Poland Coal Sector Update to the 21st Session of the Global Methane Initiative (GMI) Coal Subcommittee

Bogota, 3 June 2015

Central Mining Institute, Katowice, Poland
Experimental Mine „Barbara”
The role of coal in power generation in Poland

Poland

EU 27
Coal’s share 29 %
Location of major Polish hard coal basins

- **RESOURCES:** 67,900 Mt
- **BALANCED RESOURCES:** 43,201 Mt
- **COMMERCIAL RESOURCES:** 6,09 Mt
- **EMPLOYMENT:** 113,256
- **NUMBER OF MINES:** 30
- **HARD COAL COMPANIES:**
  - KOMPAŃIA WĘGLOWA
  - KATOWICKI HOLDING WĘGLOWY
  - JASTRZĘBSKA SPÓŁKA WĘGLOWA
  - POŁUDNIOWY KONCERN WĘGLOWY
  - LUBELSKI WĘGIEL BOGDANKA
- **OUTPUT:** 79.2 mln tones
LOCATION OF THE HARD COAL MINES IN UPPER SILESIAN COAL BASIN

Jastrzębska Spółka Węglowa
Kompania Węglowa
Katowicki Holding Węglowy
Individual coal mines
Upper Silesian Coal Basin

Upper Silesian Coal Basin:

Presently 30 operating hard coalmines including:

26 gassy coalmines

19 use drainage systems

14 utilise CMM

data for the end of 2012 (since this spring deep restructuring started)
# Poland Coal Sector Update

## Trends in the coal sector

<table>
<thead>
<tr>
<th>Unit of measures</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total volume of methane emissions</strong></td>
<td>mln m³</td>
<td>%</td>
<td>803.0</td>
<td>821.9</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td><strong>Volume of captured methane (drainage)</strong></td>
<td>mln m³</td>
<td>%</td>
<td>227.6</td>
<td>250.9</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>28.3%</td>
<td>30.5%</td>
<td>31%</td>
</tr>
<tr>
<td><strong>Volume of utilized drainage methane</strong></td>
<td>mln m³</td>
<td>%</td>
<td>167.1</td>
<td>180.9</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>73.4%</td>
<td>72.1%</td>
<td>72.3%</td>
</tr>
</tbody>
</table>
TOTAL GAS RELEASED DURING MINING OPERATIONS (about 892 mln m³) 838.2 mln m³ in 2013

- Ventilation Air
- Methane (VAM) 76.5%
- Drainage gas 23.5%
Changes of absolute gasiness versus decrease of active gassy coalmines' number

- **Number of coalmines exploiting gassy coal seams**:
  - **1989**: 50
  - **1990**: 40
  - **1991**: 30
  - **1992**: 20
  - **1993**: 10
  - **1994**: 0
  - **1995**: 0
  - **1996**: 0
  - **1997**: 0
  - **1998**: 0
  - **1999**: 0
  - **2000**: 0
  - **2001**: 0
  - **2002**: 0
  - **2003**: 0
  - **2004**: 0
  - **2005**: 0

- **Absolute gasiness in mln m³/year**:
  - **1989**: 500
  - **1990**: 400
  - **1991**: 300
  - **1992**: 200
  - **1993**: 100
  - **1994**: 0
  - **1995**: 0
  - **1996**: 0
  - **1997**: 0
  - **1998**: 0
  - **1999**: 0
  - **2000**: 0
  - **2001**: 0
  - **2002**: 0
  - **2003**: 0
  - **2004**: 0
  - **2005**: 0
Methods of methane drainage in Poland:

- drainage of the coal seams ahead of mining (before exploitation),
- drainage during coal exploitation,
- drainage of goaves
Changes of coal seams’ permeability with the depth

Drainage ahead of mining possible

Permeability $3 \times 10^{-15} \text{ m}^2$

Critical permeability $3 \times 10^{-15} \text{ m}^2$

Drainage ahead of mining not possible

depth $H$, m
Share of methane from the exploited seams constitutes about 20-40% of total released methane.

Zone of relaxation and degassing of coal seams undermined and overmined by mining exploitation.
Degassing of the longwall by the mean of drainage gallery located in the roof layers

In favorable conditions effectiveness even up to 70%-90%
Consequences

Increased gas hazard
Drastically growing statistics of stopping coal exploitation

In more and more cases it is not coal mine management but... methane which is the critical factor determining coal output!
Poland Coal Sector Update

- New trends in the energy sector

Support system for CBM & CMM in Poland

Since March 11th, 2010 there is a support system for electricity produced from **high efficiency cogeneration** (Primary Energy Saving > 10%) from CBM and CMM.

This system is a real financial support for the efficient utilisation of CBM and CMM.

According to the energy law records, this system, will be valid until the year 2018
CMM Project Outlook

- Challenges to emission reduction projects in Poland
  - Lack of clear incentives for methane capture and utilisation e.g. production of electricity from VAM, CMM, CBM which could be easily utilised by the coal mines
  - Concern that it could have impact on renewable energy prices (analysis needed?)
CMM Project Outlook (2)

- Approaches to overcoming challenges
  - Legislation and regulation
  - Policies and incentives
  - Energy pricing reform
  - Capacity building
    - 2020 EU Regulations (drastic increase of penalties!)
    - Technology transfer (need for effective surface and underground directional drilling technology)
    - Training and workshops (surface and underground directional drilling technology)
    - Polish Geological Law (after latest modifications) classifies CBM exploratory works similar like shale gas operations....
  - Agreements and/or partnerships

Polish Mining is open for cooperation and investors
Anticipated or planned projects

Ministry of Environment Project (CBM):
- methane drainage ahead of mining using surface directional drilling well at „Wesola Mine”
- poor permeability,
- high strength of coal,
- poor recovery of methane
- fracturing is essential!
Toe intersection
Dart Energy project (CBM): methane drainage ahead of mining using surface directional drilling well in Gilowice (virgin coal seams) – effects similar like above…

Individual talks of Drilling Companies with mining operators …purchase of new underground drilling equipment (directional)
- R&D in Central Mining Institute in Katowice to assist CMM recovery
- Tests to increase permeability of hard coals:
  - Hydro fracturing & new blasting materials
  - Borehole mining
Conclusions – potential

- **23.5%** of total methane released during mining is being utilized
- Drop in drainage methane utilization: **72.3%** (in 2013) **down to 69.5%** (in 2014)
- Still venting to the atmosphere drainage gas - last year: **92 mln m3** – ready resource to utilize!
- **682 mln m3** VAM (including a.m. 92mln m3 is ready to manage (subject study?)
Conclusions – potential

- Shale gas (long way ahead ... ???) – vs CMM – resource ready to utilize!
- Smaller depth and strength
- Easier fracturing...
- Smaller investment
- Guaranty of local utilization (gas, el. & thermal energy)
- New jobs!
Poland Coal Sector Methane Action Plan

- Status of Coal Sector Methane Action Plan development

Long term vision of CMM national politics under construction
GIG Cooperation with UNECE and US EPA

- 10 years’ effective cooperation with UNECE group of experts GMI and US EPA
- US EPA grant to establish Polish VAM resources
- US EPA grants to define Drainage ahead of mining using surface directional drilling
- International Center of Excellence on CMM effect of above effective cooperation

Central Mining Institute, Katowice, Poland
Experimental Mine „Barbara”
ICE-CMM Tasks

- Solicit and collect relevant case studies and best practices in sustainable CMM management, provide as needed technical guidance for their development, and serve as a depositary of such cases and practices;
- Organise on-site training and visits to ICE-CMM (on a non-profit basis, using as needed cost-sharing mechanisms) by CMM practitioners from interested UN Member States. Such training would help disseminate best practices through concrete hands-on experience;
ICE-CMM Tasks

- In collaboration with the UNECE secretariat and members of the Group of Experts on CMM, organise off-site training activities on the application of best practices in various coal mining regions;

- Conduct research in its domain of work, as requested by UNECE member States, under auspices of the Group of Experts on CMM, and in collaboration with relevant intergovernmental and non-governmental organizations, industry and other stakeholders in the CMM field;
ICE-CMM Tasks

- Engage with a wider coal mining community, including the civil society, mining associations, and decision-makers through the use of electronic and social media in order to raise awareness of the challenges and opportunities in the CMM sector.
Contact Information

Jacek Skiba: jskiba@gig.eu

Central Mining Institute, Poland