Virtual Conference
"Construction Products - Fit for the Future",
November 18th and 20th 2020

Workshop 3 – “Construction product information – the basis for circularity and sustainability of buildings”

From product information to sustainable buildings: What do energy efficiency, life cycle analyzes and sustainability certificates do in practice?

Dr. Ingrid Vogler
GdW - Federal Association of German Housing and Real Estate Companies.

Sustainability and certification: What is sustainable certification good for and for whom?

Housing Industry (rent)

Documentation of the completed building for stakeholders

Residential Developers (sell)

Documentation for sales

Real Estate Developer (rent, sell)

Documentation for capital market-oriented companies (non-financial reporting)

Running costs of residential buildings typical 30 EUR/(m²a)

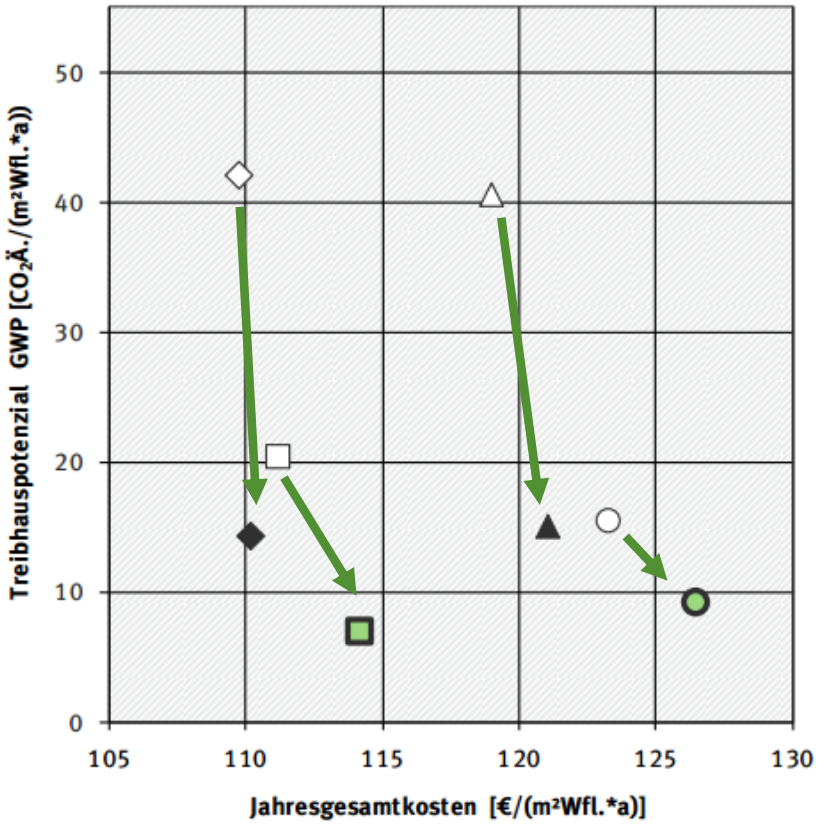
Running costs typ. 140 EUR/(m²a)

- All Certificates need a reliable data basis: EPDs, energy demand (kWh/m²a) and GHG-factor (g/kWh)
- LCA are expensive: no consistent data transfer, e.g. of the masses, manual data entry
- LCA allow rough comparisons, but are not decisive for planning – many data are not location-specific
- Greatest influence: cement and rebar
- Insufficient: data on the end of life

Sustainability and GWP: Which experiences exist with LCA for Global Warming Potential GWP?

Die Wohnungswirtschaft Deutschland GdW

New buildings



- Low GWP due to generation and /or use of renewable energies
- Low GWP due to timber construction
- It is not the higher standard of efficiency

◇ EnEV 2016 übliche Variante → ◆ EnEV 2016 ökooptimiert (Massivbau)

△ Passivhaus übliche Variante → ▲ Passivhaus ökooptimiert (Massivbau)

□ Nullenergie übliche Variante → ■ Nullenergie ökooptimiert (Holzbau)

○ Plusenergie übliche Variante → ● Plusenergie ökooptimiert (Holzbau)

Ökooptimiert = eco-optimized. That means for the research project:

EnEV and passive house:	heating with wood pellets instead of gas or district heating (and solid construction in all cases)
Zero and Plus energy house:	timber construction instead of solid construction (and heat pump in all cases)

Source: Energy consumption for building concepts over the entire life cycle
Quelle: Energieaufwand für Gebäudekonzepte im gesamten Lebenszyklus
Dr. Boris Mahler, Simone Idler, Tobias Nusser, Steinbeis-Transferzentrum für Energie-, Gebäude-und Solartechnik, Stuttgart
Dr. Johannes Gantner Fraunhofer Institut für Bauphysik IBP, Stuttgart, Im Auftrag des Umweltbundesamtes, Oktober 2019

Sustainability and energy efficiency
Example Sweden

Die Wohnungswirtschaft Deutschland GdW

Trends in emissions and energy/carbon intensity in the building sector in Sweden

Energy emissions in buildings (Heat)	**Production / Consumption Level** (output)	**Emission intensity** (GHG per output)	
		Energy intensity (Energy per output)	**Carbon intensity of energy** (Carbon per energy)
Strong reduction (over 80% reduction since introduction of carbon tax for residential emissions, also strong reduction in emissions in district heating)	**1. Decrease in household energy use by 2.1 %** (per capita, 1990–2008)	2. Increase in district heating (from about 30% to over 50%).	**4. Phase-out of fuel oil** (from about 25% to less than 5%)
		3. Changing composition of electricity-based heating (from resistance heaters to heat pumps; low effect on emissions given that electrical energy efficiency is not very relevant in Sweden due to low-carbon electricity supply).	**5. Decarbonisation of district heating through biofuels**
			6. Slight increase in electricity-based heating (from about 30% to about 35%)

https://www.euki.de/wp-content/uploads/2018/11/fact-sheet-carbontax-se.pdf

Conclusions

- Product information is not yet complete (end of life, EN-standards).
- Non-location based and not-individual information does not affect planning.
- There is a lack of integrated digital processes for LCA.
- GWP is determined by using wood and renewables.
- Energy efficiency is a door opener for renewables, more efficiency doesn't have to mean less GWP.

- Please find simple solutions - doesn't make building even more complicated, with even more assessements and even more requirements.
  All those involved in construction are already at their limits.