Poland Coal Sector Update
Global Methane Initiative
Coal Subcommittee Meeting

Geneve, October 27th, 2015

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

Poland

Coal's share: 35%

EU 27

Coal's share: 29%
Location of major Polish hard coal basins

2012 DATA

- RESOURCES: 67,900 Mt
- BALANCED RESOURCES: 43,201 Mt
- COMMERCIAL RESOURCES: 6,09 Mt
- EMPLOYMENT: 113,256
- NUMBER OF MINES: 30
- HARD COAL COMPANIES:
  - KOMPANIA WĘGLOWA
  - KATOWICKI HOLDING WĘGLOWY
  - JAŚTRZĘBSKA 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:

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 process has started and it is still taking place)
## Poland Coal Sector Update

### trends in the coal sector

<table>
<thead>
<tr>
<th>Specification</th>
<th>Year</th>
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<tbody>
<tr>
<td>Absolute methane bearing capacity (mln m³/year)</td>
<td>825.9</td>
</tr>
<tr>
<td>Methane drainage (mln m³/year)</td>
<td>217.2</td>
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<tr>
<td>Amount of economically utilized methane (mln m³/year)</td>
<td>144.2</td>
</tr>
<tr>
<td>Number of the hard coal mines</td>
<td>39</td>
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<tr>
<td>Hard coal output (mln tones)</td>
<td>99.5</td>
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</tbody>
</table>

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TOTAL GAS RELEASED DURING MINING OPERATIONS (about 891.2 mln m³) 847.8 mln m³ in 2013

- Drainage gas (36%)
- Ventilation Air
- Methane (VAM) (64%)
Changes of absolute gasiness versus decrease of active gassy coalmines' number

- **Red bars**: Number of coalmines exploiting gassy coal seams
- **Blue line**: Absolute gasiness in mln m³/year

The graph shows the decrease in the number of active gassy coalmines over the years, along with the change in absolute gasiness in millions of cubic meters per year.
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

Depth $H$, m

0 200 400 600 800

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

Drainage ahead of mining possible

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

Drainage ahead of mining not possible
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%

US EPA prefeasibility study to estimate pre-drainage using underground directional drilling and ….to replace drainage galleries?
Consequences:

Increased gas hazard
Drasitcally 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
  
  - After last weekend parliamentary elections (October 25th, 2015) and change of ruling party chance for changes ???

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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 strengh of coal,
poor recovery of methane
fracturing is essential!

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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

- 23.7% of total methane released during mining is being utilized
- Drop in drainage methane utilization: 67.8% (in 2013) **down to 65.8%** (in 2014)
- Still venting to the atmosphere drainage gas - last year: 110 mln m3 – ready resource to utilize!
- 679.8 mln m3 VAM (including a.m. 110mln 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!

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Poland Coal Sector Methane Action Plan

- Status of Coal Sector Methane Action Plan development

Long term vision of CMM national politics under construction (New Government ?)
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 (last week - MoU document executed by Polish Minister of Economy)
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