Integration of regional socio-economic LCA and environmental LCA for the assessment of industrial bioeconomy networks

Recy & DepoTech 2022

Alberto Bezama, Walther Zeug, Jakob Hildebrandt, Daniela Thrän

Introduction and Goal

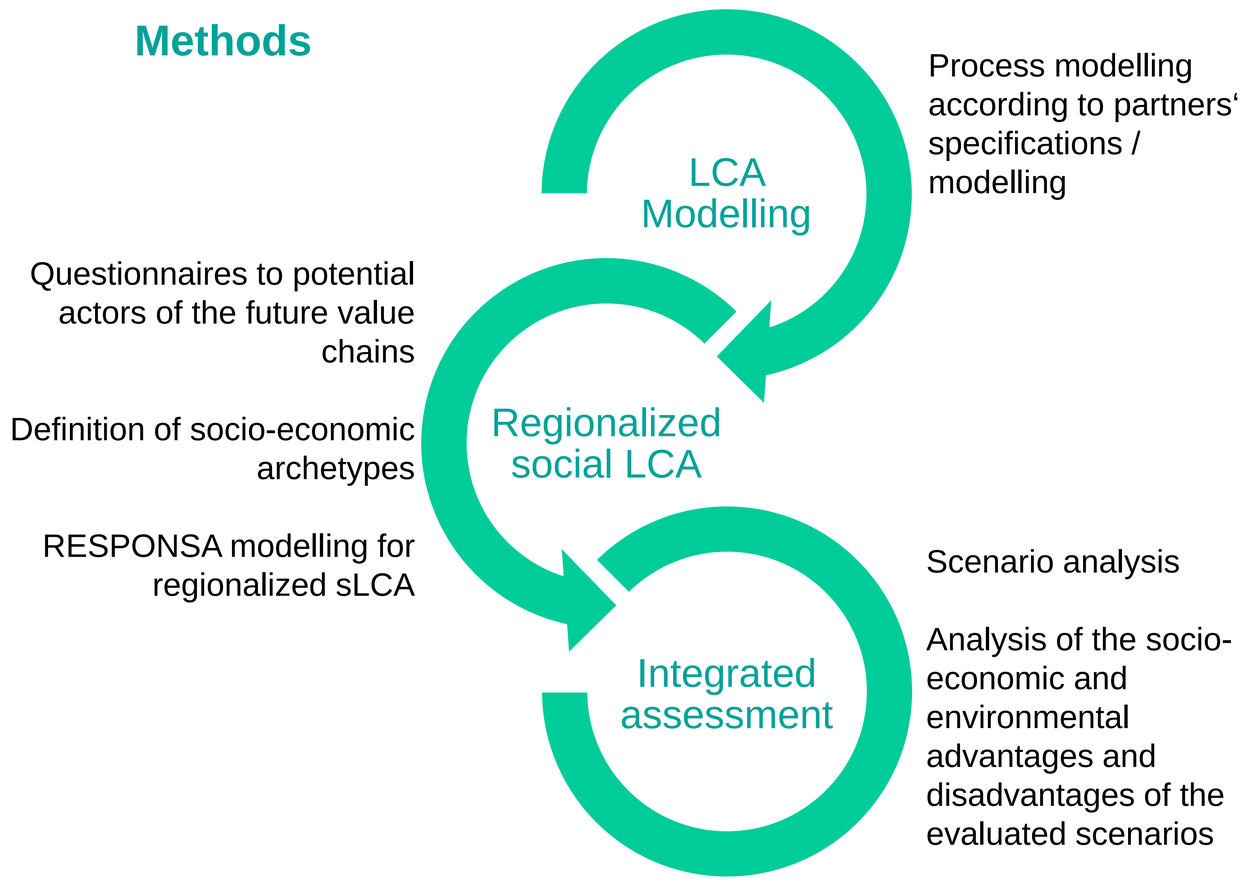
The current geopolitical situation in Europe has led to revisit the evaluation of regional energetic independence.

However, there is still a need to establish the effects of the linkages among different disciplines and economic sectors.

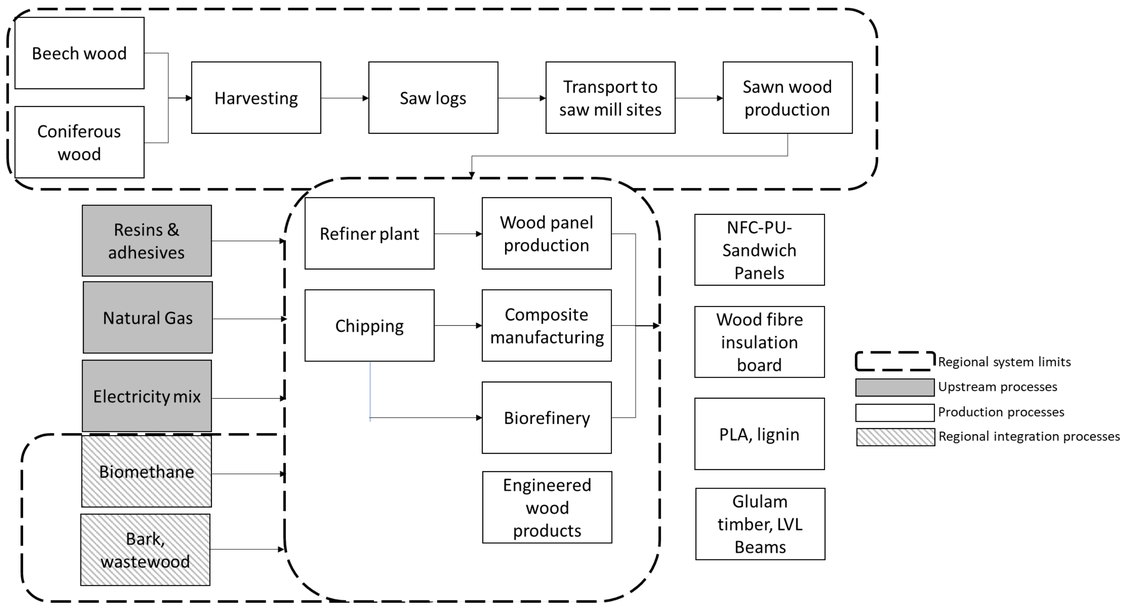
Here a major role can be expected from organizations outside of the traditional value chains.

This work intends to analyze from a life cycle perspective the potential advantages of integrating regional bio-based capacities into **an already integrated bio-based industrial network**, especially aiming at the full defossilization of its associated energy provision system

Methods



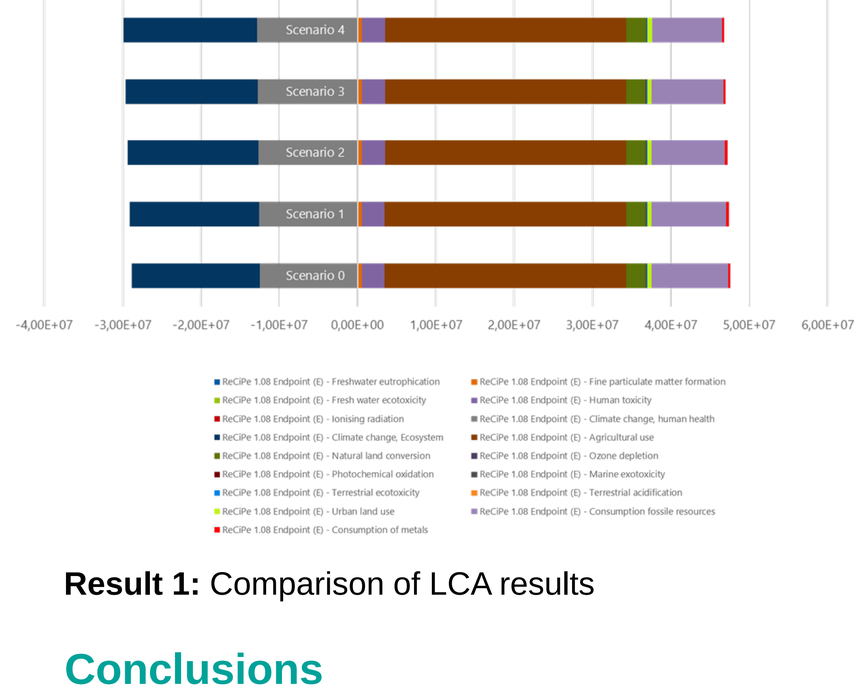
System boundaries for scenario evaluation



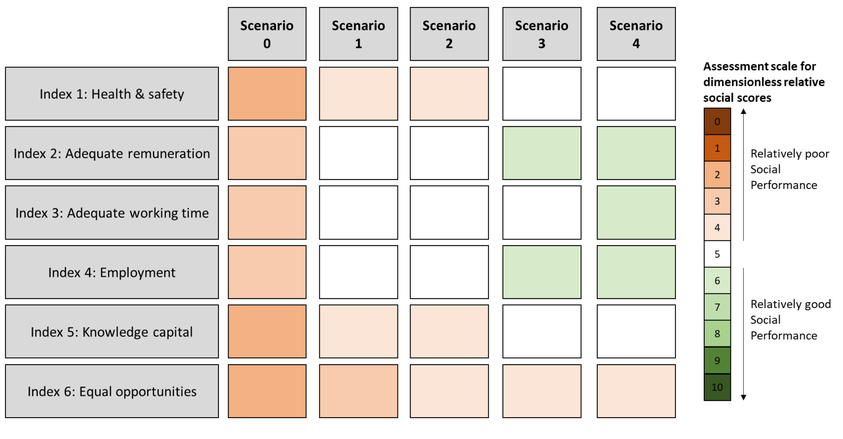
Definition of scenarios

Scenario	Types of energy carriers	Source of origin
Scenario 0 - Not decoupled from natural gas	Natural gas, bark, industrial wood residues	
Scenario 1 - 25 % decoupled from natural gas	Natural gas, bark, industrial wood residues	
Scenario 2 - 50 % decoupled from natural gas	Natural gas, biomethane, bark, industrial wood residues, waste wood	-fermentation stillage, -Sewage sludge, -LVL production, glulam production, CLT production, waste wood from external waste systems
Scenario 3 - 75% decoupled from natural gas	Biomethane from sewage sludge, corn, biowaste; bark, industrial wood residues, waste wood	-fermentation stillage, -Sewage sludge, -LVL production, glulam production, CLT production, waste wood from external waste systems
Scenario 4 100% decoupled from natural gas	Biomethane from sewage sludge, corn, biowaste; bark, industrial wood residues, waste wood	-fermentation stillage, -Sewage sludge, -LVL production, glulam production, CLT production, waste wood from external waste systems

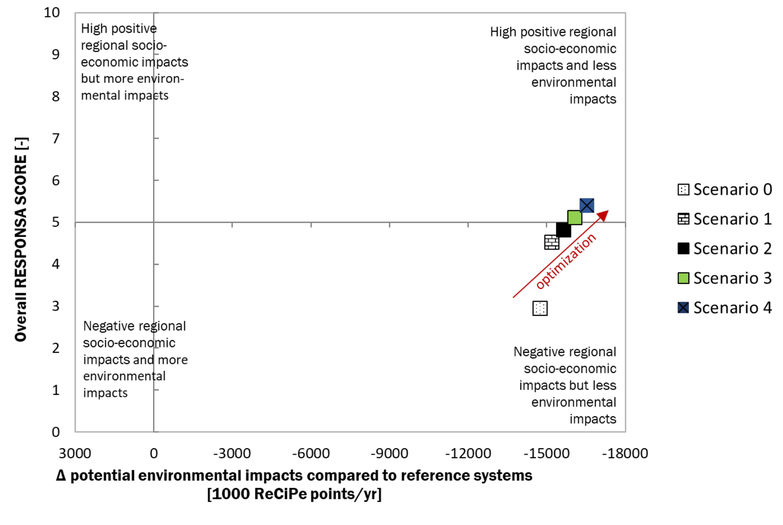
Results



Result 1: Comparison of LCA results



Result 2: Comparison of RESPONSA (sLCA) results



Result 3: Integrative analysis of evaluated scenarios

Conclusions

- Limitations of the study: primary data and system boundaries
- Based on the preliminary results, the implementation of integrated bioeconomy regions brings a series of environmental advantages to the overall evaluation.
- Social advantages are limited in this case study. Nonetheless they show a progress in the right direction
- Cascading as a factor for further environmental and socio-economic advantages? → Need of expanding system, to evaluate the whole life cycle of produced goods. Also, a further involvement of value chain actors.

Kontaktperson zum Poster:
Prof. Dr.mont. Alberto Bezama
Helmholtz Centre for Environmental Research-UFZ
Permoserstr. 15, 04318 Leipzig, Germany

Telefonnummer: +49 – 341 – 2434 579
E-Mail: alberto.bezama@ufz.de
Webseite: www.ufz.de

UFZ HELMHOLTZ Zentrum für Umweltforschung