

Circular System Design – A case study on insulation material in Switzerland

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TACLE: Towards a Sustainable Circular Economy

Circular Economy (CE) strives to maximize ecological and human well-being by closing material loops and therefore minimizing the waste produced and maximizing goods reused¹.

- But how sustainable is circular economy?
- And how can the transition from a linear to a circular economy in Switzerland be achieved?

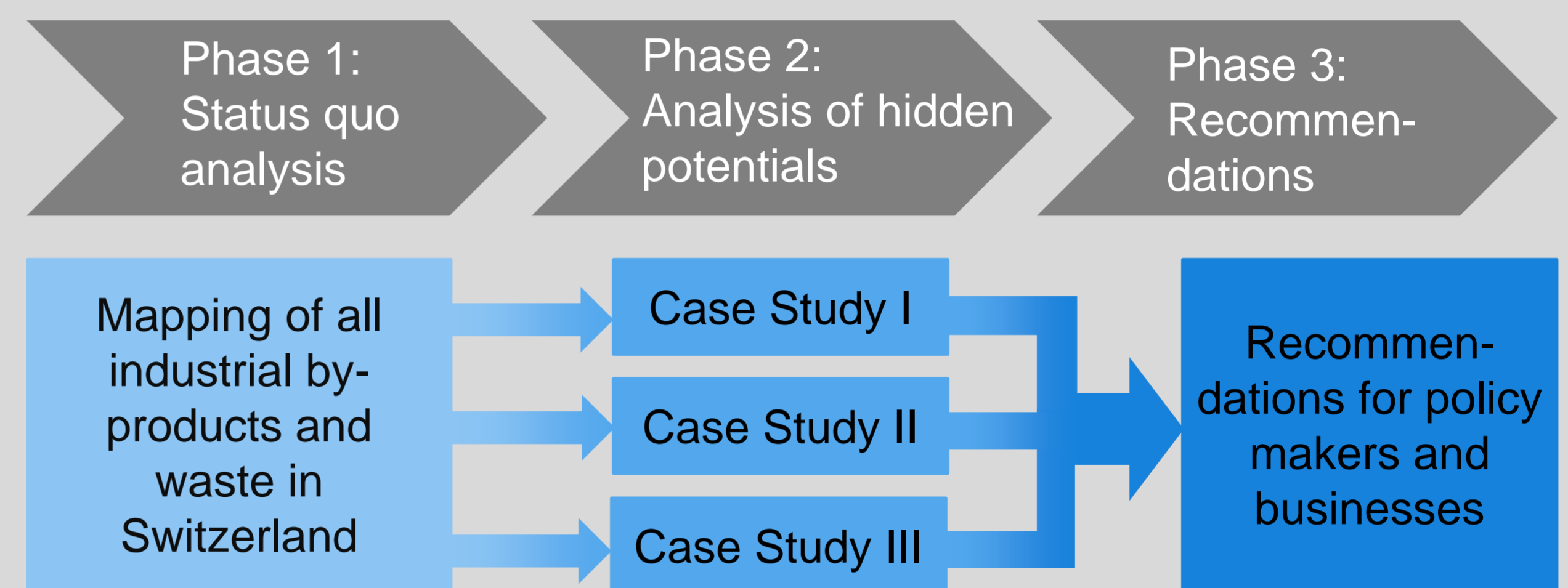
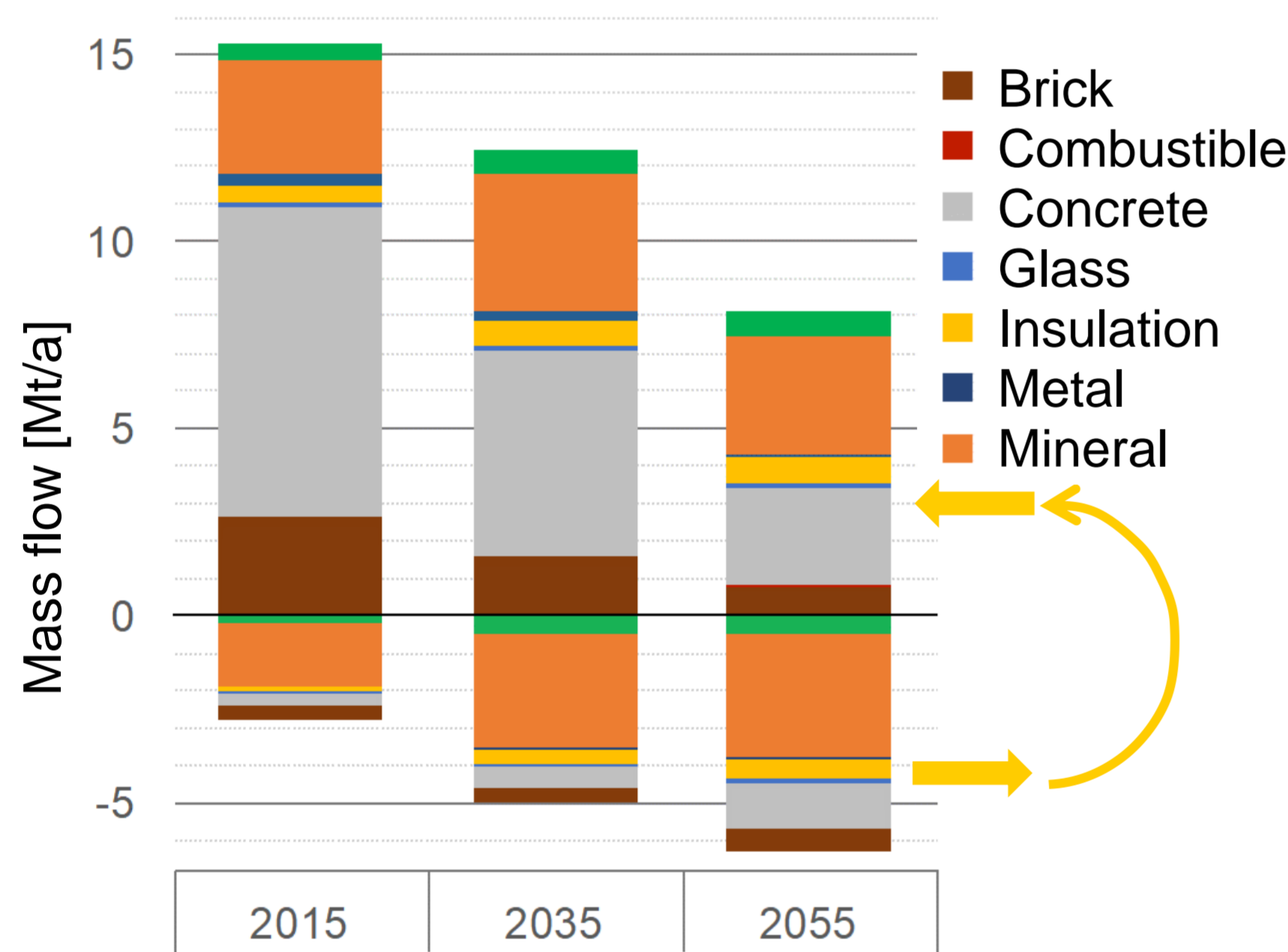


Figure 1: Schematic overview of TACLE project

Case Study: Insulation Materials in Switzerland

Introduction

Insulation materials have high impacts on climate change; they are projected to contribute 31% to the greenhouse gases related to material used in the building sector in Switzerland in 2055².



In 2055 the amount of insulation material going into the building stock will be similar to the amount of material coming out, offering a great opportunity to close material loops (Figure 1).

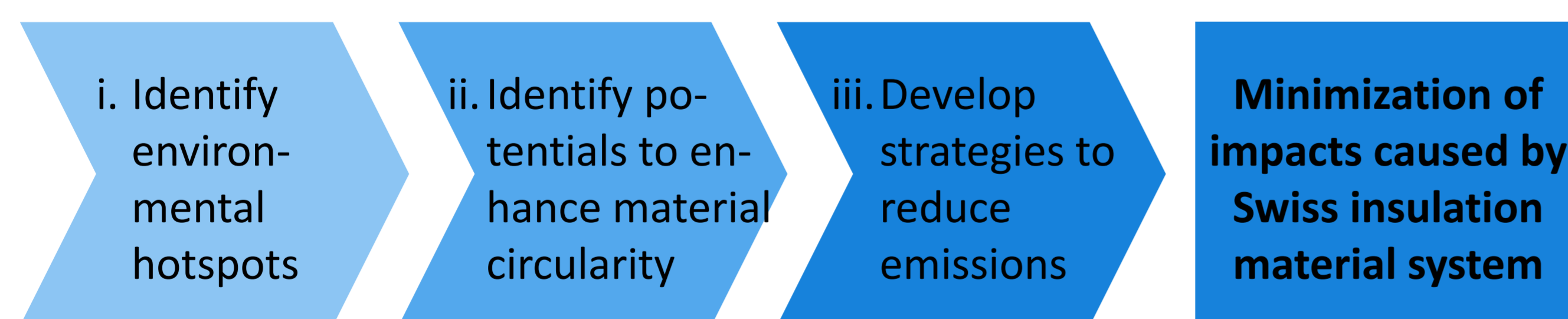
However, recycling of insulation materials is difficult as they often contain hazardous flame retardants³.

Figure 1: Mass flow of building materials going into and coming out of the Swiss building stock (Heeren and Hellweg, 2018)

Preliminary Results

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Aim



Method

A dynamic material flow analysis (MFA) (Figure 2), using a GIS-based bottom up building stock model², was combined with a modular LCA⁴.

Conclusions

- As production is the most emission-intensive process (Figure 3), recycling of insulation materials should be increased, however, barriers exist
- High environmental impacts result from the incineration of mineral oil-based materials, required due to the contamination with HBCD (Figure 3)

- Laws and regulations should include incentives for firms to establish and encourage recycling systems
- Material design considerations should take care that no hazardous chemicals are used that can inhibit recycling; ideally the direct reuse of materials should be facilitated

References

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This project is supported by the Swiss National Science Foundation (SNSF) within the framework of the National Research Programme "Sustainable Economy: resource-friendly, future-oriented, innovative" (NRP 73). Further information can be found at www.nrp73.ch.