REM: A “big-ticket” RFCS project on the reduction of methane emissions from post-mining goafs

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REM in numbers

Total budget - 21 493 154 Euro
EU funding - 10 746 577 euro
2 target sites
6 partners
Target site – Mine Pniówek
Target site – Petrosani Basin
Project goals

• increased safety of miners - by removing significant volumes of AMM/VAM from underground workings,
• significant climate change mitigation – by effective utilisation of captured AMM/VAM instead of venting it to the atmosphere,
• better adaptation of coal mines to climate change – by emphasizing them/teaching them how effectively manage and control coal mine methane emissions,
• more cost-effective activities of coal mines to smooth future phase-out transformation – by preparing lessons learnt document and training them based on REM project experience,
• increased pollution prevention and control – by elaborating methodology to monitor VAM emissions through coal mines’ shafts,
• increased motivation of coal mines’ management to invest in CMM utilization - by demonstrating the real economic effects of the REM project based on the successful “Pniówek” mine example.
Project goals

- Building a spatial and flow model of methane accumulation in goafs,
- Identification of methane accumulation locations in the reservoirs - delineation of goaf areas,
- Directional drilling to extract methane from selected goafs,
- Sealing post-mining goafs,
- Analysis of methane emissions into ventilation air and atmosphere,
- Concept, design and construction of methane drainage installation with reduced methane content,
- Production of electrical energy and heat in specially designed gas engines
Project schedule

WP1
Project Management, Coordination and Reporting

WP2
Comprehensive Management of the Post-Mining Methane Emission Chain with the Aim to Substantially Reduce VAM

WP3
Risk Assessment, Ecoefficiency Analysis and Business Case Study

WP4
Conclusions, Dissemination, Recommendation and Promotion
Construction of a methane drainage installation adjusted to Low Content Abandoned Mine Methane
Construction of a methane drainage installation adjusted to Low Content Abandoned Mine Methane

Methane-reduced demethanation system. Drainage station

Energy production 60 000 MWh/year

Directional boreholes
Construction of a methane drainage installation adjusted to Low Content Abandoned Mine Methane
Construction of a methane drainage installation adjusted to Low Content Abandoned Mine Methane
Project schedule

VAM emissions to the atmosphere from coal mines’ shafts monitoring

- **M12**: Design of sensors system for CH4 monitoring
- **M18**: Modification of CH4 dosing system in Experimental Mine Barbara
- **M24**: Finalisation of test in EM Barbara
- **M27**: Finalisation of test in Pniówek Mine

Development of algorithms for CH4 emission prediction
VAM emissions to the atmosphere from coal mines’ shafts monitoring

EM Barbara
VAM emissions to the atmosphere from coal mines’ shafts monitoring

- SNIFFER4D – Mobile sensor,
- Laser Methane sensor - BLV HEQ PURWAY-CH-4.
VAM emissions to the atmosphere from coal mines’ shafts monitoring

Satellite GHGSAT C1 Iris measurements
Project schedule

Risk Assessment, Ecoefficiency Analysis and Business Case Study

M27: FMEA group of experts assignment
M39: Environmental risk assessment
M42: Cost & Benefit analyses for reduction of GHG
M51: LCA Analysis

Business case – road map
Risk Assessment, Ecoefficiency Analysis and Business Case Study

The business case study will be mainly built on REM Project outcomes. A written document prepared under this task will describe how a coal mining company that has decided to move in this new direction should define its objectives and how it will achieve them. The business case will set out a practical example for coal mining companies from the marketing, financial, and operational point of view.
The JSW Group is the largest producer of high quality hard coking coal in the European Union and one of the leading producers of coke used for smelting steel. Production and sale of coking coal and production and sale of coke and hydrocarbons constitute JSW Group’s core business.

In 2023 the JSW Group’s mines produced:
- 13.51 mt of coal,
- 3.2 mt of coke.

The European Commission listed coking coal on the list of Critical Raw Materials for the EU.
JSW CG environmental strategy by 2030 and in 2050 perspective

The basis of the Environmental Strategy is to clarify the role of JSW CG in the environmental and energy-climate transformation of Poland and the European Union as a response to changes in the external environment – regulatory, technological and market environment.

Overarching objective: aiming to achieve climate neutrality by 2050
Intermediate objective: reduction of carbon footprint by 30% by 2030 compared to 2018

73% of JSW CG’s carbon footprint is METHANE => Methane Emissions Reduction Programme to 2025
methane capture of approximately 50% and its economic use of up to 95%

4 key areas of pro-environmental and pro-climate action:
In 2022 Jastrzębska Spółka Węglowa has presented the new Strategy including the Group’s Subsidiaries until 2030. Important part of the business strategy is the Environment Strategy. One of the significant elements of the adopted Strategy is counteracting climate change by reducing the carbon footprint by 30% by 2030 and achieving climate neutrality in 2050. The main source of greenhouse gas emissions resulting from the Group’s operations is methane, which accounts for approximately 72% of the carbon footprint.

The Methane Emissions Reduction Program developed by the Methane Drainage and Management Office is the answer to this challenge.
Key indicators at JSW and the Pniówek mine.

- Increase in methane drainage efficiency: 30% → 50% ≥ 95%
- Economic utilization of methane

**Installed Capacity**
- JSW: 60 MWe
- Pniówek mine: 8 MWe

**Energy Production**
- 400 MWh thou/year (JSW)
- 60 MWh thou/year (Pniówek mine)
Thank you for your attention!