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Conservation and promotion of the Coal Mining Heritage as Europe's cultural legacy

Deliverable 1.2

Public Publishable Report

Lead Beneficiary: CERTH Centre of Research and Technology Hellas

Authors
CERTH: Theodoros Zarogiannis, Ioanna Badouna, Nikolaos Koukouzas
KOMAG: Kamil Szewerda
GIG-PIB: Sylwia Jarosławska-Sobór, Robert Hildebrandt
BRGM: Laurent Beccaletto
DMT-THGA: Herman Flores, Tansel Dogan
PV: Tadeja Jegrišnik, Matjaž Kamenik

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Contents

1 Executive Summary

Brief overview of the project objectives and scope.

The CoalHeritage project designed to preserve and promote Europe's coal mining heritage, supporting the just transition regions. Across five countries of consortium (Greece, Germany, France, Poland, and Slovenia), the project aimed to:

- Identify processes for declaring coal sites as heritage areas.
- Enhance management of coal regions in transition, prioritizing health, safety, and environmental sustainability.
- Develop the European Visual Map Journal (EVMJ), an interactive platform to showcase coal heritage.
- Enhance dissemination and networks to support stakeholder engagement and public awareness.

Summary of key results achieved per Work Package.

- **WP2**: Documented national transition strategies, legal frameworks, and public perception through 4 deliverables (D2.1–D2.4), including a comparative analysis of coal heritage in partner countries and a compilation of 20+ transformation success stories (e.g., Zollverein Coal Mine, Germany; Guido Mine, Poland).
- **WP3**: Created a standardized inventory of 177 coal heritage assets (machinery, sites, intangible traditions) and defined management methodologies via expert interviews and focus groups.
- **WP4**: Launched and develop the EVMJ platform, integrating geospatial data, 3D models, and multimedia narratives to visualize coal heritage across Europe.

Highlights of dissemination activities.

- Digital Outreach: 49,910+ website views, 211 LinkedIn followers, and 11 newsletters.
- Stakeholder Engagement: Workshops in Germany, Greece, Slovenia, and Poland, collaborations with TICCIH, ERIH, and the Durham Miners Association.
- Scientific Impact: Presentations at 15+ conferences (e.g., KOMTECH 2023, IGC 2024, SEP 2024) and media coverage in Polish mining journals

2 Introduction

Project background and objectives.

To set the picture, the energy environment in Europe is undergoing a dramatic change at the moment. Many coal mines are closing or being repurposed as part of its pledges to cut carbon emissions and switch to sustainable energy sources. This shift presents significant social and economic difficulties even if it is required for environmental reasons.

Many historically coal-dependent villages are currently experiencing depopulation, unemployment, and a loss of cultural identity. At the same time, there is a dearth of thorough, easily available information and methods for managing, conserving, and utilizing these industrial legacies. There is a genuine chance that this rich history may be disregarded or forgotten completely in the absence of a methodical approach, which would mean lost chances for regional development, tourism, and education.

Regions can preserve their unique industrial legacy adopting the transition towards green energy recognizing heritage not just as something of the past, but as opportunity for future growth. This means creating standardized frameworks for asset inventory, developing engaging platforms for storytelling, and engaging stakeholder collaboration.

By doing so, regions can turn their industrial past into a source of pride, economic activity, and sustainable development.

The CoalHeritage project was driven by four core objectives:

1. **Identification of processes needed to declare coal sites as heritage areas supporting the just transition of the coal sector and regions**.
2. **Enhanced management in the coal regions in transition, supporting the just transition of the coal sector and regions, improving health and safety, and minimizing environmental impacts**
3. **Design and development of a European Visual Map Journal (EVMJ) supporting the just transition of the coal sector and regions**
4. **Dissemination and network development supporting the just transition of the coal sector and regions**

3 Summary of Results

This chapter provides a detailed summary of the findings and impacts of the technical WPs of CoalHeritage project. The outcomes were aligned both with the project's objectives and with each WP objectives individually. In the following subchapters, project's key achievements are presented with focus on their broader effects for stakeholders and communities.

3.1 Overview of the Main Outcomes from the Project

3.1.1 Outcomes from WP2

The main objective of Work Package 2 was to describe the current status of coal mining heritage across Europe through a comprehensive comparative analysis. WP2 activities were divided into 4 tasks. WP2 successfully produced 4 deliverables.

Overall, WP2 had made significant progress in assessing the coal heritage landscape, understanding the transition strategies, and gathering public perception data related to coal regions. The key outcomes are summarized below:

Assessment of Transition Strategies and Status: This task involved each partner country (Greece, Germany, France, Poland, and Slovenia) to prepare studies of their respective transition strategies from coal mining. The objective was to analyze actions taken to facilitate a just transition. Each partner prepared an in-depth national report detailing actions taken to phase out coal, and the status of heritage considerations in their transition plans. This work presented in Deliverable D2.1 Report on the coal transition strategy of European countries, which provides a comparative analysis of these national strategies. This includes an evaluation of national coal transition strategies and how heritage elements are integrated within those plans. Each country report within the deliverable provides detailed insights into mine closure procedures, the socioeconomic impacts of the transition, and the influence of heritage on regional development strategies.

Deliverable 2.1 also highlights exemplary cases from each partner country, offering best practice models for integrating coal heritage into modern redevelopment efforts. In Greece, the Aliveri lignite mine and the Ptolemaida power plant's informal lignite museum illustrate early preservation initiatives. Germany presents a highly developed model with the Zollverein Coal Mine Industrial Complex in Essen, now a UNESCO World Heritage Site and a vibrant cultural venue. France’s Wendel Mine in Petite-Rosselle has been transformed into a museum and is part of a cross-border cooperation effort. Poland’s Guido and Queen Louise mines have been adapted into underground museums, showcasing mining history and water systems. Slovenia’s Coal Mining Museum (Figure 1)preserves not only equipment and infrastructure but also local customs and traditions and has received several awards for its contributions to heritage preservation.

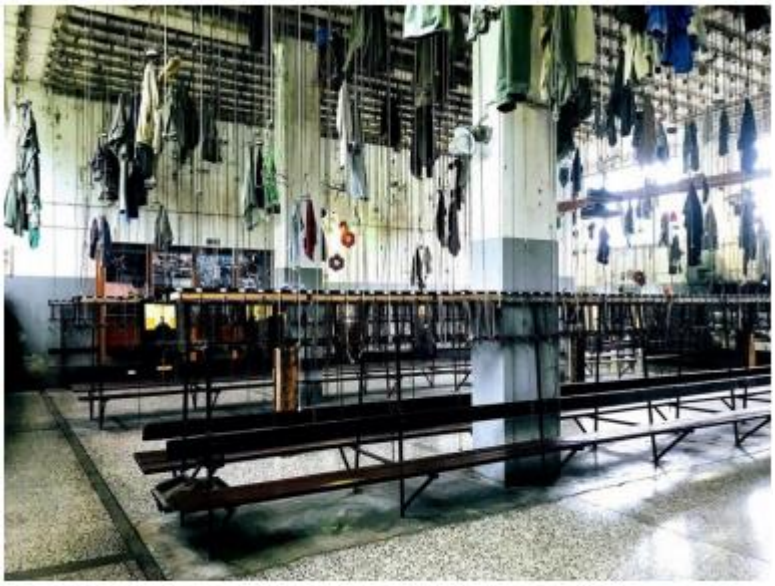


Figure 1 Coal Mining Museum of Slovenia (Deliverable 2.1)

The report concludes by emphasizing that decisions to preserve coal mining heritage for cultural purposes, education, and tourism. These heritage sites serve as lasting evidence of Europe's industrial journey and offer inspiration for how post-industrial sites can be transformed with creativity, and sustainability.

In WP2 the **legal framework for declaring coal sites as national heritage area** was also investigated. This resulted in Deliverable D2.2, Description of the processes for the identification of coal sites as national heritage which describes the steps, criteria, and ways for heritage recognition in each country. Following a definition of cultural and natural heritage, the document includes case studies and proposes guidelines to harmonize these processes across Europe. These efforts ensure that coal mining sites can be systematically identified, evaluated, and protected under existing cultural heritage frameworks. The identification of coal sites as national heritage areas involves several key processes. These processes include:

1. Legislation and Policy Considerations: The project focuses on understanding the legislation and policy guidelines related to coal-mining heritage in different countries, such as France, Germany, Greece, Poland, and Slovenia.

2. Ownership and Transfer of Facilities: The project examines the legal processes involved in the transfer of ownership of coal sites.

3. Assessment of Heritage Value: The project aims to estimate the national heritage value of coal sites by conducting a SWOT analysis to understand their potential impact.

4. Geoheritage Inventory: The project includes the identification of geoheritage elements related to coal, such as outcrops, paleontological, and mineralogical collections. This inventory helps in understanding the geological significance of coal sites.

By considering these processes and factors, the project aims to establish a framework for recognizing and preserving coal-mining heritage as part of Europe's cultural legacy.

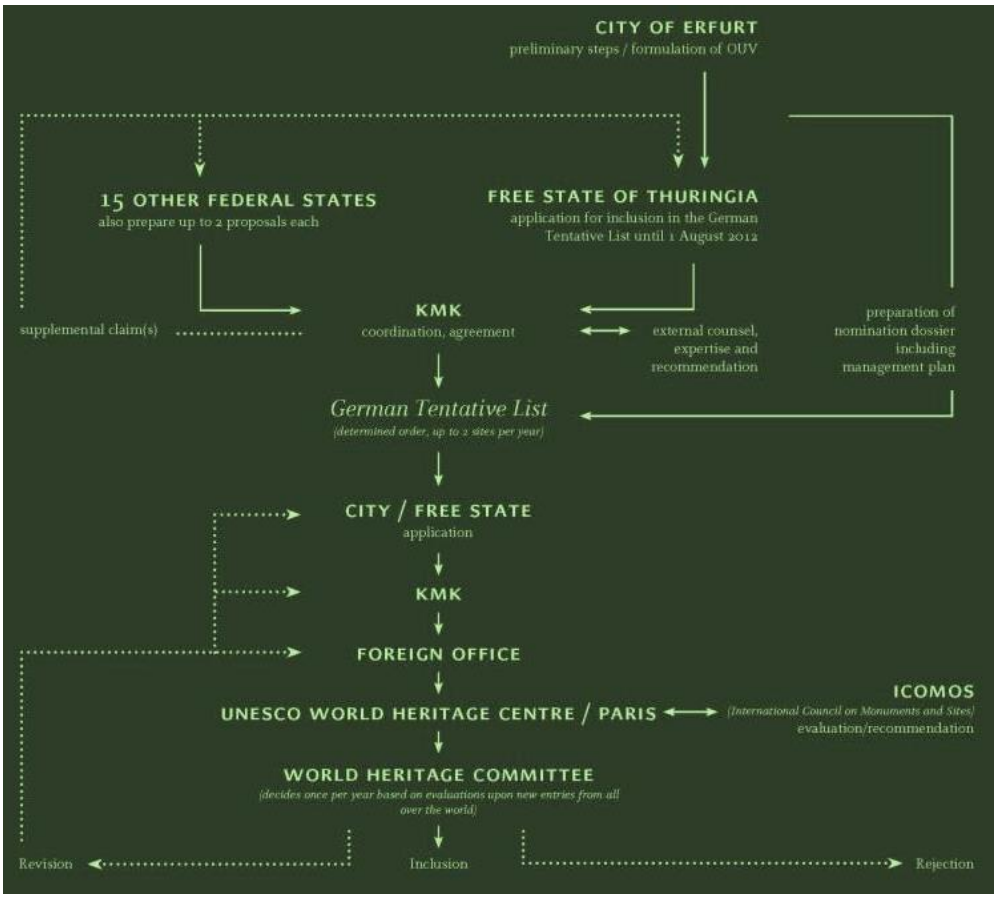


Figure 2 The process of becoming a World Heritage Site. Application process to declare a site as World Heritage (D2.2)

Another key element of WP2 was the compilation of **successful transformation stories,** captured in Deliverable D2.3 Compilation of successful stories of transforming coal mining sites into industrial heritage objects. This deliverable presents case studies from Europe where coal mining sites have been repurposed into museums, cultural centers, educational centers, or recreational places. These examples imply the importance of community engagement and sustainable development.

Poland: The transformation of coal mining sites in Poland is exemplified by four main categories. The **Guido Coal Mine** in Zabrze highlights an underground tourist route, providing visitors insight into mining heritage. Above-ground facilities, such as museums, showcase the historical significance of mining tools and life in mining communities. Former mine shafts are preserved, contributing to local heritage tourism. Additionally, good practices in transforming other post-mining facilities are observed, such as converting salt and ore mining sites into cultural spaces. This multidimensional approach not only preserves the industrial past but also fosters economic revitalization through tourism.

Exercise Mine of the Sztygarka City Museum [D2.3]

Ignacy Historic Mine in Rybnik [D2.3]

Maciej shaft in Zabrze [D2.3]

Wieliczka Salt Mine [D2.3]

Figure 3 Polish mines by four main categories (Deliverable 2.3)

Germany: Germany has done great job in transforming former coal sites to cultural and recreational places. There are examples such as the creation of parks and educational centers that are integrated into natural landscapes. The **Nordrhein-Westfalen region,** a former coal site changed into a place with art installations, museums, and recreational facilities. The country enables community involvement in these projects, in order to enable a sense of ownership over the places.

Franz-Haniel shaft system, Bottrop [D2.3]

German Mining Museum Bochum [D2.3]

Zollern Colliery shaft tower [D2.3]

Old salt works main facility at Bad Reichenhall [D2.3]

Figure 4 German mines by four main categories (Deliverable 2.3)

France: Museums and public art have helped to preserve the history of coal mining in these mining areas, which have been turned into centers of culture and education. A UNESCO World Heritage site, the Nord-Pas-de-Calais Mining Basin promotes communal activities while showcasing the area's industrial past. As part of the redevelopment, portions will be turned into parks and cultural venues where visitors and residents may learn about the history of mining. The goal of combining cultural preservation with innovative applications is to boost traditional economies and raise knowledge of their industrial heritage among the next generation

The Explor Wendel Park from the top of the slagheap[D2.3]

The entrance of the Mining Center [D2.3]

Couriot-Musée de la Mine-Saint-Etienne [D2.3]

Figure 5 France: Coal mining facilities, Mining Center and an example of successful story in France (Deliverable 2.3)

Greece: Greece has a rich mining history, particularly with lignite, in areas such as Ptolemaida and Megalopoli. These mines were important for energy production but have faced significant environmental challenges. Current transformation efforts aim to repurpose these mining sites into renewable energy installations and recreational places. The ongoing rehabilitation includes reforestation and the development of educational centers focusing on sustainable practices. Examples such as the **Western Macedonia Lignite Centre** promote both tourism and community engagement.

Ptolemaida AES power-plant [D2.3]

The Lavrion Technological and Cultural Park [D2.3]

Figure 6 Greece coal mine facilities and good practices in transforming other post-mining facilities (Deliverable 2.3)

Slovenia: In Slovenia, the transformation of mining sites focuses on cultural heritage and environmental preservation. The removal of mining infrastructure, coupled with plans to utilize the land for recreational and educational purposes, demonstrates a holistic approach to site rehabilitation. Efforts include creating hiking trails, parks, and sites for community events, promoting local history while encouraging environmental stewardship. Current projects are still in the development phase, but there is a clear intention to integrate the legacy of mining into the national identity.

Battery ground locomotive in the Coal Mining Museum of Slovenia [D2.3]

The Zagorje Mining Museum[D2.3]

The Mežica lead and zinc mine [D2.3]

Figure 7 Slovenian mines by three main categories (Deliverable 2.3)

Following this, WP2 also presents the **public perception and stakeholder awareness**. Deliverable D2.4 Public perception of industrial heritage in coal regions, finalized in April 2025, reports on a multilingual survey and a series of interviews conducted to see the public opinion about coal heritage.

The central aim of the study was to assess stakeholder awareness on coal mining history and the industrial heritage. An online survey was conducted via EUSurvey. The report offers recommendations to enhance the integration of public stakeholders into decision-making processes concerning post-mining land use and cultural heritage development. The survey structure was reviewed by a stakeholder workshop conducted in the Ruhr Area, Germany. Participants were from different target groups such as national and local authorities, mining companies, civil society, academia, and environmental organizations. In total, 449 valid responses were collected from the participating countries, offering a robust data set for exploratory analysis.

Stakeholder analysis categorized respondents into key groups such as government institutions, companies, communities, academic and research organizations, and civil society groups. The analysis revealed that the 41–60 age group demonstrated the highest engagement across most countries, with Germany also showing strong participation from younger generations aged 21–40.

Stakeholder group analysis showed notable differences between countries. Slovenia was mainly represented by mining companies, while academia and research dominated participation in Poland. Greece reflected a balanced mix of stakeholders, including local authorities, civil society, and environmental NGOs.

Regarding knowledge about coal mining history, many participants in Germany and Greece showed general awareness, although a significant part reported little to no knowledge. The majority of respondents with personal links to coal mining was reported in Poland. Across stakeholder groups, academic institutions reported the highest levels of subject expertise.

Public perception of post-mining options favored environmentally sustainable and culturally rich uses. Museums were widely recognized, but parks, green spaces, and eco-tourism emerged as the most attractive land-use preferences. On the contrary, less interest was expressed in developments such as amusement parks, sports centers, and residential housing.

Awareness of existing transformation projects was generally high, particularly in regions under transition. Respondents mentioned national and local media as primary sources of information. Academia, research organizations, and mining companies showed the greatest involvement in such projects, while local and regional governments were considered as critical actors in implementing transition strategies.

Regarding acceptance of transition and preservation measures, Germany and Slovenia received higher scores, showing that their national and local policies have attached more people. On the other hand, Greece and Poland scored lower, indicating a need for more effective communication policy. Government institutions, local communities, and residents were reported most responsible for financing and maintaining post-mining areas, with significant roles also attributed to mining companies.

Participants considered that job creation is the highest priority for future-oriented projects, followed by environmental protection and cultural heritage preservation. Education and training were also emphasized.

Finally, future visions for post-mining regions frequently included tourism, heritage conservation, renewable energy development, and environmental remediation. These opinions were especially expressed in countries like France, Germany, and Greece.

In summary D2.4 contributes to a clearer understanding of the current landscape of coal heritage and inform future management, policy development, and stakeholder engagement strategies for preserving coal mining history in Europe.

3.1.2 Outcomes from WP3

The main objective of work package 3 was to create a standardized inventory of mine assets and define mechanisms for heritage site management. WP3 activities are divided into 2 tasks. WP3 successfully produced 3 deliverables and achieved 1 milestone. In total, WP3 had achieved substantial progress in documenting, cataloging, and standardizing coal mining heritage assets.

The main outcomes are summarized below:

Creation of a Comprehensive Coal Mining Heritage Inventory: This result was achieved through several steps. The first was the achievement of **Milestone MS7**, i.e. the preparation and organization of the 'Internal workshop to determine the categories for the inventory'. The workshop took place on 05.12.2023, where consortium partners discussed on participants' views about how coal mining heritage should be classified and how particular types of coal mining heritage assets should be protected. The outcomes of this workshop served as input for the development of the coal mining heritage classification and template record cards for **Deliverable D3.1**.

Deliverable D3.1 - Catalogue of the collected assets from the partners' countries was delivered at the end of March 2024. Under D3.1, a classification of coal mining heritage developed. In this classification, two main sets, called "supergroups" have been distinguished: 'cultural heritage' and 'natural heritage'. Further division levels of the classification are: 'group', 'categories', and 'subcategories'. For each supergroup of the coal mining heritage classification, a record card developed to collect information about coal heritage assets that match them were developed. These were used by the project partners to fill in information about coal mining heritage assets at their countries. The project successfully compiled an extensive catalog of 177 assets, which included a diverse range of items such as historic technical documentation and mining machinery, architectural structures, geological features, and intangible cultural elements like oral histories and mining traditions. This inventory represents a critical resource for heritage preservation and management. The document was accompanied by 8 Appendices.

- Appendix 1 in deliverable 3.1 presents a 104 page-album of mining machiner' developed by KOMAG in 1950 – 1950 (Figure 8).

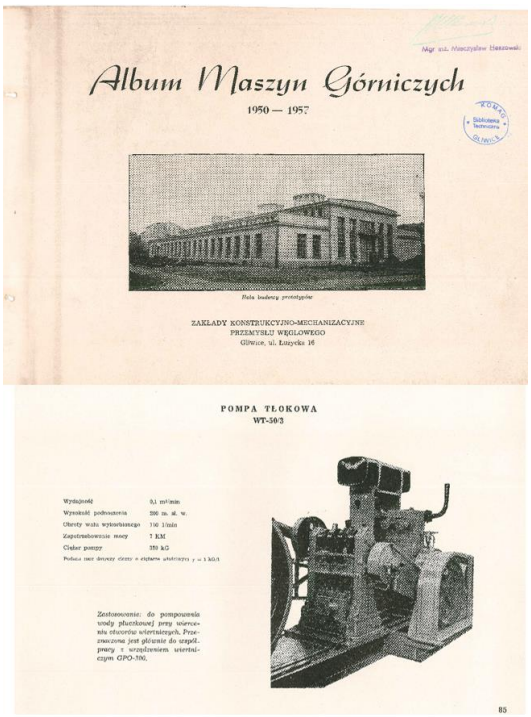


Figure 8. Part of the appendix 1

- Appendix 2 in deliverable 3.1 shows an informative 48 page- booklet published by KOMAG Construction and Technology Center for Mining Machinery (Figure 9).

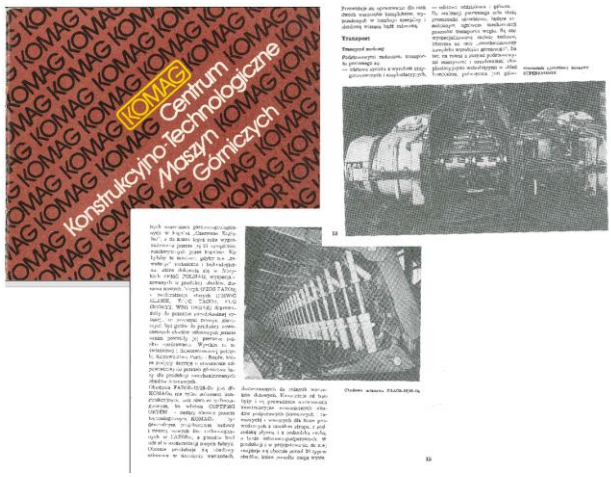


Figure 9. Part of the appendix 2

- Appendix 3 in deliverable 3.1 contains 'Catalog of mining machinery and equipment KOMAG, POLMAG, KOPEX' (192 pages) (Figure 10).

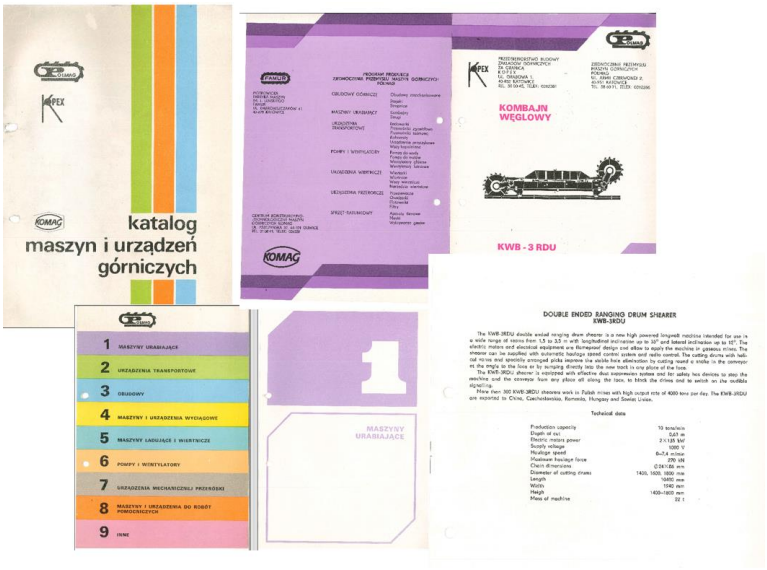


Figure 10. Part of the appendix 3

- Appendix 4 in deliverable 3.1 shows 'Catalogue of mining machinery and equipment' published by PIOMA (92 pages) (Figure 11).

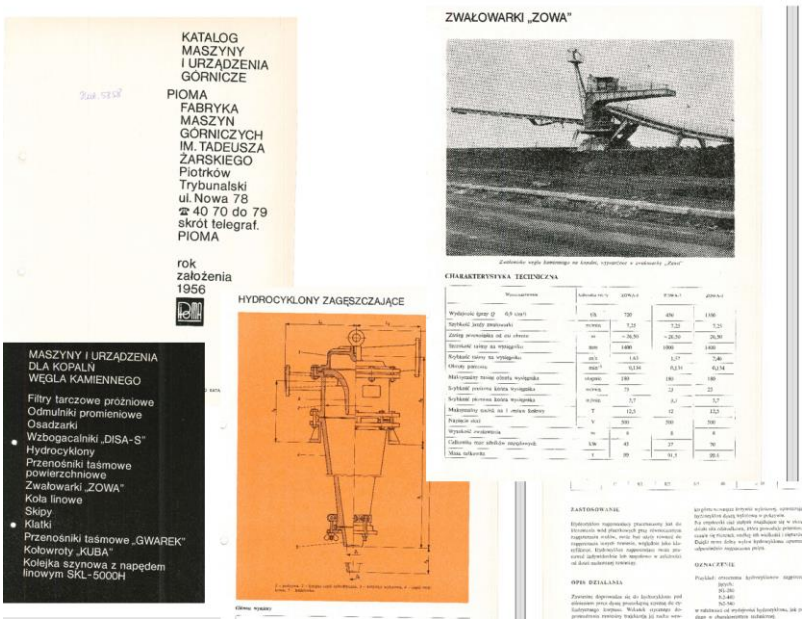


Figure 11. Part of the appendix 4

- Appendix 5 in deliverable 3.1 presents 'KOMAG Chronicle'. It contains the photos related with machines developed by KOMAG and produced between 1985-1988 (37 pages) (Figure 12).

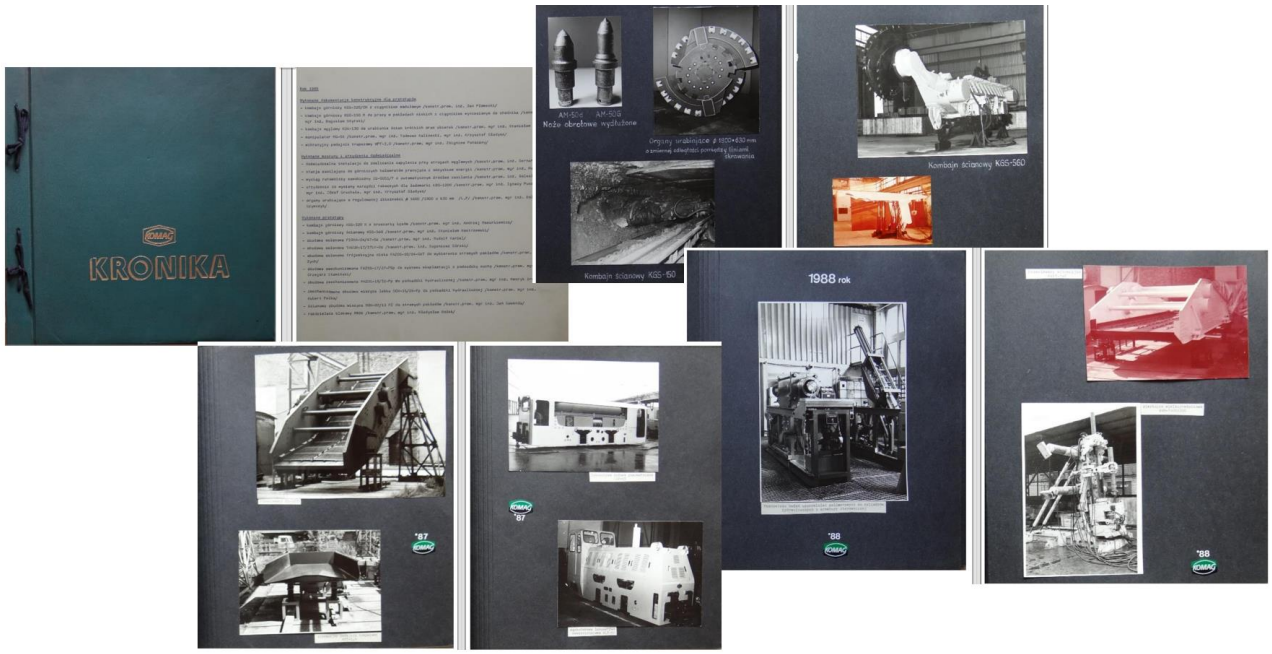


Figure 12. Part of the appendix 5

- Appendix 6 in deliverable 3.1 contains a an elaboration covering a list of research and development works performed at CKTMG KOMAG, between 1946 and 1979 (8 pages) (Figure 13).

Figure 13. Part of the appendix 6

- Appendix 7 in deliverable 3.1 includes a CoalHeritage thematic publication review of 82 articles, related to the coal mining machines (35 pages) (Figure 14).

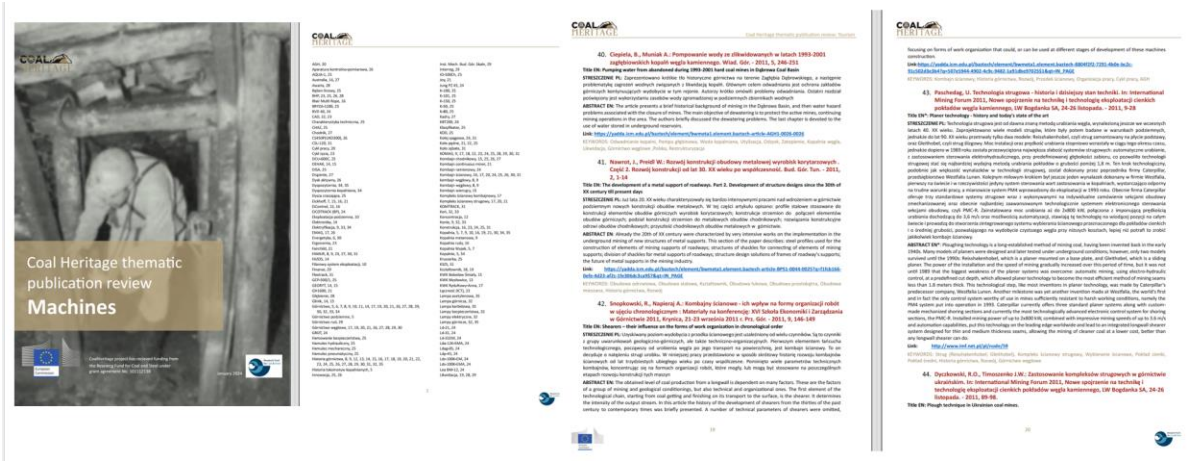


Figure 14. Part of the appendix 7

- Appendix 8 in deliverable 3.1 contains a CoalHeritage thematic publication review of 131 articles, related to Tourism and Places (51 pages) (Figure 15).

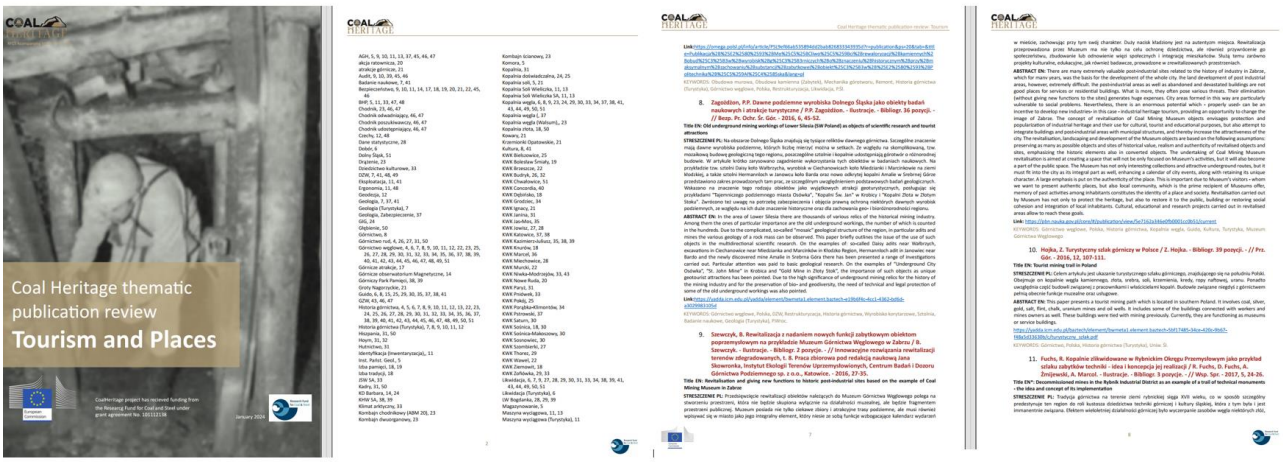


Figure 15. Part of the appendix 8

Deliverable 3.2 provided an in-depth analysis of legal frameworks, measures and policies, standards, resources, and strategies related to the management of geoheritage sites across the CoalHeritage project countries (France, Germany, Greece, Poland, and Slovenia). It documents existing examples of coal heritage sites from project countries, their conservation status, and examples of successful management practices. These findings are used to develop a comprehensive methodology for the creation of an inventory processes and managing the mine's movable and immovable property, that can be applied in all cases of coal mining heritage sites. Key sections cover mobilizing resources for conservation, evaluating the state of heritage site preservation, and formulating inventory processes and management strategies adaptable to various coal heritage sites.

The deliverable also identifies the standards and mechanisms for the management of coal heritage assets, to develop the methodology for the creation of inventory processes and managing both movable and

immovable property. Additionally, it identifies best practices that ensure the effective preservation of coal heritage sites. This assessment includes a) 15 in-depth expert interviews – CAWI research technique, b) 2 focused FOCUS expert interviews – two groups of 6 experts (12 experts in total).

Regarding the 15 in-depth expert interviews – CAWI technique was used with online questionnaire hosted in EUsurvey platfrom, using selected KPIs. The KPIs were as follows: inventory methods, mining heritage management, public participation, education and awareness, sustainable development, cooperation and partnership and future perspective. The questions were related to a variety of coal mining heritage aspects: management, local communities and public awareness, preservation and conservation methods, inventorying.

Regarding the FOCUS interviews, a set of questions related to a variety of coal mining heritage aspects: management, local communities and public awareness, preservation and conservation methods, inventorying was presented to the experts. GIG-PIB completed 2 FGI, each group compiled of 7 experts, such as:

- 21.05.2024 – international: presidents of TICCIH The International Committee for the Conservation of the Industrial Heritage, WIMH Working Industrial & Mobile Heritage Group, European Federation of Museum and Tourist Railways, directors of "Mission bassin minier" Nord-Pas-de-Calais coal basin, UNESCO Department of the Mining Museum Zabrze, the Durham Miners Association UK.
- 24.05.2024 – regional: the Provincial Conservator of Monuments, directors and managers of the Mining Museum Zabrze, Ignacy Coal Mine and Wojciech Korfanty Provincial Institute of Culture, the Silesian Museum, Museum of the Upper Silesian Ethnographic Park Chorzow, SGGP The Association of Mining Municipalities in Poland.

The results from both CAWI and FOCUS interviews were compiled and analysed, as part of deliverable D3.2. “Definition of the standards, rules, and other mechanisms for the management of the heritage sites “.

Deliverable D3.2 successfully examined and provided comprehensive insights into the current state of coal mining heritage conservation across France, Germany, Greece, Poland, and Slovenia. It analyzed existing legal frameworks, policies, and methodologies for the protection and management of geoheritage and cultural assets in these countries. The deliverable identified best practices, challenges, and areas for improvement in mobilizing resources, enhancing public awareness, and engaging communities in heritage preservation.

The document proposed an effective methodology for creating inventory processes to document and manage mining heritage assets, including both movable and immovable properties. It utilized in-depth interviews (CAWI-IDI) and focus group interviews (FGI) to assess management systems, providing actionable recommendations for integrating innovative technologies, fostering interdisciplinary collaboration, and enhancing public engagement. Additionally, the deliverable outlined strategies to incorporate mining heritage into sustainable development plans, leveraging it for cultural, educational, and economic benefits.

Overall, Deliverable D3.2 achieved its goals by setting a solid foundation for effective management systems, highlighting the need for structured approaches to inventory creation, conservation, and promotion of mining heritage. It also provided a roadmap for stakeholders to address challenges related to financing, legal compliance, and environmental impacts while ensuring the long-term preservation and

relevance of coal mining heritage.

Insights from these interviews, combined with data analysis, inform conclusions and actionable recommendations for creating sustainable preservation and management plans. These recommendations aim to support stakeholders in integrating coal heritage conservation into broader societal and economic frameworks, ensuring long-term protection and promotion of mining-related cultural resources.

3.1.3 Outcomes from WP4

Work Package 4 (WP4) of the CoalHeritage project focuses on the development of an interactive European Visual Map Journal (EVMJ) that combines geospatial data, multimedia content, and story-telling related to coal mining heritage. WP4 presents the results of WP2 and WP3 into an accessible digital platform. The main objective of WP4 is to create an informative tool that supports the dissemination of the project and general the coal heritage across Europe.

A core achievement of WP4 during this reporting period has been the creation of a comprehensive and standardized geodatabase, documented in Deliverable D4.1. Creation and Standardization of the Coal Heritage Geodatabase This geodatabase consolidates spatial and non-spatial data gathered from all five participating countries through earlier project activities. It includes georeferenced site locations, descriptive metadata, historical narratives, photographs, video content, and 3D models of mining machinery and infrastructure.

The geodatabase is the main feature for the EVMJ platform, since it supports the visualization of coal heritage assets in a technical way and helps the story-telling. The use of standardized metadata ensure that the platform is compatible with broader European geospatial platforms, such as EGDI (European Geological Data Infrastructure), allowing for continued relevance and usability beyond the lifespan of the project.

The European Visual Map Journal (EVMJ), as presented in Deliverable 4.2, represents a significant digital platform enabling users to explore historical sites, industrial infrastructure, and cultural places across five European countries: France, Germany, Greece, Poland, and Slovenia. Through the use of modern GIS technologies, 3D modeling, and multimedia content such as photographs and videos, the EVMJ provides an immersive experience that combines spatial data with narrative elements to contextualize the cultural and social significance of coal mining sites.

The platform's technological foundation is built upon two complementary geodatabases developed in ArcGIS Pro and hosted via ArcGIS Online. One database stores 2D spatial datasets, including points, polygons, and polylines representing heritage sites, mine boundaries, and underground infrastructure, standardized for cross-country interoperability. The other database includes 3D models created via photogrammetry by KOMAG, which are georeferenced and incorporated into the platform as Scene Layer Packages. This combination permits to reveal internal structures and detailed exploration of machinery, enhancing the public engagement and the education.

The structure of the EVMJ includes the coal heritage and is organized per participant country. Coal heritage consists of groups such as machinery, mining sites, and cultural sites. Interactive map allows users to explore metadata including site names, locations, operational periods, and activity types. The platform

further includes multimedia, images, videos, and stories that illustrate the human and societal dimensions of coal mining. Tools such as swipe and timeline widgets enable the public engagement and the education.

A key feature of the EVMJ is its capability to offer an immersive narrative experience. Interactive elements, including linked 2D maps and 3D models, along with embedded photographs and historical texts, facilitate multi-layered exploration of each site. The platform is designed user -friendly, ensuring ease of access and education.

In conclusion, the EVMJ demonstrates the potential of spatial storytelling in industrial heritage preservation, offering a replicable model that combines geospatial data, multimedia content, and 3D visualization to enhance public awareness, education, and sustainable tourism. Its entrance within the European data ecosystem through the EGDI platform ensures its long-term accessibility, contributing significantly to the legacy and visibility of coal-dependent regions in transition.

3.2 Specific Achievements of WP2 Linked to Project Goals and WP2 Goals

WP2's work was very important in helping CoalHeritage reach its goals. It did this by focusing on documenting the transition plans used in each country, the laws that were in place, how stakeholders saw the situation, and the best practices used at former coal mining sites.

Project Objective 1: Identification of processes needed to declare coal sites as heritage areas supporting the just transition of the coal sector and regions

WP2 contributed to this objective by:

- Legal framework: Deliverable 2.2 reported the legal requirements for the recognition of coal sites as heritage areas in each partner country. These findings are essential for understanding and proposing policy initiatives in Europe.

Project Objective 2: Enhanced management in the coal regions in transition, supporting the just transition of the coal sector and regions, improving health and safety, and minimizing environmental impacts

WP2 supported this objective by:

- National Transition Strategies: Deliverable 2.1 presented detailed analyses from Greece, Germany, France, Poland, and Slovenia on their national coal transition policies. This includes plans for mine closures and socio-economic impacts and some regional development suggestions.

Project Objective 4: Dissemination and network development supporting the just transition of the coal sector and regions

WP2 contributed to this objective by:

- Assessing Public Perception of Industrial Heritage: Deliverable 2.4 presents an EUSurvey showing community awareness, and values associated with coal mining heritage. This research provides recommendations to strengthen communication and engagement.
- Disseminating Knowledge on Success Stories: D2.3 presents successful stories of coal mining sites as museums, cultural centers, and recreational places.

Achievements of WP2 were also focused on addressing the specific objectives of WP2 itself. The main WP2 goals were:

- To describe the current status of industrial coal mining heritage in Europe.
- To identify legal framework for heritage recognition.
- To find out the successful stories of best practices and transition.
- To understand stakeholder awareness of coal mining heritage.

The following achievements demonstrate the successful fulfillment of these goals:

- Comprehensive National Assessments: Deliverable 2.1, capturing the current status and the transition strategies in five countries. The report offers an understanding of economic, social and industrial impact of mine closure.
- Legal Framework Documentation: D2.2 focus on the national legislation used for coal heritage site designation and produced some guidelines for future declarations.
- Best Practices: Deliverable D2.3 presents a report at successful transition examples across Europe, offering strategies for regional development.
- Stakeholder Awareness Research: D2.4 assessed public perception via EUSurvey, uncovering challenges and opportunities for engaging communities in coal heritage preservation.

Concluding, WP2 outcomes have assisted CoalHeritage to fulfill its objectives in WP level and on project level.

3.3 Specific Achievements of WP3 Linked to Project Goals and WP3 Goals

WP3's contribution was essential in achieving CoalHeritage's objectives by focusing on the identification, documentation, and management of coal mining heritage assets. The specific achievements of WP3 are linked to both broader project objectives and the specific goals of the work package itself.

Project Objective 1: Identification of processes needed to declare coal sites as heritage areas supporting the just transition of the coal sector and regions

WP3 contributed to this objective by:

- **Classification and Categorization of Heritage Assets:** The MS7 workshop included discussions among consortium partners, ensuring that the classification framework reflected diverse perspectives. Partners come from different countries with different background and phase of coalheritage. It was essential that everyones' opinion was heard, especially from partners who's countries already were a step forward in this direction. WP3 set the classification methodology and categorised the coal mining heritage into two primary supergroups: 'cultural heritage' and

'natural heritage,' with further subdivisions into groups, categories, and subcategories. This systematic approach may aid the potential stakeholders in recognizing and assessing the historical and cultural significance of various coal mining sites.

- **Developing a Comprehensive Inventory of Coal Mining Heritage Assets:** Through Deliverable D3.1, WP3 established a catalog of 177 coal mining heritage assets, including tangible and intangible elements. This inventory serves as a critical resource for identifying assets suitable for heritage designation and paves the way for including similar ones into heritage list.

Project Objective 2: Enhanced management in the coal regions in transition, supporting the just transition of the coal sector and regions, improving health and safety, and minimizing environmental impacts

WP3 addressed this objective by:

- **Documenting Best Practices and Challenges:** Deliverable 3.2 presents a comprehensive report of the existing legal frameworks, measures and policies, standards, resources, and strategies for the management of geoheritage sites for each one of the countries involve in the CoalHeritage project. It also presents existing examples of coal heritage sites from the countries involved and their conservation status, in order to be used as an example for setting an effective management system.
- **Incorporating Expert Insights:** Within D3.2 In-depth interviews and focus group discussions with 27 experts from various fields discussed and assessed the presented standards and mechanisms for the management of coal heritage assets. The IDI and FGI analysis recommendations were provided for setting an effective and sustainable plan for the preservation, management, and promotion of coal heritage.

Project Objective 3: Design and development of a European Visual Map Journal (EVMJ) supporting the just transition of the coal sector and regions

WP3 achievements set the foundation for the EVMJ by:

- **Providing detailed record cards and classification templates.** The inventory of Deliverable D3.1 served as a resource for long-term provision of elements to incorporate into the EVMJ platform.
- **Providing 56 (fifty-six) 3D models** of mining machinery to be integrated into the EVMJ platform and embedded in the Sketchfab platform. (https://sketchfab.com/komag_dlm/collections). Models are also available on the websites of some divisions of the Silesian University of Technology (https://www.polsl.pl/rg/lab-maszyny-gornicze/) and the AGH University of Science and Technology (https://kimit.agh.edu.pl/dydaktyka/maszyny-gornicze-w-3d).

Project Objective 4: Dissemination and network development supporting the just transition of the coal sector and regions

WP3 contributed to this objective by:

- **Knowledge Sharing:** The IGI and FOCUS interviews performed within D3.2, apart from serving as an essential part for deducting conclusions for the effective management of coal heritage assets, functioned also as a dissemination action of the project's efforts and ambitions. The involved

stakeholders in the interviews is possible to be interested in the final project's results and build a strong network for the future.

Achievements of WP3 were also focused on addressing the specific objectives of WP3 itself. WP3 main objectives were

- the formation of a list with the most important content/ data/ categories of data that will be used at a later stage
- recommendations of the management standards and mechanisms for the protection and conservation of a coal mining site

The fulfillment of these goals following achievements demonstrate the fulfillment of these goals:

- **Standardized Inventory Creation:** WP3 successfully compiled a detailed catalog of 177 heritage assets, including diverse items such as mining machinery, architectural structures, geological features, and intangible cultural elements. This inventory is a testament to the meticulous documentation and classification efforts undertaken by the project team.
- **Collation and Recommendation regarding the Management Mechanisms of coal heritage sites:** Deliverable D3.2 outlined comprehensive methodologies for the preservation and management of coal mining heritage assets. These methodologies address both movable and immovable properties, ensuring a holistic approach to heritage conservation. The use of CAWI and FGI research techniques provided valuable insights into heritage management practices. The outputs of this deliverable were designed in order to be adaptable for future use.

Concluding, WP3 outcomes have assisted CoalHeritage to fulfill its objectives in WP level and on project level. The contribution of its deliverables and milestones were essential for the smooth progress of the project.

3.4 Specific Achievements of WP4 Linked to Project Goals and WP4 Goals

WP4's contribution was essential in achieving CoalHeritage's objectives by focusing on the integration, visualization, and dissemination of coal mining heritage information through the development of the European Visual Map Journal (EVMJ). The specific achievements of WP4 are linked both to the broader project objectives and to the specific goals of the work package itself.

Project Objective 1: Identification of processes needed to declare coal sites as heritage areas supporting the just transition of the coal sector and regions

WP4 supported this objective indirectly by:

- Storytelling of Heritage Sites: The platform provides history of mines and transition processes supporting possible policy development.

Project Objective 2: Enhanced management in the coal regions in transition, supporting the just transition of the coal sector and regions, improving health and safety, and minimizing environmental impacts

WP4 contributed to this objective by:

- Developing a Management Tool: D4.1 presents the creation of a geodatabase that share information of management of coal heritage sites. This geospatial structure supports stakeholders in planning and monitoring and hence managing coal heritage places.
- Decision-Making via Visualization: The creation of interactive maps and multimedia within EVMJ enables decision-makers to better understand the impact of their decisions.

Project Objective 3: Design and development of a European Visual Map Journal (EVMJ) supporting the just transition of the coal sector and regions

WP4 addressed this objective directly by:

- Developing the EVMJ Platform: WP4 designed a web-based GIS platform which includes site-specific content, multimedia, and narrative storytelling to engage public.
- Creating a Geodatabase: The geodatabase includes geospatial site data, metadata, and multimedia from all five countries. It fulfils the protocols of European Geological Data Infrastructure (EGDI) for future exploitation.

Project Objective 4: Dissemination and network development supporting the just transition of the coal sector and regions

WP4 significantly contributed to this objective by:

- Providing a Dissemination Tool: The EVMJ works as a communication platform for the project, visualizing technical data from WP2 and WP3 accessible to the public.
- Supporting Stakeholder Engagement: The platform supports cultural tourism, and creates opportunities for future collaboration, community-based heritage initiatives.

Achievements of WP4 were also focused on addressing the specific objectives of WP4 itself. The main WP4 goals were:

- The development of a harmonized geodatabase to house coal mining heritage data.
- The design and implementation of a user-friendly, web-based visual storytelling platform for heritage dissemination.

The following achievements demonstrate the achievement of these goals:

- Development of the Geodatabase: WP4 successfully created a database that includes geospatial data (site locations, boundaries), non-spatial data (narratives, operational status), and multimedia content (photos, videos, 3D models).
- Implementation and development of platform: The EVMJ was developed with interactive GIS layers, and narrative content related to the historical and cultural importance of coal heritage sites.

Concluding, WP4 outcomes have assisted CoalHeritage to fulfill its objectives in WP level and on project level.

3.5 Impact Analysis

A common goal of modern development policies is economic growth, which may include investment, or productivity or job creation. But this may overlook resources that are necessary for sustained success. Coal heritage is considered as something of the past. However, mining heritage has lasting significance that goes beyond numbers, just like any other form of cultural wealth.

Coal heritage can contribute to the development of regional areas, through cultural tourism development. Coal heritage can lead to the creation and practical support of mining heritage/tourism businesses, which exploit the identity of the place, create innovative experiences and strengthen the local economy. By exploiting coal mining heritage to create thriving cultural spaces that engage the local communities, attract visitors and make a substantial contribution to economic development. By strengthening the creative professions in order to produce a 'product' that can be used for development. By using mining heritage in the branding of the place, aiming for visibility. Instead of 'communicating' the place only in geographical or economic terms (e.g. energy), its cultural character (traditions, local stories, people) should be highlighted at the same time. This makes it much more attractive to the average potential visitor.

Mining communities are not defined solely by economic activity but by a distinct identity built through generations. Preserving and activating coal heritage enables:

- **The preservation of collective memory**, ensuring that the skills, and stories of mining populations are not lost;
- **The regeneration of community pride and social cohesion**, especially in areas facing demographic and economic loss;
- **The creation of popular cultural destinations**, through museums, festivals, and interpretive routes.

Investing in mining heritage aligns with modern cultural tourism trends and stimulates:

- **Place-based branding** that strengthens regional visibility and attraction;
- **Alternative tourism models** f on experience, history, and identity (INDUSTRIADA);
- **Creative industries** that generate employment in design, interpretation, and local craftsmanship.

These opportunities produce not just employment, but **meaningful economic participation**, rooted in local identity and resilience to change. Culture is a strategic tool for sustainable development. The coal heritage initiative complements environmental and economic measures by addressing **social continuity**, ensuring that communities are not excluded from future narratives. As such, it aligns with the principles of a **just transition**—one that leaves no one behind, and values people as much as production.

Where mines once extracted coal, communities can now express identity, memory, and innovation. Recognizing mining heritage as a pillar of development is not retrospective—it is forward-looking. It provides **values**, anchoring future growth in the richness of the past.

3.5.1 Quantitative and Qualitative Benefits of the Results of WP2

Four public deliverables are submitted within WP2 that describe the current situation of coal mining heritage across the participant countries. Website data show that Deliverables 2.1 and 2.2, which cover coal transition strategies and legal processes for heritage designation respectively, attracted a combined total of 40 visitors and 141 views. This depicts a high interest for the content of the aforementioned deliverables. It is worth to notice that D2.3, which focuses on successful transition stories such as the Guido Mine and Ruhr region, recorded the highest number of visitors (42). This means that the public want to learnt from the best practices examples. Deliverable 2.4, despite being the last published, quickly has gained attention with 26 visitors and 31 views depicting interest in stakeholder perception.

Their visibility were shown from the data analytics and as it is depicted in Table 1

Table 1 data analytics for D2.1 D2.2, D2.3 and D2.4

Deliverable	Visitors	Views	Published Date
D2.1	14	60	15 May 2024
D2.2	26	81	15 May 2024
D2.3	42	56	31 October 2024
D2.4	26	31	16 April 2025

The qualitative results of WP2 offer deeper insights into the social, political, and legal complexities of heritage management in post-coal regions. D2.4 provided results on public first perception via an online EUsurvey across five countries. The findings reveal different levels of community engagement, general knowledge about coal heritage, and attitudes toward preservation, financials of transition and responsibility target groups. D2.3 reveal best practice examples of coal site transition, serving as a valuable resource for decision-makers. D2.2 collects national legislations and land use policies, ending up to the requirements to declare coal sites as heritage areas. D2.1 shows the current status and the transition strategies in five countries. The deliverable offers an understanding of economic, social and industrial impact of mine closure.

3.5.2 Quantitative and Qualitative Benefits of the Results of WP3

The field of coal mining heritage conservation benefits greatly from the quantitative and qualitative results of WP3. The quantitative results include the inventory of 177 assets of Deliverable 3.1, that represents a major contribution to the knowledge base in the coal mining heritage sector. The inventory includes assets from the five participant countries, of different historical periods ensuring to be as much representative as possible. The thorough documentation provided by D3.1 serves as a foundational resource for future research, heritage projects, and educational initiatives. This comprehensive catalogue includes diverse aspects of coal mine heritage that extend from mining machinery and architectural structures to geological elements and mining traditions.

The deliverables of WP3 were also uploaded on the project's website. Their visibility were shown from the data analytics and as it is depicted in Table 2.

Table 2 data analytics for D3.1 and D3.2

Deliverable	Visitors	Views	Published Date
D3.1	7	23	25 October 2024
D3.2	4	31	30 September 2024

The qualitative results of WP3 include the development of a robust classification of coal mining heritage. The classification system developed through D3.1 ensures that coal mining heritage is recognized as a multidimensional topic, comprising of both tangible and intangible elements. This broader, more inclusive approach for coal heritage management will have a significant impact on the way heritage assets are preserved, promoted, and integrated into local and national heritage strategies.

Additionally, the expert interviews performed under Deliverable D3.2 provided valuable qualitative data that improved the overall understanding of the current state of coal mining heritage conservation. The results of the interviews unveiled key areas for improvement such as the raise public engagement, development of funding mechanisms, and the integration of new technologies in the preservation process. The proposed recommendations of D3.2 will guide future efforts to improve coal heritage management across the project countries.

3.5.3 Quantitative and Qualitative Benefits of the Results of WP4

WP4 collects transforms and present the results of WP2 and WP3 into a virtually, interactive, user-friendly way via the EVMJ. D4.1 attracted 31 unique visitors and 73 views. This shows the interest and the level of public engagement considering that the platform works as a dissemination tool.

The deliverables of WP4 were also uploaded on the project's website. Their visibility were shown from the data analytics and as it is depicted in Table 3

Table 3 data analytics for D4.1

Deliverable	Visitors	Views	Published Date
D4.1	31	73	30 September 2024

From a qualitative point of view, the EVMJ incorporates interactive storytelling maps, 3D models of mining equipment, and thematic story-telling aspects that highlight heritage across five countries. The platform also features tools for spatial exploration and comparative analysis, helping users visualize changes in landscape and usage over time. The platform is designed in a user friendly way for different target groups enhancing their engagement.

Moreover, WP4 ensures the continuity of the CoalHeritage project by making its outputs accessible beyond the project's duration. The geospatial and multimedia content of EVMJ platform can be hosted via the European Geological Data Infrastructure (EGDI), enhancing the sustainability and the project legacy.

4 Dissemination Activities

4.1 Outline of the communication plan

The Dissemination, Communication and Exploitation (DCE) plan (Deliverable 5.1, *Figure 16*) was performed in September 2023 and was a live document (was updated if needed). The Deliverable 5.1, described all the activities that were expected to be used for the successful promotion of the project and dissemination of results.

Figure 16 Deliverable 5.1 Dissemination, Communication and Exploitation plan

Apart from the activities and tools that the DCE plan described, it included also the main key target groups, potential actors and benefits for the project (Government and Municipality agencies, Research and education institutions, Industry, Corporations, Civil Society Organizations, Local communities, Press and National, European and international networks) *Table 4*.

Table 4 Key target groups, potential actors and benefits (D5.1)

Target Group	Potential actors	Benefits from the project

Research/ education	Research organizations/ institutions, universities (at least 25 researchers), post-secondary/ secondary/ primary education institutions, other education organizations and NGOs that are in the vicinity of the coal mining areas, as well as in a national and European level.	Increased knowledge on the value of coal mines as industrial/cultural heritage and promotion as such, on a local, national and European scale. This will ultimately increase public acceptance and will prevent the deterioration of the mines' assets.
Industry	Coal mining companies, companies that will undertake mine reclamation and conversion to museums.	Solutions and visibility concerning mines near closure, recently closed and/or abandoned mines. Public and private funding for the reclamation and valorisation of the mines is likely to increase due to their enhanced visibility and promotion.
CSOs - Civil Society Organisations	Private funding agencies, NGOs (environment, education, economic development, tourism, heritage and promotion of science and technology), coal mining trade unions, grassroot organisations.	All types of CSOs interested in industrial heritage and its valorisation/promotion will benefit from the resulting tool of CoalHeritage, the EVMJ.
National, European and international networks	European Route of Industrial Heritage	Enrichment of industrial routes and networks in systematically documented coal mines within a heritage/tourism framework.
Local communities	Local authorities, tourist organisations, businesses	Promotional material that will increase visibility and touristic interest both in a local and national/European scale, and a new type of visitors interested in industrial heritage.
General Public	Local and national citizens in order to address public opinion /Citizens and community groups from the surrounding areas (especially near mining areas)	Distribution of news and information about the project and its activities to the local and national public / Awareness raising related to industrial heritage and coal mining specifically

To ensure comprehensive stakeholder coverage, all project partners have provided lists of potential target groups for each country, resulting in the creation of a preliminary target group list (DCE, Annex 1). This list was continuously updated throughout the project's implementation. The information presented in the preliminary list aimed to inform and raise awareness among various target groups about the coal mining history, the tourism industry's potential in these areas, and to introduce alternative ways of exploiting the coal regions.

4.2 Dissemination Tools and Channels

4.2.1 Summary of tools used

Among the various channels of communication that were established, the first fundamental was CoalHeritage's website (*Figure 17*, *Figure 18*). The project's website is playing a crucial role for the successful promotion. Under the website, news and events were published, along with information for the project, all public deliverables or public versions of them, newsletters, and the EVMJ platform.

Figure 17 CoalHeritage website

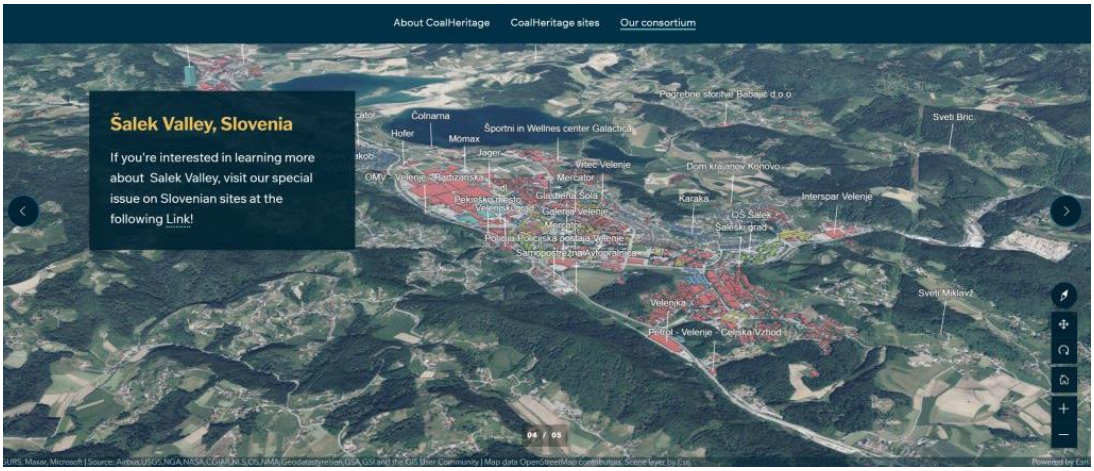


Figure 18 CoalHeritage website hosts the EVMJ platform.

9 deliverables have already been uploaded to CoalHeritage Website:

Table 5: List of uploaded deliverables to the website

D1.1	Comprehensive overview of the project
D2.1	Report on the coal transition strategy of the European countries
D2.2	Description of the processes for the identification of the coal sites as national heritage areas
D2.3	Successful stories of transforming coal mining sites and areas into industrial heritage objects
D2.4	Report on the questionnaires and first results on the public perception
D3.1	Catalogue of the collected assets from the partners' country
D3.2	Report on the standards and mechanisms for the management of the heritage sites
D4.1	Coal heritage geodatabase
D5.1	Dissemination, Communication and Exploitation plan

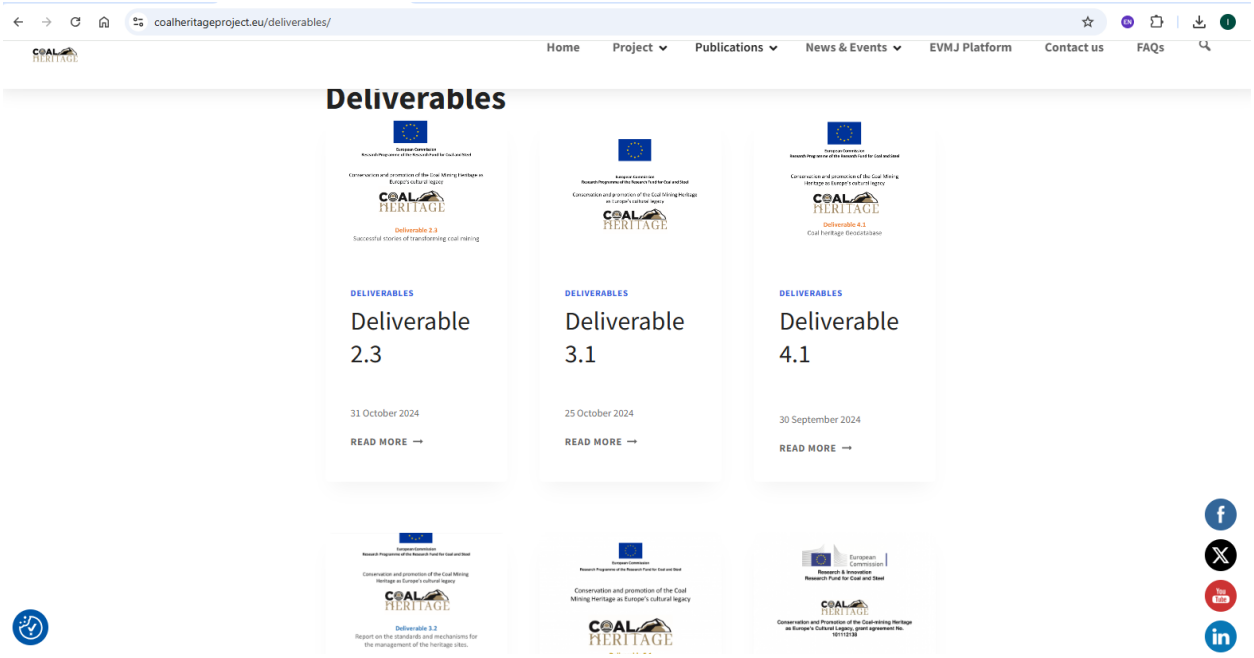


Figure 19 CoalHeritage website hosts all public deliverables or their public versions.

The next important tool was the creation of Social media profiles of the project:

- X (*Figure 20*)
- Facebook (*Figure 20*)
- LinkedIn (*Figure 21*)

Posts were made and disseminated through the social media accounts almost every 2 weeks.

Another channel that project's news and progress were published was a YouTube channel – CoalHeritage - YouTube (*Figure 21*).

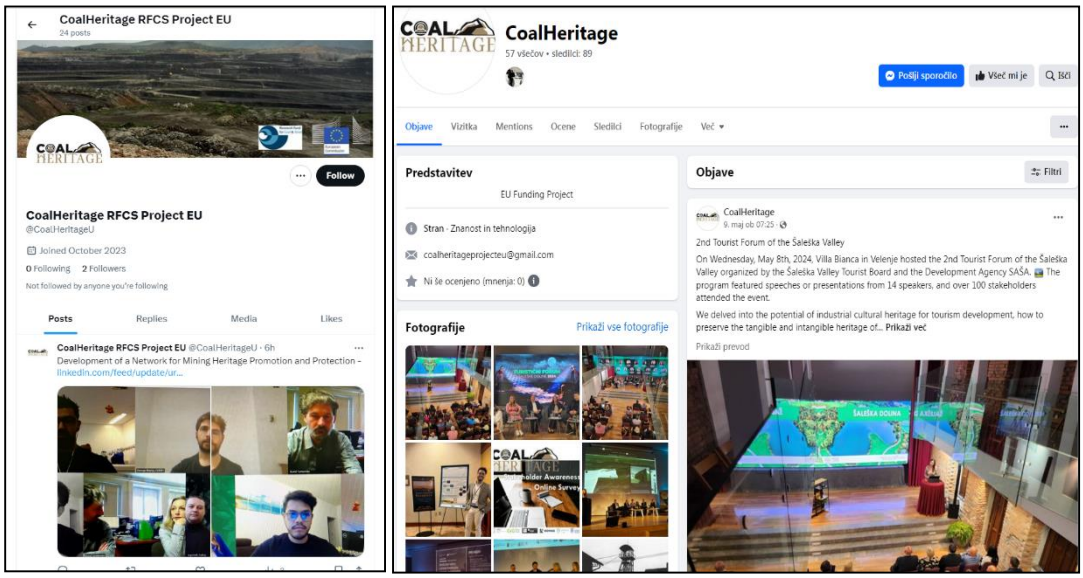


Figure 20 CoalHeritage X profile page and Facebook profile page.

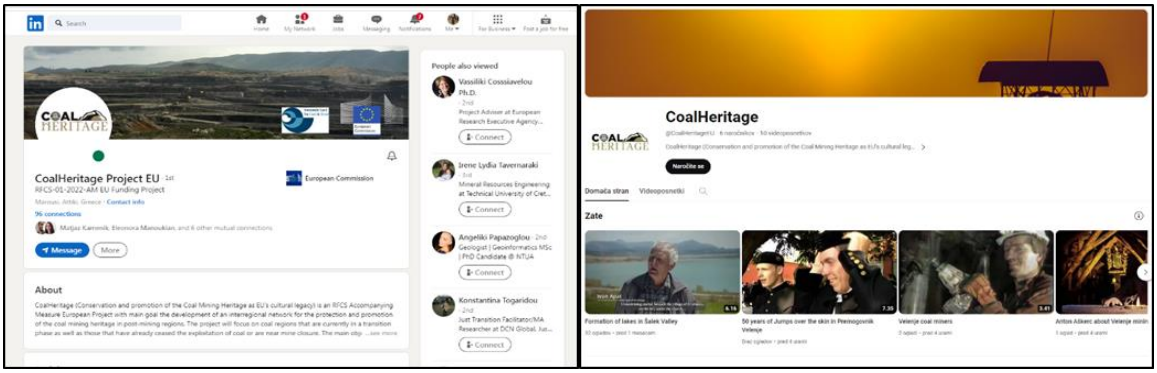


Figure 21 LinkedIn and Youtube page of CoalHeritage project.

The last dissemination tool used was the publication of newsletters. 1 newsletter was published every 2 months, according to the Grant Agreement, with input from all partners. So far, 11 newsletters (edited

and designed by PV) (*Figure 22*) were published on CoalHeritage channels and partners' communication channels:

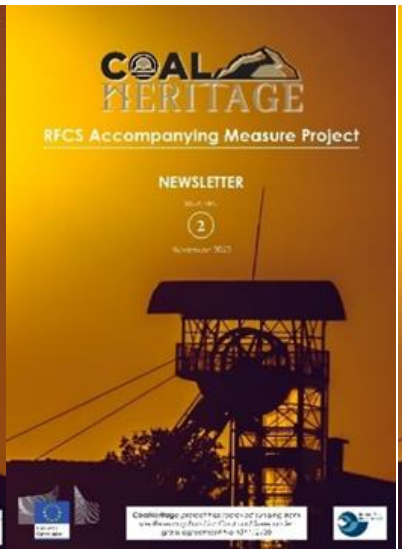
- Issue No.1 Briefly presenting COALHERITAGE project and results of kick-off meeting.
- Issue No.2 Presentation of best practices to showcase the importance of mining and industrial sites conservation as heritage (GREECE: Industrial Gas Museum, POLAND: Guido Coal Mine and The Experimental Mine Barbara, SLOVENIA: Coal Mining Museum, FRANCE: Wendel Mine Site and Lewarde Mining Center History, GERMANY: Zollverein Coal Mine Industrial Complex)
- Issue No.3 Summary of project progress and upcoming events (Report on the coal transition strategy of the European Countries, Internal workshop to determine the categories for the inventory – survey, progress meeting report and Partnership with the Association of Mining Communes in Poland[1], European Visual Map Journal, Participation at the KOMTECH Conference 2023 and The meeting with Dr. Simon Wright from Australia at KOMAG)
- Issue No. 4 Stakeholder Workshop in Germany, international collaboration with China, REMINDNET Meeting in Ostrava, presentation at Working Industrial & Mobile Heritage Group Meeting, explore coal heritage through video (link via QR code) and upcoming events).
- Issue No. 5 3D models of coal heritage assets, presentation of the project at the International Mining Event (West Virginia), presentation at Conference "Cultural Heritage and the Investment Process" in the Silesian Museum in Katowice Poland and call to public to participate in Stakeholder Awareness Online Survey.
- Issue No. 6 Summary of Progress and working Meeting in Velenje (review of all WPs progress, presentation of one of the Slovenia most famous mine museums Idrija, a UNESCO World Heritage site, showcased its history, cultural heritage status, ongoing preservation efforts and their experiences with protection and preserving of mining heritage, cooperation at Tourism Forum of the Šalek Valley – coal mining as opportunity for Cultural Tourism, presentation of project at International Conference EnRe – Energy & Responsibility Slovenia, BRGM visit of various players involved in the promotion and conservation of France's coal mining heritage).
- Issue No. 7 Best practices in CoalHeritage project. Lavrion in Greece, a place with mining roots from ancient times through the modern era, and how its mining heritage is now a central part of a Technological and Cultural Park. Hoheward in Germany hidden in the heart of the Ruhr region lies the Colliery Ewald a former coal mine that has transformed into a tourist and business destination. CoalHeritage project is now featured on EGDI Platform.
- Issue No. 8 Best practices in CoalHeritage project from Poland and Slovenia turning their old mining sites into cultural heritage spots and tourist attractions. It highlights examples from Poland like the Queen Louise Adit in Zabrze, Water Tower which preserves mining history while also boosting local identity and economy. The Mežica Lead and Zinc Mine, which is today fine example of coal heritage preservation in Slovenia, is one of the oldest mines in Europe.
- Issue No. 9 KOMTECH conference in Poland where CoalHeritage project was presented. A special session focusing on coal mining heritage, covering everything from legal stuff to virtual

reality. Presenters joined both in person and online via youtube, with live translations making sure everyone could follow along.

- Issue No. 10 The micro-adventure intitiative in the CoalHeritage project offers short, engaging journeys through historic mining sites, steam engines, and transport systems. Desing for both virtual and physical exploration, these adventures feature mapped routes, key points of interest, and interactive elements. Each adventure includes a concise guide with thematic narratives, logistics, and multimedia content form Greece, Poland, Germany, Slovenia and France.

- Issue No. 11 results of deliverable 2.4 were presented. Stakeholder Workshop 2025 in Bochum, Germany took place to explore local strategies and international perspectives for the preservation and transformation of former mine sites. Stakeholder Workshop 2025 in Athens in Greece where results of CoalHeritage were presented. On April 10-11, 2025 the international conference “European Steel and Coal Heritage” was held in Katowice with a strong participation of our project partners, GIG and KOMAG.


COAL HERITAGE
RFCS Accompanying Measure Project
NEWSLETTER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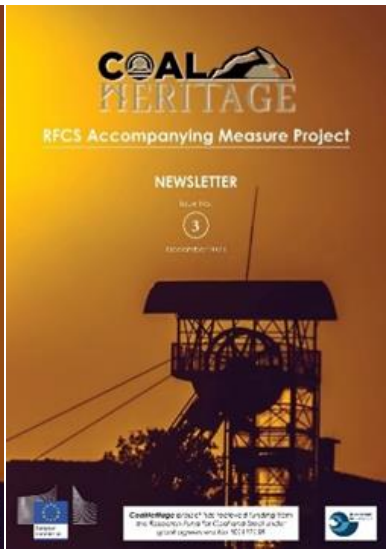
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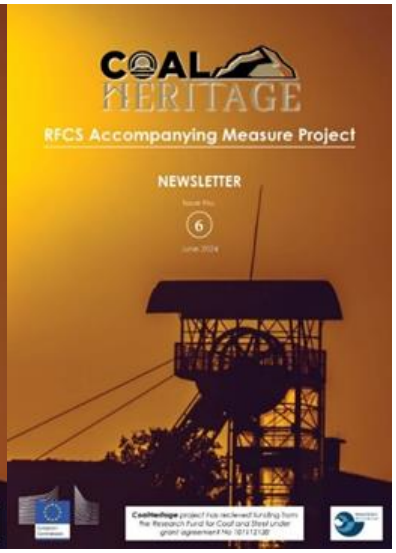
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RFCS Accompanying Measure Project
NEWSLETTER
Issue No.
7
September 2024


COAL HERITAGE
RFCS Accompanying Measure Project
NEWSLETTER
Issue No.
8
October 2024


COAL HERITAGE
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NEWSLETTER
Issue No.
9

Figure 22 CoalHeritage Newsletters 1-11

4.2.2 Metrics of reach and engagement.

The aim of the project website (https://coalheritageproject.eu/) is to disseminate and communicate all the above-mentioned results to a wider online audience. Results from workshops and conferences were shared on website and social media as soon as possible, as well as news for the upcoming events. The project website has had more than 49,910 views so far, from more than 23,843 visitors. The deliverables were uploaded on the website after their submission with a disclaimer, and social media posts lead to the "Deliverables" page of the website so that the texts are accessible more easily. Updates in the platform are also given on a regular basis, with links to the platform so as to increase visibility. WP Leader meetings that relate to the progress of the project were also being shared. The online audience has been carefully built so that it includes people of all ages from as many European countries as possible, in order to increase visibility. Additionally, the content of the posts is being carefully prepared so that it is visually appealing. The website, platform and social media pages are interconnected to increase visibility and traffic. For that reason, there were at least two posts per week. PV also sent Newsletter to its employees – around 2100 people.

Visitor and engagement analytics are powerful tools for the monitoring of the online dissemination platforms of the project. Since the social media pages' lead to the website and the EVMJ platform it is very important to be aware which social media platforms are more effective, and how to make improvements. It is important to note that social media posts help increasing website traffic considerably.

The project's LinkedIn profile (*Figure 23*) is the most popular of the social media pages, with the most audience engagement so far, since the LinkedIn platform facilitates post visibility more effectively. It also helps reaching a wider audience (283 followers so far) and this is reflected in the post analytics (*Figure 24*).

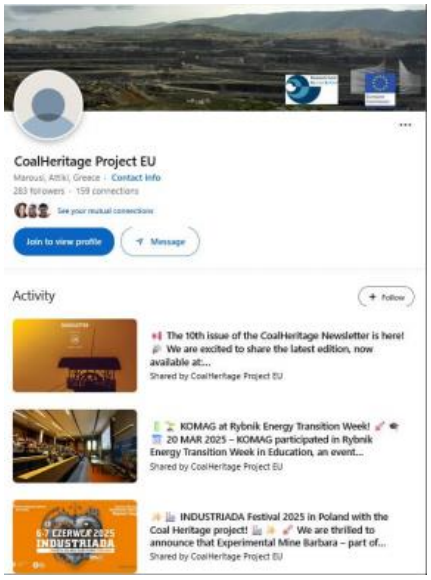

Figure 23 Coalheritage LinkedIn page

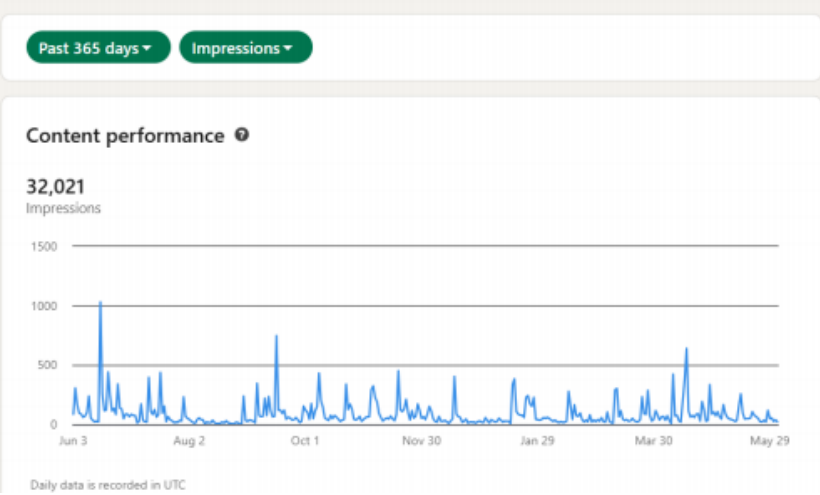

Figure 24 Coalheritage LinkedIn analytics

Coalheritage's Facebook page (118 followers so far) and analytics (most popular posts and audience demographics) and are shown in *Figure 25* and *Figure 26*, while Figure 27 shows the X page. Social media analytics show that posts increase visibility, engagement and traffic.

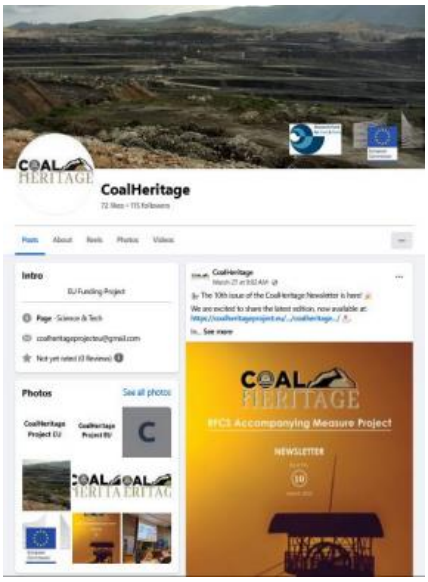

Figure 25. Coalheritage's Facebook page

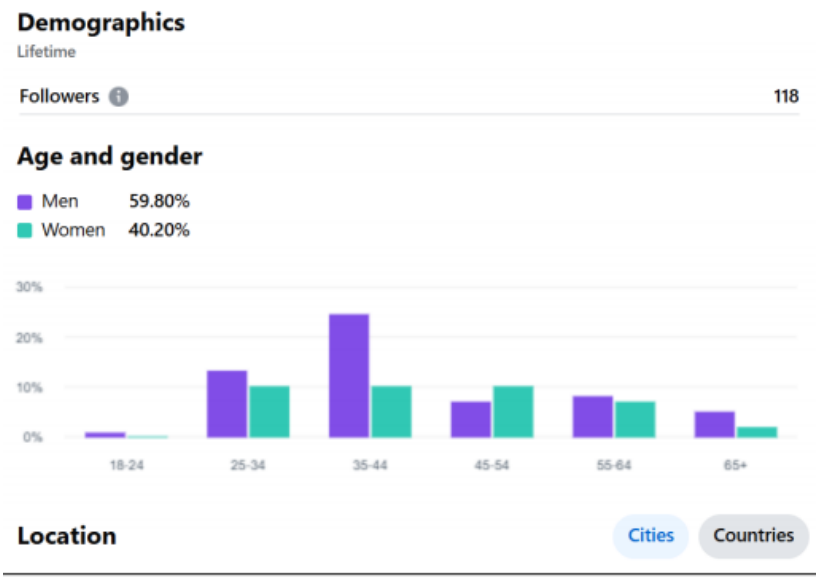

Figure 26 Coalheritage's Facebook demographics.

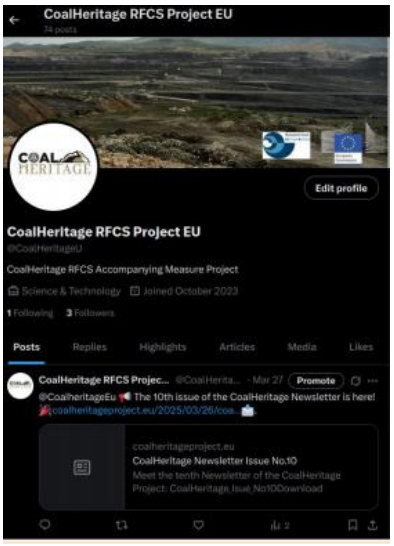

Figure 27 CoalHeritage's X page.

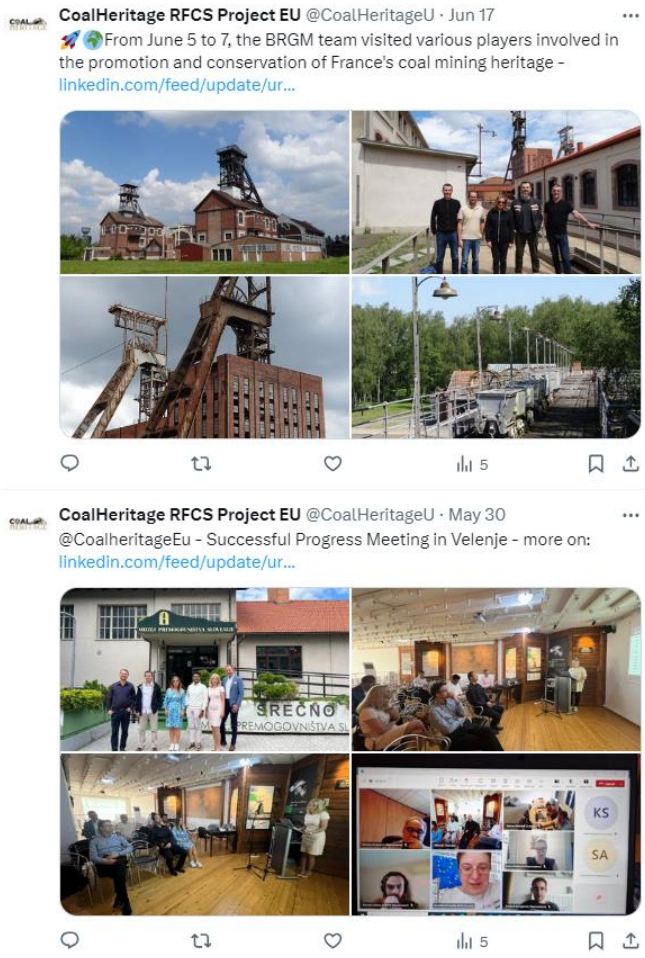

Figure 28 Indicative posts of Coalheritage's X page.

4.3 Scientific Contributions

List of conferences, journals, and workshops where results were presented.

As it was mentioned above, in order to achieve the impact on social and on industrial level, several stakeholders including policy makers, research communities and general public were reached through participation in workshops and the collaborations with other industrial heritage networks. Particularly CoalHeritage was presented at the following workshops and conferences:

- the International Scientific and Technical Conference KOMTECH, on 6-8.11.2023, organized by the KOMAG Institute November 2023 in Szczyrk (presenter KOMAG), with about 150 participants including representatives of companies, research and development units, authorities related with coal mining and green transformation (https://komag.eu/aktualnosci/2859-komtech-2023). There, a dissemination of the project was performed and Komag organized a stand with a newsletter and VR goggles.

- the 21st Altbergbaukolloquium (ABK) 2023 annual conference at the UNESCO World Heritage Zollverein in Essen (presenter DMT), 9-10.11.2023, on with about 500 participants (Newsletter distribution over the event, to give visibility to the CoalHeritage project and rise awareness about preservation measures on coal mining sites.)

- a presentation during a meeting at KOMAG in Gliwice, Poland, 01.12.2023, on with Dr. Simon Wright (Charles Sturt University, Australia) and Mr. Dariusz Stankiewicz (Marshal Office of the Silesian Voivodeship). CoalHeritage was presented as part of an overview of current projects by KOMAG.

- the first external project workshop (MS6), organized and hosted by DMT-THGA in Germany, on 08.02.2024, with around 15 participants (from national and local authorities, industry in the area, local society, students and scientific employees). The workshop not only contributed to the validation and design of the questionnaire of WP2, but also facilitated the development of an interregional network dedicated to conservation and preserving coal mining heritage.

- Working Industrial & Mobile Heritage (WIMH) Group Meeting, on 13.02.2024, to international experts involved in the preservation of industrial heritage (presenter GIG-PIB). WIMH, is a consortium of European umbrella organisations representing the industrial and mobile heritage sectors. The meeting participant were distinguished representatives i.a. European Route of Industrial Heritage (ERIH) Board Members, TICCIH. ERIH, is the tourism information network of industrial heritage in Europe. which has around 350 members in 27 countries. TICClH is recognized by the International Council on Monuments and Sites (ICOMOS) as a designated consultant in all matters related to the study and preservation of industrial heritage. In particular, ICOMOS' network of experts counsels UNESCO on properties to be added to the World Heritage List. Therefore, TICCIH advises on historically significant industrial sites for the World Heritage List.

- conference School of Underground Mining SEP 2024 in Cracow, Poland, on 26-27.02.2024. School of Underground Mining, SEP is one of the largest and the most important conference in Polish mining. It gathered 360 participants, authors and guests, including board members of biggest polish mining enterprises (presenter GIG-PIB)

- scientific conference "Cultural Heritage and the Investment Process" in the Silesian Museum in Katowice, Poland, on 8.04.2024. The conference, with the participation of the Silesian Voivode, attracted almost 80 specialists from various fields of science, including humanities, social sciences, economics and law, but also natural sciences (biologists) and practitioners of investments in cultural heritage (presenter GIG-PIB).

- the West Virginia Mine Drainage Task Force Symposium & 15th International Mine Water Association

Congress 2024, in Morgantown, USA, on 21-26.04.2024. A poster was exhibited presenting the CoalHeritage project concept and Ruhr area cases.

- the 2nd Tourist Forum of the Šaleška Valley, in Velenje, on 08.05.2024. Information about the CoalHeritage project was shared during discussions. Audience included representatives of the ministry, tourism organizations, cultural institutions, and local communities.

- the 6th International Conference EnRe – Energy & Responsibility, on 21.05.2024, organized by the Faculty of Energy Technology at the University of Maribor, which took place in May in Velenje, Slovenia. The Velenje Coal Mine will present three projects – also Preserving and Promoting the Coal Mining Heritage as Europe's Cultural Heritage (100 participants).

- the popular-scientific conference “Tarnogórscy przemysłowcy w starożytności i średniowieczu” (EN: Industrialists of Tarnowskie Góry in Antiquity and the Middle Ages) during the traditional holiday ‘Gwarki’, on 06-08.09.2024, organized by the Association of Tarnowskie Góry Land Lovers. Project promotion included newsletter distribution.

- the 37th International Geological Congress (IGC 2024), held in Busan, South Korea, on 27.08.2024. Presentation by Charles N., Beccaletto L. et al., titled "CoalHeritage Project: Unlocking the potential of Europe’s coal mining heritage."

- the KOMTECH 2024 International Scientific and Technical Conference, Szczyrk, Poland, on 04-06.11.2024. A dedicated session to CoalHeritage was organized on 05.11.2024 with 6 presentations (KOMAG and GIG in person, other partners online), simultaneous translation, live YouTube stream, and a multimedia stand promoting the project.

- a scientific seminar at KOMAG, on 07.11.2024, with a presentation titled "Protection and Promotion of Coal Mining Heritage as the Cultural Legacy of the EU – the CoalHeritage Project." The seminar, attended by about 25 people, focused on VR and 3D model use for historical mining machinery

- Title: Industriada pierwszy raz w 100-letniej Kopalni Doświadczalnej "Barbara" w Mikołowie, jedynym takim ośrodku w Europie (Industriada for the first time in the 100-year-old Experimental Mine "Barbara" in Mikołów, the only such facility in Europe); Language: Polish. Date of publication: 07.06.2025. LINK: https://www.slazag.pl/industriada-pierwszy-raz-w-100-letniej-kopalni-doswiadczalnej-barbara-w-mikolowie-jedynym-takim-osrodku-w-europie

- Presentation at the 37th International Geological Congress in Busan, South Korea, 27.08.2024 (IGC2024). Charles N., Beccaletto L. et al. "CoalHeritage Project: Unlocking the potential of Europe’s coal mining heritage".

- Presentation and workshop in event held on 20.03.2025 in Rybnik, Poland within Energy Transition Week in Education organized by Silesian University of Technology for secondary school students in classes specializing in hydrogen and renewable energy

- Promotion of the CoalHeritage project during a visit paid by BRGM at the Faymoreau Mining Center

- International Scientific Conference “European Heritage of Coal and Steel”, Katowice, 10-11.04.2025, organized by National Heritage Institute, Ministry of Culture and National Heritage, Working Industrial and Mobile Heritage Platform WIMH, Foundation for the Protection of Industrial Heritage in Silesia. Patronage of the Polish Presidency of the Council of the EU.

In addition to the aforementioned activities, CoalHeritage was shared and discussed also at:

- the St. Barbara’s Day celebration ceremony in KOMAG, on 08.12.2023. During the ceremony, CoalHeritage project was mentioned in Komag’s presentation. The audience included representatives of authorities, higher education, industry and R&D sector related (directly or indirectly) with coal mining and green transition.

- the Traditional mining parade in Tarnowskie Góry, on 10.12.2023. Sharing the project ideas with participants of traditional mining parade in Tarnowskie Góry took place.

- the new Master's degree course "Material Engineering and Industrial Heritage Conservation'', by the DMT-THGA . CoalHeritage project has been presented and discussed with the interested parties: students and professors.

- the monthly meetings organised by DMT-THGA with representatives from HCC Ruhr (Heritage Conservation Center Ruhr) and the mining museum to discuss the project progress, potential collaborations and information exchange about transfer projects and heritage conservation.

- the Solemn Mass at the church in Bobrowniki Śląskie (a district of Tarnowskie Góry, Poland) on 4.12.2024. The event was used by KOMAG as opportunity to share the project ideas to the service attendees. The mass was organized by the Miner's Club operating at this parish.

- a lesson on mining traditions at a primary school in Tarnowskie Góry, Poland, on 6.12.2024, which was carried out by a representative of KOMAG's CoalHeritage team.

- a traditional mining parade that passed through the streets of Tarnowskie Góry, on 8.12.2024, where a representative of KOMAG's CoalHeritage team participated.

- a group of tourist guides from the Historic Guido Mine at the Experimental Mine Barbara (Poland), partner of the CoalHeritage project, on 8.11.2024, hosted by Central Mining Institute-National Research Institute. The guides learned about the history of the Barbara Experimental Mine, which has been operating as a research unit since 1925, visit the underground experimental galleries and find out more about our CoalHeritage project.

Also, CoalHeritage approached and made collaboration with other industrial heritage networks to enhance its impact, such as:

- ERIH, the European Route of Industrial Heritage

- TICCIH, The International Committee for the Conservation of the Industrial Heritage,

- WIMH, Working Industrial & Mobile Heritage Group

- the Durham Miners Association

- the 'EuroGeoSurveys' in order to host a geodatabase after the end of the project at the European Geological Data Infrastructure (EGDI)

- the HCC Ruhr (Heritage Conservation Center Ruhr)

Publications and their impact (e.g., citations, audience).

The public has been informed by polish media with articles such as:

- the article in Polish media "Od wydobywania węgla do muzeum. Powstaje sieć wspierająca zachowanie dziedzictwa górniczego" (From coal mining to the museum. Development of network supporting the preservation of mining heritage), that was published in the in Biuletyn Górniczy nr 4/2023 (the Mining Magazine), no hyperlink, only printed issue (Figure 29)

- Title: Warsztaty podsumowujące projekt CoalHeritage (Workshops summarizing CoalHeritage project). Language: Polish. Date of publication: 06.06.2025. LINK: https://metropolia.slaskie.travel/event/1029097/warsztaty-podsumowujace-projekt-coalheritage

TRANSFORMACJA

biu Węglowym (GZW), zlikwidowane kopalnie Dolnośląskiego Zagłębia Węglowego i przez kopalnię Bogdanka w nowym Lubelskim Zagłębiu Węglowym. Opisano także deformacje powierzchni, które powstały w wyniku zakończonej eksploatacji węgla kamiennego prowadzonej w Europie, na przykład w Wielkiej Brytanii i w Niemczech i prowadzonej obecnie eksploatacji w Rosji, Ukrainie, Stanach Zjednoczonych czy Chinach.

Najwięcej doświadczeń i wyników pomiarów deformacji dotyczy GZW, w którym prowadzono eksploatację z podsadzką hydrauliczną pod śródmieściem Katowic i Bytomia. Przykładem eksploatacji wielokrotnej prowadzonej z zawałem stropu jest wieloletnia eksploatacja górnicza pod dzielnicami Karb i Miechowice miasta Bytomia. Wieloletnia i wielokrotna eksploatacja złoża wielopokładowego prowadzona w GZW spowodowała powstanie liniowych nieciągłych deformacji powierzchni (LNDP), które zostały omówione w monografii. Do monitoringu deformacji nadal będą wykorzystywane metody geodezyjne uzupełniane nowymi technologiami i urządzeniami, na przykład skaningi laserowy naziemny i lidar, a także interferometria satelitarna, które umożliwiają równoczesny pomiar obniżeń na dużych powierzchniach.

Profesor Kowalski w swoich ostatnich opracowaniach naukowych porusza również problem wykorzystywania metod numerycznych i sztucznej inteligencji do opisu deformacji powierzchni, bowiem z zastosowaniem tych metod wiąże się duże oczekiwania. Dotyka także tematu likwidacji kopalń, do tej pory przeprowadzonej głównie w północnej części GZW. Przedstawiono w niej przykłady dokumentowania skutków likwidacji kopalń na powierzchni i oceny terenów pogórniczych do zabudowy, co jest niezwykle istotne w kontekście ich dalszego wykorzystania.

Profesor Andrzej Kowalski jest uprawnionym mierniczym górniczym oraz rzeczoznawcą do spraw szkód górniczych Zarządu Głównego Stowarzyszenia Inżynierów i Techników Górnictwa. Współpracuje z Akademią Górniczą we Freibergu i Wyższą Szkołą Górniczą w Ostrawie.

Należy pamiętać, że profesor Andrzej Kowalski jest również inicjatorem wielu spotkań i dyskusji pomiędzy ekspertami oraz przedstawicielami górnictwa i samorządów na najbardziej aktualne tematy, np. dotyczące sytuacji zapadlisk w Trzebini, a wcześniej sytuacji katastrofy budowlanej w Bytomiu Karbiu, czy problemów prawnych szkód górniczych i użytkowania budynków wcześniej odszkodowanych, a wciąż zamieszkałych, co wciąż stanowi jeden z najważniejszych problemów tematyki szkód górniczych.

Sylwia Jarosławska

Od wydobywania węgla do muzeum. Powstaje sieć wspierająca zachowanie dziedzictwa górniczego

Kopalnia Guido, sztolnia Luiza, szyb Ignacy to tylko kilka, najbardziej sztandarowych przykładów udanego wykorzystania dziedzictwa górniczego. Proces dekarbonizacji i planowane zakończenie wydobycia węgla kamiennego do 2049 r. powoduje dla regionu konieczność podjęcia działań mających na celu nie tylko transformację społeczną i gospodarczą, ale także rekultywację terenów i obiektów górniczych. Jedna z priorytetowych wizji rozwoju Śląska, zawarta w strategii Zielone Śląskie 2030, zbudowana jest wokół nowoczesnej gospodarki, opartej na innowacyjności, kreatywności i wiedzy, ale także na dziedzictwie i tradycjach przemysłowych regionu.

Coal Heritage: Zachowanie i promocja dziedzictwa górnictwa węglowego jako dziedzictwa kulturowego UE to nowy projekt finansowany ze środków Funduszu Badawczego Węgla i Stali, który rozpoczął się w tym roku. Projekt koordynowany jest przez greckie centrum badawcze CERTH, a jego partnerami są jednostki z 5 państwa: słoweńska firma górnicza Premogovnik Velenje, francuskie BRGM, niemieckie DMT-THGA oraz polskie jednostki: Instytut Techniki Górniczej KOMAG i Główny Instytut Górnictwa – Państwowy Instytut Badawczy.

Celem projektu jest stworzenie międzyregionalnej sieci poświęconej ochronie dziedzictwa węglowego. Po rozpoznaniu i waloryzacji majątku wybranych kopalń w oparciu o najlepsze praktyki opracowana zostanie strategia ich zachowania. Zidentyfikowane zostaną również procesy potrzebne do uznania konkretnej kopalni za dziedzictwo narodowe. Co ważne, w tym przypadku przeanalizowane zostaną nie tylko zasoby materialne i niematerialne kopalń, ale uwzględnione zostanie także pojęcie geodziedzictwa odnoszące się do samego węgla jak i do innych elementów naturalnych takich jak wychodnie, czy zasoby paleontologiczne i mineralogiczne.

– Nasz projekt kładzie nacisk na procesy identyfikacji obiektów węglowych jako obszarów dziedzictwa narodowego i przyjęcie najlepszych praktyk w zakresie przekształcania terenu w dziedzictwo przemysłowe. Stąd oczekiwanym rezultatem jest opracowanie geobazy danych Coal Heritage Geo-database, współtworzonej z międzyregionalną siecią interesariuszy, w celu gromadzenia danych geoprzestrzennych i tekstowych z wybranych kopalń węgla kamiennego w oparciu o określone kryteria. Chcielibyśmy także aby była to szczególna ścieżka tematyczna w ramach Europejskiego Szlaku Dziedzictwa Przemysłowego (ERIH) – mówi dr Theodoros Zarogiannis, kierownik projektu z CERTH.

Istotnym krokiem na drodze do uznania regionu za krajobraz kulturowy i przekształcenia go w atrakcję turystyczną jest transformacja kopalń w obiekty kultury, np. muzea i podziemne szlaki turystyczne. Takim przykładem jest Zagłębie Ruhry, które po zamknięciu zakładów wydobywczych odnotowuje renesans kulturowy.

Obiekty dziedzictwa przemysłowego mają istotne znaczenie w wielu wymiarach: technicznym, historycznym, artystycznym, architektonicznym, naukowym czy kulturowym. Stanowią podstawę lokalnej tożsamości i są istotne dla zmian gospodarczych. Z drugiej strony organy ochrony zabytków nie są w stanie utrzymać wszystkich budynków, a proces podejmowania decyzji za lub przeciw zachowaniu danego obiektu opiera się nie tylko na kryteriach ekonomicznych. Ponieważ społeczny odbiór korzyści lub kosztów utrzymania takiego majątku będzie odgrywać istotną rolę w procesie decydowania o zachowaniu, w projekcie przewidziane są również badania społeczne z udziałem różnych grup interesariuszy.

Głównym efektem projektu będzie interaktywna mapa wizualna pod nazwą European Visual Map Journal, promująca potencjał górnictwa, jako wspólnego dziedzictwa industrialnego. Mapa dostępna będzie na stronie internetowej. W zależności od miejsca i sposobu wizualizacji prezentacje mogą zawierać elementy postaci w postaci quizów, animacji czy pokazów z wykorzystaniem technologii VR.

– Chcemy, aby Coal Heritage wspierał również tworzenie nowych miejsc pracy w lokalnej turystyce dla byłych pracowników przemysłu wydobywczego poprzez wsparcie prywatnych agencji finansujących przekształcanie kopalń w muzea. Pracownikami muzeów będą byli pracownicy kopalń z regionu. Swoimi cennymi doświadczeniami podzielą się ze zwiedzającymi muzeum. Przekwalifikowanie byłych pracowników kopalń łagodzi utratę miejsc pracy, a pojawienie się nowych usług związanych z transformacją poprawi warunki pracy – podkreśla dr Theodoros Zarogiannis.

Ostatecznym celem wszystkich działań projektu jest podniesienie świadomości na temat historii górnictwa węgla, przyciągnięcie uwagi do możliwości działania nowych sektorów w oparciu o istniejące dziedzictwo przemysłowe, które już jest oraz alternatywne sposoby wykorzystania regionów węglowych w bardziej zrównoważony sposób.

Projekt realizowany będzie do 2025 r., a jego finałem będą specjalne warsztaty i pokazy w Kopalni Doświadczalnej Barbara GIG-PIB. Kopalnia Doświadczalna Barbara to jedyny w Europie podziemny poligon doświadczalny. Jej powstanie w 1925 r. umożliwiło opracowanie wielu nowatorskich rozwiązań w zakresie zwalczania zagrożeń naturalnych w górnictwie.

Sylwia Jarosławska

Fot. SJS

Podziemna trasa turystyczna w kopalni Św. Jan w Krobicy.

Figure 29 Article "Od wydobywania węgla do muzeum. Powstaje sieć wspierająca zachowanie dziedzictwa górniczego" (From coal mining to the museum. Development of network supporting the preservation of mining heritage), published in Biuletyn Górniczy nr 4/2023 (the Mining Magazine).

- 4 articles published in Trybuna Górnicza and at the portal:www.nettg.pl , the most popular mining media in Poland

➢ Title: Troska o pogórnicze dziedzictwo (Care for the post-mining heritage) file:///C:/Users/sjaroslawska/Downloads/50.pdf

➢ Title: Rozpoczął się projekt, który ma chronić i promować dziedzictwo górnictwa węglowego (A project has begun to protect and promote the heritage of coal mining) https://nettg.pl/gornictwo/198599/rozpoczal-sie-projekt-ktory-ma-chronic-i-promowac-dziedzictwo-gornictwa-weglowego

➢ Title: Wspólnymi siłami chcą stworzyć interaktywną mapę miejsc związanych z węglem kamiennym (Together, they want to create an interactive map of places related to hard coal) https://nettg.pl/gornictwo/201603/wspolnymi-silami-chca-stworzyc-interaktywna-mape-miejsc-zwiazanych-z-weglem-kamiennym)

➢ Title: Konferencja „Dziedzictwo kultury a proces inwestycyjny" (Conference "Cultural Heritage and the Investment Process") https://nettg.pl/gornictwo/204698/konferencja-dziedzictwo-kultury-a-proces-inwestycyjny

- 1 article at portal www.gwarkowie.pl

➢ Title: Zachowanie i promocja (Preservation and promotion) (https://www.gwarkowie.pl/index.php/publicystyka/5172-zachowanie-i-promocja)

• Article on a website of Stowarzyszenie Gmin Górniczych w Polsce (Association of Mining Municipalities in Poland), Title: CoalHeritage, 21.12.2023. LINK: https://sggp.org.pl/coal-hertitage/ ; https://sggp.org.pl/projekty/

•Article on PGG Magazyn 01/2024, Title: Zachować potencjał górnictwa (Preserving the potential of mining, page 7 (PGG's company newsletter). LINK: https://www.pgg.pl/pobieranie/923/PGG-1-styczen-2024.pdf

•Article with title: Ochrona i promocja dziedzictwa górnictwa węglowego (Protection and promotion of coal mining heritage). Date of publication: 07.12.2024. LINK: https://tinyurl.com/kse6bu76

The Slovenian public was informed through the following articles:

- Title "Ponovno uspešni pri črpanju evropskih sredstev" (RUDAR-02-2023.pdf (rlv.si))
- Title "Premogovnik Velenje na 6. mednarodni konferenci EnRe – energy & responsibility" (2024 – Premogovnik Velenje d.o.o. (rlv.si))
- Title "Premogovnik Velenje ponovno uspešen pri črpanju evropskih sredstev RFCS-sklada" (Premogovnik Velenje ponovno uspešen pri črpanju evropskih sredstev RFCS-sklada – Premogovnik Velenje d.o.o. (rlv.si))
- Title "Premogovnik Velenje gostil delovno srečanje mednarodnega projekta CoalHeritage" (Premogovnik Velenje gosti mednarodno delovno srečanje sodelujočih v projektu za ohranjanje premogovne dediščine CoalHeritage – Premogovnik Velenje d.o.o. (rlv.si)
- Title: Premogovnik Velenje gostil delovno srečanje mednarodnega projekta CoalHeritage, RUDAR 02/2024, pp. 6,7. LINK: https://www.rlv.si/casopis-rudar/2024-2/
-
- Title: Ohranjanje in promocija premogovne dediščine, RUDAR 05/2023, pp. 22,23. LINK: https://www.rlv.si/wp-content/uploads/2023/12/RUDAR-05-2023_small.pdf
- Title: PV na 6. Mednarodni konferenci EnRe – energy & responsibility, RUDAR 02/2024, pp. 8,9. LINK: https://www.rlv.si/casopis-rudar/2024-2/
- Title: Premogovnik Velenje gostil delovno srečanje mednarodnega projekta CoalHeritage. Date of publication: 31.05.2024. Portal: VELENJE.COM. LINK: https://tinyurl.com/449atezc
- Title: Delovno srečanje mednarodnega projekta CoalHeritage. Language: Slovenian. Date of publication: 03.06.2024. Portal: Naš čas. LINK: https://nascas.si/clanek/novice/gospodarstvo/6659b75403d30/delovno-srecanje-mednarodnega-projekta-coalheritage

An account was created on the Sketchfab platform, through which the 3D models developed in the project have been made available to the general public. More than 30 3D models can be seen on the platform. Link to platform: https://sketchfab.com/komag_dlm/models

A CoalHeritage Calendar for 2025 has been prepared and shared via the project website and social media. There are stunning photos of 3D models from our rich coal mining heritage. Each month showcases a different aspect of coal mining history, bringing the past to life through detailed and immersive 3D imagery (https://coalheritageproject.eu/2025/01/16/the-coalheritage-calendar-2025/)

Scientific peer reviewed articles were also published:

- Protection of Post-Industrial Cultural Heritage. A Task for Smart Societies (https://managementpapers.polsl.pl/wp-content/uploads/2024/04/194-Marszowski-Hildebrandt-2.pdf) MARSZOWSKI, Ryszard, and Robert HILDEBRANDT. "PROTECTION OF POST-INDUSTRIAL CULTURAL HERITAGE. A TASK FOR SMART SOCIETIES." Scientific Papers of Silesian University of Technology. Organization & Management/Zeszyty Naukowe Politechniki Śląskiej. Seria Organizacji i Zarzadzanie 194 (2024).

- Main objectives of the strategy, as well as motivations for the transformation of hard coal mining in Poland (https://managementpapers.polsl.pl/wp-content/uploads/2024/04/194-Marszowski-

Hildebrandt-1.pdf) MARSZOWSKI, Ryszard, and Robert HILDEBRANDT. "MAIN OBJECTIVES OF THE STRATEGY, AS WELL AS MOTIVATIONS FOR THE TRANSFORMATION OF HARD COAL MINING IN POLAND." Scientific Papers of Silesian University of Technology. Organization & Management/Zeszyty Naukowe Politechniki Śląskiej. Seria Organizacji i Zarzadzanie 194 (2024).

- CoalHeritage: Visualizing and Promoting Europe's Coal Mining Heritage https://www.mdpi.com/2673-6489/4/3/28) Krassakis P, Karavias A, Zygouri E, Koukouzas N, Szewerda K, Michalak D, Jegrišnik T, Kamenik M, Charles N, Beccaletto L, et al. CoalHeritage: Visualising and Promoting Europe's Coal Mining Heritage. Mining. 2024; 4(3):489-509.

- Conservation and promotion of the coal mining heritage as Europe's cultural legacy: Ruhr area examples (https://www.imwa.info/docs/imwa_2024/IMWA2024_Flores_193.pdf), Flores, H., Dogan, T. and Haske, J., Conservation and promotion of the coal mining heritage as Europe's cultural legacy: Ruhr area examples. – In: Kleinmann, B., Skousen, J., Wolkersdorfer, Ch.: West Virginia Mine Drainage Task Force Symposium & 15th International Mine Water Association Congress. – p. 193 – 195; Morgantown, WV, USA (International Mine Water Association).

- Miners as depositories of mining tradition Jarosławska-Sobór S., Szewerda K., Turczyński K., Mining Machines, 2025 Vol. 43 https://wydawnictwa.komag.eu/index.php/miningmachines/article/view/64