Poland

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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 2018

4274 research and service works for over 1800 clients

20 applications for an invention, utility models and trademarks

156 scientific publications

about 100 million zł of revenue

18 accredited testing laboratories

55 projects, including 23 national and 32 international ones

135 people with academic degrees and titles among 490 employees

over 2500 participants of trainings and courses
Coal in Europe / Poland

Coal in Europe 2018
(lignite production, hard coal production & imports)

EU-28 million tonnes

- lignite: 367
- hard coal: 76
- imports: 166

Source: EURACOAL members — * 2017 data
Note: bars show million tonnes of coal equivalent (Mtce) while figures at top of bars show millions of physical tonnes (Mt)
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

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<tbody>
<tr>
<td>Absolute methane bearing capacity (million m(^3)/year)</td>
<td>880.9</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>918.7</td>
<td>916.1</td>
<td>↓</td>
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<tr>
<td>Methane drainage (million m(^3)/year)</td>
<td>274.2</td>
<td>255.9</td>
<td>250.2</td>
<td>266.7</td>
<td>276.6</td>
<td>321.1</td>
<td>338.97</td>
<td>342.1</td>
<td>324.9</td>
<td>317</td>
<td>↓</td>
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<tr>
<td>Amount of economically utilized methane (million m(^3)/year)</td>
<td>156.5</td>
<td>161.1</td>
<td>166.3</td>
<td>178.6</td>
<td>187.7</td>
<td>211.4</td>
<td>197.09</td>
<td>195.0</td>
<td>209.1</td>
<td>203.1</td>
<td>↓</td>
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<tr>
<td>Number of the hard coal mines</td>
<td>31</td>
<td>32</td>
<td>31</td>
<td>31</td>
<td>30</td>
<td>30</td>
<td>23</td>
<td>21</td>
<td>20</td>
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<tr>
<td>Hard coal output (Mt)</td>
<td>83.6</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>65.8</td>
<td>63.4</td>
<td>↓</td>
</tr>
</tbody>
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Source: WUG reports
Total gas released during mining operations

(about 916.1 mln m³) 918.7 mln m³ in 2017

Ventilation Air
Methane (VAM)
65.4%

Drainage gas
34.6%
Coal Mine Methane utilisation

CMM drainage – implementation and utilisation

2018:
Amount of economically utilized methane
203.1 million m³ CH₄

34 CH₄ 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. Elaborated, innovative technology should allow for its industrial application in USCB coal seams.
Thank you for your attention

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