Panel Discussion:
Challenges and Opportunities for Capture and Use of Coal Mine Methane in the COVID-19 World

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GŁÓWNY INSTYTUT GÓRNICTWA (GIG)
CENTRAL MINING INSTITUTE
is a scientific-development organization combined
since the year 1945
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.
AREAS OF GIG’s activities

- Mining and Geoengineering
- Environmental Engineering
- Clean Coal Technologies
- Occupational Safety in the Industry
- Material Engineering
- Certification and Attestation
- Training and Education
Basic information

GIG 2019 facts and figures

- Over 4000 research and service works for over 1600 clients
- About 100 million zł of revenue
- 27 applications for an invention, and 5 trademarks
- 173 scientific publications
- 63 projects: 38 international and 25 national ones
- 146 people with academic degrees and titles among 490 employees
- Over 2200 participants of trainings and courses

Global Methane Initiative

Basic information
Coal in Europe / Poland

### Coal in Europe 2018

<table>
<thead>
<tr>
<th>EU-28</th>
<th>million tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>lignite</td>
<td>367</td>
</tr>
<tr>
<td>hard coal</td>
<td>76</td>
</tr>
<tr>
<td>imports</td>
<td>166</td>
</tr>
</tbody>
</table>

**Note:** bars show million tonnes of coal equivalent (Mtce) while figures at top of bars show millions of physical tonnes (Mt).

**Source:** EURACOAL members – *2017 data**
Coal in Poland

Total coal production: 124.3 Mt
(2017: 130.7 Mt)

Hard coal 63.4 Mt
(2017: 65.8 Mt)

Lignite (brown coal) 58.5 Mt
(2017: 60.2 Mt)
Conditions in Polish hard coal mining industry

- Gas (methane) hazard
- Fire hazard
- Dust hazard
  - Seismic and rock burst hazard
  - Seismic and rock burst hazard
  - Water hazard
  - Climatic hazard
  - Radiation hazard
## Coal Mine Methane in Poland

<table>
<thead>
<tr>
<th>Specification</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absolute methane bearing capacity (million m³/year)</td>
<td>880.9</td>
</tr>
<tr>
<td>Methane drainage (million m³/year)</td>
<td>274.2</td>
</tr>
<tr>
<td>Amount of economically utilized methane (million m³/year)</td>
<td>156.5</td>
</tr>
<tr>
<td>Number of the hard coal mines</td>
<td>31</td>
</tr>
<tr>
<td>Hard coal output (Mt)</td>
<td>83.6</td>
</tr>
</tbody>
</table>
Total gas released during mining operations

(about 803.8 mln m³) 916.1 mln m³ in 2018

Ventilation Air
Methane (VAM) 62.5%

Drainage gas 37.5%
Coal Mine Methane utilisation

CMM drainage – implementation and utilisation

2019:
- Amount of economically utilized methane
  - 189.4 million m$^3$ CH$_4$
  - while 203.1 million m$^3$ CH$_4$ last year
- 34 CH$_4$ engines
- total power 72 MWe
Latest CMM related projects

- **PICTO** (Production Face Environmental Risk Minimisation in Coal and Lignite Mines),

  The main objective of the PICTO project proposed is “to develop an ICT system to eliminate or minimise undesired and unplanned production stoppages due to increased gas emissions at coal faces through the use of Integrated production process and environmental monitoring and control systems”.

  The project objective will be achieved through:

  - Systematic testing and monitoring of underground gas emission and ventilation conditions at faces and numerical modelling to optimise face monitoring and environmental control designs.
  
  - Systematic monitoring of gas drainage performance of drainage boreholes and numerical modelling to optimise face and tailgate gas monitoring and environmental control designs
  
  - Development of an ICT software tool and demonstration of the control procedures.
Latest CMM related projects

- **DD-MET** (Advanced methane drainage strategy employing underground directional drilling technology for major risk prevention and greenhouse gases emission mitigation)

The primary objective of the proposed project is to demonstrate application of long reach underground directional boreholes drilled above mined coal seams as a novel methane drainage technology in longwall mining of coal. The project aims at demonstration of alternative methane drainage technology (not used in Europe) which will contribute to increased mine safety and productivity, reduction of methane emissions and hazards mitigation costs. The project will be conducted in Poland and in Russia. The implementation of proposed technology will be supported by research (laboratory experiments, numerical modelling and extensive field testing) to assure adjustment to field conditions and technology optimisation. The aim of performing two field pilots in different geological and mining conditions of largest Polish and Russian hard coal basins will provide the opportunity to compare the results of individual tasks and will make this technology even more credible and universal. Project will develop a cost effective and environmentally friendly technology to perform methane drainage during coal seam exploitation using in-mine directional drilling replacing very expensive methane drainage galleries developed above mining coal panels, as well as other auxiliary methane drainage methods. The project assumptions will be confirmed in the field and, as a result, best practices will be derived, which will cover technical, technological, environmental and economic aspects, which should be considered in decision making for implementation of proposed drainage technology.
Major goal of this project is elaboration of hydraulic fracturing technology dedicated for the conditions of USCB. It will consist of the fracturing fluids recipes, adjusted for them proppant materials as well as technical and technological recommendations for performing the fracturing tests.
Covid-19 pandemic’s impact to the coal industry

- Impact of Covid-19 on the mining sector in Poland
Thank you for your attention

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