EIGHTH COAL DIALOGUE

30 May 2012
Charlemagne Building, Brussels

European Commission

EURACOAL

Programme

Opening addresses:

Chair: Mr. Jan Panek, Head of Unit – Internal Market III: Retail markets; coal & oil, DG Energy

Dr. Tudor Constantinescu, Principal Adviser to Director-General, DG Energy

Dr. Christian Ehler MEP, Rapporteur for "Rules for the participation and dissemination in Horizon 2020"

Amb. Janusz Reiter, President of the Center for International Relations in Warsaw

Session I: The coal sector in the context of energy policies

Panel session introduced by EURACOAL President Dr.-Ing. Hartmuth Zeiss

Chair/moderator: Ms. Sonja van Renssen, European Energy Review

Panellists:

Mr. Kilian Gross, Deputy Head of Unit A1 – Energy Policy & Monitoring of electricity, gas, coal & oil markets, DG Energy – "Future role of coal in the context of the *Energy Roadmap 2050*"

Mr. Johannes Enzmann, Policy Officer, Unit B1 – Implementation of ETS, DG Climate Action – "Update on the Emission Trading System (ETS)"

Mr. Gareth Carpenter, Head of the European Coal Team, Platts – "European coal markets from the analysts' point of view"

Dr.-Ing. George Milojcic, Chairman EURACOAL Energy Policy Committee – "EURACOAL response to the *Energy Roadmap 2050*"

Mr. David Brewer, Chairman EURACOAL Environment Committee – "Review of recent and proposed EU policies and measures relevant to coal exploitation and use"

Session II: Role of new technologies for coal's future

Chair: Mr. Christof Schoser, Deputy Head of Unit C2 – New energy technologies, innovation & clean coal

Mr. Patrick Clerens, Secretary-General, EPPSA – European Power Plant Suppliers Association on behalf of Dr. Franz Bauer, Acting Chief Executive, VGB PowerTech – "Network services with state-of-the-art and next generation coal-fired power plants"

Dr.-Ing. Tom Naundorf, Managing Director – Technical, ROMONTA GmbH (and IBI – Innovative Braunkohlen Integration in Mitteldeutschland) – "From mining to refining – innovative process technology for monetising EU lignite resources"

Dr. Vangelis Tzimas, EC Joint Research Centre, European Industrial Initiative on CCS – "Research and innovation in CCS: state of play and future needs"

Session III: Coal and CCS – key success drivers

Panel session introduced by Mr. Kai Tullius, Policy Officer, Unit C1 – Renewables and CCS policy, DG Energy – "Status of CCS in Europe"

Chair/moderator: Dr. Tudor Constantinescu, Principal Adviser to Director-General, DG Energy

Panellists:

Mr. Heinz Bergmann, Chairman, Coordination Group, ZEP – Zero Emissions Platform – "ZEP initiatives aimed at accelerating CCS demonstration"

Dr. Florian Kern and Prof. Jim Watson, Sussex Energy Group and SPRU – Science and Technology Policy Research, Sussex University – "Carbon capture and storage – realising the potential?", report for UK Energy Research Centre

Dr. George Milojcic, Chairman EURACOAL Energy Policy Committee – "CCS and public acceptance: role of demonstration and infrastructure projects"

Session IV: Role of best practices in securing a future for European coal

Panel session introduced by Mr. Michael Schütz, Policy Officer, Unit C2 – New energy technologies, innovation and clean coal, DG Energy – "EUCORES: a geographical database and map of EU coal basins based on a harmonised typology – results of workshop on 29 May"

Chair/moderator: Mr. David Brewer, Chairman EURACOAL Environment Committee

Dr. Gunter Baldermann, Director of Occupational Safety/Fire Department on behalf of Dr. Joachim Geisler, CEO, MIBRAG – "Training for health and safety: why a zero-accident target has improved productivity, communication and work safety at lignite mines in Germany"

Mr. Radim Tabášek, Senior Executive on behalf of Dr. Klaus-Dieter Beck, CEO, OKD – "Safety first – a focus on modernisation of mining technology and personal protection aids in the Czech Republic"

Prof. Franz-Josef Wodopia, Chief Executive, GVSt – "Best practices as ways to reinforce public awareness and acceptance for EU coal – including examples from post-mining use of mine sites for renewable energy and energy storage"

Reports of session rapporteurs, final discussion and conclusions

Chair: Mr. Jan Panek, Head of Unit – Internal Market III: Retail markets; coal & oil, DG Energy

Wrap-up and concluding statements by EURACOAL and DG Energy

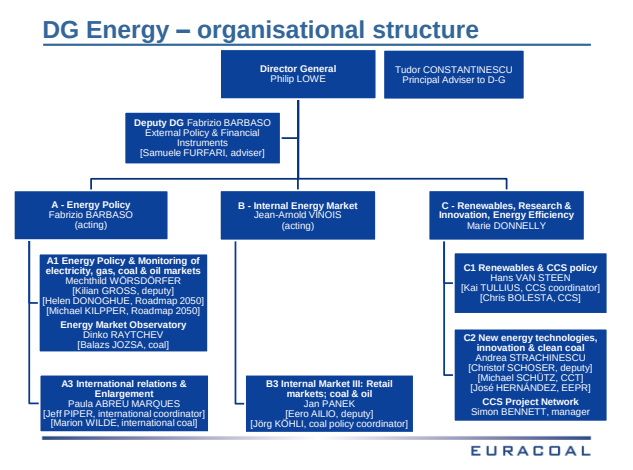
All presentations are available on the EURACOAL website (www.euracoal.org)
– only selected slides are included in this summary report.

Introduction

This, the 8th Coal Dialogue, jointly hosted by the European Commission DG Energy and the European Association for Coal and Lignite (EURACOAL), aimed to better acquaint officials with the coal industry and the issues that it currently faces. It also offered a platform for the Commission to outline the important steps being taken to secure a clean, secure and competitive energy future for the European Union.

Sessions covered energy policies, new technology, carbon dioxide (CO_2) capture and storage or CCS and the role of best practices. The latter topic features also in the Berlin Fossil Fuels Forum initiative where stakeholders are encouraged to develop platforms for best practice sharing.

The final session allowed the Commission and EURACOAL to reflect and reach some conclusions which are summarised at the end of this report, on page 18.



Opening addresses

Mr. Jan PANEK, Head of Unit – Internal Market III: Retail markets; coal & oil at DG Energy, welcomed participants to the 8th Coal Dialogue and introduced the three keynote speakers who, he said, would set the scene for four sessions devoted to topics of special interest. The final session would allow the Commission and the coal industry to draw conclusions and to look ahead at how the most important issues for the industry would be handled further, making also the best use of the new organisational structure within DG Energy.

Dr. Tudor CONSTANTINESCU was pleased to see so many stakeholders present, noting that this perhaps reflected coal's importance to EU energy supply: accounting for 17% of primary energy and over 25% of electricity generation. With coal and lignite mined securely in many Member States – meeting 60% of EU coal demand – he foresaw a continued role for coal in the EU's energy future. Improving the efficiency and flexibility of existing plants would be crucial. Dr. Constantinescu referred to the Commission's decision to end the last remaining coal subsidies by 2018 as part of a wider aim to eliminate all fuel subsidies, including eventually renewable energy subsidies.

Turning to the subject of CCS, he called for industry to look ahead, beyond the demonstration stage. Progress was needed to make the technology an internationally competitive low-carbon technology – especially in the big coal-using countries of China and India. The CCS Directive, well-funded RTD programmes and financial support under the European Energy Programme for Recovery and the NER300 now appeared insufficient, especially with today's low ETS price signal. He asked why industry was not more actively engaged with building public acceptance of CCS and to create a business case for this technology which, he said, was a "precondition" for coal's future. Finally, Dr. Constantinescu looked forward to hearing more about best practices in the coal industry and the role of environmental standards in delivering best practices.

Dr. Christian EHLER MEP (EPP, Germany) began with some words on his coal-related activities in the European Parliament and his rapporteur responsibilities on Horizon 2020, before making

some more general observations. He likened EU energy politics to a pendulum, sometimes swinging to extremes before returning to more familiar territory. On coal, he observed that 10% of the world's population consume one third of the world's energy, and asked why these same people questioned the use of coal. Whilst EU energy policy is CO_2 driven, other countries and regions have not followed and do not question coal's role in providing cheap and secure energy, he said, adding that the rapidly growing use of coal outside the EU could not be ignored.

Dr. Ehler questioned if the CCS precondition in the EU was politically or economically practical because it left us tactically trapped and unable to promote new, more efficient and more flexible plants as a sound interim measure. On this point, he suggested that a part of the research framework programme's risk-sharing facility should be reserved to help finance a new generation of highly efficient coal-fired power plants. He called for the CCS discussion to be re-opened and broadened to cover coal-to-liquids, -gas and -chemicals. Here, he believed that gaining public acceptance was fundamental and also demanded better communication from the industry.

Finally, Dr. Ehler turned to Germany's *Energiewende* or energy U-turn and its impact on neighbouring countries. He described the plan to exit nuclear as "insane" and used this to justify a more European approach to energy policy, as called for by Commissioner Oettinger, that was clever, smart, efficient, reliable and cost effective.

Amb. Janusz REITER, President of the Center for International Relations in Warsaw, remarked that coal was not generally popular in Europe, although he admitted that Poland's anti-EU climate policy had proven popular in his own country. His aim was to build bridges between the different camps – be they Czech or Polish coal producers, French nuclear industrialists or Swedish hydro operators – to allow progress, rather than a return to some previous *status quo*. Most importantly, Amb. Reiter wanted the EU to show leadership by example with credible solutions that are relevant to the global situation. This would, he said, strengthen EU climate policy by earning the respect of China and India.

He personally believed that it was politically, economically and morally right to set low-carbon goals in the EU, but was concerned that these goals were seen as hostile towards coal by the Polish energy sector, as well as by others. To change this view, coal must be seen not as an anachronism of the 19th Century but as a reality of the 21st Century, he said, noting that coal's share in the global energy mix was growing. He compared the EU's progress on CCS unfavourably with that seen in other regions, such as the Middle East and North America, despite the fact that this technology can close the gap between EU climate and energy policy goals.

In his summing up, Amb. Reiter said that the energy transformation must be seen to increase competitiveness, be acceptable to all Member States by taking into account their particular realities, and must include the coal industry taking an active role to communicate carefully crafted messages that mobilise public support and earn social acceptance. To achieve this, he too believed that a true EU energy policy was required because of the wider impacts of national decisions.

Sessions

Session I: The coal sector in the context of energy policies

The first session gave key data on the coal sector, showing that coal was the number one fuel for power generation worldwide, due to its availability and affordability.

In Europe, coal accounts for over 25% of power generation and, even though DG Energy's *Energy Roadmap 2050* foresees a decreasing use of coal in the future, coal will stay part of the energy mix. The five decarbonisation scenarios all show some level of coal use, even though Europe must adapt to become a low-carbon economy by 2050. For coal and other fossil fuels, this means that CCS must become commercially viable and compete with other large-scale, low-carbon options.

The *Energy Roadmap* was welcomed by the industry as it presents several strategies on how to reach Europe's decarbonisation targets, but it was nevertheless also seen as a potential threat to Europe's economy, which was becoming less and less competitive compared with other economies around the world where environmental constraints were less strict.

EURACOAL President, **Dr. Hartmuth ZEISS**, opened the session by stressing the importance of coal in a secure, affordable and balanced European energy mix where national, but also regional needs have to be taken into account by policymakers and industry. He therefore welcomed the ongoing discussion during the 8th Coal Dialogue and the efforts to find an acceptable way to make coal, which is by far the fastest-growing fuel worldwide, a pillar of the EU's economic growth, as it had been since the creation of the ECSC in 1952.

To this end, CCS and its infrastructure must urgently be demonstrated – policymakers and industry must work together in order to gain public acceptance for the ongoing and future projects. The EU can set a good example for the rest of the world to follow, but it is no longer the technology leader. It was therefore high time to develop Europe's potential and to prioritise deployment, Dr. Zeiss concluded.

Future role of coal in the context of the *Energy Roadmap 2050*

Deputy Head of Unit A1, **Mr. Kilian GROSS**, presented the *Energy Roadmap 2050* which, he said, should not to be seen as a forecast or prediction, but as an analysis of different long-term scenarios leading to a decarbonised EU economy. Depending on the scenario, coal would play a greater or lesser role, but would in all five scenarios remain part of the energy mix, provided that it was used with CO_2 abatement technologies. It would have the highest share in the energy mix in a scenario with full implementation of CCS, and the lowest share in a scenario assuming delayed CCS. The *Energy Roadmap* should therefore be seen as a starting point to an iterative process that aims to create investment and planning security, whilst driving Europe towards a low-carbon economy.

Update on the Emission Trading System (ETS)

Mr. Johannes ENZMANN, Policy Officer in Unit B1, confirmed that the EU ETS remained the key policy tool to achieve the EU's climate goals and that it had served as a reference for New Zealand, Australia, China and other countries and regions, which have established or plan to establish similar trading schemes. Today, in the EU, carbon prices are therefore taken into account by industry when developing investment plans.

There will be some important changes in the third trading period starting in 2013. The 27 national caps will be replaced by a single EU cap and the national registers by one single EU register. Allowances will be progressively auctioned from 2013 onwards, and industry sectors at risk of "carbon leakage" will benefit from certain exceptions. Mr. Enzmann said that it would be nevertheless necessary to reshape the EU ETS in order to increase the carbon price – for example, by setting aside a certain number of allowances. Any structural change to the EU ETS scheme would require a co-decision procedure. As a first step, the Commission will publish a "Carbon Market Report" before the summer break to clarify its intentions.

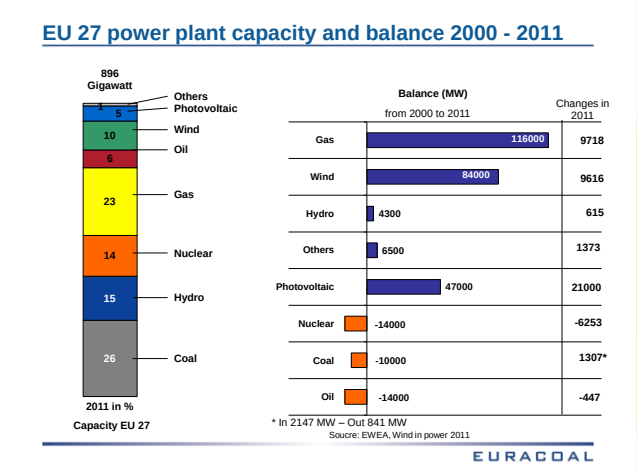
European coal markets from the analysts' point of view

Mr. Gareth CARPENTER, Head of the European Coal Team at Platts, reported on the global seaborne steam coal market and recent trends showing lower world market prices, although European coal remained competitive. One reason was an oversupply to the Atlantic market, notably due to the US, where the shale gas boom had put pressure on US coal prices. Changing behaviour among the largest coal importers, such as China, India and Japan, had also influenced global prices, as in other commodity markets. Short-term influences on coal prices included regional supply disruptions, such as logistical problems in South Africa and floods in Queensland. Fuel choices in particular EU Member States, such as the phasing out of nuclear in Germany and Italy, have also influenced coal prices in Europe. Considering all these factors, Mr. Carpenter believed that coal would remain a part of Europe's energy mix since it would remain cheap, secure and safe to transport. Nevertheless, CCS will have to play a role in future coal use, he concluded.

EURACOAL response to the *Energy Roadmap 2050*

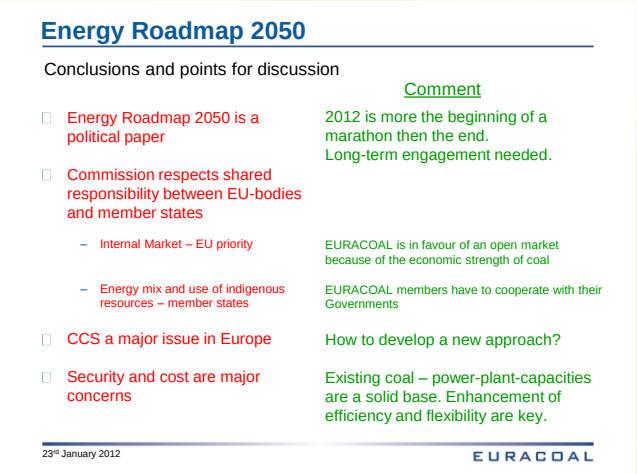
Chairman of the EURACOAL Energy Policy Committee, **Dr. George MILOJCIC**, remarked that certain policy decisions created expectations which cannot be delivered, as was the case with the Lisbon Agenda which promised that the EU would become the most competitive knowledge-based economic region in the world. This was not achieved. In energy policy, there are good reasons not to be overambitious and to look more at what we can do today and tomorrow. Overambitious, long-term targets may have the unwanted side effect of not achieving what could be achieved because we concentrate on visions based on today's assumptions.

He said that the EU had formulated its decarbonisation goals without worrying too much about the future consequences, whereas a reality-based energy policy would look more at the economic impacts. Citizens needed jobs, welfare, secure and affordable access to electricity; and regions needed to feel that their diversity was being taken into account, he added and asked for more pragmatism and realism.

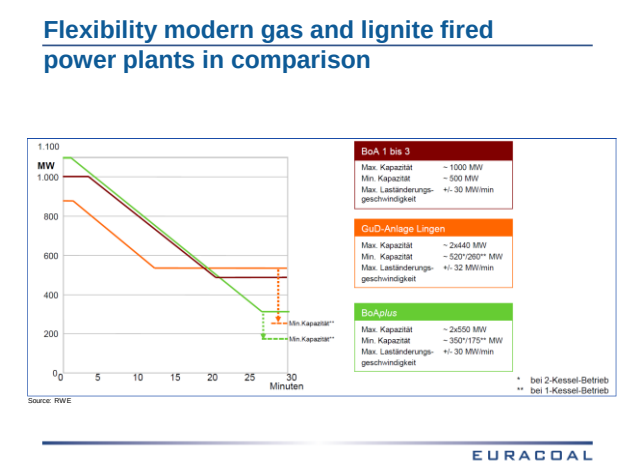


There is not one single solution for a decarbonised Europe, there must be a plethora of solutions, taking into account differences in each Member State. Only a win-win model will lead to success and acceptance, he said. The years 2020 and 2030 mark important milestones with ambitious targets on which we should concentrate.

A good tradition in the EU sees diversity as a strength, acknowledges differences in structure and respects the special interests of Member States and regions. In this respect, coal will and must keep its role in the European energy mix, according to Dr. Milojcic. Of course, CCS should be further deployed and infrastructure extended, but as a first step, we should focus on conventional power plants and the potential to enhance efficiency and flexibility to back-up renewables. Continuous modernisation immediately improves environmental performance and, above all, contributes to economic growth, he observed.



The *Energy Roadmap 2050* is, Dr. Milojcic concluded, an excellent instrument to start a discussion on Europe's short-, medium- and long-term visions for a low-carbon economy, preserving fuel diversity and economic competitiveness.



Review of recent & proposed EU policies and measures relevant to coal exploitation & use

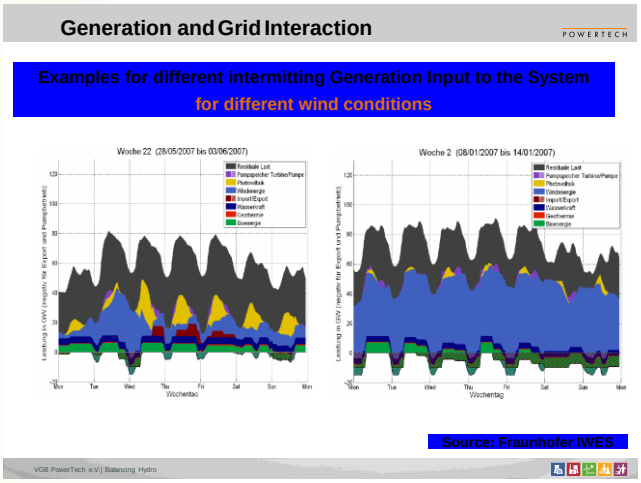
EURACOAL Environment Committee Chairman, **Mr. David BREWER,** briefly summarised the latest EU environment policy developments, covering the Industrial Emissions Directive, revisions to the National Emissions Ceilings Directive and the related Gothenburg Protocol, which all aimed to further reduce NO_x and SO_2 emissions, and also potential limits on mercury emissions. Mr. Brewer insisted that the technical potential of reducing the emissions from power plants be taken properly into account. Different, leap-frogging or even contradictory new requirements could create enormous investment challenges which would not be in line with the reality of what can be achieved. New investments in coal-fired power generation could then be difficult and have an impact on any country's energy security and affordability, he warned.

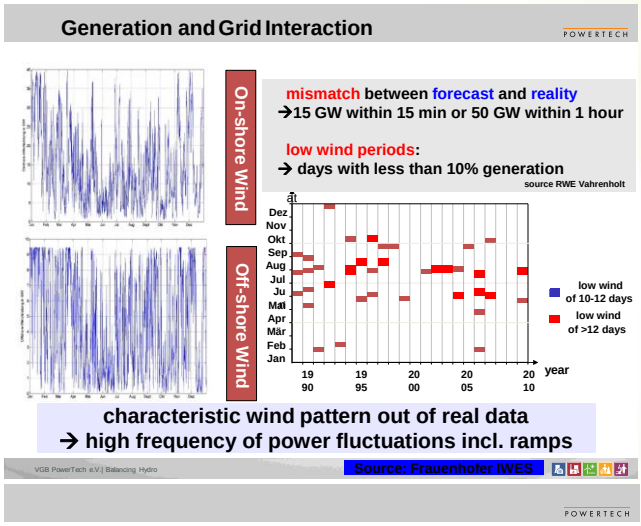
Session II: Role of new technologies for coal's future

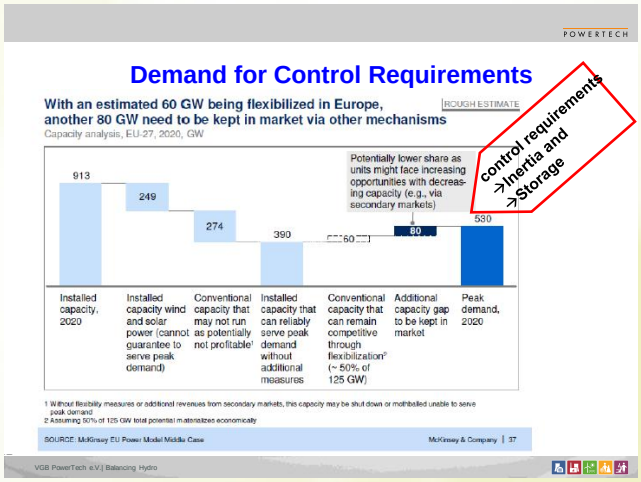
This session showed the different aspects of R&D needs, not only in the field of CCS, but also with regards to flexibility and efficiency enhancements at power plants. The Horizon 2020 proposal from the Commission has a clear focus on CCS and suggestions were made by stakeholders to also include R&D on coal to chemicals. Nevertheless, the Commission stressed that with CCS, the Horizon 2020 proposal explicitly focuses on the technology that is indispensable for the long-term use of fossil fuels, especially coal. Furthermore, despite the importance of Horizon 2020, there is also the Research Fund for Coal and Steel (RFCS), where EURACOAL members have been very successful, whilst Member States have national R&D programmes and industry itself carries out near-market R&D.

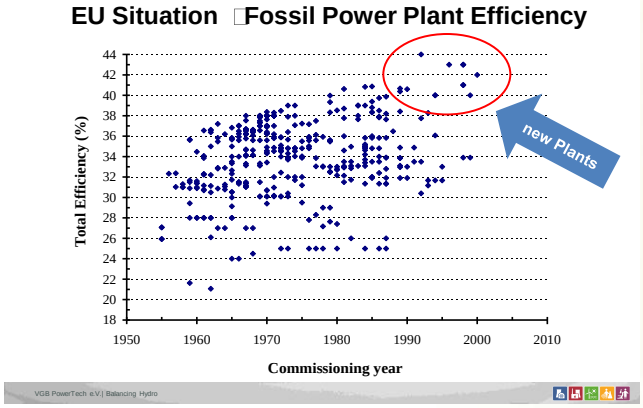
Network services with state-of-the-art and next generation coal-fired power plants

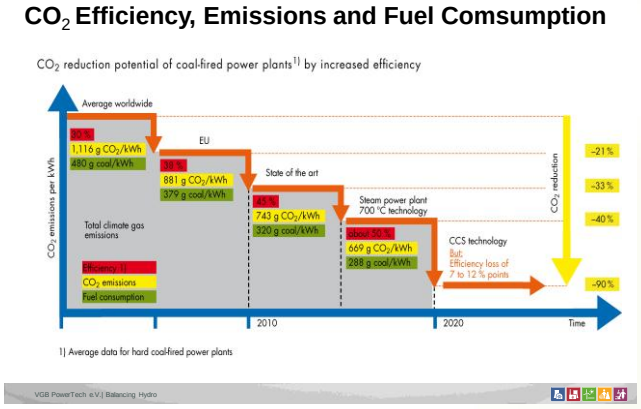
Mr. Patrick CLERENS, Secretary-General of EPPSA, made a short summary on behalf of Dr. Franz BAUER of VGB, who was unable to attend the meeting. He observed that Europe faced diverse challenges, such as the financial crisis and turmoil in its energy sector. But, he said, politicians often do not know that the electricity supply system is like a mobile: it is very sensitive to changes and only continuous control ensures a dynamic equilibrium. This equilibrium can only be maintained with knowledge of the key elements and drivers in the electricity system. It is very difficult to predict the weather – sun or wind – in order to know if wind turbines and PV will run or not. It is therefore crucial that active power can be put on grid in an instant when frequency and voltage drop.











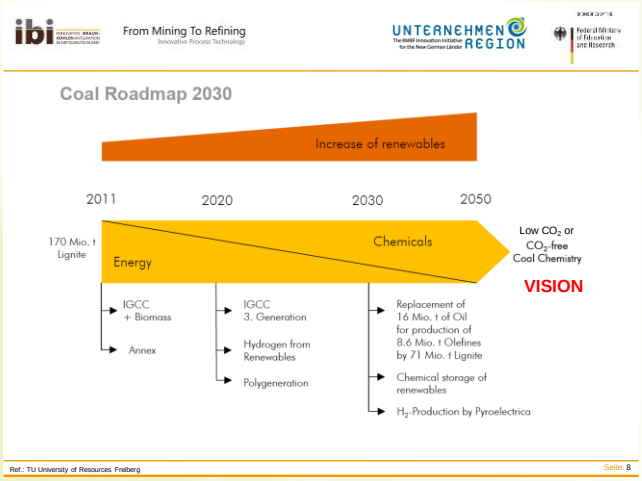
Flexibility in conventional Power Generation

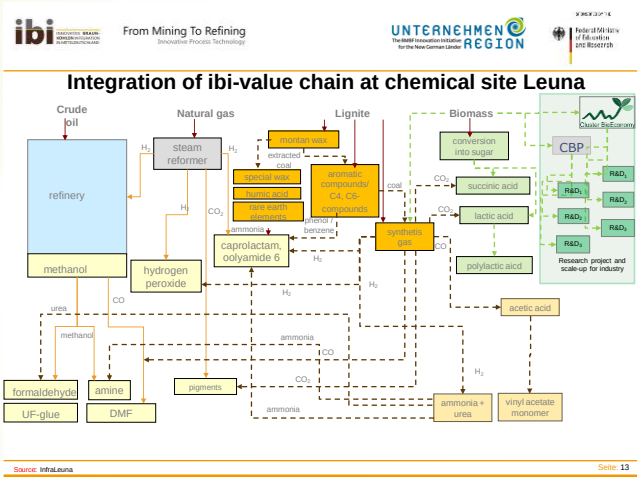
	NPP	HC	Lign	CCG	PS
Start-up Time „cold“	~ 40h	~6h	~10h	<2h	~0,1h
Start-up Time „warm“	~ 40h	~3h	~6h	<1,5h	~0,1h
Load Gradient ↗„nominal Output“	~5%/m	~2%/m	~2%/m	~4%/m	>40%/m
Load Gradient ↘„nominal Output“	~5%/m	~2%/m	~2%/m	~4%/m	>40%/m
minimal Shutdown Time	←		no	→	~10h
minimal possible Load	50 %	40 %	40 %	<50%	~15 %

The development of highly flexible back-up capacities and storage facilities will be crucial to ensure system stability in the future, which, Mr. Clerens admitted, were big challenges. The industry therefore calls for more research today to prepare power generators for the requirements of tomorrow. To back up an increasing share of renewables, highly efficient and flexible power plants are needed. Mr. Clerens said that it would not be sufficient to wait for the deployment of CCS – continuous modernisation of conventional power plants was urgently needed and the Horizon 2020 initiative could be a decisive instrument to support the underpinning research efforts, he concluded.

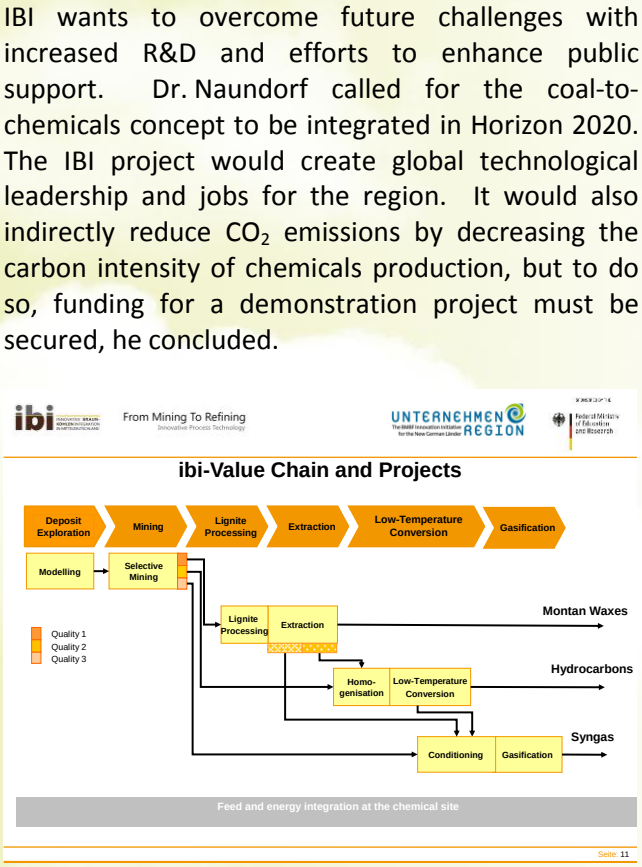
From mining to refining – innovative process technology for monetising EU lignite resources

Dr. Ing. Tom NAUNDORF, Managing Director (Technical) of ROMONTA GmbH and representing the Innovative Braunkohlen Integration in Mitteldeutschland (IBI), presented the chemical project of the Leuna region in Germany which aims to use lignite as a chemical feedstock instead of crude oil or natural gas. He stressed lignite's long-term availability and affordability compared to oil and gas. A demo plant should be built by 2020, but the EU ETS presents a real hurdle to the deployment of this new technology, since it penalises direct CO_2 emissions, without taking into account the full life-cycle emissions of the fuel supply – which is where the IBI project has clear advantages.



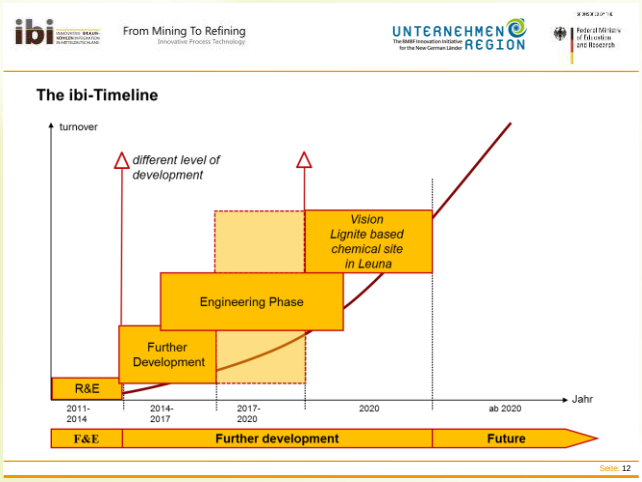


IBI wants to overcome future challenges with increased R&D and efforts to enhance public support. Dr. Naundorf called for the coal-to-chemicals concept to be integrated in Horizon 2020. The IBI project would create global technological leadership and jobs for the region. It would also indirectly reduce CO_2 emissions by decreasing the carbon intensity of chemicals production, but to do so, funding for a demonstration project must be secured, he concluded.

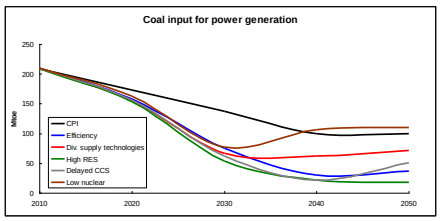


Research and innovation in CCS: state of play and future needs

Dr. Vangelis TZIMAS from the EC Joint Research Centre explored the potential for coal in the energy mix after 2030, assuming that CCS would be commercially available from that date. According to the policy scenarios in the *Energy Roadmap 2050*, investment in CCS will be small before 2030, but increasingly necessary after 2030 if coal is to stay in the energy mix. CCS is included in the SET-Plan, setting a framework for the development of a range of cost-effective, low-carbon technologies in the EU. The deployment of CCS is expected to be driven by the ETS and, once commercially viable, should be deployed across all carbon-intensive industry sectors. In order to speed up CCS demonstration, there are several instruments such as the European Energy Programme for Recovery (EEPR) – funding six selected projects with €1 billion – and the NER300, as well as FP7 / Horizon 2020 and national funding.

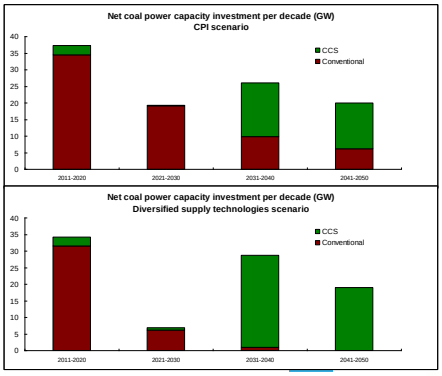


Coal in the future power system



Decarbonisation implies a reduced use of coal for power generation, which can still be significant after 2030 under some scenarios.

The importance of CCS



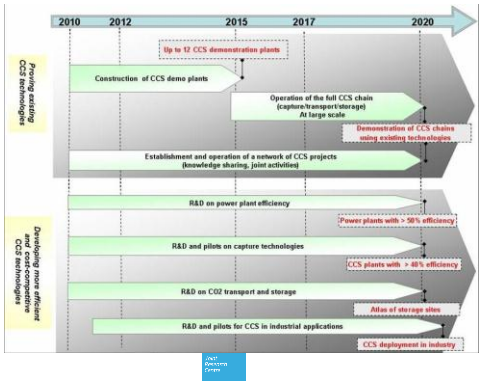
- CCS technology is deployed on a large scale (post-2030) once commercialised
- Under scenarios of decarbonisation, all investment in coal will be for CCS plants
- The successful development and deployment of CCS is:
  - ✓Critical for decarbonisation
  - ✓Pivotal for the European coal sector

The role of SET-Plan

- The SET-Plan establishes an energy technology policy for Europe
- A strategic plan to accelerate the development and deployment of cost-effective low-carbon technologies
- The plan comprises measures relating to planning, implementation (EIIs), resources and international cooperation in the field of energy technology
- It is supported by its own information system (SETIS)
- CCS is one of the strategic energy technologies
- Partners: Industry, Member States, European Commission, EERA

SETIS
Information For Decision-making

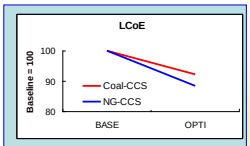
CCS technology roadmap



Key performance indicators

An essential toolkit for monitoring and reviewing the overall progress

- **Two overarching KPIs:**
  - Levelised cost of electricity (LCoE), measured in €/MWh
  - Cost per tonne of CO2 avoided, measured in €/tCO2
- **13 second-tier KPIs** have been defined to monitor 4 dimensions:
  - Progress in the demonstration programme
  - Cost effectiveness
  - Environmental effectiveness and safety
  - Public awareness of CO2 storage



Targets:

- Achieve a ~10% reduction of the LCOE of the first commercial CCS plant (2020+) compared to the first demo plant (2015).
- Achieve a 25% reduction of CO2 avoidance costs under the same conditions

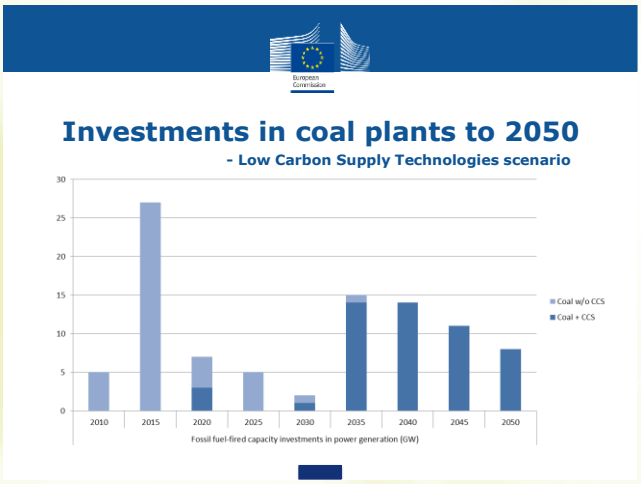
Session III: Coal and CCS – key success drivers

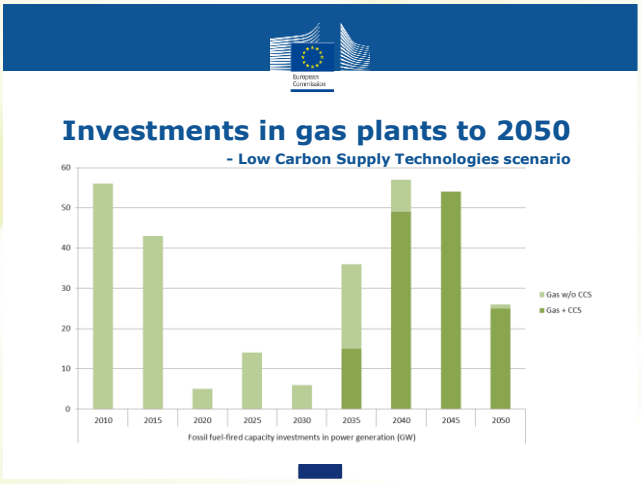
Session III examined the most important topic of CO_2 capture and storage (CCS). There was a general acknowledgment that progress with demonstration plants had slowed for a number of reasons. Less clear was how to address this and participants offered different views on how to speed up progress.

Mr. Kai TULLIUS gave a short overview of the Commission's efforts to promote CCS with a number of important initiatives. He concluded that, according to the *Energy Roadmap 2050* analysis, coal can only stay in the energy mix if CCS is deployed, so it would still be vital to demonstrate CCS this decade. Given this, CCS has the potential to be competitive with other low-carbon technology options, if the ETS gives the right price signal. This conclusion was reflected in the *Energy Roadmap 2050* which – in the diversified supply technology scenario – shows that major investment in coal and gas with CCS could take place after 2030 (200 GW in total) allowing these fossil fuels to stay in the energy mix. However, he saw competitiveness as just one of six crucial factors to be addressed: legislation, beginning with transposition of the CCS Directive; additional funding and political support for demonstration projects; commercial viability after 2020 at c. €40/tCO_2; acceptance by the public; establishing a transport and storage infrastructure which would likely be most acceptable offshore; and innovation to reduce costs.

Finally, Mr. Tullius posed this question to industry participants, "What are the plans to revitalise the EU demonstration programme and put new impetus

into delivering the much-needed CCS demonstration projects before 2020?"





ZEP initiatives aimed at accelerating CCS demonstration

Mr. Heinz BERGMANN of RWE and Chair of the ZEP (European Zero Emissions Platform) Coordination Group presented results from the ZEP cost study published in 2011. These show good medium-term economic prospects for CCS. However, the necessary financing was uncertain, starting with the low value of the NER300 fund. He acknowledged the EU support for up to 12 CCS demonstration projects, including EEPR funding, but called for a greater commitment by Member States. Given the current situation, he expected that of the eleven demonstration projects still in the NER300 competition, perhaps only two or three would succeed within the first tranche, but noted that projects might move forward outside of the competition (*e.g.* ROAD in the Netherlands). He was optimistic that projects using first-generation technology could now be realised, pointing to examples in Canada, the USA and Australia.

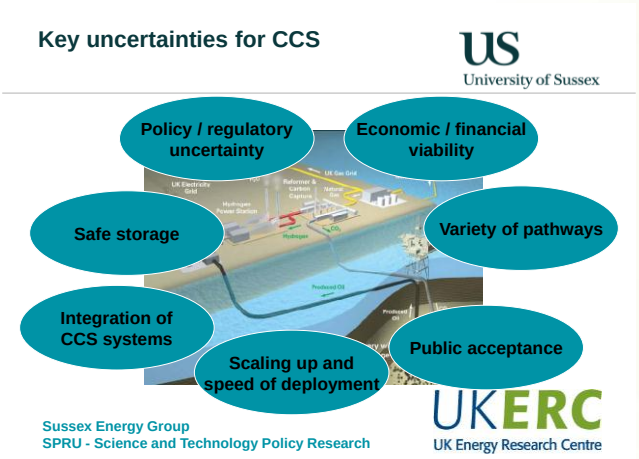
Mr. Bergmann explored the short-term (to 2020) and medium-term (2020-2030) measures that should lead to a level playing field for all low-carbon options in the longer term after 2030, drawing on a draft ZEP report. For the short to medium term, Mr. Bergmann talked of incentives such as feed-in tariffs and also of the need to "fix" the ETS by reducing the number of allowances issued and setting caps for 2030 and 2040 to create a driver for CCS. Responding to a question from a Bellona representative, he said that ZEP members did not unanimously favour emission performance standards (EPS) for CO_2, adding that this should really only be discussed once the technology is mature. For hard coal plants, a CO_2 price of about €40/tCO_2 was expected by ZEP to make CCS attractive for mid-2020s optimised technology (but more than double this price for gas plants with CCS). **Mr. Peter TJAN** of 2Co Energy in the UK, noted that the current UK Energy Bill promised a level playing field for CCS, with "contracts for difference" to reduce the risks for early-stage demonstration. Others pointed to the derogation for CCS demonstration plants from the UK's planned emission performance standard (EPS) that would force adoption of CCS at new coal-fired power plants.

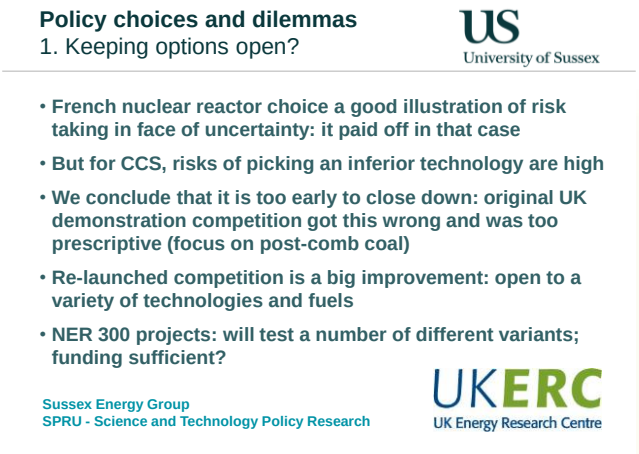
According to a ZEP strategy paper published in February, a critical issue was not CO_2 capture but CO_2 storage which typically requires a five-year evaluation period to verify the suitability of any underground site. Hence, any projects that plan to be operational by 2016 must already be making good progress with storage site assessment. Responding to the issue of public acceptance, Mr. Bergmann reported that ZEP was preparing a new study on large pilot storage projects (30,000-100,000 tCO_2/yr), focusing on onshore storage, which could later be upscaled to industrial scale. These would build confidence and acceptance, he said.

In conclusion, Mr. Bergmann welcomed the *Energy Roadmap 2050* since it showed the necessity of CCS to achieve the deep CO_2 reduction targets. Finally, he spoke of the need for more international co-operation and referred to the CO_2Europipe project (www.co2europipe.eu) as a guide to accelerate the necessary infrastructure development in the EU which he saw as a key medium-term challenge.

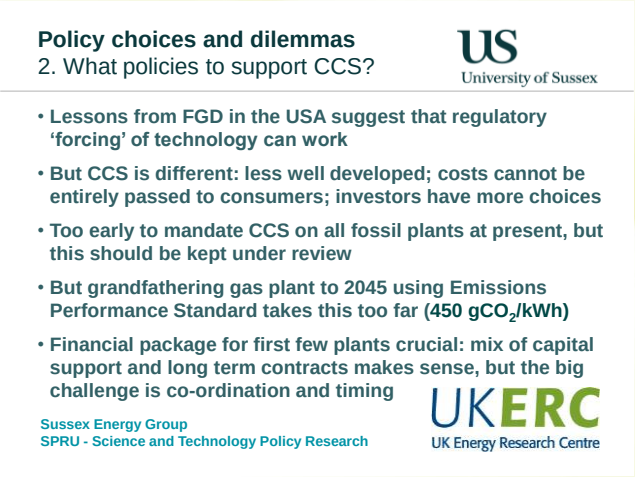
Carbon capture and storage – realising the potential

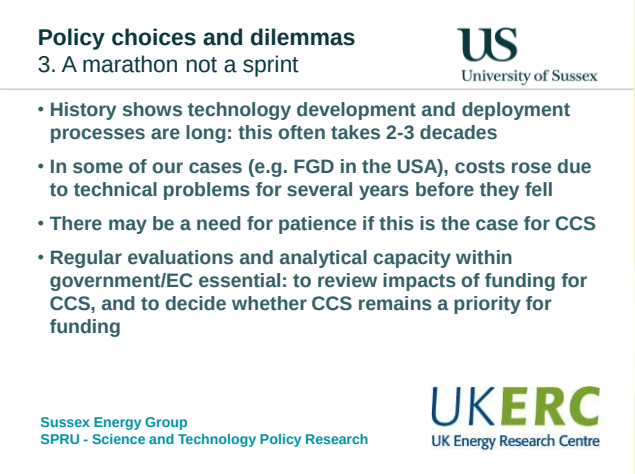
In his presentation, **Dr. Florian KERN** of the Sussex Energy Group of SPRU at the University of Sussex asked what could be learnt from past infrastructure developments, such as the UK natural gas network, the French nuclear programme, radioactive waste management in the UK and the retrofitting of flue gas desulphurisation (FGD) in the USA – just four of nine case studies in a recent report prepared by SPRU for the UK Energy Research Centre (www.ukerc.ac.uk/support/tiki-index.php?page=ES_RP_SystemsCCS).





Much could be learnt of relevance to CCS from these analogies, but he warned that the context of each one was unique. In particular, risk sharing arrangements differed enormously. He concluded that "learning by doing" through integrated demonstration projects was the most effective way to make progress: executing projects and using the experience to master new technologies. Dr. Kern also warned that governments should keep options open and should not be tempted to "pick winners", so called for a portfolio of CCS projects using different technologies across the EU. Given that new technologies took two to three decades to perfect, he urged for patience. In response to the role of regulatory forcing – as was the case with FGD in the USA – he cautioned that CCS was less developed and more costly, and lacked the option to pass costs through to consumers. Since investors in the power sector had other investment options, he saw a need to steer investment to meet policy objectives that were in the public interest. Dr. Kern also pointed out that it is important to periodically review the impacts of public funding for CCS (*e.g.* in terms of decreasing costs) and its performance *vis-à-vis* other low-carbon technologies in order to decide whether CCS remains a priority for funding.





CCS and public acceptance: role of demonstration and infrastructure projects

Dr. George MILOJCIC, Chief Executive of DEBRIV (German Brown Coal Association), referred to a proposed EURACOAL project with the Centre of Applied Economic Research at WMU Münster. This

would explore how CCS infrastructure – a public good – might best be developed as a precursor to the wide deployment of CO_2 capture, a technology which had largely been proven by utilities and industry. Regional solutions, with incentives for pipelines and storage sites, could create new "backbones" that would allow future growth as more capture projects came on stream. Dr. Milojcic said that we needed to be sure exactly what problem CCS would solve: an environmental problem, an energy policy problem, a security of supply problem or an economic problem. The Coal Dialogue and other similar forums should examine the infrastructure issue, responding to questions such as: Who is responsible? Who pays? How should it evolve? He believed that much could be learnt from other sectors where infrastructure was crucial to establishing a new industry, such as air transport. Moreover, he pointed to the crucial role of governments in initiating, facilitating and even executing infrastructure projects. With Member States free to choose their own energy mixes, Dr. Milojcic believed that clean coal and ultimately CCS were needed to keep a range of options open across Member States. For that reason, as CCS infrastructure was in the public interest – because it responded to a public good – it was certainly not in the interests of individual plant operators to invest in infrastructure. He warned that governments seemed prepared to make swift decisions to phase out particular energy sources – nuclear, maybe even coal and gas – but were less prepared to take the bold steps needed to meet all their competing energy policy objectives.

During the discussion, there was some disagreement about whether CO_2 capture projects would lead or follow transport and storage infrastructure development. Some suggested that it was more important to identify which regions were most promising in terms of CO_2 sources, push capture projects forward and allow infrastructure to develop – perhaps by ship as an interim solution – once capture is a marketable technology. However, given the situation in Austria, Germany and the Netherlands, more effort was clearly needed to gain acceptance of storage. More fundamentally, **Mr. Chris McGLEN**, representing CoalPro in the UK, called for speedier progress with the faltering CCS demonstration projects so that coal-mining companies could make their own long-term investment decisions with some confidence of a market. He noted that UK government policy is not to permit any new unabated coal plant and asked when the first CCS demonstration plant would be operational.

On a question regarding funding decisions under the NER300 process, the Commission said that the European Investment Bank's assessment of CCS (and innovative renewables) projects would be completed this year, ranked by cost per tonne of CO_2 abated.

All agreed that we need to continue this debate rather urgently as Member States take widely different energy policy measures – from emission performance standards and a carbon floor price in the UK, to the nuclear phase out in Germany. In any event, governments and the European Commission would need to tread carefully.

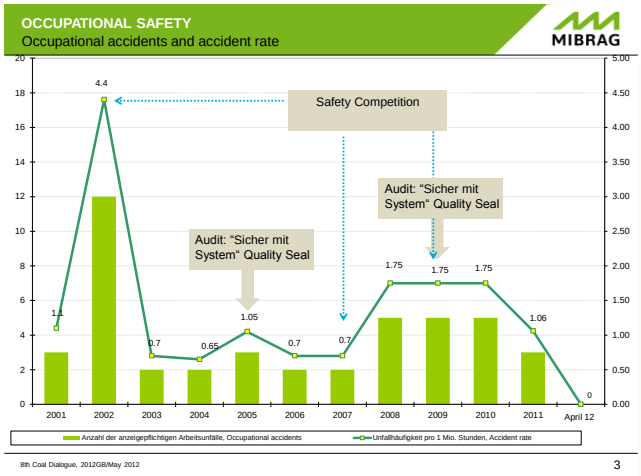
Session IV: Role of best practices in securing a future for European coal

Session IV focused on best practices in the field of health and safety (H&S). It was evident that best results were obtained not only through technical improvements, but through effective communication and staff motivation. Best practices in gaining public acceptance meant the involvement of citizens at the very beginning of a project, in order to listen to their needs and to make them feel respected.

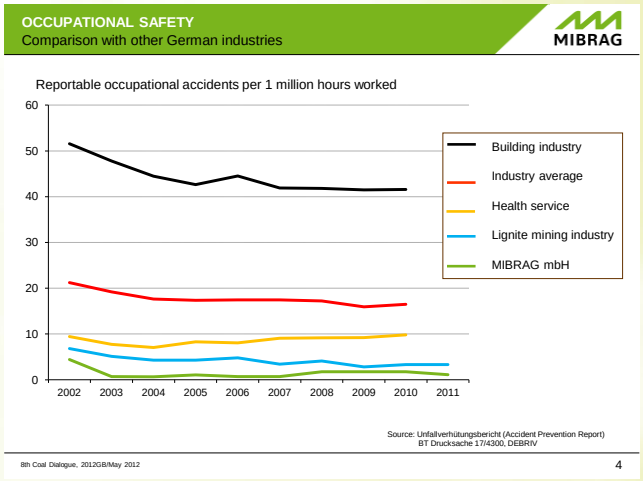
Mr. Michael SCHÜTZ, Policy Officer in Unit C2, reported on the EuCoRes workshop which had taken place on the previous day. It brought together industry representatives, representatives from national geological surveys and the EuCoRes project leaders from the universities of Aachen and Leuven. The project aims to establish a European geological database and map of EU coal basins, including potential sources of coal bed methane (CBM), based on a harmonised typology. The first part of the project will establish a common typology for coal/ lignite and CBM and select a classification system compatible with the UNECE (2009) system – which makes it relatively easy to accommodate national systems. The project leaders called for collaboration in gathering the necessary data to populate the database, since the ultimate success of the project would depend on the availability of data.

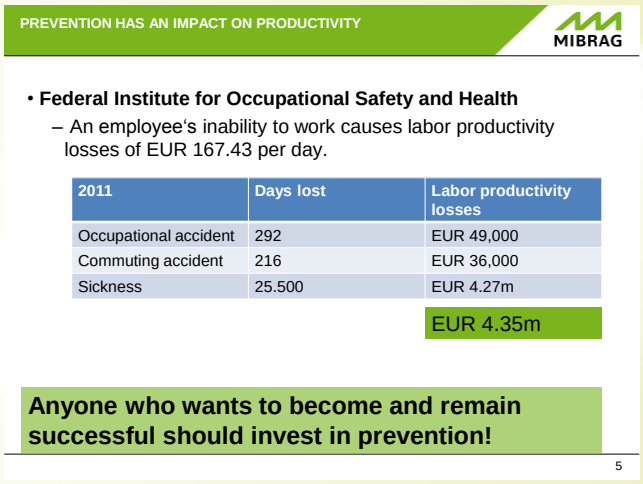
Training for health and safety: why a zero-accident target has improved productivity, communication and work safety at lignite mines in Germany

Dr. Gunter BALDERMANN, Director of Occupational Safety at MIBRAG mbH presented MIBRAG's approach on how to become a zero-accident company: defining H&S targets is certainly a key priority, but motivation (including a bonus system) and communication as well as training, monitoring and innovation were all key to achieving results. At MIBRAG, H&S management goes hand in hand with environmental protection and a related code of conduct needs the co-operation of the entire company.



Middle managers are key communicators of H&S objectives and incentives as they are on the frontline and able to motivate and recompense directly the workers under their charge. By changing behaviour across the company, and by analysing the causes of accidents, MIBRAG began 2012 with zero accidents. According to investigations, most accidents in the past happened due to a lack of communication, poor discipline or a failure of corporate culture. For this reason MIBRAG put much effort into educating employees to adopt safe working and living conditions, even outside their workplaces. The result is not only a safe working environment where people feel comfortable but also a significant cost reduction for the company itself.





Safety first – a focus on modernisation of mining technology and personal protection aids in the Czech Republic

Mr. Radim TABÁŠEK, Senior Executive from OKD, presented his company's H&S strategy which is based on motivation (through posters, slogans, educational charts and an internal newsletter) and, of course, on safety education, training and equipment modernisation. At OKD, the guiding principle is that, "neither tonnes of coal mined, nor the financial results can be compared to the value of a human life and health."

During the "SAFETY 2010" initiative, important measures were taken to replace the workers' safety equipment. Significant improvements were also made by installing high-efficiency air conditioning systems and by reducing nuisance dust. Even though the accident rate dropped significantly, further goals were set in 2012 to keep people motivated.

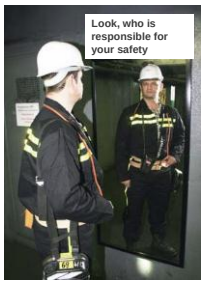
OKD Safety Campaign

Motivation to safe work
- Accident-free Operations – competitions (car or trip abroad)

Promotion of safe work
- Safety slogans of the month – applied across OKD
- Safety boards at all work sections – 'Safety First'
- Safety mirrors – "This person is responsible for your safety"
- Updated safety information in the 'Horník Weekly'

Safety education a trainings for employees
- Broadcasting on TV screens in the entrance lobbies
- New instruction and training movies

Technical and organizational measures enhancing safety
- Employee safety cards (SAP HR)
- Names of people responsible for tidiness of walkways and transportation lines are posted on information boards at work sections



www.okd.cz 4

SAFETY 2010 Programme

- Launched at the end of 2008
- Within the Programme state-of-the-art working gear for our miners was purchased


Working boots

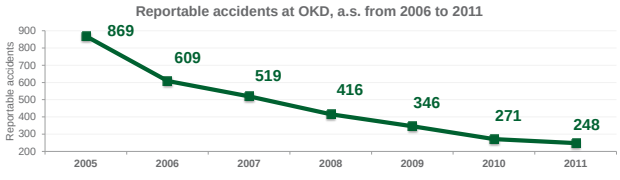

U/G cap lamps

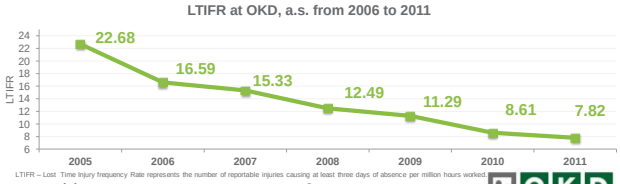

Self-rescue devices


Modern dangerous gas detectors

www.okd.cz 7

Key Safety Parameters





LTIFR – Lost Time Injury frequency Rate represents the number of reportable injuries causing at least three days of absence per million hours worked.

www.okd.cz 9

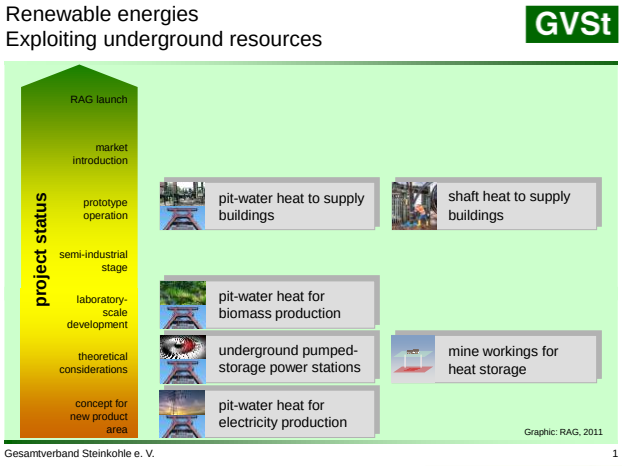
OKD, HBZS, a.s. – OKD's subsidiary

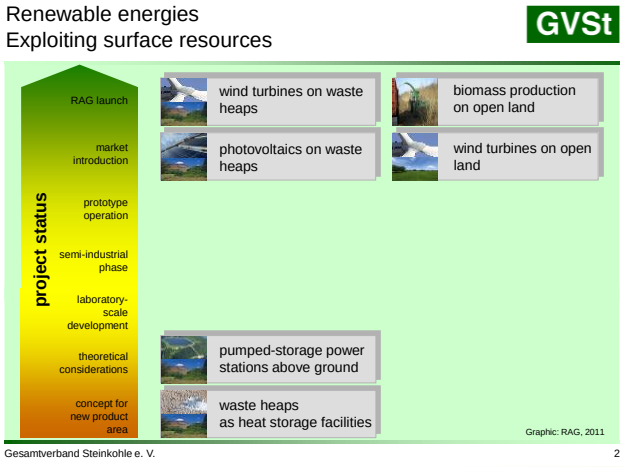
The only rescue corps to intervene in case of an underground emergency event; in other emergency situations, they cooperate with all other entities of the Czech Integrated Rescue System

www.okd.cz 12

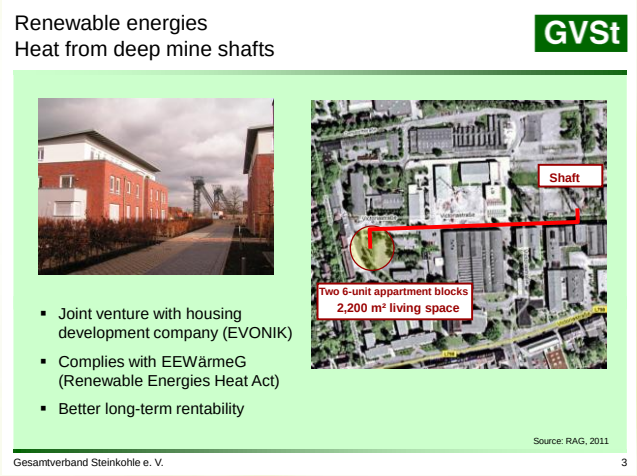
Best practices as ways to reinforce public awareness and acceptance for EU coal – including examples from post-mining use of mine sites for renewable energy and energy storage

Prof. Franz-Josef WODOPIA, Chief Executive of GVSt, affirmed that even though hard coal mining in Germany would be phased out by 2018, public acceptance would need to be maintained throughout. This was also an important consideration given the planned follow-on activities of the industry.





Projects, such as the use of mine water for heating purposes, had to be explained to people from the very beginning and people must feel involved in the entire demonstration phase in order to understand the benefits of any project and to accept it. The same principle applies to other renewable energy projects, such as wind turbines and PV panels installed on waste heaps. The German hard coal industry enjoyed 150 years of successful operations, typified by wide public acceptance thanks to good communication from the industry – communication that will be maintained in future, he concluded.



Final discussion and conclusions

In this concluding session, **Prof. WODOPIA** spoke on behalf of EURACOAL President Dr. Zeiss and thanked Mr. Panek and his colleagues from the Commission who had clearly put a lot of thought into the day's proceedings. He said that the future of coal was both exciting and challenging. In the short term, he wondered how the euro crisis would affect energy policy decisions and called for realistic policies that reflected the realities of the situation. He referred to Dr. Ehler's attempt to open our eyes to the current *cul de sac* that CCS now finds itself in, and the steps that could be taken to put it back on a viable track forward that includes efficiency improvements on all fronts. Prof. Wodopia called for a feasible route to a low-carbon economy – not necessarily a perfect route, but one that others around the world could follow.

Mr. PANEK wrapped up on behalf of the Commission, drawing a number of positive messages from the dialogue which had included input from other DGs and a lively discussion among the eighty or so participants, including many non-EURACOAL members. He said that although there was no chapter devoted to coal in the *Energy Roadmap 2050*, it would have an important role to play in the future. During the meeting, he had seen the industry thinking constructively about its future strategies, for example on flexible generation where coal-fired plants could be just as valuable as gas-fired ones. Nevertheless, Mr. Panek expressed some worry about the mood towards CCS which, for the Commission, was a *sine qua non* technology. He called on industry to push ahead on the assumption that CCS would be needed.

To achieve commercial deployment by the mid 2020s required action now, he said, to address public acceptance barriers. In this respect, offshore CO_2 storage would help some projects, but not all. Mr. Panek called for efforts to be refocused on the issue of public acceptance, linking this to best practices in the coal industry and its social licence to operate. Here, he referred to an important conclusion from the dialogue: how to transfer the best practices that had been presented during Session IV and on previous occasions?

He understood that mining conditions were different in different countries and even in different coal basins, but believed that "meta" messages could nevertheless be drawn. He encouraged EURACOAL to share its members' best practices more widely – a process that the Commission could facilitate.

Before thanking participants and everyone involved with organising the meeting, Mr. Panek spoke positively about how DG Energy's re-organisation meant that coal was now mainstreamed in the DG, with more units now integrating coal-related topics such as coal markets, coal-related R&D and coal policy in their respective agendas. He admitted that this meant EURACOAL needed to spend more time and effort on its dialogue with DG Energy. The Berlin Fossil Fuels Forum plenary meeting on 11-12 October 2012 would, he said, offer the opportunity for industry and the Commission to report progress on the issues raised during the 8th Coal Dialogue.

EURACOAL Members

CoalPro – Confederation of UK Coal Producers (GBR)

DEBRIV – Deutscher Braunkohlen-Industrie-Verein (DEU)

GVSt – Gesamtverband Steinkohle (DEU)

MMI – Mini Maritza Istok (BGR)

PPC – Public Power Corporation (GRC)

PPWB – Confederation of the Polish Lignite Producers (POL)

ZPWGK – Polish Hard Coal Employers' Association (POL)

ENEL S.p.A. (ITA)

ZSDNP – Czech Confederation of Coal and Oil Producers (CZE)

APFCR – Coal Producers and Suppliers Association of Romania (ROU)

BRGM – Bureau de Recherches Géologiques et Minières (FRA)

CARBUNIÓN – Federation of Spanish Coal Producers (ESP)

CoalImp – Association of UK Coal Importers (GBR)

DTEK (UKR)

EPS – Electric Power Industry of Serbia (SRB)

GIG – Central Mining Research Institute (POL)

HBP – Hornonitrianske bane Prievidza (SVK)

ISFTA – Institute for Solid Fuels Technology & Applications (GRC)

Mátrai Kraftwerke (HUN)

PATROMIN – Federation of the Romanian Mining Industry (ROU)

Premogovnik Velenje, d.d. (SVN)

RMU Banovići, d.d. (BIH)

Swedish Coal Institute (SWE)

TKI – Turkish Coal Enterprises (TUR)

Ukrvuglerobotodavtsy – All-Ukrainian Coal Employer's Association (UKR)

Vagledobiv Bobov dol EOOD (BGR)

VDKi – Verein der Kohlenimporteure (DEU)

Coaltrans Conferences Limited (GBR)

EMAG (POL)

Finnish Coal Info (FIN)

Golder Associates (GBR)

Geocontrol (ESP)

ISSeP – Institut Scientifique de Service Public (BEL)

KOMAG (POL)

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