# LCA Hotspot of Phenolic Block Foam

**C-Recycle Project** 

Intern: Garrett Mondragon Dublado Supervisor: Alexander Compeer and Yujun Huang **Project/Research Group:** Biobased Resource and Energy (BRE) Contact information: g.dubaldo@student.avans.nl **Date:** 12 June 2025

**Partners**:

Medegefinancierd door de Europese Unie

The C-Recycle project focused on helping companies in the Brabant region to transition towards a bio-based economy. Teqtix, one of the consortium partners, is interested in assessing the environmental impact of its production of phenolic foam insulation. Through a life cycle hotspot analysis (LCA), the intern determined the process with the highest impact on the environment.

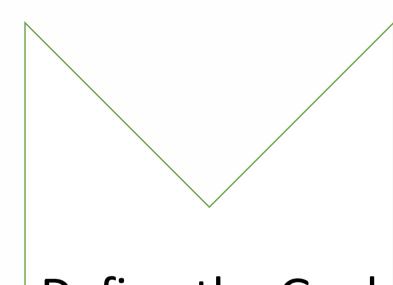


Results

In the LCA hotspot analysis, the result showed the significance of each process based on each environmental impact category. The table presented an overall comparison of the impact of components in making phenolic foam blocks, the main production line, and the final packaging process.

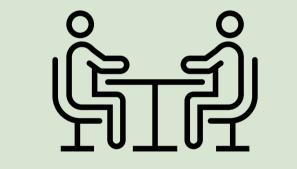
### Methodology

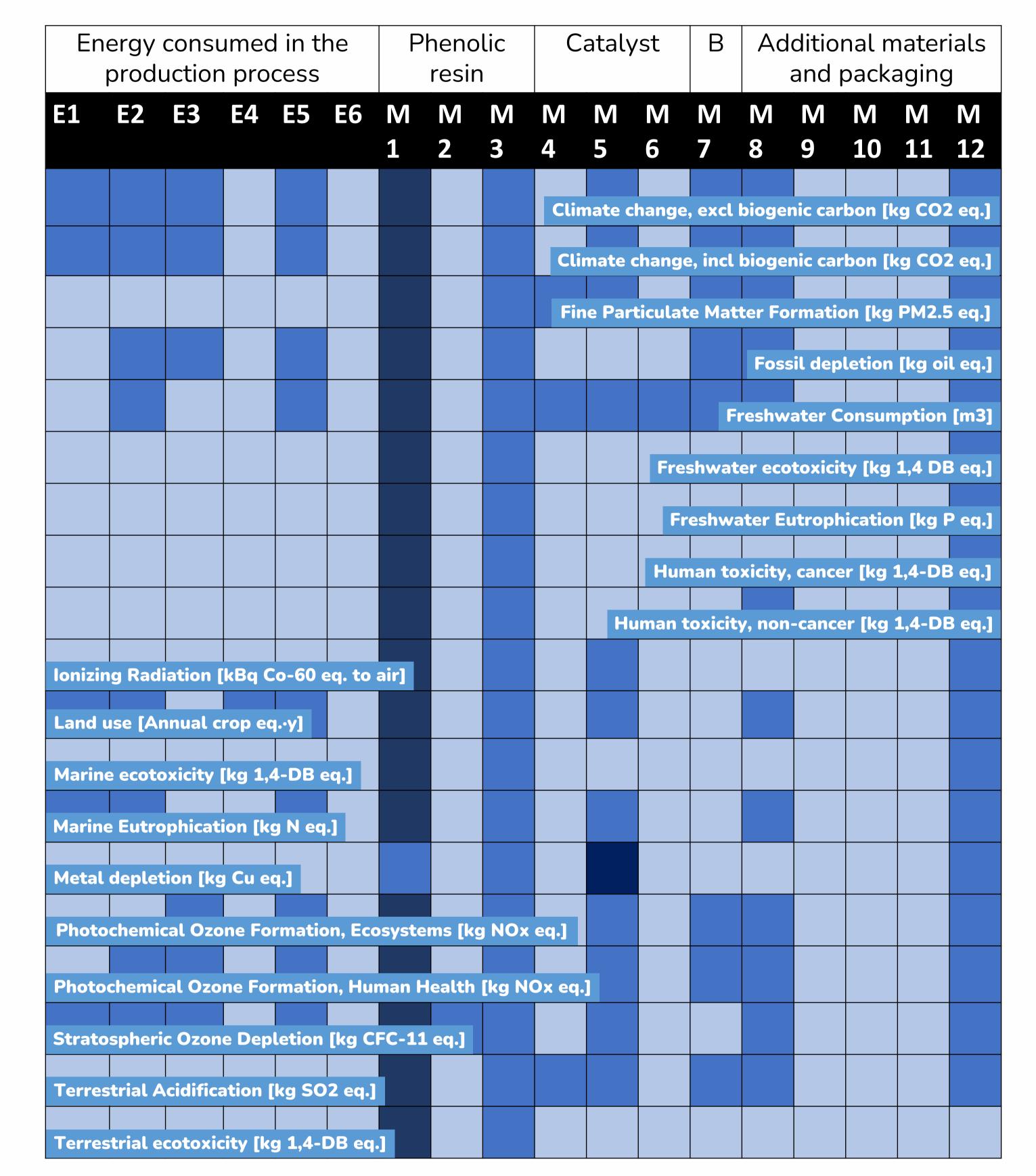
LCA follows a 3-stage method and evaluation to provide a standardized assessment that considered most, if not all, processes involved in the activities of the product or service. The following flowchart addressed the actions initiated by the intern in the past 4 months to reach the desired goal of the project.



• General introductions at Tegtix to;

 clarify the LCA methodology, understand the product and the manufacturing process





### Define the Goal and Scope

Data Gathering

(LCI)

Analyzing

the Data

(LCIA)

Evaluation

#### agree on certain areas and boundaries.

#### • excluded transportation and the EoL treatment.

• Site visits,

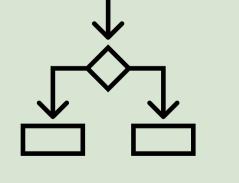
• Multiple emails requesting specific data,

On-site data collection,

• Critical evaluation of the data collected and provided.



- Design the process system in the software, Sphera.
- Check that the inputs, outputs, and flows are consistent with the LCI.
- Present the result in a simple way that addresses the hotspot.



General result according to the Dutch LCA ReCiPe impact categories. E = energy consumption; M = material; B = blowing agentDarker blue 50<% relative impact; Blue 0.1% to <50%; Light blue <0.1%

## Discussion

In the production of phenolic block foam, the phenolic resin contributes most significantly to the overall environmental impact, while the catalyst shows a higher influence on metal depletion. The reasons may be attributed to the volume used or the chemical characteristics of the material. The next steps are to assess the feasibility of alternative materials or practices that could reduce environmental burdens without compromising performance.

 Evaluate the work and assumptions significantly affecting the data inventory and the impact result.



Milestones of the LCA Phenolic Foam Insulation Product Production

pubchem, "Phenol-formaldehyde resin compound summary," [Online]. Available: https://pubchem.ncbi.nlm.nih.gov/compound/Phenol-formaldehyde-resin#datasheet=LCSS.

[2] RIVM, "LCIA: the ReCiPe model," 24 10 2024. [Online]. Available: https://www.rivm.nl/en/lifecycle-assessment-lca/recipe.







