BUILDING ACTION SYMPOSIUM
COP23, Bonn, 2017

"How to achieve the Paris Agreement? Identifying key ingredients to achieving a low-carbon, energy efficient buildings and construction sector"

Breakout group IV – Building data capture and management as a catalyst for moving the sector onto a 2°C pathway.

IEA EBC Annex72: Assessing and influencing life cycle related environmental impacts caused by buildings: how can data help?

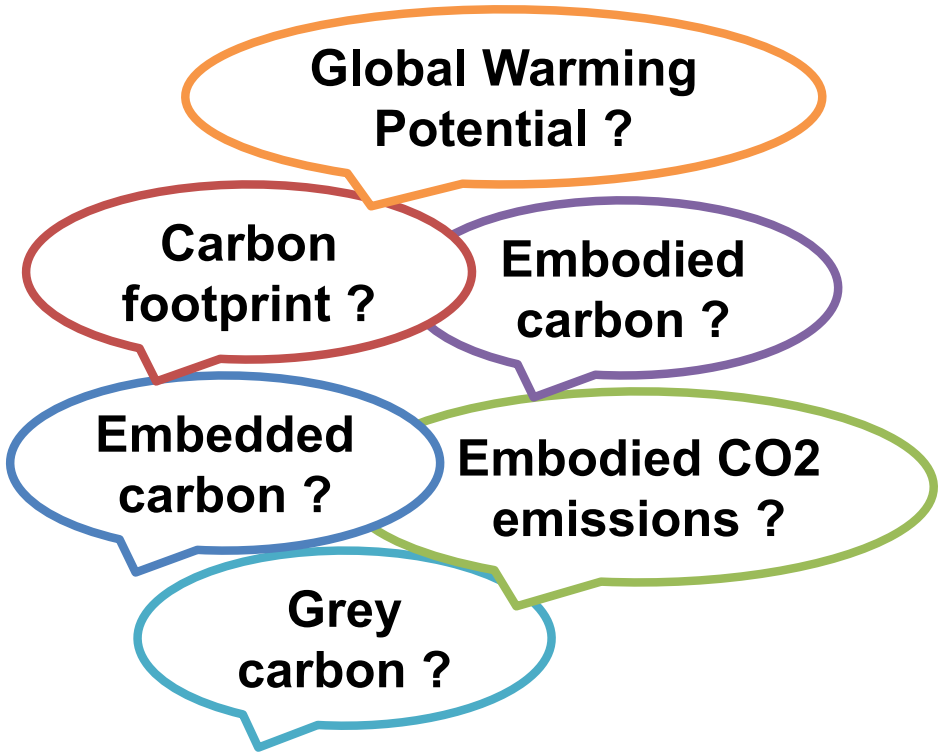
COP23: A. Passer, T. Lützkendorf and R. Frischknecht

09.11.2017

*"To harness innovation, enterprise and investment to fast track the development and deployment of climate solutions that will build future economies with **net zero greenhouse gas emissions**, in an effort to limit the rise of global temperatures to 1.5°C above pre-industrial levels." (COP21)*

The goal:

- **netZeroEnergy**
- **netZeroEmissions**
- **netZeroImpacts?**

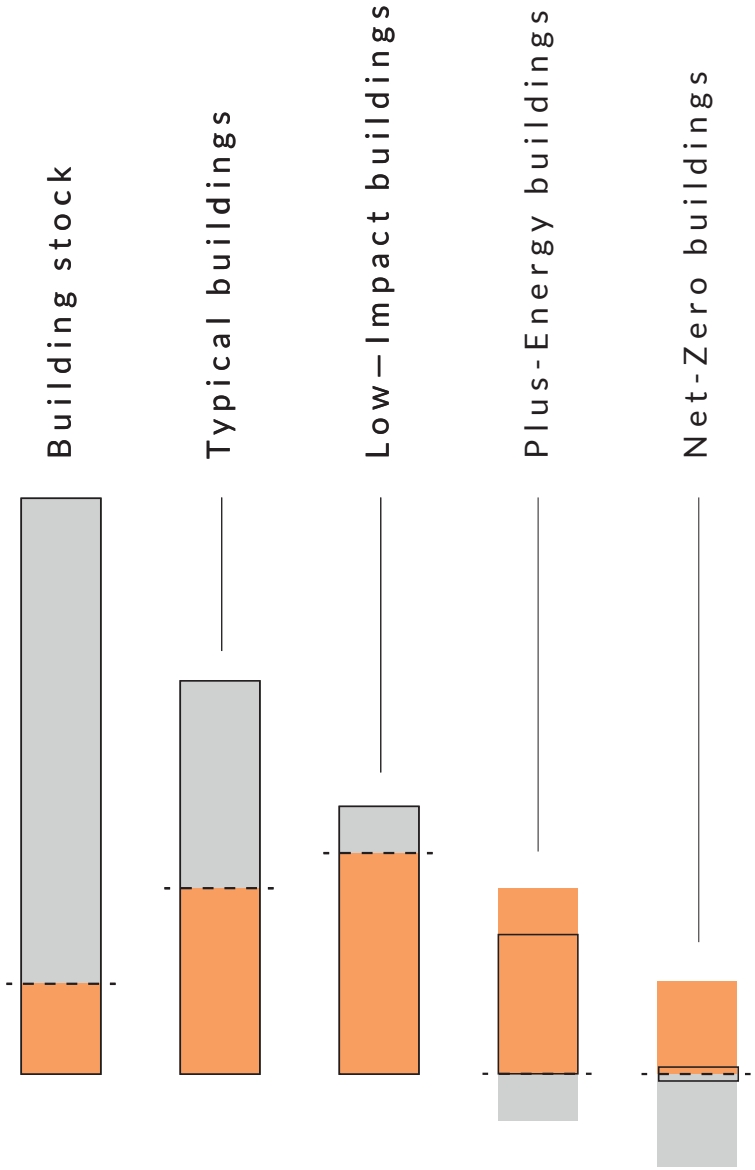


Source: IEA EBC Annex 57, TU Graz

A Life Cycle approach is required!

Source: IEA EBC Annex 72, TU Graz

Net-Zero life cycle performance is the goal!



Primary Energy Demand and related GHG emissions!

operational impacts

embodied impacts

Source: IEA EBC Annex 72, TU Graz

IEA EBC Annex 57 - Evaluation of Embodied Energy and CO2 Equivalent Emissions for Building Construction

- Methodology, Comparability and Documentation
- Guidelines for Designers and Consultants, Construction Products Manufacturers, Policy Makers and Educators

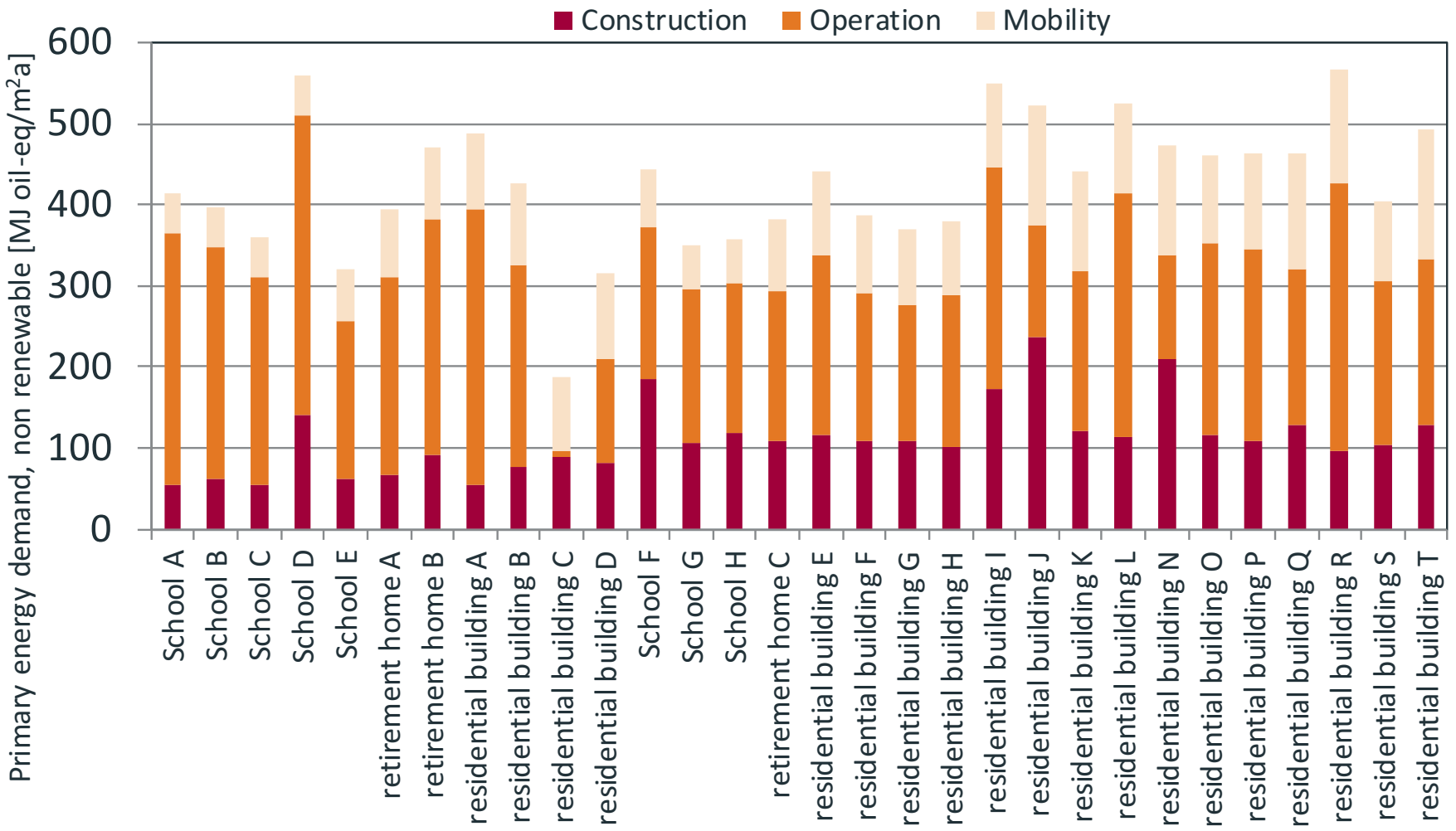
Download: www.iea-ebc.org/projects/completed-projects/ebc-annex-57/

IEB EBC Annex 72: Assessing Life Cycle Related Environmental Impacts Caused by Buildings

- Methodology *(ST1)*, Workflows and tools *(ST2)*, Case studies and benchmarks *(ST3)*, LCA databases *(ST4)*
- Guidelines for Design Decision Makers and Policy Makers

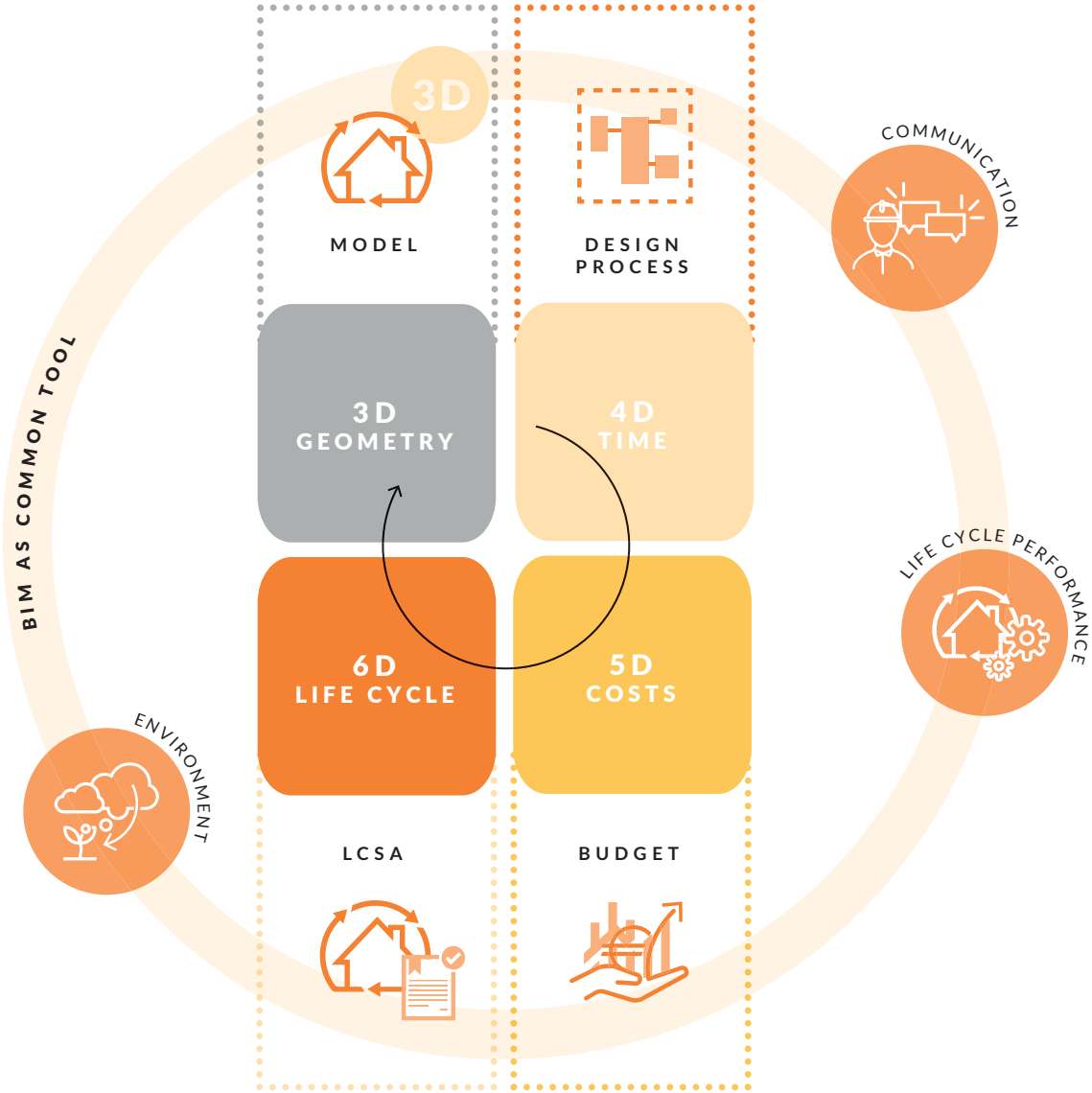
Visit: http://www.iea-ebc.org/projects/ongoing-projects/ebc-annex-72/

Large scale building assessment to derive **Paris compatible benchmarks for buildings**



Source: Frischknecht, R., et al.: IEA EBC Annex 57 (2016)

BIM as common tool!



Source: Passer, Alexander, TU Graz 2016

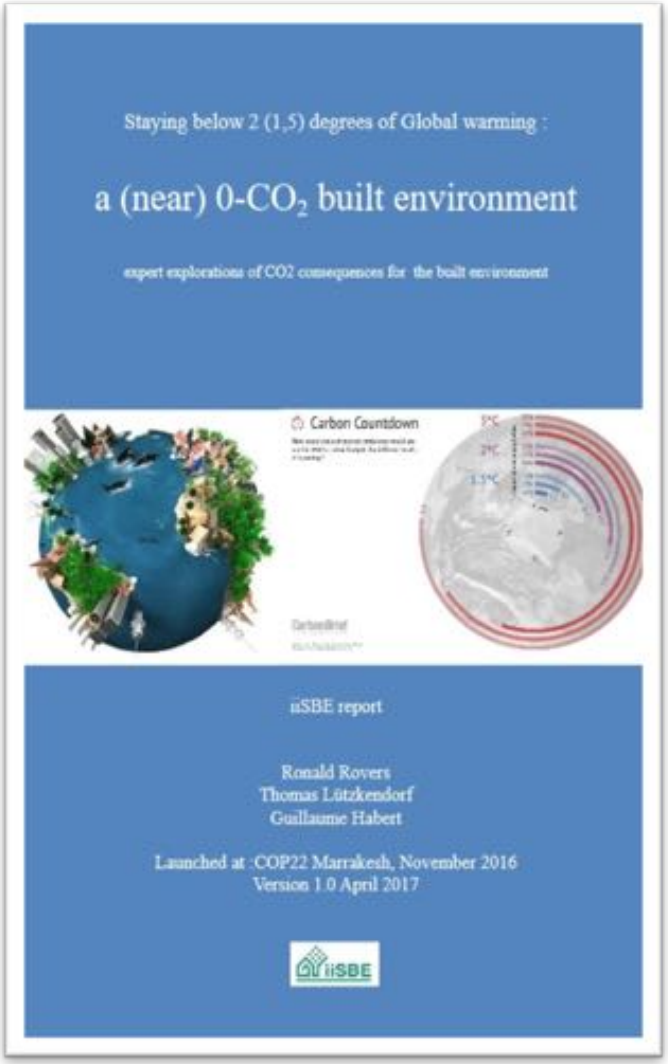
Data is only useful if,

- It is able to highlight the **relevant issues** and challenges
- It **supports stakeholders** in the assessment and improvement
- It is **reliable** and tested
- It **fits the question**/problem

The availability and reliability of appropriate data becomes a prerequisite for calculating, assessing, influencing and proving climate-neutrality of buildings!

We need:

- Evolution of scope: Integration of **full life cycle** to avoid emission leaking (focusing on either construction or operation) and to **identify benefits and trade-offs** along the life cycle of buildings (production, construction, operation, dismantling)
- Establishment of additional **building characteristics**: **GHG emissions in the life cycle / carbon footprint** and other environmental impacts
- Provision of **life cycle based information** on products (LCA/EPD/PEF) to the public and incentives for low carbon manufacturing
- Comprehensive **case study** evaluation for analysis of **interdependencies** and development of **design recommendations**
- Derivation of Paris compatible benchmarks for buildings (different building types); they may be dynamic and be lowered with time
- **Empirical data** on the **economic advantages** of **nZEB buildings** (RICS)



Conclusions from iiSBE report (2017):

Its **sheer impossible** for the Built environment **to stay within** a max CO2 **emission budget** under a 2 degree scenario, unless the built environment will:

- Change for and the primarily use of biobased materials
- Limit materials input in general and for retrofit for ZEB specifically
- Have the building supply industry change firstly for renewable energy based production
- Have household energy demand to be reduced significantly
- Speed up development of new RE conversion technologies

"Our scarcest resource is not oil, metals, clean air, capital labor, or technology. It is our willingness to listen to each other and learn from each other and to seek the truth rather than seek to be right."

Donella Meadows

Thank you for your attention!

The Austrian participation in IEA EBC Annex 72 is co-funded by following institutions and programs:

bmvit Bundesministerium für Verkehr, Innovation und Technologie

IEA RESEARCH COOPERATION

FFG

Working Group Sustainable Construction

Institute of Technology and Testing of Building Materials
Graz University of Technology

"Our research is dedicated to sustainability assessment methods and the workflows within the building design process to improve the applicability of assessment methods in the built environment as well as their successful implementation within full scale demonstration projects.

In our interdisciplinary projects our foci lie on the optimization of the environmental and economic performance by the use of life cycle assessment, life cycle costing, system analysis and multi- criteria assessment methods within digital design processes."

Visit: http://agnhb.tugraz.at/

- Sustainable design and process integration
  - Life Cycle Assessment (LCA)
  - Life Cycle Cost Assessment (LCCA)
  - Multi-Criteria Decision Making (MCDM)
  - Building Information Modeling (BIM)

Visit: http://agnhb.tugraz.at/