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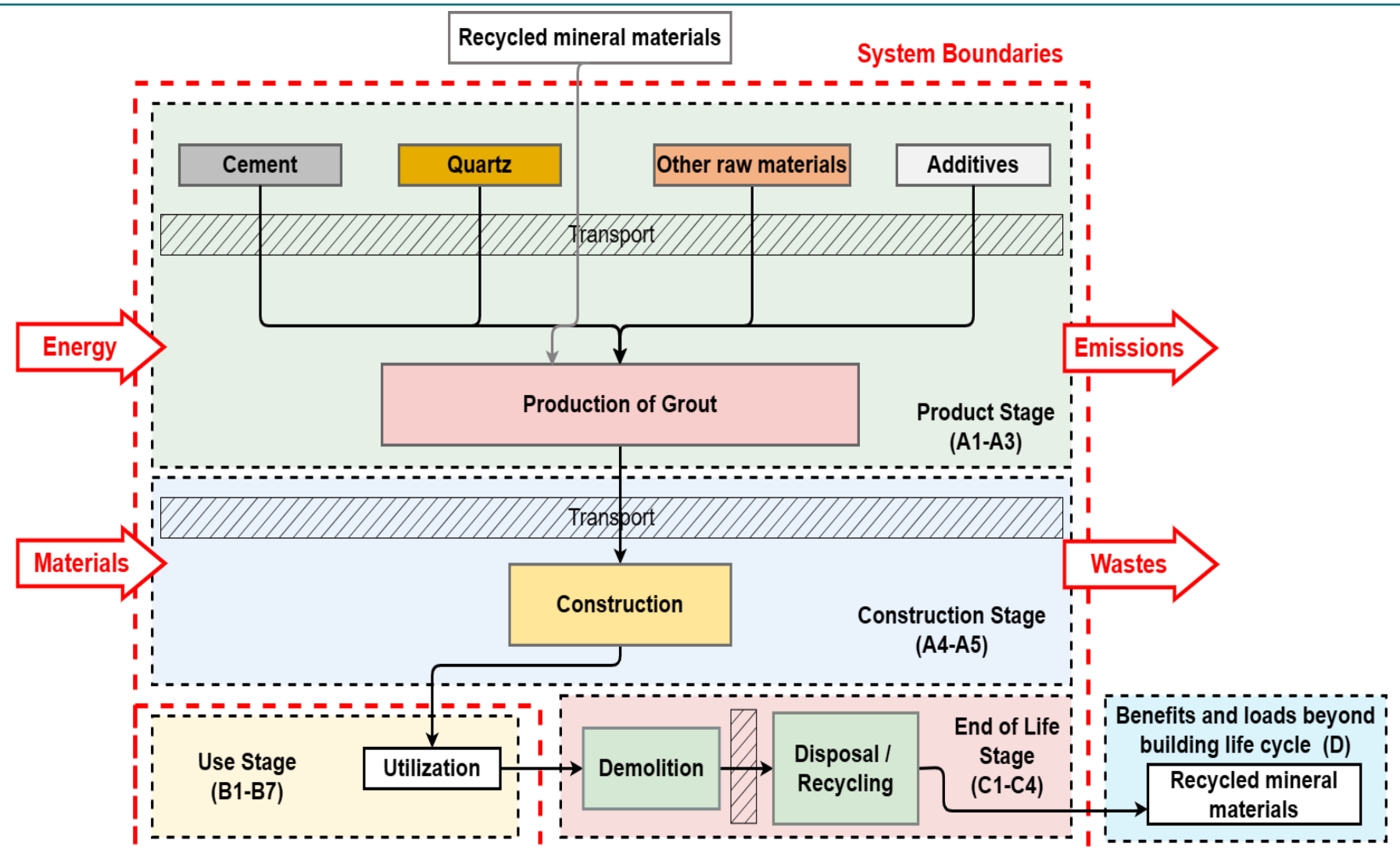
Introduction

The **construction** industry significantly contributes to environmental pollution, primarily due to the **extraction of natural mineral resources** [1]. In Wallonia, Belgium, the push for sustainable development has redirected industrial focus toward reverse mineral industries. **Grouts**, essential for maintaining structural integrity in **construction**, undergo meticulous selection processes that integrate **secondary mineral materials** such as recycled concrete aggregates, quarry fillers, concrete slags, sludges, glass calcines, etc. This project conducts a **Life Cycle Assessment (LCA)** on **high-performance grouts**, guiding sustainable material choices in construction.

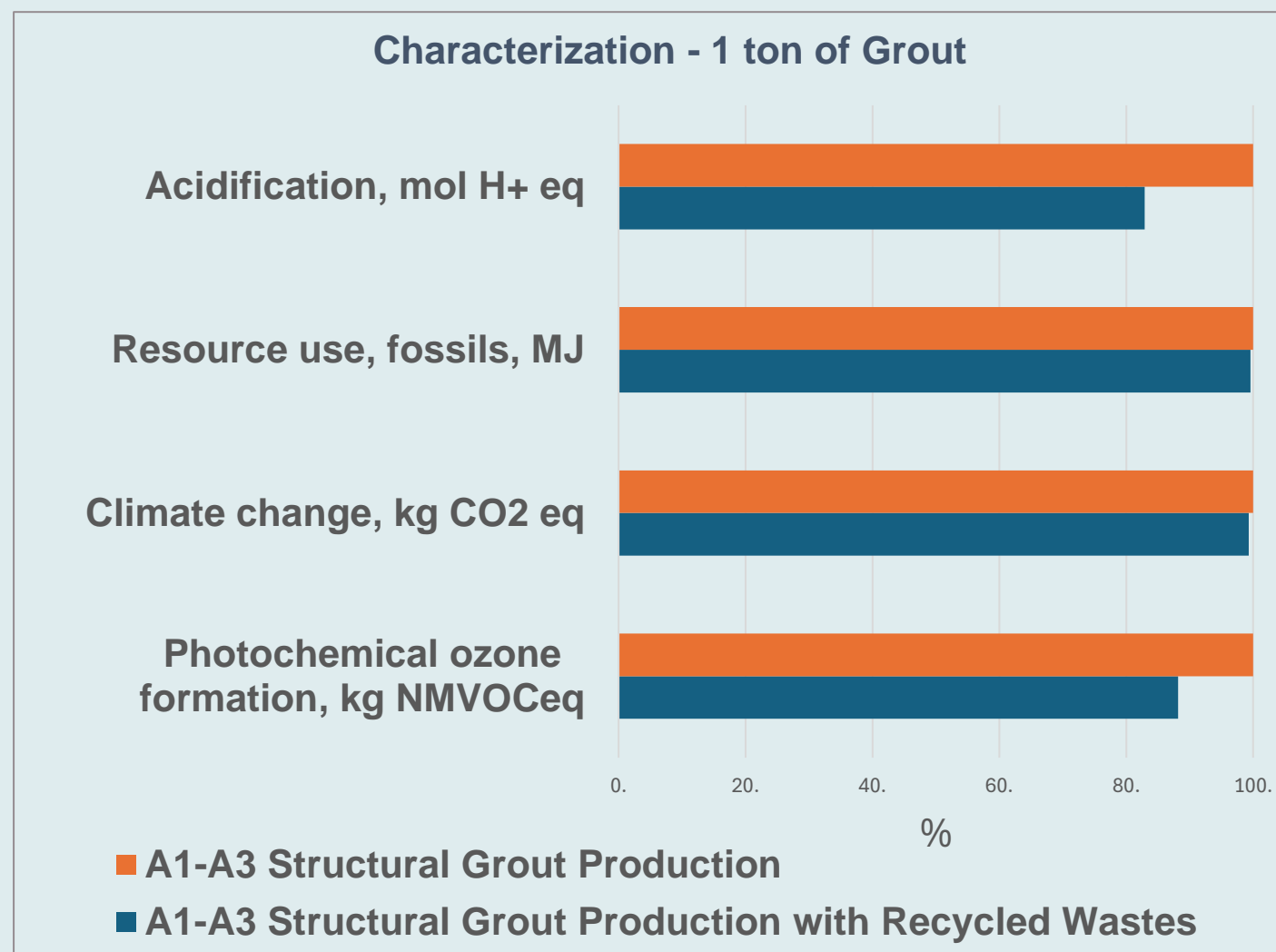


Methodology

- ✓ System boundaries following **EN15804+A2:2019** [2]
- ✓ **FU : 1 ton** of Grout
- ✓ Primary data from industrials and laboratory tests
- ✓ Identification of “**hotspots**” and impact assessment – EF. 3.1 method Ecoinvent v3.9
- ✓ **Cut-off** approach : waste is “free”
- ✓ Selection of local mineral wastes -> compatible with the industrial products
- ✓ Case by case **characterization** of waste through laboratory analysis to determine physical, chemical and mechanical properties
- ✓ Evaluate the environmental impacts using **LCA ISO 1440/44:2006** in a **cradle-to-grave** perspective for each scenario (traditional/new process + pre-treatment of wastes) -> ensuring compliance with environmental standards



Results



Focusing on four key impact categories following LCA normalization

INVENTORY

State of the art : Cradle-to-gate

Scenario 1 : Conventional grout production

Scenario 2 : Grout production with **Recycled Concrete Aggregates** (normal crushing process, internal transport and sieving) and **marble sawing fines** (drying and grinding)



INTERPRETATION

Recycled minerals in grout production proves superior to **natural material resources** across all impact categories

⇒ sparking validation interest in the potential for replacement

No significant reduction on climate change when substituting the aggregates of the grout composition

No significant reduction on abiotic depletion => reducing the distance of recycled materials supply

Next steps: further studies on different recycled mineral wastes scenarios and ways of environmental impacts improvements

Projects and Partnerships

- ✓ **39 months for project** - started in October 2022
- ✓ **2 phases**
 - Industrial Research → **GO/NO GO**
 - If Go -> Experimental Development and Upscaling



Scan me to know more about this project

References

[1] Stapleton, L. (2021). Mineral Resources. Encyclopedia of Ecology, 246-252

[2] Ioannidou D., Foster, C., Symeonidis A., Muller J., Bourgault G., FitzGerald D., Moreno Ruiz E., (2021). Documentation for the 'Allocation, Cut-off, EN15804' system model, ecoinvent Association, Zurich, Switzerland

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