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BUILDING MATERIALS RECOVERY – CREATING A WEB MAP VISUALIZATION TOOL FOR CIRCULAR ECONOMY

Ioan Cosma, Ioana Petre, Cosmina Stalidi, Andrei Dănilă, George Suciu

BEIA Consult International, 12-22 Peroni Str. district 4, 041386, Bucharest, ioan.cosma@beia.eu, Romania

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Introduction

Construction materials constitute the largest material stock in modern society. The rapid increase in material stock is closely tied to high resource and energy consumption, waste from demolitions, and elevated embodied energy and CO2 emissions. European governments are exploring ways to replace raw materials with secondary resources through reuse and recycling, aiming for a circular economy. However, cities face numerous practical challenges in implementing these initiatives. This work proposes a visualization tool for tracking material stocks and flows in the built environment to promote circularity by enabling the recycling and reuse of materials in existing buildings and infrastructure. Effective recovery of building materials in a circular economy necessitates map-based visualization tools that allow for statistical analyses of buildings or groups of buildings. Such a tool must include API links to real building inventory data from local public authorities and advanced real-time analysis functions for attribute tables and geospatial data.

Over the past century, global material stocks have increased dramatically, driven by extensive resource consumption, energy use, and the generation of demolition waste [1]. This accelerating trend underlines the necessity to adopt circular economy (CE) strategies aimed at optimizing resource utilization, reducing greenhouse gas emissions, and mitigating environmental degradation. Therefore, the visualization tool presented in this paper aims to enhance decision-making processes and support the transition to a circular built environment by improving and expanding existing, validated tools and frameworks. The focus will be on strengthening the recycling and reuse of materials within existing buildings and infrastructure, through a co-creation process [2] and a living lab participation approach [3] to engage stakeholders and tailor outputs to their specific needs.

Results and conclusions

The main scope is to develop and deploy a visualization tool for built environment material stocks and flows and provide tailored software solutions to cities to support circularity with the focus on reuse and recycling. Figure 1 presents the detailed architecture of the visualization tool developed in CREATE project.

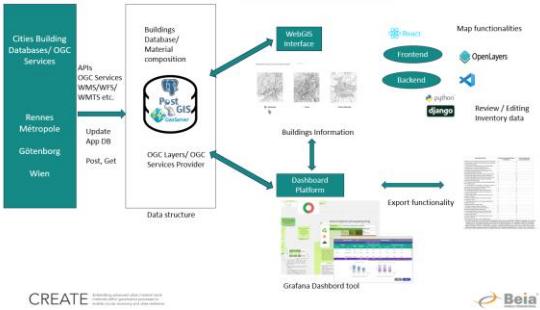

Figure 1. Architecture of the CREATE visualization tool

Figures 2-3 present the functionalities of the visualization platform. As future work we envision integration of datasets and APIs from the municipalities and urban living labs involved in the project to enhance the results and functionalities of the tool.

Figure 1. Selection the area of city

Figure 2. Building information in the selected area

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