - Increased use of solvents
  - Combining CO2 storage with other energy sources (ESR, geothermal etc.)
  - Increasing storage performance
  - Learning from demo phase need to be included

The future of lignite in Middle Eastern Germany

EURACOAL
European Association for Coal and Lignite
THE FUTURE OF LIGNITE IN MIDDLE EASTERN GERMANY
PANEL DISCUSSION

During the Panel Discussion, participants focused on the following issues:
EUROCOAL President, Petr PUDIL emphasised that the European coal industry had been a stabilising factor in the financial and economic crisis.

Coal production is stable in most EU Member States; both EU lignite and hard coal production are at the forefront in the world as regards technology and environmental protection.

With its share of almost 30% of EU power generation and also its share of 80% of the EU’s fossil fuels resources, coal and lignite stand for security of energy supply and for energy price stability in Europe, making coal and lignite utilisation an unavoidable reality for the time being.

For the future, the European objective to achieve at least 20% of renewables implies the need for additional capacity and more flexibility when using fossil fuels. It is new coal-fired power plants that will be able to properly complement the intermittent and variable power from most renewable sources.

Mr. PUDIL invited Member States and European institutions, together with the coal industry, to work on the climate protection challenge via higher efficiency and technologies like CCS. As instruments he suggested:
• To confirm the 20% GHG objective for 2020 and have clear but ambitious and achievable objectives till 2030, both for GHG and security of supply;
• To invite Member States to use the option of a 15% investment aid for new capture-ready plants as from 2013 and to extend the end date of this rule from 2016 to 2020;
• To link the construction of new power plants and climate protection objectives by obliging all fossil fuel-fired power plants going into operation after the middle of the decade to be equipped with CCS once that technology is best available technology (BAT). Public acceptance would, however, be a precondition and reliable CCS infrastructure should be available at the same time.

On behalf of the Technology Platform Zero Emissions Fossil Fuels Power Plant (TP ZEP), Philippe PAELINCK reported on the research and development issues beyond the demonstration plant phase. He said CCS should be seen as a new market for the coal industry.

With the demonstration projects, it is expected that it will be possible to develop second generation CCS technologies by 2020. Both CO2 capture and CO2 transport and storage will benefit from further research and development. With regard to CO2 capture, this could particularly mean looking at new CO2 sorption media and plant integration of the capture process. The enhancement of transport and storage processes would ensure that all parts of the technology chain are covered. R&D should be aimed at reducing both energy consumption and costs as well as proving storage permanence.

Mr. PAELINCK invited participants to study the TP ZEP recommendations for research in the deployment of CCS in Europe beyond 2020 on the TP ZEP website.

Martin NAUNDOFF introduced the Leuna chemical site and cluster in central Germany. He emphasised that lignite would be the only stable, available and competitive energy feedstock for the chemical industry at Leuna assuming that in the long-term the prices of oil and gas will increase.

According to Mr. NAUNDOFF, the EU and Member States should match their CCS strategies and CCS projects all over the EU with coal utilisation as a feedstock for the chemical industry. In order to achieve this, coal to chemicals should be a part of the 7th Framework Programme for Research and Development. The Leuna chemical site could contribute to that with projects directed to the unconventional use of lignite, particularly synthesis gas production.

During the discussion, the following topics were covered:
• Franz KLEMP from EVN Austria recalled that greenhouse gas emissions can occur during all steps of producing goods and also during all steps of fossil fuel production and utilisation. Unfortunately until now, EU legislation related to CO2 emissions only looks at a part of the chain, i.e. the power plant.
With this, a considerable amount of CO2 emitted when oil and gas are produced is not covered by any EU GHG emission legislation.
• Franz-Josef WODOPIA from the German hard coal association referred to the EU State Aid for Coal Regulation. The existing regulation foresees that it will expire by the end of 2010. A number of coal industries, including the German, Spanish, Romanian, Slovak and Polish hard coal industries consider that there is an on-going need for a future regulation as from 2011. Together with Mercedes MARTIN, he invited DG Energy to propose such a future regime within the Commission. Jan PANEX answered that there is a clear timetable for consultations within the Commission on the issue that would lead to a Commission decision by summer 2010. The Council would certainly have to deal with the issue in a number of months before coming to a decision itself.
• Mr. PUDIL and Mr. PAELINCK confirmed that new power plants, based on either coal or lignite, can operate much more flexibly than older power plants. They can work at a load of about 50% of the nominal load, both technically and economically, and change load quickly. Mr. PAELINCK also added that an IGCC plant could provide additional flexibility via its integrated hydrogen production. Asked if CO2 emission limit values could make sense, Mr. PAELINCK was sceptical about the idea. He said that with the tendency towards low gas prices, and gas being “half dirty”, emission limit values for CO2 would only push coal out of the market. This leads to the conclusion that CO2 ELVs - sometimes wrongly called emission performance standards - would have to be established at a very low level to make sure that both new coal and gas power plants would have to apply them.
• Asked about the TP ZEP’s view on gas CCS, Mr. PAELINCK confirmed that gas CCS is more expensive per CO2 unit, but the cost for gas CCS and coal-related CCS would be almost the same per kWh. The key issue would be to create a level playing field between the two kinds of power plants.
• George MILOCIC of DEBRIV reported that there was strong reticence when planning replacement investments for coal-fired power plants. The worry was a strong increase of gas-fired power generation in the EU. The reason for this is mainly the Emissions Trading Scheme.
The German lignite industry association (DEBRIV) had calculated the costs of scenarios entitled “Dax for gas” and “Widespread modernisation of coal-fired power plants” and their impact to 2030, with different assumptions concerning prices. Notwithstanding that coal utilisation is also a strategy in favour of security of energy supply, enormous increases in the price for fuels would be expected in the case of a “dax for gas”. Compared with the alternative of modernising coal-fired power plants, it would imply between € 73 to € 115 billion extra fuel costs in the EU during the period to 2020, in the 2020s, extra fuel costs would be between € 258 and € 400 billion. Mr. MILOCIC offered to present the calculations in detail.

In his concluding comments, Mr. HILBRECHT referred to the different timeframes to look at. For the time until 2020, the technical realisation as well as the financing of the CCS demonstration projects, and also state aid issues, will be at the forefront of Commission coal policies. For the longer term, i.e. after 2020, very ambitious climate protection objectives are probable. By combining coal and CCS, but also with unconventional coal utilisation, such as coal-to-chemicals, lignite and hard coal can have a bright future, not only on a global scale but also in Europe.

Together with Mr. PUDIL, Mr. HILBRECHT thanked the speakers for their various contributions. Both particularly thanked Mr. PAELINCK and Mr. NAUNDOFF for their participation and also for the open and constructive discussion that will certainly be continued during 2010.