Coal’s Contribution to Security of Energy Supply in Europe
EURACOAL Members

- DEBRIV - Deutscher Braunkohlen-Industrie-Verein e.V. (GER)
- GVSt - Gesamtverband Steinkohle e.V. (GER)
- COALPRO - Confederation of UK Coal Producers (UK)
- ZPWGK - Polish Hard Coal Employer’s Association (POL)
- PPWB – Employer’s Confederation of the Polish Lignite Industry (POL)
- PPC - Public Power Corporation (GR)
- ZSDNP – The Employer’s Association of Mining and Oil Producers (CZR)
- CARBUNION - Federation of Spanish Coal Producers (ESP)
- MATRA - Matra Kraftwerk AG (HUN)
- Mini Maritsa Iztok EAD (BUL)
- PATROMIN - Federation of the Romanian Mining Industry (ROM)
- Hornonitrianske Bane Prievidza a.s. (SVK)
- VDKI - Verein der Kohlenimporteure e.V. (GER)
- CoalImp - Association of UK Coal Importers (UK)
- Swedish Coal Institute (SWE)
- Premogovnik Velenje d.d. (SLO)
- All-Ukrainian Coal Employers Association (UKR)
- TKI - Turkish Coal Enterprises (TUR)
- EPS - Electric Power Industry of Serbia (SER)
- RMU Banovici Coal Company (BiH)
- ISSeP - Institut Scientifique de Service Public (BEL)
- University of Nottingham (UK)
- Rock Mechanics Technology Ltd. (UK)
- Coaltrans Conferences Ltd. (UK)
- BRGM – Bureau de Recherches Géologiques et Minières (FRA)
- CERTH/ISFTA – Centre for Research and Technology Hellas/Institute for Solid Fuels Technol. & Applic. (GR)
- KOMAG Institute of Mining Technology (POL)
Coal’s contribution to security of energy supply in Europe

Agenda

- European coal potential
- Energy risk management – advantages of coal
- Coal’s challenge: climate protection policies
- Looking beyond 2020
Projected EU energy import dependence

The use of coal reduces import dependence.
The gas crisis – power generation 5th to 11th January 2009 - example Germany

Coal generation helped in the crisis, renewables did not.

24th September 2009 - Figure 5
Coal in Europe

Lignite production, hard coal production and imports in Mt in 2008

Data as per 2/2009

EURACOAL

24th September 2009 - Figure 6
## Hard coal - European potential (Mt)

<table>
<thead>
<tr>
<th>Country</th>
<th>Reserves</th>
<th>Resources</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Czech Republic</td>
<td>3,112</td>
<td>21,106</td>
<td>24,219</td>
</tr>
<tr>
<td>Germany</td>
<td>118</td>
<td>82,947</td>
<td>83,065</td>
</tr>
<tr>
<td>Hungary</td>
<td>276</td>
<td>5,075</td>
<td>5,351</td>
</tr>
<tr>
<td>Poland</td>
<td>12,459</td>
<td>167,000</td>
<td>179,459</td>
</tr>
<tr>
<td>Romania</td>
<td>14</td>
<td>2,373</td>
<td>2,387</td>
</tr>
<tr>
<td>Spain</td>
<td>868</td>
<td>3,363</td>
<td>4,231</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>432</td>
<td>186,700</td>
<td>187,132</td>
</tr>
<tr>
<td>Other EU</td>
<td>770</td>
<td>7,468</td>
<td>8,231</td>
</tr>
<tr>
<td><strong>TOTAL EU</strong></td>
<td><strong>18,049</strong></td>
<td><strong>476,032</strong></td>
<td><strong>494,081</strong></td>
</tr>
<tr>
<td>Turkey</td>
<td>413</td>
<td>793</td>
<td>1,206</td>
</tr>
<tr>
<td>Ukraine</td>
<td>32,039</td>
<td>49,006</td>
<td>81,045</td>
</tr>
</tbody>
</table>

Source: BGR
<table>
<thead>
<tr>
<th>Country</th>
<th>Reserves</th>
<th>Resources</th>
<th>Potential</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bulgaria</td>
<td>1,928</td>
<td>4,194</td>
<td>6,122</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>185</td>
<td>772</td>
<td>956</td>
</tr>
<tr>
<td>Germany</td>
<td>40,818</td>
<td>36,760</td>
<td>77,578</td>
</tr>
<tr>
<td>Hungary</td>
<td>2,633</td>
<td>2,704</td>
<td>5,337</td>
</tr>
<tr>
<td>Greece</td>
<td>2,876</td>
<td>3,554</td>
<td>6,430</td>
</tr>
<tr>
<td>Poland</td>
<td>3,870</td>
<td>41,000</td>
<td>44,870</td>
</tr>
<tr>
<td>Romania</td>
<td>408</td>
<td>7,947</td>
<td>8,355</td>
</tr>
<tr>
<td>Slovakia</td>
<td>83</td>
<td>525</td>
<td>609</td>
</tr>
<tr>
<td>Slovenia</td>
<td>315</td>
<td>341</td>
<td>656</td>
</tr>
<tr>
<td>Other EU</td>
<td>359</td>
<td>1,502</td>
<td>1,861</td>
</tr>
<tr>
<td><strong>TOTAL EU</strong></td>
<td><strong>53,475</strong></td>
<td><strong>99,299</strong></td>
<td><strong>152,774</strong></td>
</tr>
<tr>
<td>Bosnia-Herzegovina</td>
<td>2,369</td>
<td>1,814</td>
<td>4,182</td>
</tr>
<tr>
<td>Serbia</td>
<td>7,523</td>
<td>3,750</td>
<td>11,273</td>
</tr>
<tr>
<td>Turkey</td>
<td>1,814</td>
<td>7,176</td>
<td>8,990</td>
</tr>
</tbody>
</table>

Source: BGR
Power generation structure in selected EU 27 Member States

<table>
<thead>
<tr>
<th>Country</th>
<th>Gross power generation</th>
<th>Share of coal in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU 27</td>
<td>3,357,958 TWh</td>
<td>29</td>
</tr>
<tr>
<td>Poland</td>
<td>1,617,432 TWh</td>
<td>92</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>843,613 TWh</td>
<td>59</td>
</tr>
<tr>
<td>Greece</td>
<td>607,89 TWh</td>
<td>53</td>
</tr>
<tr>
<td>Germany</td>
<td>636,600 TWh</td>
<td>42</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>45,843 TWh</td>
<td>41</td>
</tr>
<tr>
<td>Romania</td>
<td>62,698 TWh</td>
<td>40</td>
</tr>
<tr>
<td>UK</td>
<td>398,327 TWh</td>
<td>38</td>
</tr>
<tr>
<td>Spain</td>
<td>303,007 TWh</td>
<td>22</td>
</tr>
<tr>
<td>Hungary</td>
<td>35,859 TWh</td>
<td>20</td>
</tr>
<tr>
<td>Italy</td>
<td>314,122 TWh</td>
<td>14</td>
</tr>
<tr>
<td>Belgium</td>
<td>85,535 TWh</td>
<td>8</td>
</tr>
<tr>
<td>France</td>
<td>574,473 TWh</td>
<td>4</td>
</tr>
</tbody>
</table>

As at 9/2008
What we want to achieve - the EU energy policy triangle

- **Competitiveness**: Coal prices are lower and less volatile than oil and gas prices.

- **Sustainable Development**: Clean coal and CCS must be part of the solution.

- **Security of Supply**: Indigenous coal plus diverse and well-functioning world markets give security.
Major risks - a combined energy, climate, foreign and economic policy is needed

Major risks to be managed by society*

1. Energy sources, transport and transit risks

2. Technical risks (infrastructure, new technologies)

3. Economic and business risks (trade, investment price volatility)

4. Geopolitical risks (strategic options, objective function of governments and other actors)

5. Environmental risks (emissions, climate)


Coal has advantages compared to other fuels regarding items 1 to 4 – the challenge is item 5.
Important coal policy issues (I)

Coal extraction: Access to Resources

- Member States should emphasize that assuring access to resources is a common task of the EU, Member States and industry in order to secure energy supply
  - No hasty closing down of mines on the basis of short-term considerations
  - The legal system must ensure that access to resources (opencast and underground) remains possible also in practice – this refers mainly to regional planning as well as environmental approval procedures
The challenge for coal is the environment – EU decisions concerning climate protection

EU objectives till 2020:

- 20% renewables, 20% energy savings; 20% less GHG

Possible objectives till 2050:

- Limit global rise in temperature ≤ 2°C; objective ≤ 450 ppm CO₂ in atmosphere
- Worldwide reduction of anthropogenic GHG emissions to 50% of 1990 level
- Fair burden sharing, i.e. industrialised countries reduce over-proportionally, i.e. 80 – 95% with 1990 as base year. Fairness at ≈ 2 t GHG emissions per capita per year
Electricity generation: significant capacity needs to be replaced in the short to medium term

Lifetime Assumptions:
- OIL: 30 years
- GAS: 30 years
- LIGNITE: 40 years
- COAL: 40 years
- NUCLEAR: 40 years

Source: Prognos, here: EU-25

24th September 2009 - Figure 14
Important coal policy issues (II) - Modernisation and increased efficiencies

The right base: continuous power plant modernisation/renewal
Continuous modernisation remains important
Germany – STEAG AG / EVN AG

DUISBURG - WALSUM 10

- New 750 MW hard coal-fired power plant
- Efficiency: > 45%
- 2010

Continuous modernisation and efficiency increase are a precondition for CCS.
Important coal policy issues (III) - CCS

- CCS is a **highly promising technology** within climate protection policies

- The demonstration **project network** proposed by the Commission and industry / the ZEP Technology Platform must be put into practice as soon as possible, best by 2015
  - Project selection - criteria and modalities to be definitely established in the Comitology procedure
  - Encourage Member States to co-finance the projects from emissions trading auctioning revenues

- Retrofit with CCS after 2020: in some places, top efficiencies may be the best option; any retrofit is subject to proportionality

- Capture-readiness as defined in the CCS Directive is backed
A number of CCS demonstration projects - Example UK

- Kingsnorth, e.on, 300 MW new post-combustion, 2014
- Ferrybridge, Scottish and Southern Energy, 500 MW retrofit, 2015+
- Tilbury, RWE nPower, 1600 MW new post-combustion, 2016
- Hatfield, Powerfuel Power, 900 MW new pre-combustion, 2012-14
- Teesside, Centrica etc., 800 MW new pre-combustion, 2013
- Killingholme, e.on, 350 MW new pre-combustion, 2016+
Climate protection in the EU
Two phases – two speeds

Conclusion: For the EU, this means that GHG emissions of 5.8 billion t/a in 1990 must be limited to ca. 4.6 billion t in 2020 and ca. 1 billion t/a in 2050.
The minus 80-95% CO$_2$ - case

- All fossil fuels to be used in industrial installations with CCS only; CCS becomes a general obligation for industry in Europe

- Operators of installations must pay for capture, transport and storage, independent of the fossil fuel type used

- The CCS infrastructure (transport and storage) is needed at around 2020 and becomes an issue of secure energy later
  
  - It creates planning security
  
  - It secures industrial activity in Europe and may become a production factor for Europe
  
  - Its construction is therefore of general interest; a single user cannot afford it; a common effort is needed
Conclusions

- Security of energy supply remains important

- Hard coal and lignite represent 80% of the EU-27 domestic fossil fuel resources

- In the decades to come,
  - access to coal resources,
  - continuous modernisation of coal-fired power plants and
  - carbon capture and storage (after 2020) for all fossil fuels, including the respective infrastructure,

will be essential for a secure, competitive and sustainable energy supply.

Coal will remain a part of the solution to Europe's energy supply.
Thank you for your attention!

Photos courtesy of:
- E.ON
- STEAG

Brussels - 24th September 2009