



Mitigating Environmental and Social Consequences of Coal Production and Use

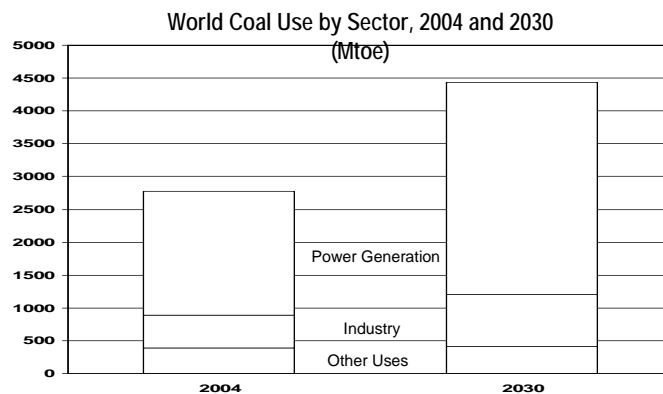
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Coal use is projected to increase throughout the world.



Source: International Energy Agency, *World Energy Outlook 2006*, p. 492.



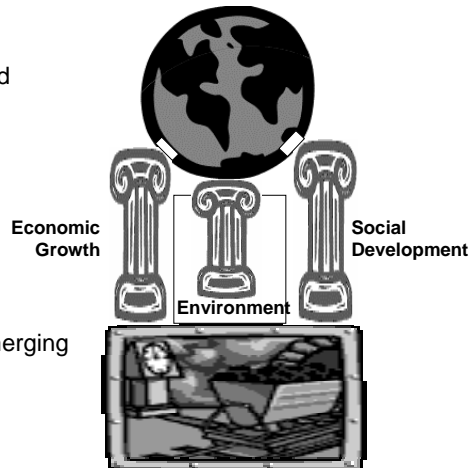
Energy security and sustainability are related.

Energy Security: “continued availability of energy in varied forms, in sufficient quantities and at affordable prices”

Energy security is required for all three pillars of sustainable development

In both industrialized and emerging economies, coal is:

- ▶ Abundant and widespread
- ▶ Affordable
- ▶ Safe/Reliable



Sustainability—we can't get there without coal and technology.

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IEA Definition: Zero Emissions Technologies (ZETs)

Zero Emissions Technologies (ZETs) for fossil fuels are innovative technologies that will virtually eliminate emissions from conversion fossil fuels and their consequential pressures on health and the environment.

Such emissions are known to be harmful to the environment and human health and contribute to climate change. ZETs will therefore enable fossil fuels to play a vital role in supporting sustainable economic development, providing security of energy supply and contributing to an improved environment and quality of life around the world.

ZETs can be used in applications for fossil fuels such as:

- ▶ power generation,
- ▶ fossil fuel production and refining,
- ▶ metals manufacturing,
- ▶ cement manufacturing, and
- ▶ other applications utilizing fossil fuels.

While some early applications may be commercial in 2006, ZETs are not yet ready for widespread commercial deployment and so will continue to be developed and demonstrated over the next decade.

ZETs require an adequate regulatory and legal framework, particularly for the transport and storage of carbon dioxide.

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FutureGen: Public-Private Partnership with International Participation



- 10-year industry/government partnership involves many power generators.
- FutureGen combines IGCC with CCS and hydrogen production.
- 275 MW power plant will emit virtually no pollutants.
- Investment required is US \$1 billion; site selection is now down to final four.

<http://www.fe.doe.gov/programs/powersystems/futuregen/index.html>

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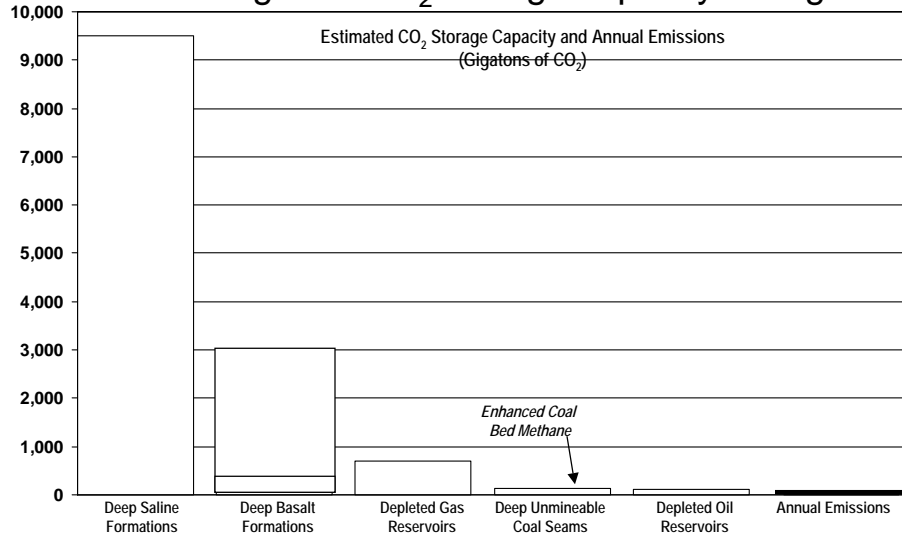
Coal Mine Methane (CMM)

- ▶▶ Opportunities exist within ECE Region to expand the use of CMM.
- ▶▶ Such use could:
 - ▶ Improve mine safety,
 - ▶ Reduce emissions of this potent greenhouse gas,
 - ▶ Provide a valuable energy resource.
- ▶▶ Technical/economic barriers must be overcome to enable expansion.
- ▶▶ Several international collaboration mechanisms currently operate:
 - ▶ UNECE Ad Hoc Group of Experts on Coal Mine Methane
 - ▶ Methane to Markets Initiative
 - ▶ Asia Pacific Partnership

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Potential global CO₂ storage capacity is huge.



Source: Battelle Memorial Institute, "Carbon Dioxide Capture and Geologic Storage: A Core Element of a Global Energy Technology Strategy to Address Climate Change," April 2006

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Sustainable use of coal faces challenges:

1. Maintaining a sustained effort over the 15-20 years required to develop and deploy the technology;
2. Financing the costs of these technologies, especially in the early stages of deployment when their costs are higher; and
3. Ensuring that they are deployed in developing countries where:
 - ▶ growth in coal use is expected to be greatest,
 - ▶ but the financial capabilities to pay for them are the least.

If these challenge are met, then coal can be secure and sustainable.

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Carbon Sequestration Leadership Forum (CSLF)

- ▶▶ An international climate change initiative with a focus on new technology development for separation, capture, transport, and long-term storage of CO₂
- ▶▶ Objectives:
 - ▶ Make new technologies broadly available internationally
 - ▶ Identify and address wider issues relating to carbon capture and storage
- ▶▶ Members include 21 countries and the European Commission

www.csforum.org

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Toward security and sustainability with coal...

- ▶▶ Coal use will unavoidably increase throughout the world.
- ▶▶ The need for security and sustainability will stimulate innovation, creating coal technology that is clean, climate friendly, and affordable.
- ▶▶ Advanced technology for sustainable use, such as Zero Emissions Technologies and Carbon Sequestration, are under development.
- ▶▶ Three challenges must be met to make coal use sustainable:
 - ▶ Sustaining the effort to develop and deploy technologies,
 - ▶ Financing the costs of these technologies,
 - ▶ Ensuring that they are deployed in developing countries.
- ▶▶ These challenges must and can be met.

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Agenda

- ▶▶ Role of Coal in Energy Security and Making the Link with Improved Environmental Performance, *Milton Catelin, World Coal Institute*
- ▶▶ Zero Emissions Fossil Fuel Power Plant: ZEP European Technology Platform, *Nick Otter, ALSTOM Power Technology Centre, United Kingdom*
- ▶▶ ZEP Platform Activities, Perspective of an Energy Supply Company, *Heinz Bergmann, RWE Power, Germany*
- ▶▶ Coal Mine Methane: A Global Resource for Sustainable Development, *Roland Mader, Germany and UK, Chair Group of Ad Hoc Group of Experts on CMM*
- ▶▶ Coal Industry as a Foundation of Steady Energy Supply, *Borys Gryadushchyy, Donetsk Research Institute of Coal Mining, Ukraine*
- ▶▶ Discussion and Q&A