NEWSLETTER NO. 1

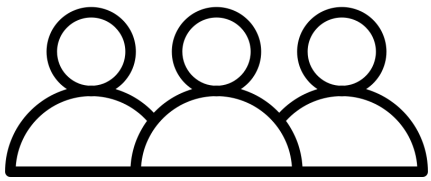
Shortly about H2GEO

H2GEO New technology for hydrogen and geopolymer composites production from post-mining waste

The goal of the H2GEO project is to develop a comprehensive technology for the management of post-mining waste heaps in line with the principles of a circular economy. The project involves utilizing separated mineral fractions and fly ash for the production of geopolymers with the use of CO_2, as well as utilizing energy fractions to obtain hydrogen through gasification.

Seven partners from three European countries are collaborating to ensure high-quality results and contribute their expertise:

- Instytut Techniki Górniczej KOMAG – KOMAG (Poland) – the Coordinator
- Główny Instytut Górnictwa – GIG (Poland)
- Ustav Stavebnictva A Architektury Slovenskej Akademie Vied VVI – USTARCH (Slovakia)
- Instytut Technologii Paliw i Energii – ITPE (Poland)
- Technical University of Ostrava – VSB (Czech Republic)
- Politechnika Wrocławska – PWR (Poland)
- Haldex S.A. – HDX (Poland) – Industrial partner



Co-funded by the European Union

H2GEO project has received funding from the Research Fund for Coal and Steel (RFCS) under GRANT AGREEMENT No. 101112386. Project co-funded by the Polish Ministry of Science and Higher Education under the program entitled „Co-financed International Projects", agreement no. 5676/FBWiS/2023/2024/2.

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Review of the H2GEO Project Progress

On March 17, 2025, a monitoring meeting was held to review the progress of the H2GEO project.

The meeting was attended by representatives of the Institute of Mining Technology: Daniel Kowol and Piotr Matusiak; the Institute of Fuel and Energy Technology: Joanna Bigda and Agata Czardybon; as well as virtual participants, Ondrej Nemcek from VSB, Martin Palou from USTARCH, Project Officer Francesco Palazzo, and Project Monitor Violetta Sokoła-Szewioła.

During the meeting, the progress of the H2GEO project for the years 2023-2024 was discussed. The scope of activities carried out and the results obtained were presented. Additionally, responses were provided to reviewers' questions regarding the details of the periodic report on the completed work.

The H2GEO project has been progressing well because all required deliverables and milestones due within the first half of the project realization period (18 months) have been met on time.

Table 1. Project bar chart (Structure of the project)

Work package	Work package title	Deliver-ables	1st year				2nd year				3rd year			
			I	II	III	IV	I	II	III	IV	I	II	III	IV
WP 1	Project Management & Coordination													
Task 1.1	Project coordination and cooperation between project partners													
Task 1.2	Project promotion and dissemination	D1.1, D1.2, D1.3												
Task 1.3	Lessons Learned and Recommendations document and results dissemination	D1.4												
WP 2	Critical analysis of mine waste dumps													
Task 2.1	Inventory of active and recultivated mine waste dumps	D2.1												
Task 2.2	Testing the physicochemical and mechanical properties of mine wastes	D2.2												
Task 2.3	Development of the database system													MS1
WP 3	Use of gravitational processes for recovery of raw materials from mine wastes													
Task 3.1	Laboratory tests of jig beneficiation	D3.1				MS2								
Task 3.2	Physicochemical analyses and mechanical property tests of the separation products	D3.2, D3.3												
Task 3.3	Development of the prototype of mobile system for coal and raw materials separation from mine wastes									MS3				
WP 4	Development of thermochemical methods of management of energy fraction of waste from jig beneficiation process to hydrogen generation													
Task 4.1	Production of H2 through plasma gasification of coal enriched fraction	D4.1								MS4				
Task 4.2	Production of H2 through FB gasification of coal enriched fraction													
Task 4.3	Upgrading and gas separation for H2 production	D4.2										MS5		
Task 4.4	Modelling of the H2 production process	D4.3												
WP 5	Development of methods of using the mineral wastes from jig beneficiation process													
Task 5.1	Advanced waste treatment for geopolymer composites preparation	D5.1												
Task 5.2	Research on geopolymer composites synthesis with CO2 and fly ash used	D5.2										MS6		
Task 5.3	Use of products from mine wastes jig beneficiation process in building and road construction materials, environment engineering and mining industry													
Task 5.4	Use of products from mine wastes jig beneficiation process in agriculture and in land recultivation	D5.3												
Task 5.5	Recovery of minerals and chemicals from products of mine wastes jig beneficiation process	D5.4												
WP 6	Evaluation of new technology for hydrogen and geopolymer composites production from post-mining waste													
Task 6.1	Development of the full chain technology concept of hydrogen and geopolymers production from mine waste dumps	D6.1												
Task 6.2	Economic aspects of hydrogen and geopolymer composites production from waste dumps	D6.2												
Task 6.3	Environmental, social and legal aspects hydrogen and geopolymer composites production from waste dumps	D6.3												

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Scientific and Technical Conference KOMEKO 2025

At the Scientific and Technical Conference KOMEKO 2025, held from March 24-26, 2025, in Szczyrk (Poland), the presentation titled "Efficient Separation of Mining Waste as a Key Element of the Circular Economy" was delivered during the "Urban Mining and Critical Raw Material Recovery" session.

The presentation included the results of work carried out as part of T3.1 “Laboratory tests of jig beneficiation” and T3.3 Development of the prototype of mobile system for coal and raw materials separation from mine wastes” was presented by PhD Eng. Daniel Kowol.

Laboratory tests of mining waste beneficiation were conducted to determine the impact of selected technical and technological parameters on the efficiency of material separation, as well as to select preliminary input data for designing a new device for industrial-scale mining waste separation.

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The results of the conducted research have been included in D3.1. "Results of laboratory tests of mine wastes of jig beneficiation".

The tests involving gravity enrichment of extracted mineral raw materials was conducted at an experimental laboratory jig stand.

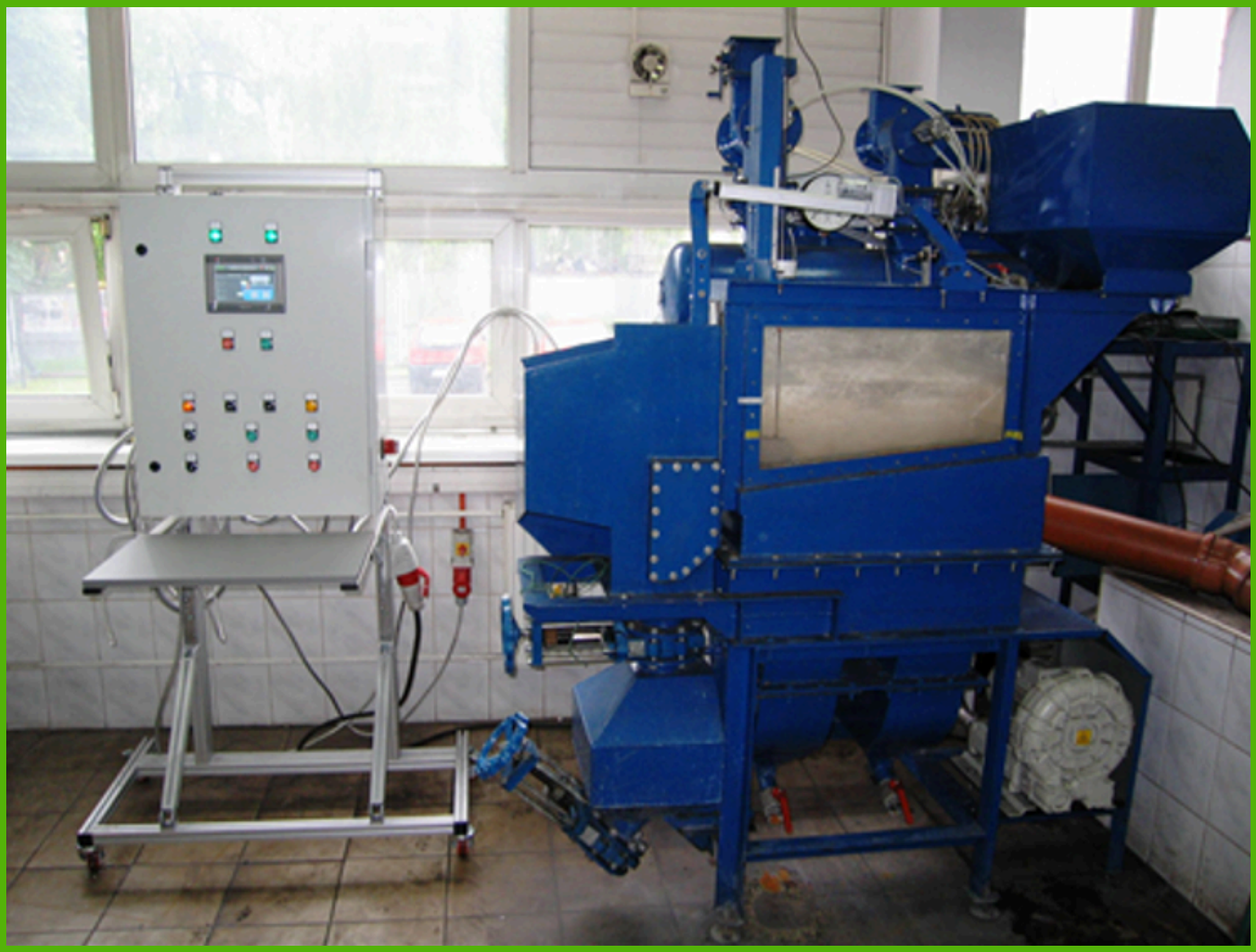

Fig. Laboratory jig stand

Currently, technical documentation is being developed for a new density-based mining waste separation device to recover products for further processing. Along with the device's technical documentation, a control system documentation is also being prepared, including solutions for process monitoring and visualization.

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