Poland Coal Sector Update
Global Methane Initiative
Coal Subcommittee Meeting

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Geneve, September 24th, 2018

Central Mining Institute, Katowice, Poland
Experimental Mine „Barbara”
GŁÓWNY INSTYTUT GÓRNICTWA (GIG)
CENTRAL MINING INSTITUTE
is a scientific-development organization combined since the year 1925 with the Upper Silesian extractive industry and region.
Where are we?

We are in the heart of Polish hard coal mining industry, namely in Upper Silesia, in Katowice.
GŁÓWNY INSTYTUT GÓRNICTWA IN BRIEF

- Research institute, established 1925,
- Subordinates to the Minister of Energy of Poland,
- Employees (2017) – 493 people, including 10 professors, 17 Assoc. Prof. and 102 DSc,
- Notifying Body No. 1453 of the European Union within the range of the directives: 2014/28/UE – for explosives for civil uses, 2013/29/UE – for pyrotechnic articles, 2014/34/UE – for electrical equipment for use in potentially explosive atmospheres (ATEX), 2006/42/UE – for machinery used underground, and within IECEx system that facilitates international trade in equipment and services for use in explosive atmospheres.
- The Scientific Council holds full academic authorizations to grant the degree of doctor and doctor habil., and to apply for the title of professor in mining (since 1961) and environmental engineering (since 1998).
EXPERIMENTAL MINE „BARBARA”
AN UNIQUE PLACE FOR MINING INVESTIGATIONS IN A REAL SCALE

COAL DUST EXPLOSION IN EXPERIMENTAL GALLERY

BLASTING BUNKER

EXPERIMENTAL ADIT
GIG in 2017

- 3900 research and service works for nearly 1300 clients
- 16 applications for an invention and utility models
- Over 200 scientific publications
- About 100 million zł of revenue
- 17 accredited testing laboratories
- 46 projects, including 30 national and 16 international ones
- 129 people with academic degrees and titles among nearly 500 employees
- Nearly 2400 participants of trainings and courses
AREAS OF GIG’s activities

- Environmental engineering
- Safety and certification
- Mining and Geoengineering
- Education
POLISH MINING INDUSTRY
in brief
Coal in Europe and Poland

Lignite production
Hard coal production
Imports

Poland in 2017
[mln Mg]

Source: Euracoal
STRUCTURE OF ELECTRICITY PRODUCTION IN POLAND BETWEEN 2010 - 2017

![Graph showing the structure of electricity production in Poland between 2010 and 2017. The graph illustrates the percentage contribution of different energy sources, including hard coal, lignite, natural gas, renewables, and others, to the overall electricity production.](image-url)
Polish coal basins and reserves

- Resources: 56,220.48 Mt
- Economic resources: 3,573.69 Mt
- Production – 65.5 Mt, 
  - 53.0 Mt Steam coal,
  - 12.5 Mt Coking coal
- Number of hard coal mines – 21 (32 plants)
- Hard coal companies:
  - Polska Grupa Górnicza
  - Jastrzębska Spółka Węglowa
  - Węglokoks Kraj Sp. z o.o.
  - Spółka Restrukturyzacji Kopaliń S.A.
  - Tauron Wydobycie S.A.
  - Lubelski Węgiel Bogdanka
  - Others mines (Siltech, Eco-Plus, Silesia)
- Employment – about 82,700 workers
Hard coal mines in Upper Silesia Basin
The coal seams are mined in conditions of natural hazards

- Gas hazards
- Fire hazard
- Dust hazard
- Seismic and rock burst hazard
- Water hazard
- Climatic hazard
- Radiation hazard

Such mining conditions negatively affect the costs of mining activity of Polish companies.
Methane in Polish coal mines
Data for the end of 2017

- For 21 hard coal mines only 5 are not considered gassy-ones.

- In 13 coal mines drainage of the coal seams was carried out – by 20 surface and 2 underground methane drainage station plants
Methane in Polish coal mines

- Methane accompanying the hard coal exploitation is extremely dangerous for the underground work environment and it is also one of the most active greenhouse gases.
- Methane drainage in underground excavations in Polish mines is conducted to ensure the safety of mining operations.
- Most of the drained methane is released to the atmosphere.

**IT IS ESSENTIAL TO INCREASE COMMERCIAL USE OF METHANE AS AN ENERGY SOURCE.**
## CBM/CMM potential in Poland

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<tbody>
<tr>
<td>Absolute methane bearing capacity (mln m³/year)</td>
<td>878.9</td>
<td>880.9</td>
<td>855.7</td>
<td>834.9</td>
<td>828.8</td>
<td>828.2</td>
<td>847.8</td>
<td>891.2</td>
<td>933.0</td>
<td>933.8</td>
<td>948.5</td>
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<td>Methane drainage (mln m³/year)</td>
<td>268.8</td>
<td>274.2</td>
<td>259.8</td>
<td>255.9</td>
<td>250.2</td>
<td>266.7</td>
<td>276.6</td>
<td>321.1</td>
<td>339</td>
<td>342.1</td>
<td>337</td>
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<td>Amount of economically utilized methane (mln m³/year)</td>
<td>165.7</td>
<td>156.5</td>
<td>159.5</td>
<td>161.1</td>
<td>166.3</td>
<td>178.6</td>
<td>187.7</td>
<td>211.4</td>
<td>197.1</td>
<td>195</td>
<td>212</td>
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<td>Number of the hard coal mines</td>
<td>31</td>
<td>31</td>
<td>31</td>
<td>32</td>
<td>31</td>
<td>31</td>
<td>30</td>
<td>30</td>
<td>31</td>
<td>23</td>
<td>21</td>
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<tr>
<td>Hard coal output (mln tones)</td>
<td>87.4</td>
<td>83.6</td>
<td>77.3</td>
<td>76.1</td>
<td>75.5</td>
<td>79.2</td>
<td>76.5</td>
<td>72.5</td>
<td>72.2</td>
<td>70.4</td>
<td>65.5</td>
</tr>
</tbody>
</table>

72.0 mln tonnes
Total gas released during mining operations

(about 948.5 mln m³) 933.8 mln m³ in 2016

- Drainage gas: 36%
- Ventilation Air Methane (VAM): 64%
Methods of methane drainage in Poland:

- drainage of the coal seams ahead of mining (before exploitation),
- drainage during coal exploitation,
- drainage of goaves.
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 supports the efficient utilisation of CBM and CMM.

- According to the energy law records, this system will be valid until the year 2018

Long term program for CMM is needed
CMM/CBM projects outlook

- **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 sector is open for cooperation and investors
Planned projects

✓ Polish Oil and Gas Company (CBM): methane drainage ahead of mining using Surface directional drilling well at „Gilowice site”

✓ Specific conditions:
  ▪ poor permeability,
  ▪ high strength of coal,
  ▪ poor recovery of methane

✓ Fracturing to be implemented!

✓ Long term CBM project „Geo-Metan”
GIG support activities

- 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
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