THE ROLE OF COAL IN EUROPE

World Mining Congress 2008

Dr. Maksymilian Klank
President
<table>
<thead>
<tr>
<th>EURACOAL Members</th>
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<tbody>
<tr>
<td>DEBRIV - Deutscher Braunkohlen-Industrie-Verein (GER)</td>
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<td>GVSt - Gesamtverband des deutschen Steinkohlenbergbaus (GER)</td>
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<tr>
<td>COALPRO - Confederation of the UK Coal Producers (UK)</td>
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<td>ZPWGK - Polish Hard Coal Employers’ Association (POL)</td>
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<td>PPWB - Confederation of the Polish Lignite Industry (POL)</td>
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<td>PPC - Public Power Corporation (GR)</td>
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<td>ZSDNP - Czech Confederation of Coal and Oil Producers (CZR)</td>
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<td>CARBUNION - Federation of Spanish Coal Producers (ESP)</td>
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<tr>
<td>MATRA - Matra Erőmu Rt (HUN)</td>
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<td>Mini Maritza Istok AG (BUL)</td>
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<td>PATROMIN - Federation of the Romanian Mining Industry (ROM)</td>
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<td>Banovici Coal Mining (BHZ)</td>
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<td>VDKI - Verein der Kohlenimporteure (GER)</td>
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<td>COALIMP - Coal Importers’ Association (UK)</td>
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<td>Swedish Coal Institute (SWE)</td>
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<td>HBP - Hornonitrianske Bane Prievidza AG (SVK)</td>
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<td>Premogovnik Velenje (SLO)</td>
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<td>EPS - Electric Power Industry of Serbia (SER)</td>
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<tr>
<td>BRGM - Bureau de Recherches Géologiques et Minières (FRA)</td>
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<tr>
<td>ISSeP - Institut Scientifique de Service Public (BEL)</td>
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<td>University of Nottingham (UK)</td>
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<td>Rock Mechanics – Int. Mining Consultants Ltd. (UK)</td>
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<td>ISFTA - Institute for Solid Fuels Technology &amp; Applications (GR)</td>
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<td>Coaltrans Conferences Limited (UK)</td>
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<tr>
<td>All-Ukrainian Coal Employers’ Association (UKR)</td>
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<td>Euriscoal (BEL)</td>
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<td>CMC KOMAG (POL)</td>
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Coal in Europe
Lignite production, hard coal production and imports in Mt in 2007

Data as per 7/2008
EU dependence on energy imports will increase

Use of domestic coal reduces import dependence

Source: European Commission

World Mining Congress – September 2008, Figure 4
Clean coal comes in three stages

**Clean coal I**
Retrofit and new-build in line with state of the art, increase in efficiency, reduction of SO$_2$, NO$_x$ and dust

**Clean coal II**
Research and development for increase in efficiency to > 50 %

**Clean coal III**
CO$_2$ capture and storage

Investment in ultra-modern technology
Polish Coal Basins and Reserves

DZW Lower
Silesia Coal Basin
GZW Upper
Silesia Coal Basin
LZW Lubelskie
Coal Basin

- Viable reserves: 16.050 million t
- Industrial reserves: 6.725 million t
- Operational reserves: 4.800 million t
- Easily accessible reserves: 2.750 million t

Source: ZPGWK
## Export developments, Poland 2004 - 2006

<table>
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<tr>
<th></th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
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<tbody>
<tr>
<td>Hard coal output</td>
<td>99 Mt</td>
<td>97 Mt</td>
<td>94 Mt</td>
</tr>
<tr>
<td>Hard coal exports</td>
<td>21 Mt</td>
<td>19 Mt</td>
<td>16 Mt</td>
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<tr>
<td>Steam coal</td>
<td>18 Mt</td>
<td>16 Mt</td>
<td>13 Mt</td>
</tr>
<tr>
<td>Coking coal</td>
<td>3 Mt</td>
<td>3 Mt</td>
<td>3 Mt</td>
</tr>
<tr>
<td>Coking exports</td>
<td>5 Mt</td>
<td>4.5 Mt</td>
<td>6.3 Mt</td>
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<tr>
<td>Export rate</td>
<td>28 %</td>
<td>25 %</td>
<td>26 %</td>
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<tr>
<td>Major important countries/regions</td>
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<td>EU-15 after 2004: E-25</td>
<td>17.5 Mt</td>
<td>17.1 Mt</td>
<td>15.9 Mt</td>
</tr>
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</table>
Brown coal industry in Poland in 2007

- The 2007 production of brown coal was 57.4 million tons.

- The employment in brown coal industry amounts to about 20,000 persons.

Source: ZPGWK
German Lignite: two projects, one goal - the low-emission lignite-fired power plant

Conclusion: Carbon Capture & Storage opens up the use of fossil energy sources with dramatically reduced emissions, after 2020
Financial aid for German hard coal

Including RAG's own contribution. Till 2006: according to coal-policy agreements (without consideration of the shift in time for payments); from 2012: according to framework agreement 2007; 2018 subject to review in 2012; from 2019: no aid.
Additional fiscal costs in case of stopping German hard coal mining by 2018

Million € per year*

* Less income / more expenditure of all public budgets, only Ruhr mining region

Source: Prognos, 2007
Czech Republic: OKD hard coal sales

- 2004:
  - Coking: 7.3 MM tons
  - Steam: 5.9 MM tons
  - Total: 13.2 MM tons

- 2005:
  - Coking: 7.0 MM tons
  - Steam: 5.8 MM tons
  - Total: 12.7 MM tons

- 2006:
  - Coking: 7.8 MM tons
  - Steam: 5.7 MM tons
  - Total: 13.5 MM tons

- 1H 2006:
  - Coking: 3.7 MM tons
  - Steam: 2.7 MM tons
  - Total: 6.5 MM tons

- 1H 2007:
  - Coking: 3.9 MM tons
  - Steam: 2.5 MM tons
  - Total: 6.4 MM tons

Legend:
- Blue: Coking
- Yellow: Steam
Czech Republic - Lignite

Stable brown coal and lignite production

2005: 48,680
- Sokolovska uhelna a.s.: 10,3
- Mostecka uhelna a.s.: 16,1
- Severoceske doly a.s.: 22,3

2006: 48,500
- Sokolovska uhelna a.s.: 10,3
- Mostecka uhelna a.s.: 15,3
- Severoceske doly a.s.: 22,5

2007: 49,320
- Sokolovska uhelna a.s.: 10,3
- Mostecka uhelna a.s.: 14,6
- Severoceske doly a.s.: 22,5

Source: ZSDNP
Fuel Input for Power Generation in UK

Source: EUROSTAT
United Kingdom: Over 11 GW new coal plant is proposed

Opted-in – 20.6 GW
Opted-out – 8.2 GW
New – up to 11.4 GW

Source – EWS Energy/HMRC
Coal in Greece - Dominant in Electricity

- **Western Macedonia** (Ptolemaida, Amydeo, Florina): 1.898 million tons or 59.3%
- **Elassandra**: 146 million tons or 4.6%
- **Megalopolis**: 257.5 million tons or 8.1%

**Legend:**
- Deposits remaining 3.2 billion tons
- Lignite already consumed 1.3 billion tons
# Greek lignite (reserves)

<table>
<thead>
<tr>
<th>DEPOSIT</th>
<th>EXPLOITABLE RESERVES (5Mt)</th>
<th>STRIPPING RATIO</th>
<th>ASH CONTENT (DRY BASIS)</th>
<th>HEATING VALUE (MJ/kgr)</th>
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<tbody>
<tr>
<td>PTOLEMAIS-AMYNTION</td>
<td>1 595</td>
<td>5,3</td>
<td>29,2</td>
<td>5 650</td>
</tr>
<tr>
<td>FLORINA</td>
<td>325</td>
<td>7,8</td>
<td>39,6</td>
<td>8 180</td>
</tr>
<tr>
<td>MAGALOPOLES</td>
<td>237</td>
<td>2,3</td>
<td>32,6</td>
<td>4 350</td>
</tr>
<tr>
<td>ELASSONA</td>
<td>169</td>
<td>5,0</td>
<td>34,8</td>
<td>8 300</td>
</tr>
<tr>
<td>DRAMA</td>
<td>900</td>
<td>6,0</td>
<td>39,0</td>
<td>4 370</td>
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Power generation structure in selected EU-27 Member States - 2006

Gross electricity production
TWh  Coal share %
3.358  29
162   92
84    59
61    53
637   42
46    42
63    40
388   38
31    17
15    36
303   22
36    20
314   14
579   4

Source: EUROSTAT, Yearly Statistics 2007, as at 06/2008
Current challenges with regard to coal

- Access to Resources
  - No close down of mines based on short term considerations
  - The legal system must – also in practice – further allow reasonable planning permission delays for coal and lignite production

- Industry to continuously modernise coal-fired power plants, increase efficiency and to develop/deploy CCS; policy makers to help by delivering investment security

- The EU ETS as from 2013 – Fuel specific benchmarks with load factors offer incentives to modernise power plants. They are also an option for other industrialised and threshold countries.
Thank you