

INTERNATIONAL ENERGY AGENCY
COAL INDUSTRY ADVISORY BOARD



32nd PLENARY MEETING

DISCUSSION REPORT

IEA Coal Industry Advisory Board Plenary Meeting
OECD Headquarters in Paris, 18/19 November 2010

OECD – 2, rue André Pascal– 75777 Paris Cedex 16

PROGRAMME – Thursday, 18 and Friday, 19 November 2010

SESSION 1: Global Value of Coal: a study of coal's socio-economic value

Chaired by Mr. Greg Boyce, Chairman & Chief Executive Officer, Peabody Energy, USA

Presentation of the Draft Report and Key Messages

Dr. Frank Clemente, Penn State University

Discussion

SESSION 2: Coal's Role in a Diversified Energy Future

Chaired by Mr. J Brett Harvey, President and Chief Executive Officer, CONSOL Energy Inc., USA

German Energy Policy Developments – What are the Implications for Coal Use in Germany and Beyond

Statement by Dr.-Ing Johannes Lambertz, Chief Executive Officer, RWE Power AG

A US Perspective on Coal's Role in a Diversified Energy Future

Mr. Steven Winberg, Vice President of Research & Development and Coal Conversion & Power Development, CONSOL Energy Inc., USA

European Energy Policy and its Future Implications for Energy Mix

Mr. Philip Lowe, Director-General, DG Energy, European Commission

How achievable is the 450ppm target without using CCS in coal-fired power plants?

Dr.-Ing Markus Ewert, Vice-President Strategy & Corporate Development, New Technologies, E.ON AG, Germany

Discussion

SESSION 3: Low Emission Energy Technologies for a Low Carbon Future

Chaired by Mr. Doug Ritchie, Chief Executive Energy, Rio Tinto, Australia

Developments Since Copenhagen

Mr. Richard Baron, Head of IEA Climate Change Unit, IEA

Carbon Capture and Storage: outlook and IEA activities

Mr. Juho Lipponen, Head of IEA CCS Technology Unit, IEA

Low Emission Energy Technologies

Mr. Stu Dalton, Director, Generation, Electric Power Research Institute, USA

The Need for Carbon Capture and Storage

Mr. Kurt Waltzer, Clean Air Task Force, Boston, USA

Discussion

Presentation: IEA World Energy Outlook 2010

Mr. Nobuo Tanaka, Executive Director, IEA

Discussion

Introduction

The aims of the sessions were to engage the IEA Secretariat, CIAB Members including consumers (particularly the electricity industry and its customers), producers and infrastructure/transportation providers and invited guests in a debate on major issues affecting the coal industry. These issues, including coal's role in supporting energy security and efforts and technologies to mitigate climate change, affect both developed and developing countries.

SESSION 1: Global Value of Coal: a study of coal's socio-economic value

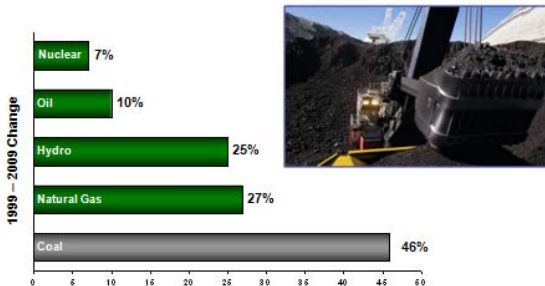
Session chaired by Mr. Greg Boyce, Chairman & Chief Executive Officer, Peabody Energy, USA

Mr. Greg Boyce characterised coal as the fastest growing fuel over the last decade, in its role as the primary fuel used for electricity generation. As population and energy demand grow in the future, and the challenge of improving people's global access to energy is addressed, he projected a continuing role for coal in electricity generation over many decades to come. He said that the growth in electricity generating capacity over the next fifteen years is projected to be equivalent to the current total capacity in the USA.

Coal: The World's Fastest Growing Fuel for the Past Decade

Peabody

Change in Global Energy Consumption



Source: BP Statistical Review of World Energy, June 2010.

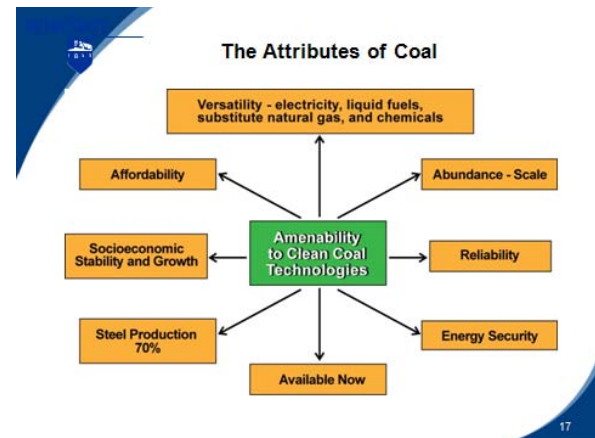
He stated that China has the world's largest fleet of super-critical coal-fired power plants and that carbon capture and storage (CCS)

needs to be more robustly demonstrated worldwide.

He also stressed that we must continue to commercialise next generation clean coal technologies, including CCS. This is the sustainable path for coal that creates global energy access, while advancing environmental goals.

Presentation of Key Messages

Dr. Frank Clemente illustrated the strong correlation between world population and economic growth, both of which had driven a more than doubling in coal use between 1970 and 2009. Coal played a major role in electricity generation, he said, further illustrating the clear correlations between increased electricity use and both increased life expectancy and reduced infant mortality in many countries. The main global challenges to 2050 were characterised as meeting increasing energy and electricity requirements driven by population, economic growth and energy poverty alleviation while simultaneously reducing greenhouse gas emissions by 80%.



He said that coal will need to continue playing a major role in meeting world energy needs, based on its abundant reserves, secure and reliable supply and affordability; while illustrating past experience in the USA that demonstrates how technology can be applied to mitigate emissions from coal-fired power stations. He suggested that the growing role of coal had been consistently underestimated in the past and that this continued to be the case, resulting in unrealistically high projections of electricity

required to be produced from other forms of energy.

Session 1 Discussion

There was general support from the meeting for further promoting the messages on coal, especially given the very considerable amount of work done by Dr. Clemente and colleagues. Coal was seen as remaining of central importance to electricity generation and this role is not clearly understood by policy makers and the public. The IEA's general willingness to give support in order to publish the work, after some refinement, was well received.

SESSION 2: Coal's Role in a Diversified Energy Future

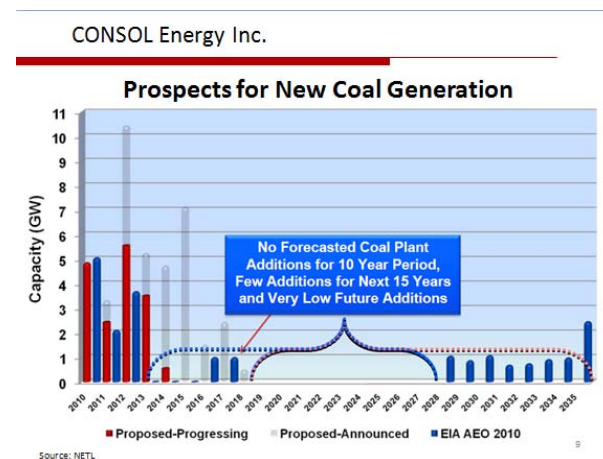
Session chaired by Mr. J Brett Harvey, Chairman, President and Chief Executive Officer, CONSOL Energy Inc., USA

German Energy Policy Developments – What are the Implications for Coal Use in Germany and Beyond

At the beginning of the second session, **Dr. Johannes Lambertz** updated the meeting on the German government's concept on the development of the German energy market and its effects on coal investments. He welcomed the Energy Concept as a framework for providing a predictable energy system, combining strong sustainable development and security of supply. He saw a brighter mid- to long-term future for coal benefitting relative to gas. Possible drawbacks resulting from the further integration of renewables will be compensated by the life time extension of nuclear power plants, dampening the price for carbon. In addition, due to insufficient pumped storage potential, coal will play a key role in order to provide the flexible windless reserve. He critically drew attention to the commercial and public acceptance issues associated with further renewables integration, including the need for nationwide transmission system reinforcement. If this need is not met, the demand on coal to provide reserve capacity will increase.

A US Perspective on Coal's Role in a Diversified Energy Future

Mr. Steven Winberg gave a presentation on future expectations of investment in coal fired power plant in the US market. In his view, the US market will see only very low coal-fired electricity generation capacity additions over the medium term (between now and 2020), due to low priced natural gas and already announced regulatory initiatives that will likely result in the closure of older, smaller coal-fired power plants. He saw natural gas as very likely to be the major fuel to replace the projected 40 GW of coal capacity lost due to these regulations.



He welcomed the existing Department of Energy's Coal R&D programme to foster the commercial introduction of CCS from 2016 onwards and allow coal to compete in the electricity generation market in the future. He stated that additional spending is necessary to reduce capital costs of new coal technologies and improve efficiencies.


European Energy Policy and its Future Implications for Energy Mix

At the beginning of his presentation, **Mr. Philip Lowe** stressed that EU legislation sets common rules e.g. on the common market and on environmental protection, but that the energy mix is a matter of choice for each EU Member State. He pointed out, however, that in a more and more integrated European energy market, the European Commission, the Member States and the European Parliament need to closely work together to ensure affordability, security and sustainability of EU's energy supply. He

presented the European Commission's Energy Strategy 2020 as well as the EU Energy Infrastructure Package and outlined plans for the Energy Roadmap 2050. The future of coal is closely linked to the successful development and implementation of clean coal technologies, such as CCS, he said. The EU aims at proving by 2020 that CCS can be commercially viable under the Emission Trading Scheme, for which a concerted effort by the public sector and the industry is needed. He highlighted the CCS project network, with the 6 CCS demonstration projects supported by the €1 billion EU contribution as the first such close knowledge-sharing network worldwide. CCS, like all new technologies, faces 4 challenges: technical, commercial, budgetary viability and public acceptability.

How achievable is the 450ppm target without using CCS in coal-fired power plants?

As the final speaker of Session 2, **Dr. Markus Ewert** highlighted a number of possible future development paths for energy systems without the inclusion of CCS. He reasoned that existing threats to CCS deployment, including arguments such as carbon leakage, storage site competition and public acceptance, may prevent (timely) CCS development. His conclusion was that, even without CCS, it is possible to reach climate reduction targets by deploying nuclear, gas or renewable capacities, or a mixture.



There is no silver bullet while the replacement of CCS by nuclear is economically attractive with low social acceptance

Scenario	Sustainability			Possible impediments		
	Environment	Costs	Resources	Technologies commercial available	Necessary infrastructure	Social acceptance
IEA 450ppm	+	+	o	o	+	o
Nuclear	-	++	o	+	++	-
RES	++	-	++	+	-	++
Nu + RES	o	+	+	+	o	+
Gas + Nu	o	o	-	+	++	o

Future scenario supply without CCS

He said that a scenario including new nuclear plants is the lowest cost scenario, with an additional 55% of new nuclear power plant capacity by 2035 compared to the CCS

scenario (IEA 450 Scenario). Whereas the nuclear scenario would have to struggle for public acceptance, the widely accepted renewable scenario appears to be the highest cost case, involving an additional 165% of investments in the period to 2030 compared to the CCS case, and this could not be compensated by the savings in fuel costs.

Session 2 Discussion

In response to the statement on the German Energy Concept and expected energy system developments, **Mr. Roger Wicks** highlighted the importance of Germany as a future role model for other developed countries, which deserves further discussion in the future. He appreciated Dr. Lambertz' view that coal can stay competitive even in the case of future electricity system developments including increasing renewable energy integration, carbon prices and nuclear power plant lifetime extension.

Ms. Anna Belova highlighted the necessity of encouraging investments in a variety of clean coal technologies, as the future of the energy system is dedicated to emission reductions. She pointed out that scenario projections showing a declining role for coal can be self-fulfilling by discouraging investment in new technology, but questioned whether the 450 Scenario is achievable in practice. **Mr. Greg Boyce** raised the possibility of EU industry losing international competitiveness as it bears the additional costs of emission reductions, while **Mr. Robert Gentile** pointed out that the additional cost for private consumers may affect policy direction. **Mr. Philip Lowe** reaffirmed the EU's commitment to the agreed greenhouse gas targets and stressed that the business community can expect clarity also as regards such objectives, but reaffirmed that Commissioner Oettinger is very conscious of EU competitiveness issues.

SESSION 3: Low Emission Energy Technologies for a Low Carbon Future

Session chaired by Mr. Doug Ritchie, Chief Executive Energy, Rio Tinto, Australia

Prior to the presentations, **Mr. Doug Ritchie** stated that, in order to meet emission reduction targets, climate change policy development must be informed by reliable advice on energy technology options and costs.

Developments Since Copenhagen

In the first presentation of Session 3 **Mr. Richard Baron** discussed the outcomes of the Copenhagen Climate Conference. He highlighted the merely noted agreements on a target to limit global temperature increase by 2°C, even though the additionally agreed pledges fall a long way short of the 2°C goal. He also mentioned the positive development of China and India both associating with the findings, pledges and targets. In addition he provided the audience with limited expectations of the outcomes of United Nations climate negotiations in Cancun, citing issues with regard to the Kyoto Protocol and Long-term Cooperative Action such as

- the inclusion of USA and other key emitters,
- the surplus of emission rights in Russia and Ukraine,
- developments of CDM, including CCS and nuclear,
- measuring emission goals and financial contributions and
- technology cooperation and funding.

With regard to future negotiations he raised the question of the necessity of global and legally-binding agreements, as he sees a push for sustainable development on a regional basis, such as existing and proposed emissions trading schemes, low-emission development strategies elaborated in developing countries, and other massive CO₂ reduction plans (e.g. China).

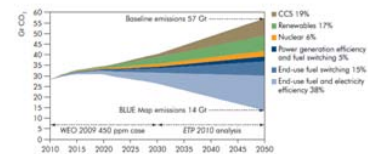
Carbon Capture and Storage: outlook and IEA activities

Mr. Juho Lipponen described the future outlook and challenges for CCS. He described the global situation as being at the crossroads between doubling or halving energy related CO₂ emissions and emphasised the necessity of deploying a

wide range of low-carbon technologies. He saw the next ten years as a critical period in which to kick-start CCS development and also pointed out the potential significant contribution of CCS to emissions reduction in a variety of sectors.



CCS: SIGNIFICANT POTENTIAL



- 2nd largest share (19%) of CO₂ reductions in 2050
- 31% of CO₂ reductions in power sector in 2050
- Scenario without CCS-power: + USD 4,7 trillion additional investment cost 2010-2050
- In industry & fuel transformation, CCS contributes to 33% of direct emissions reductions

According to the findings of the Energy Technology Perspectives Blue Map Scenario, which is in line with the World Energy Outlook 450 Scenario, CCS can play a significant role in CO₂ reductions, coming to represent 19% of the total reductions required in 2050. CCS will also have a beneficial impact in reducing the total cost of emission reductions globally. For example, in the power sector alone, integrating CCS could reduce additional investments by US\$ 4.7 trillion in the period to 2050.

According to him, to foster the emerging and future CCS deployment requires

- sound strategies and improved awareness of the technology,
- incentive and regulatory frameworks,
- funding and knowledge sharing and
- storage site evaluation and long-term security measures

to be developed and implemented, a process in which the IEA is willing to play a key facilitator role.

Low Emission Energy Technologies

In his presentation, **Mr. Stu Dalton** validated the findings of the Session 2 speakers, saying that future US energy systems with CCS show significantly lower overall cost

than in a world without this option. He also underlined the necessity of a quick roll-out of CCS and other low-carbon options in order to reach the global emission stabilisation targets, as coal is continuing to grow as a global commodity.

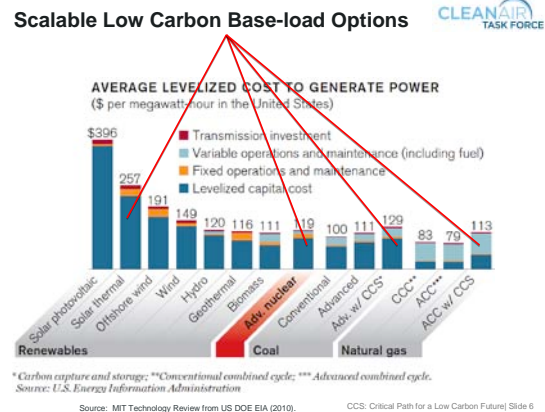
affordable base-load, low carbon power solutions. He argued for rapid deployment of CCS worldwide, given that some of the latest climate science indicates we may be beyond a target of 2° C warming by 2100.

Advanced Coal Technology Challenges

- Pulverized coal (PC)**
 - Increase plant efficiency
 - Reduce energy penalty and cost of CO₂ capture
 - Retrofit CCS in existing plants
- Integrated gasification combined cycle**
 - Integrate CCS in optimized plant design
 - Cost
- Oxy-firing**
 - Scale and Gas clean-up requirements
 - Storage/Sequestration
- CO₂ storage – Confirm**
 - Permanent
 - Environmentally safe

Goals: Reduce costs and demonstrate technologies, storage

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In support of previous speakers, he pointed out that political will and proper storage site selection and management are likely the biggest issues for CCS deployment.

The development of the CCS industry will occur in three phases. The first is a Pioneer Phase that will overcome the increased risk and costs resulting from technical uncertainties. The second is a Cost Reduction Phase during which the learning curve will lower costs to the point at which the technology reaches the third period, or Maturity Phase.

He also examined effects of carbon reduction targets on inter-fuel competition in the US market. With regard to the possible effects of carbon pricing in the USA, EPRI modelling studies show the potential for dispatch of uncontrolled coal at prices below US\$ 50/tCO₂, as coal will stay competitive. He showed that pricing at this level will likely not reach the desired emission reduction targets.

Citing USA as an example, he did not see an adequately funded Pioneer Phase program in place today. The current spending by the US Administration of roughly US\$3 billion is clearly falling behind the \$25 billion being necessary in the US for a CCS pioneer phase.

The Need for Carbon Capture and Storage

He also emphasised the need for CCS deployment on both coal- and natural gas-fired power plants, arguing that a price-related shift to a new tranche of natural gas combined cycle electricity generating plant without CCS would have only limited CO₂ emissions reduction benefits.

During the last presentation of Session 3, **Mr. Kurt Waltzer** stated that much more effort and co-operation are needed in developed countries, in order to introduce CCS into the market. He also underlined that dynamic markets, especially in China and India, give the opportunity to reduce technology costs and to commercialize CCS.

Finally, he noted that pioneer phase costs and timelines could be accelerated by greater collaboration between the private sector in developed and developing countries, backed by government encouragement. Several such collaborations already exist between companies from the US and China.

According to him, the rise of rapidly developing economies is leading to an energy usage footprint that will be substantially larger than the OECD. Urbanization and development needs in those regions require development of

Session 3 Discussion

Dr. Don Elder pointed out, that there is a cost to households of meeting the 450 Scenario and questioned whether households would be prepared to pay that cost, especially considering research that shows that households apply a discount rate significantly greater than 100%, and therefore will not make an investment unless its payback period is less than a year.

In response, **Mr. Richard Baron** referred to the results of WEO modelling and Energy Technology Perspectives findings, showing GDP reduction of 2% from baseline levels in 2030 (3.2% by 2035) and additional investment requirements in the transport and buildings sectors, which could be more than compensated for energy cost savings. He also mentioned the IEA's 25 policy recommendations on energy efficiency to governments, including policy measures to provide sound incentives for energy efficient appliances and buildings.

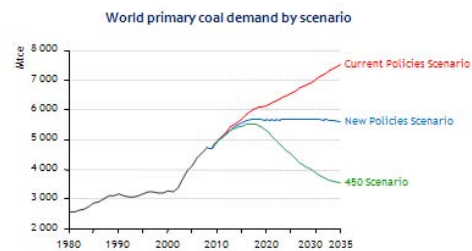
The meeting generally endorsed the low carbon technology development potential in developing economies, recognising the IEA knowledge sharing initiatives and emphasising the urgent requirement for effective technology transfer mechanisms.

Presentation: IEA World Energy Outlook 2010

Presentation given by Mr. Nobuo Tanaka, Executive Director, IEA

Mr. Nobuo Tanaka gave a presentation on the findings of the recently published WEO 2010. He explained the introduction of the so-called New Policies Scenario, which reflects all existing energy and emissions policies and plans together with a cautious implementation of the pledges under the Copenhagen accord. The New Policies Scenario shows a 20% increase in coal demand by 2035, with demand being significantly higher in the Current Policies Scenario and significantly lower in the 450 Scenario.

Primary coal demand trends

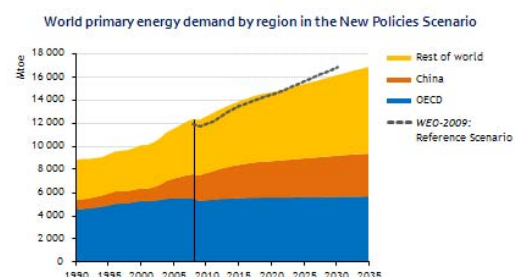


In the New Policies Scenario, demand for coal increases by 20% in 2008-2035, with almost all of the growth before 2020. Demand is significantly higher in the Current Policies Scenario and much lower in the 450 Scenario

Whereas the New Policies Scenario shows the implications of recent developments in climate and energy policy, the 450 Scenario sets out an energy pathway in line with limiting average global temperature increase to 2°C and the Current Policies Scenario describes how the energy trends would evolve if no new policies were adopted beyond mid-2010.

Mr. Nobuo Tanaka agreed with previous speakers, that growth in global energy demand will be mostly driven by non-OECD countries. In the New Policies Scenario global energy demand grows by 36% by 2035. He said that demand for coal and oil decreases in OECD countries relative to present levels, but that this is more than offset by increasing demand from non-OECD countries.

Recent policy commitments, if implemented, would make a difference

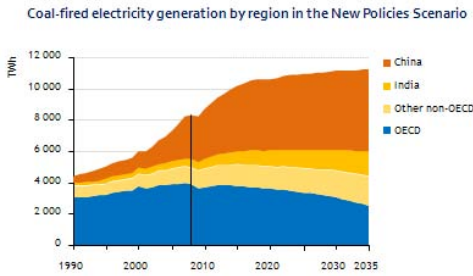


Global energy use grows by 36%, with non-OECD countries – led by China, where demand surges by 75% – accounting for almost all of the increase

With regard to growing coal demand in non-OECD countries it is unsurprising that the additional generation from coal-fired power plant fleet comes from non-OECD countries, especially from China and India. Again, these developments offset the declining coal-

fired power generation in OECD countries by far; so that coal will remain the backbone of electricity generation.

Coal remains the backbone of global electricity generation World Energy Outlook

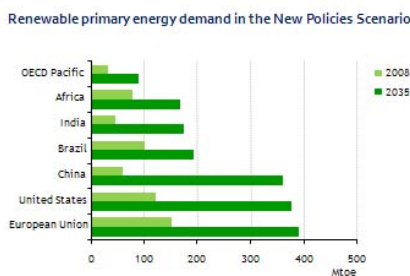


A drop in coal-fired generation in the OECD is offset by big increases elsewhere, especially China, where 600 GW of new capacity exceeds the current capacity of the US, EU & Japan

The future for crude oil and for gas both differ from the future of coal. In the New Policies Scenario oil production from conventional sources plateaus at around 65 mb/d, with all the growth coming from natural gas liquids and unconventional oil. Natural gas demand rises by 44% by 2035, with unconventional gas accounting for 35% of the growth. The gas glut has put downward pressure on gas prices and encouraged the shift away from oil indexation. With even lower gas prices, gas demand could be much stronger, backing-out renewables and coal in power generation.

Renewable sources are entering the mainstream, but they need government support. Thanks to growing support, rising from US\$ 57 bn in 2009 to over US\$ 200 bn in 2035, the use of renewables triples and their share in electricity supply rises from 19% to 32%.

Renewables enter the mainstream.... World Energy Outlook

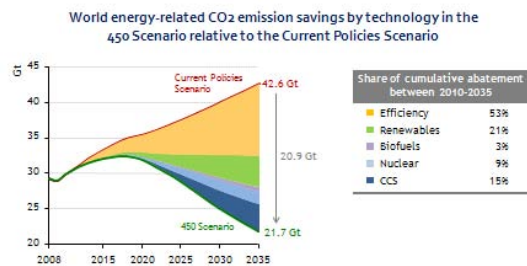


The use of renewable energy triples between 2008 & 2035, driven by the power sector where their share in electricity supply rises from 19% in 2008 to 32% in 2035

With regard to the 450 Scenario, he stated that the lack of transparency in the Copenhagen pledges amounts to some 3.9 Gt CO₂, which could more than outweigh the abatement in Annex-I countries. Moreover, the lack of ambition has increased the cost of achieving the 2°C goal by US\$ 1 trillion over 2010 to 2030 compared to WEO 2009.

Echoing previous speakers, he mentioned the crucial role of CCS in the set of abatement measures over the next 25 years and pointed out that in the 450 Scenario low-carbon technologies account for over three-quarters of global power generation by 2035.

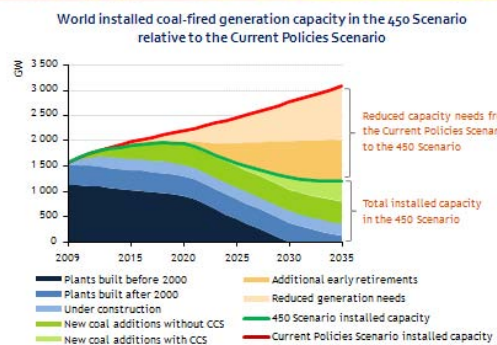
The 450 Scenario: Abatement by technology World Energy Outlook



In the 450 Scenario, compared with the Current Policies Scenario, efficiency measures provide 53% of the necessary abatement, but renewables, CCS & nuclear are also crucial

In comparison to the Current Policies Scenario, coal fired power generation decreases significantly in the 450 Scenario. CCS is expected to play a crucial role in this scenario, embracing almost 95% of coal-fired capacity added between 2021 and 2035.

Peak coal capacity in the 450 scenario World Energy Outlook



He highlighted the message that the age of cheap oil is over, but that international price increases will be reduced by well-targeted

policy measures. While renewables will enter the mainstream and reduce emissions, phasing-out the subsidies for fossil fuels is the most effective measure to cut energy demand.

He concluded with the message that next year's WEO will have a focus on coal as one of its special topics.

WEO Presentation Discussion

Mr. Roger Wicks expressed some concerns about the use of the "price gap" analysis by the IEA to estimate coal subsidies, especially with regard to countries such as South Africa that use indigenous, low quality coal that may have little or no value on international markets. He also welcomed the IEA's increasing focus on coal and signalled the CIAB's willingness to support this. **Mr. Nobuo Tanaka** thanked the CIAB for its offer of support for the WEO 2011, which will indeed provide a good opportunity to look into IEA's approach on the coal subsidy issue.

Replying to questions from **Mr. Milton Catelin and Ms. Anna Belova, Mr. Nobuo Tanaka** pointed out that the peak oil could be caused by demand reduction and a shift to alternatives, whereas addressing supply-side peak oil would be only a matter of sufficient investment. He also mentioned that total subsidies to renewables grow in all scenarios, but that unit costs will decline. He said that the growth of subsidies to renewables does not necessarily affect national debts as, depending on the type of policies in place, the costs of subsidies can be met from direct governmental expenditure or passed on to consumers.

Mr. Greg Boyce stated that energy poverty is a pivotal issue for the following decades, supported by **Mr. Don Elder** who argued for a single Scenario on energy poverty eradication in WEO 2011. With regard to these statements, **Mr. Nobuo Tanaka** explained the major findings of this year's WEO, including annual US\$ 36 bn expenditure to grant access to electricity to 1.2 bn people and access to clean cooking facilities to 2.8bn people by 2030. This year's study on Energy and Poverty shows that universal access to modern energy services can be achieved with the use of sustainable technologies, with decentralised renewables options playing a key role in electricity access for rural zones. The IEA treated the issue of poverty eradication as a special case. This reveals that the modest impacts of attaining universal modern energy access for CO₂ and oil demand in the New Policies Scenario would be even smaller if the generation fuel mix to supply the additional demand was the same as that projected in the 450 Scenario. Mr Tanaka also encouraged the audience to study closely the findings of this chapter in WEO 2010 and to provide the IEA with feedbacks.

Answering one question from **Dr. Johannes Lambertz, Mr. Nobuo Tanaka** underlined that the IEA does not favour any fuel- or technology- specific policy choices, but draws on its findings of cost related modelling analyses. This also does include the costs and potential cost reductions of CCS.

Annex – Plenary Meeting Participants

CIAB MEMBERS:

Mr. Gregory H	Boyce	Chairman and Chief Executive Officer, Peabody Energy	USA
Mr. Milton	Catelin	Chief Executive, World Coal Association	GBR
Mr. Andrea	Clavarino	Chairman, Assocarboni and Executive Vice President, Coeclerici Group	ITA
Dr. Don	Elder	Chief Executive Officer, Solid Energy New Zealand Ltd.	NZL
Mr. Peter	Freyberg	Chief Executive, Xstrata Coal Pty Ltd.	AUS
Mr. Robert H	Gentile	President and CEO, Leonardo Technologies Inc.	USA
Mr. Yasuhiro	Haba	Executive Officer and General Manager, Energy & Mineral Resources Dept., Idemitsu Kosan Co. Ltd.	JPN
Mr. J Brett	Harvey	Chairman, President and Chief Executive Officer, CONSOL Energy Inc.	USA
Mr. Masayoshi	Kitamura	President, J-Power	JPN
Mr. Miroslaw	Kugiel	President, Kompania Węglowa S.A.	POL
Dr. Johannes	Lambertz	Chief Executive Officer, RWE Power AG	DEU
Dr. Xolani	Mkhwanazi	Chairman, BHP Billiton South Africa Ltd.	ZAF
Mr. C Wick	Moorman	Chairman, President and CEO, Norfolk Southern Corporation	USA
Mr. Doug	Ritchie	Chief Executive Energy, Rio Tinto plc	AUS
Mr. Seppo	Ruohonen	Managing Director, Helsinki Energy	FIN
Dr. Jürgen W	Stadelhofer	President and Chief Executive Officer, Coal and Minerals GmbH	DEU
Mr. Robert H	Stan	President and Chief Executive Officer, Grande Cache Coal Corporation	CAN
Mr. Michael W	Sutherlin	President and Chief Executive Officer, Joy Global Inc.	USA
Mr. Alain	Verry	Operating VP of Fossil-Fired Generation & Engineering, EDF	FRA
Mr. Angel L	Vivar	Director of Energy Resources and Environment, UNESA	ESP
Mr. Roger	Wicks	Special Advisor, Anglo Coal	ZAF USA

CIAB ASSOCIATES:

Mr. Tom	Altmeyer	Arch Coal Inc.	USA
Ms. Anna	Belova	Deputy CEO, Strategy & Corporate Development Director, Siberian Coal Energy Company (SUEK)	RUS
Mr. Zygmunt	Borkowski	Head of Foreign Relations, Kompania Węglowa S.A.	POL
Mr. Mick	Buffier	Group Executive – Corporate Affairs, Government and Industry Relations, and sustainable Development, Xstrata Coal Pty Ltd.	AUS
Mr. Antonio	Canseco	Presidente, Fuelec SL	ESP
Ms. Sylvie	Cornot-Gandolphe	Principal Energy Advisor, ATIC Services	FRA
Mr. Stuart M	Dalton	Director, Generation, Electric Power Research Institute (EPRI)	USA
M r. Hans	Daniels	Vice President, Alpha Coal Sales Co., LLC	USA
Ms. Gina	Downes	Corporate Consultant: Environmental Economics, Corporate Services Division, Climate Change and Sustainability Department, ESKOM	ZAF
Dr. John	Groom	Safety and Sustainable Development Advisor, Anglo American plc	GBR
Mr. Jan-Kees	Hordijk	Manager, Concepts & Economics, Essent Business Development	NLD
Mr Takenori	Iwasaki	Manager, Business Planning Department, J-Power	JPN
Mr. Kauno	Kaija	Director, Helsinki Energy/Group Services	FIN
Mr. Toshiya	Kawai	J-Power	JPN
Mr. Tim	Marples	UK Coal Mining Ltd.	GBR
Ms. Maggi	Rademacher	Performance Improvement and Operational Excellence, Steam	DEU

Dr. Hans-Wilhelm	Schiffer	Global, E.ON Kraftwerke GmbH Head, General Economic Policy/Science, RWE AG	DEU
Mr. Kunihiko	Shibata	Asst to General Manager, Energy & Mineral Resources Department, Idemitsu Kosan Co. Ltd.	JPN
Mr. Benjamin	Sporton	Director, Policy, World Coal Association	GBR
Mr. Skip	Stephens	Washington Representative for Joy Global Inc.	USA
Mr. Supriatna	Suhala	Executive Director, Indonesian Coal Mining Association (APBI- ICMA)	IDN
Dr. Martin	Wedig	Economics, Energy, Environment, German Hard Coal Association	DEU
Mr. Ross	Willims	Vice President External Affairs, BHP Billiton Metallurgical Coal	AUS
Mr. Alex	Zapantis	Manager, Climate Change - External Relations, Rio Tinto Coal Australia Pty Ltd	AUS

GUESTS & SPEAKERS:

Mr. Julian	Beere	Head of Business Development and Strategy, Thermal Coal, Anglo Operations	ZAF
Dr. Frank	Clemente	Penn State University	USA
Dr. Markus	Ewert	Vice President Strategy & Corporate Development, New Technologies, E.ON AG	DEU
Mr. Michael J.	Flannigan	Vice President of International Government Relations, Peabody Energy	USA
Mr. Ian	Hall	Regional Head of Strategy, Thermal Coal, Anglo American	ZAF
Mr. Philip	Lowe	Director-General, DG Energy, European Commission	EU
Mr. Norman	Mbazima	Anglo American	ZAF
Mr. Michael	Schütz	Policy Officer, DG Energy, European Commission	FRA
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Coal Industry Advisory Board

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