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REECOL Ecological rehabilitation and long term monitoring of post mining areas

Deliverable 6.2

Semi-automated ecological remediation progress visualization tool

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1. Introduction

The REECOL project is a significant initiative focused on enhancing environmental sustainability in coal regions undergoing transition. This collaborative effort includes eleven partners from five European countries, encompassing research institutions and key industry stakeholders such as coal mining companies. The core aim of the project is to significantly improve post-mining ecological rehabilitation methods. By integrating a comprehensive understanding of ecosystem degradation, intended future land uses, and the economic viability.

The Semi-automated ecological remediation progress visualization tool developed under WP6 – Task 6.2. of REECOL addresses the need to transform the information generated through monitoring and rehabilitation activities into an accessible and structured visual representation. This visualization tool is the output of an auditing process that was repeated in a post mining area, which is under a rehabilitation process, and is intended to help both the evaluators and the stakeholders to monitor a rehabilitation project through time.

1.1. Role and location in REECOL Project

The development of the visualization tool is closely connected with the other technical activities of REECOL. The case-study areas selected in the project provide the spatial and environmental context in which rehabilitation measures and monitoring approaches are investigated. The rehabilitation solutions developed and tested in WP4 provide information on the interventions applied to post-mining areas, while WP5 provides monitoring methodologies and data for assessing ecological functions and rehabilitation outcomes. WP6 subsequently uses this knowledge to support the development of an audit and visualization framework for ecological rehabilitation. In this way, D6.2 contributes to the integration and practical visualization of results generated across the project.

2. Semi-automated ecological remediation progress visualization tool

2.1. Objective

The dashboard is intended to serve as a platform for collecting and visualizing the assessments generated in a post-mining area that has been designated for environmental rehabilitation. Through this environment, users or regulatory agencies can gather information on the progress of the restoration project and use it as a tool to optimize areas in need of improvement.

2.2. Architecture

The D6.2 visualization tool has been designed as a semi-automated system for the integration, processing and graphical presentation of information relevant to ecological rehabilitation progress in post-mining areas. The architecture follows the overall logic of REECOL WP6, in which information generated through rehabilitation and monitoring activities is transformed into an accessible framework for evaluating and comparing ecological rehabilitation progress.

That framework was formed as an Audit Catalogue (D6.1) which was structured in five main areas and each area included some criteria which in general was twenty-five. The auditing of those criteria is used as input data into a data base and by using filters as:

Data input layer → Data processing layer→ Visualization layer → User interaction layer

The outcome is a semi-automated visualization tool for monitoring the process of a rehabilitation program.

2.3. Dashboard interface

The user can enter the semi-automated ecological remediation progress visualization tool via the following link.

☞ Online version of the Audit Catalogue/ Semi-automated ecological remediation progress visualization tool:

Ecological Rehabilitation Audit Tool

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To get through the online version use the following login credentials:

- username: REECOL
- password: rehabilitation123

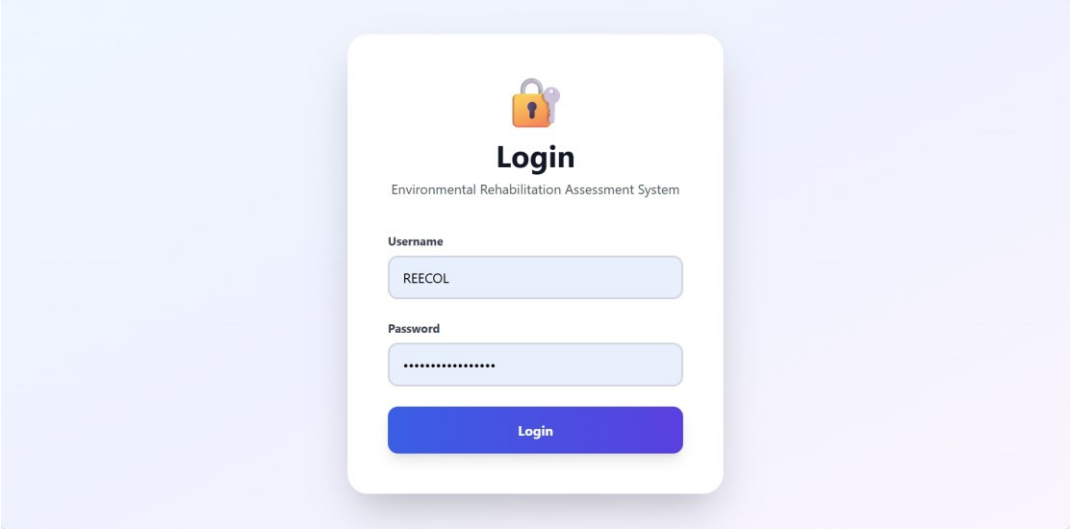


Fig. 1. User Login

When the user is logged in is directed to the main section, where he can choose whether to conduct a new audit or view the progress of his audits for each project. By clicking on “My Audits”, the user enters the interface where he can view and analyse audits.

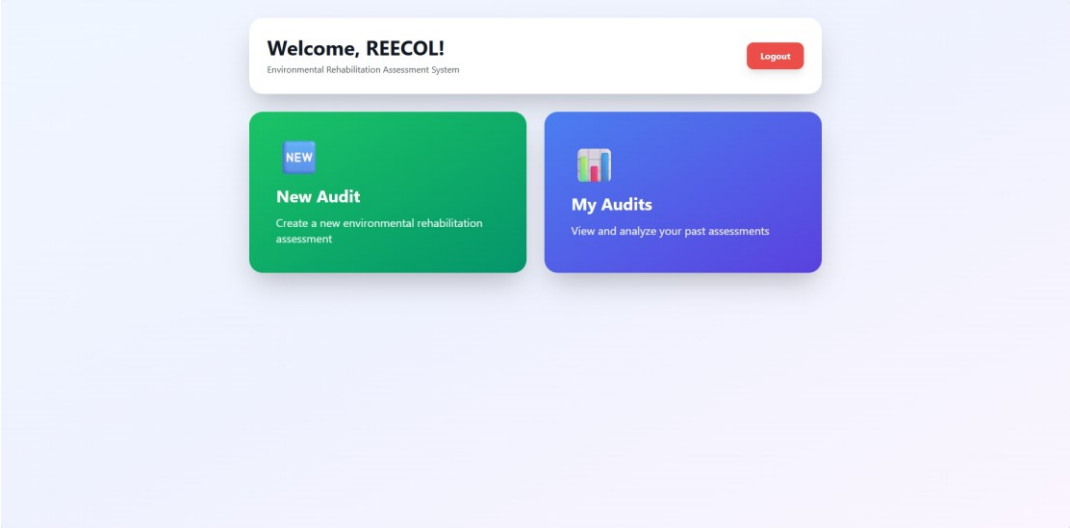


Fig. 2. Main section where the user chooses whether to use the web application as an Audit Tool or as Progress visualization tool (Dashboard)

When the user chooses to use the tool as a progress visualization tool is directed to the interface where he can view the evaluations was made for each project. One user can be responsible for more than one rehabilitation project and for that reason, the tool gives the opportunity to categorize the audits by rehabilitation project.

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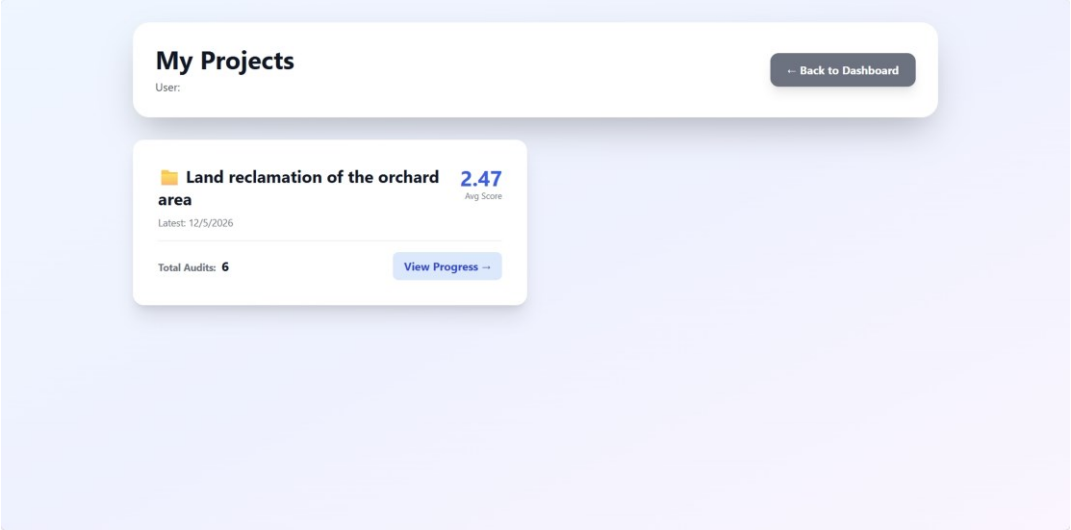


Fig. 3. Interface where the user can view the evaluations was made categorized by project

By clicking on **View Progress,** the user is directed to the Dashboard related to the rehabilitation project he wants to check. That interface consists of information related to the project such as:

- Program Leader
- Annual budget
- Project duration
- Human resources
- Strategic plan
- Strategic plan year

Also, it gives information about the number of audits have been conducted, when was the last audit and its average score. Through the dashboard the user can monitor and get information about the evolution of rehabilitation project from day one, when the first audit was made, and the last audit. The dashboard also does a comparison between the five key stages of monitoring an environmental rehabilitation project, as they were specified in deliverable D6.1. of REECOL program, for the last three audits.

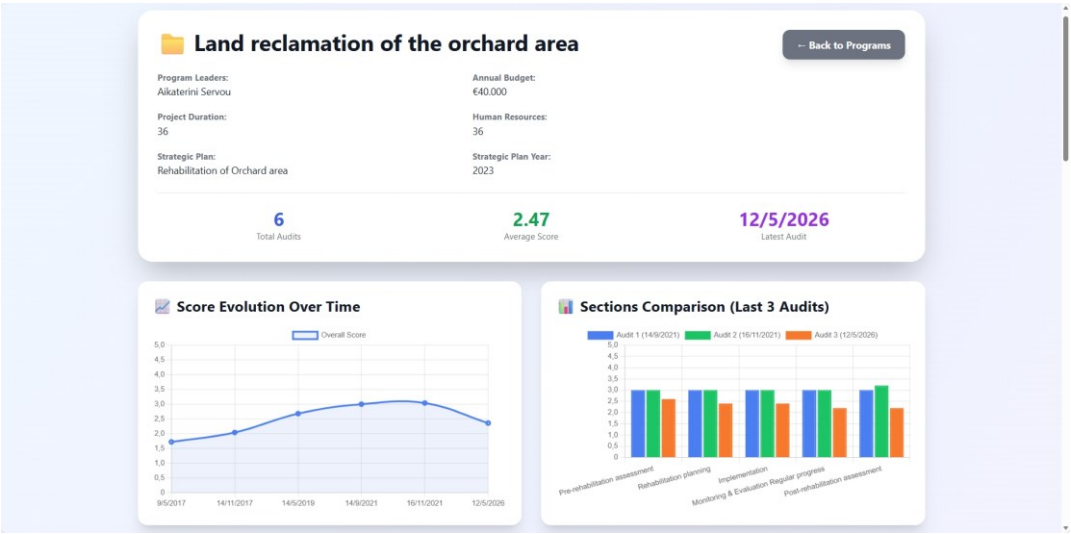


Fig. 4. First section of the dashboard – Project Name and information – Score Evolution over time – Sections Comparison (Last 3 Audits)

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Next, the user can navigate through the dashboard and view the results of the most recent audit regarding the five key stages of an environmental rehabilitation project, as well as the score received on each criterion of a stage. Those diagrams are helpful for the user thus they can be used to detect the areas that should be checked and upgraded in the rehabilitation project.



Fig. 5. Second section of the dashboard - Latest Audit Details

Finaly, the dashboard provides a section where the user can find all the audits that have been conducted to a specific rehabilitation project categorised in chronological order, while the user can enter in each audit and take information about the results of that specific audit.

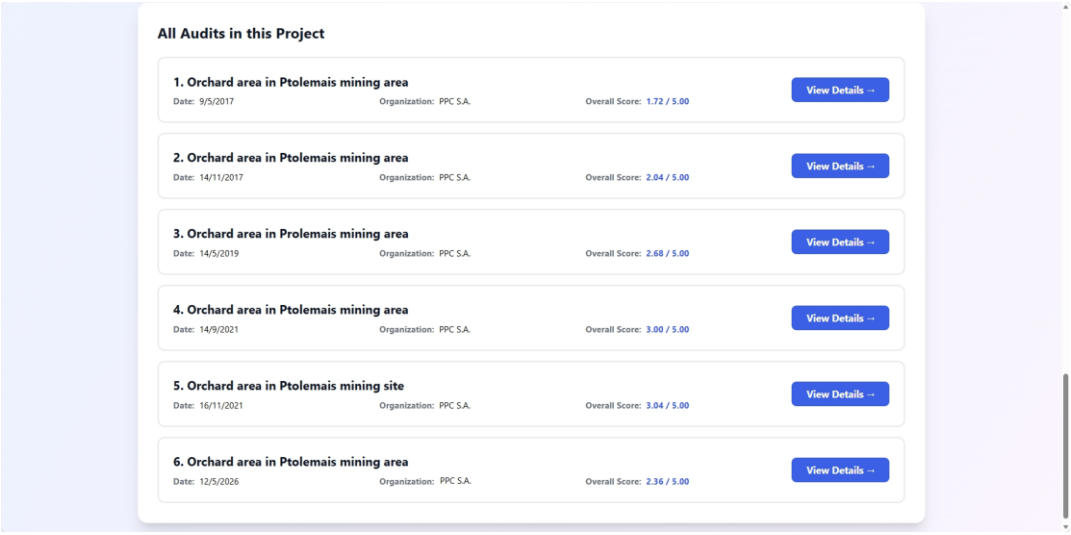


Fig. 6. Last section of the dashboard – All Audits in this Project

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3. Conclusions

The development of the dashboard provides a structured approach for bringing together heterogeneous information associated with post-mining rehabilitation. By organising information at site, indicator and monitoring-period levels, the tool creates a common visualization environment in which ecological and environmental information can be explored in a consistent manner. This is particularly relevant for post-mining areas, where rehabilitation conditions and objectives may differ considerably between sites and where rehabilitation progress needs to be interpreted in relation to the specific characteristics of each area.

From a stakeholder perspective, the visualization tool provides a more accessible way of interacting with complex environmental information. The REECOL project identifies different stakeholder groups, including mining operators, local authorities, NGOs and consultancy organisations, as potential users of project outputs. The D6.2 dashboard can therefore serve as an interface between technical monitoring information and the practical information needs associated with rehabilitation planning, monitoring and evaluation.

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