



Prospective life cycle analysis of the German building stock Implications for future development

(Dissertation Project)

and

HORIZON-CL6-2026-03-GOVERNANCE-05:

Coordinated European contribution to the WMO Global Greenhouse
Gas Watch and its international governance

Nathalie Glenn

Publications:

- Wilhelm Büchner Hochschule, Klett Gruppe, DBP01 0624N01, Strategien des Digitalen Bauens (Studienheft)
- BIH Meeting Tagungsband Contribution, (to be published this year)
- OER Video Training (one of many videos)
Der Lebenszyklus eines Gebäudes, ORCA.nrw.
DOI: 10.5446/66748, Glenn, N. (2023).

Conferences:

- BIH-Meeting 27.08. – 29.08.2025 Kiel
Symposium for scientific staff in the field of civil engineering
- LCM 2025 Palermo, 9.09.-12.09.2025
12th international conference on life cycle management
Invited as Speaker, Poster presentation

Education:

- Dipl.-ing. Arch
- M.A. Educational Media
- PhD Candidate TU Graz,
Sustainable Construction
- Research Assistant since 2017

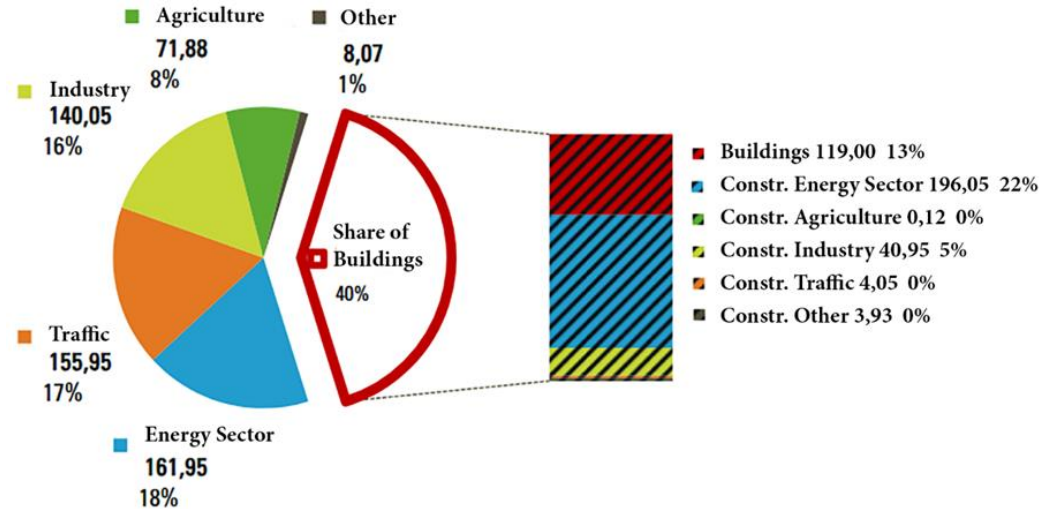
Trainings:

- LCA Consolidation,
- Sustainable Building Assessment
(RWTH Aachen)
- Consequential LCA Practise
(BioEcoGraduate School, Toulouse)

Potential Partners

Interest in :

- HORIZON-CL6-2026-03-GOVERNANCE-05: “Coordinated European contribution to the WMO Global Greenhouse Gas Watch and its international governance “ or a similar call.
- Research Questions, that can be answered with (prospective) LCA in the construction industry.



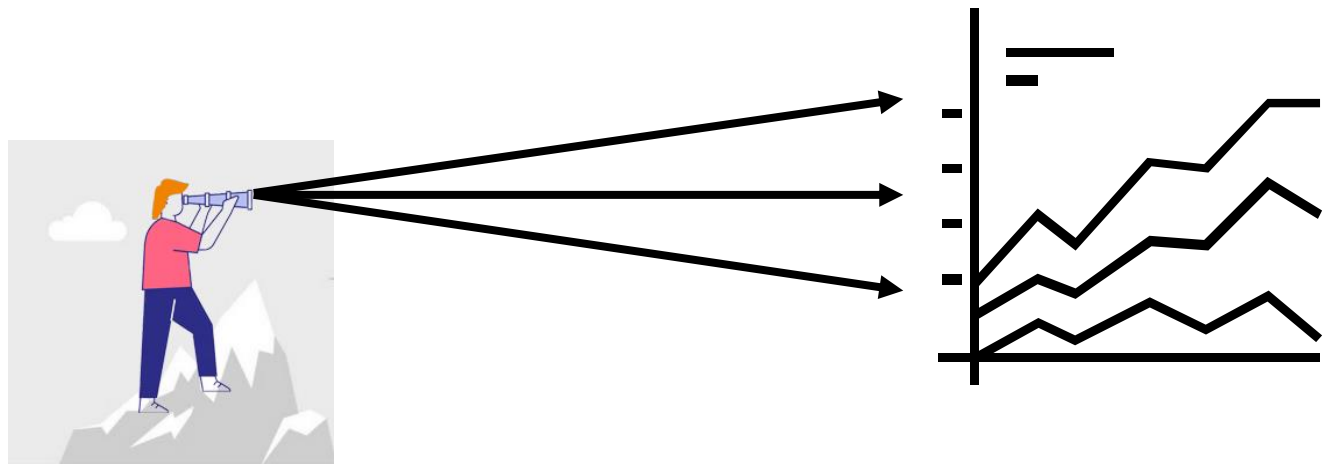
GHG Emissions in Mio t CO² equivalents : Σ 902
after (Ramseier & Frischknecht, 2020)

- Construction and Building operation are causing around 40% of GHG emissions.
- Despite the emissions, the construction industry and demolition globally cause 35% of waste in and consumes up to 50% of primary materials.

Prospective LCA as a method

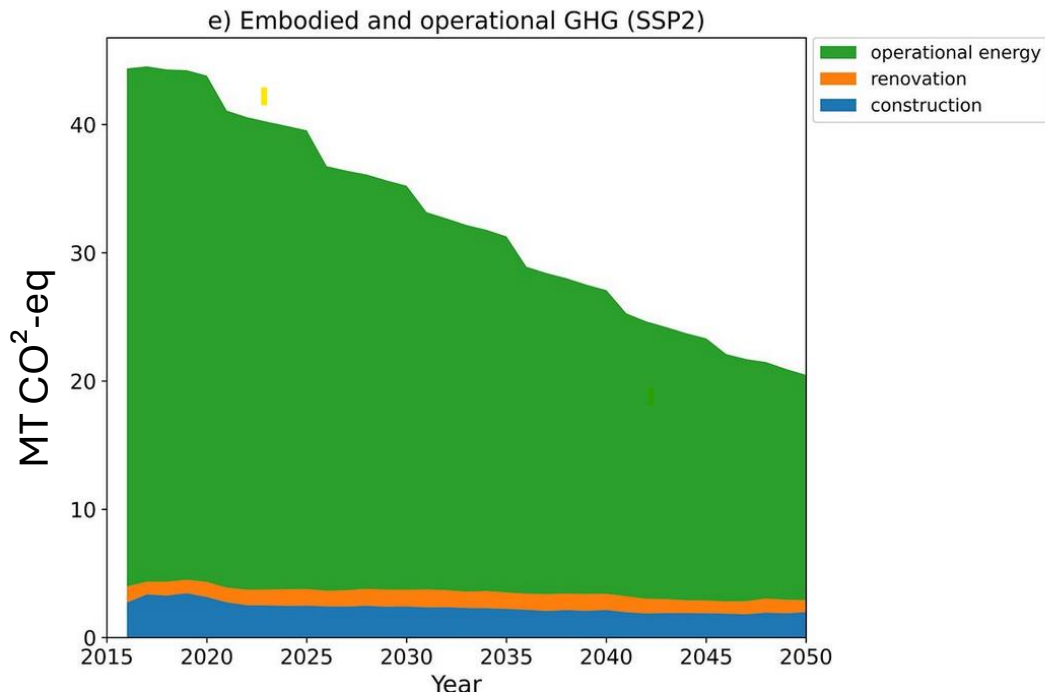
Prospective (or ex-ante) LCA tries to anticipate environmental impacts of products and services provided by future technologies.

- Modeling of "estimated" processes for emerging, lab-scale, or not yet-commercialized material
- The integration of **future scenarios** is intentional, which leads to **a range of results**.

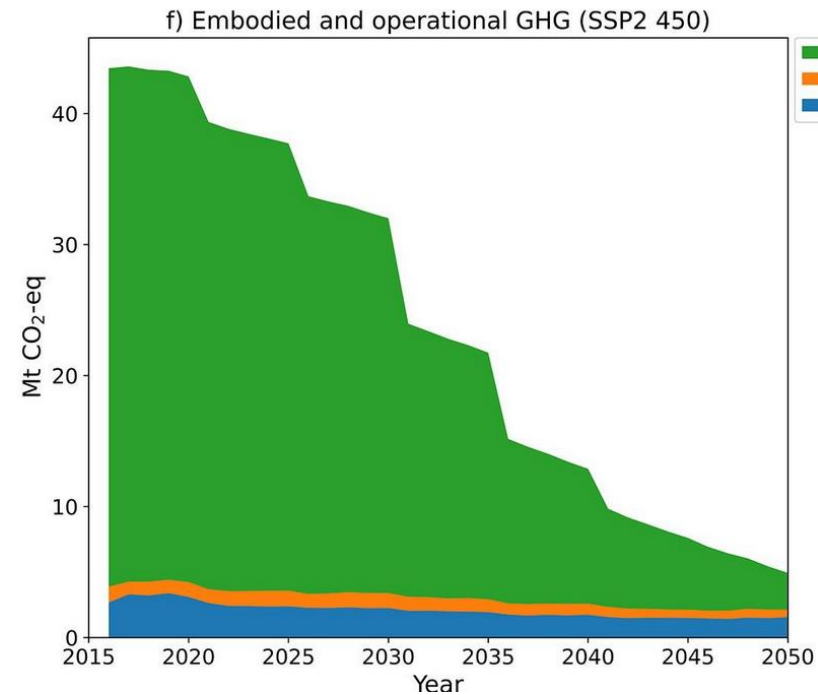


Building Stock pLCA, Embodied and Operational GHG

Szenario SSP2, 3-4 degrees temp. rise



Szenario SSP2 450, 2 degrees temp. rise



The term **SSP2** (Shared Socioeconomic Pathway 2) most commonly refers to a central climate scenario developed by the Intergovernmental Panel on Climate Change (IPCC). **SSP2-450** (climate scenario): This is a combined scenario in which the SSP2 narrative is coupled with a climate policy that leads to a radiative forcing of 4.5W/m² in 2100. It is a middle ground that could avoid the worst consequences of climate change but still represents significant warming over 2 degrees.

Yang et al. 2022, based on premise scenarios, example from the Netherlands

Summary of Potentials

The pLCA results provide a data basis for decision-making processes on the foundation of which governance can be revised or newly created.

- Current life cycle assessment practice uses old data to project the evolution of environmental impacts over the period of fifty to one hundred years. A pLCA can modify this data according to IPCC or other scenarios, also individual scenarios can be set up.
- A German building stock model based on the IOER Material Cadastre of Buildings in Germany is used to create an inventory and calculate a range of impact results as a case study.
- pLCA makes the consequences of decisions visible and comparable, which is useful for understanding the impact of different choices.

