

# 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**

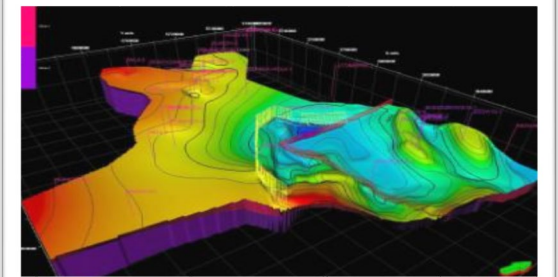
**CLEAN COAL TECHNOLOGIES**

**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

about

**100**



million zł of revenue

**135**



people with academic  
degrees and titles among  
490 employees

**20**



applications for an invention,  
utility models and trademarks

**18**



accredited  
testing laboratories

over

**2500**



participants of trainings  
and courses

**156**



scientific publications

**55**






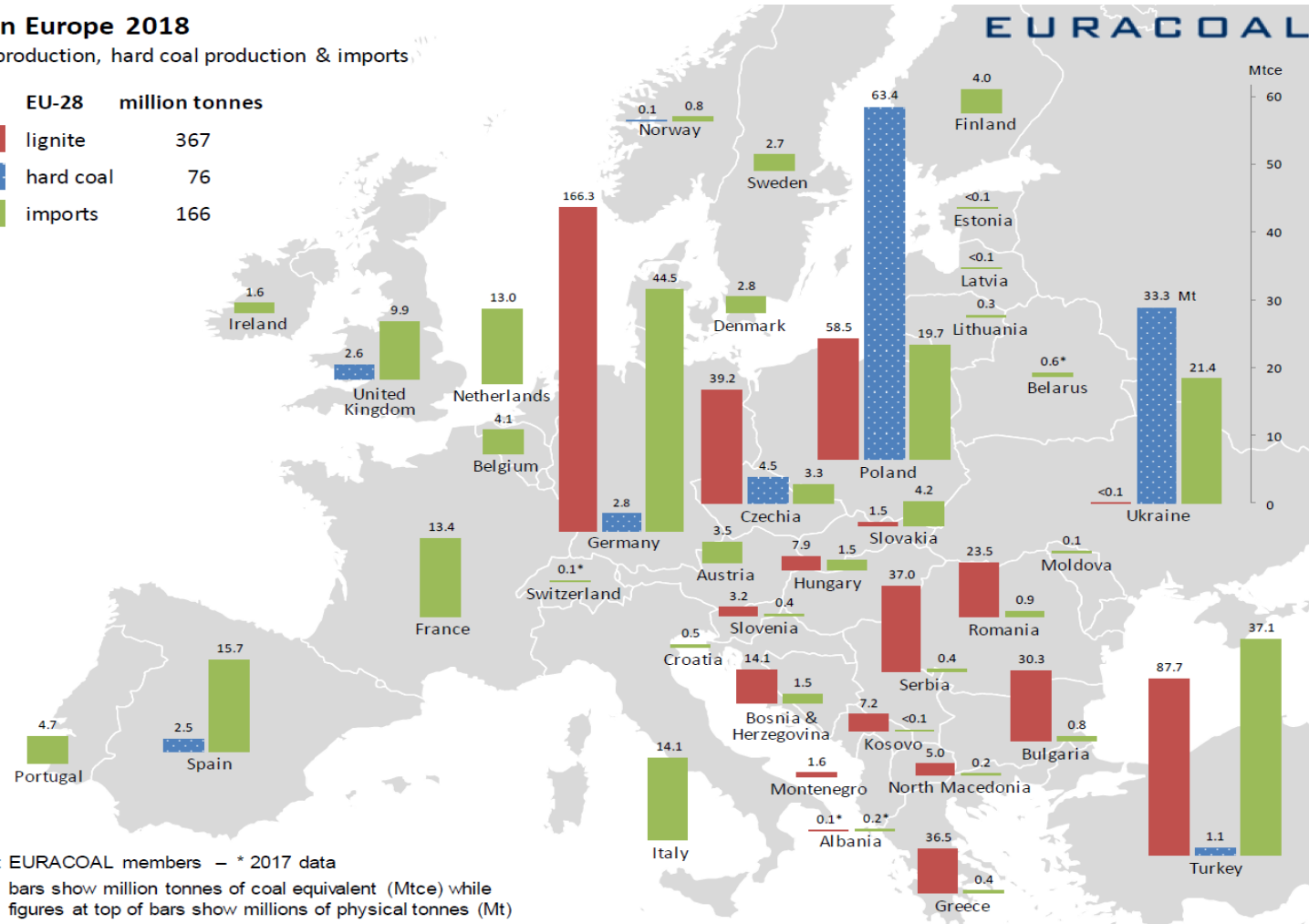
projects,  
including 23 national  
and 32 international ones

# 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**



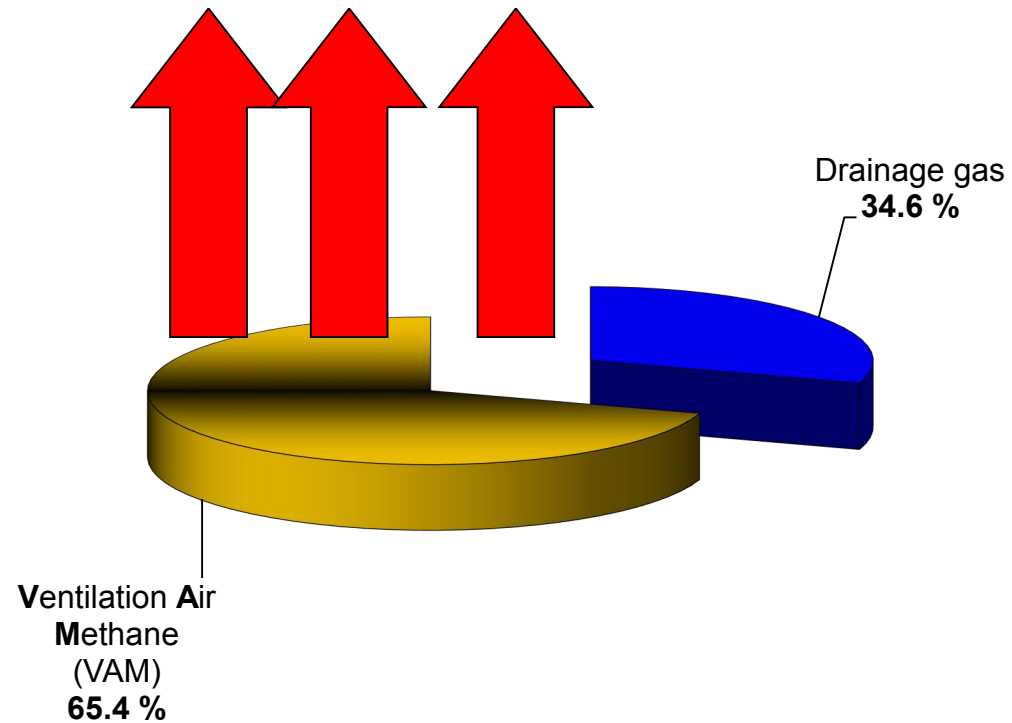
# Coal Mine Methane in Poland

Specification	Year										Trend
	2008	2010	2011	2012	2013	2014	2015	2016	2017	2018	
Absolute methane bearing capacity (million m <sup>3</sup> /year)	880.9	834.9	828.8	828.2	847.8	891.2	933.0	933.8	918.7	916.1	↓
Methane drainage (million m <sup>3</sup> /year)	274.2 31.13%	255.9 30.65%	250.2 30.19%	266.7 32.20%	276.6 32.63%	321.1 36.03%	338.97 36.33%	342.1 36.64%	324.9 35.37%	317 34.60%	↓
Amount of economically utilized methane (million m <sup>3</sup> /year)	156.5 17.77%	161.1 19.30%	166.3 20.07%	178.6 21.56%	187.7 22.14%	211.4 23.27%	197.09 21.12%	195.0 20.88%	209.1 22.76%	203.1 22.1%	↓
Number of the hard coal mines	31	32	31	31	30	30	30	23 (34 plants)	21 (27 plants)	20 (30 plants)	↓
Hard coal output (Mt)	83.6	76.1	75.5	79.2	76.5	72.5	72.2	70.4	65.8	63.4	↓

Source: WUG reports

# Total gas released during mining operations

( about **916.1 mln m<sup>3</sup>** ) 918.7 mln m<sup>3</sup> in 2017



# Coal Mine Methane utilisation

## CMM drainage – implementation and utilisation

2018:

Amount of economically utilized methane

**203.1 million m<sup>3</sup> CH<sub>4</sub>**

**34 CH<sub>4</sub> 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.*

# ELABORATION OF CBM CAPTURE INTENSIFICATION TECHNOLOGY BY APPLICATION OF HYDRAULIC FRACTURING IN THE GEOLOGICAL CONDITIONS OF UPPER SILESIA COAL BASIN

Akronym: **SilesiaFrac**  
(POIR.04.01.01-00-0017/18-00)



Conception of the Project relies on the assumption that for the fracturing of USCB coal seams more advanced technologically fracturing fluids can be applied – allowing to minimize damage of the rock matrix and developed hydraulic fracture - increasing by this fracturing efficiency

Financed by: PGNiG i NCBiR  
Realisation period: 2019 – 2023  
Performed by ICE – CMM, i.e. Instytut Nafty i Gazu - PIB project leader, Państwowy Instytut Geologiczny – PIB, Główny Instytut Górnictwa



Operating under auspices of the UNECE Group  
of Experts on Coal Mine Methane

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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