DEVELOPMENT OF LCABYG FOR THE DANISH BUILDING SECTOR
DRIVERS FOR THE DEVELOPMENT AND APPLICATION OF THE TOOL

HARPA BIRGISDOTTIR

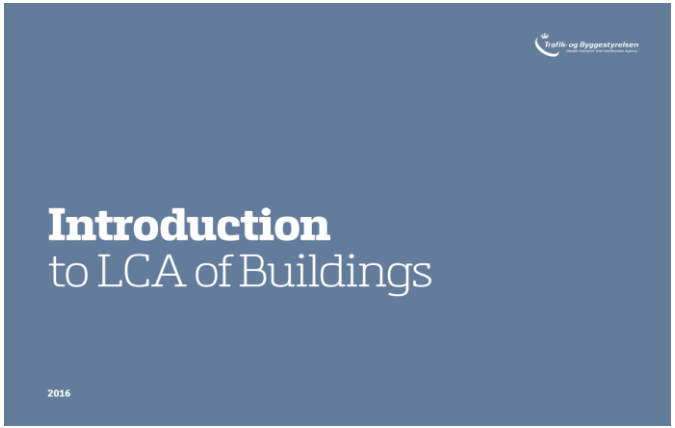
DANISH BUILDING RESEARCH INSTITUTE
AALBORG UNIVERSITY COPENHAGEN

Why, how, when?

2014
The Danish Government:
Political strategy for buildings
with
Vision for a Voluntary Sustainability Class in the Building Code

DGNB

2015
National LCA-tool LCAbyg launched in April 2015
+
Several publications

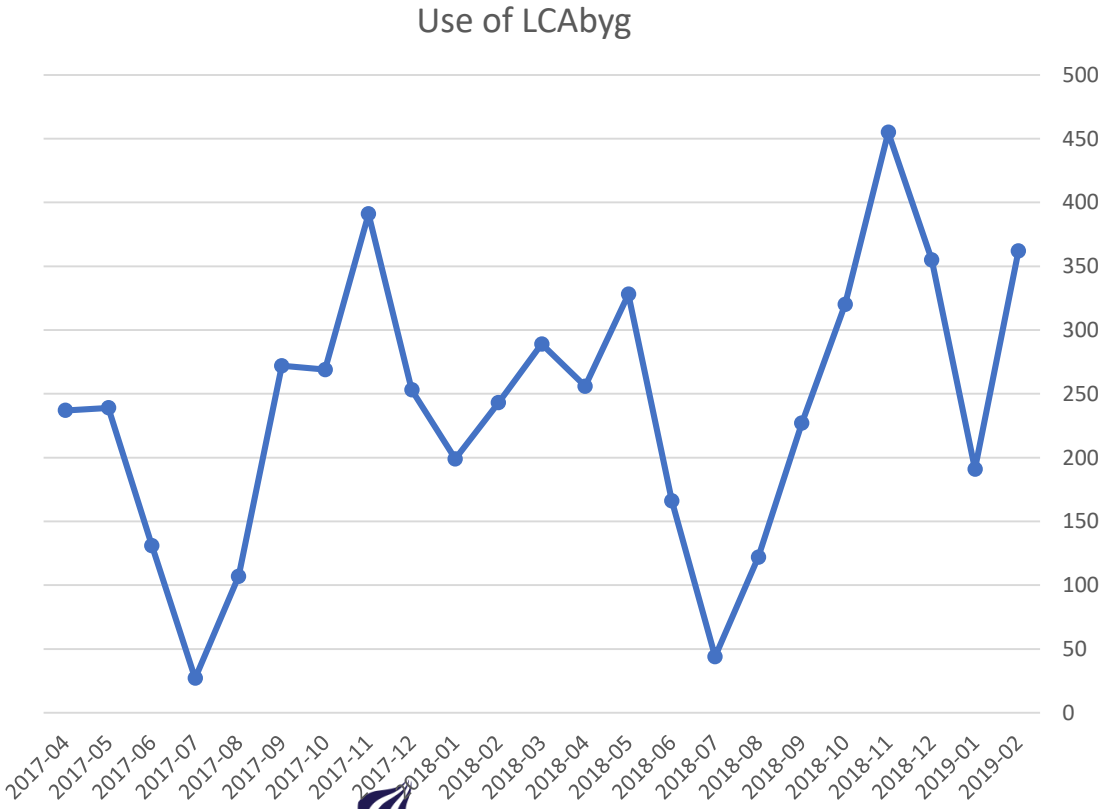


In brief

- Developed by The Danish Building Research Institute for the Danish Transport, Construction and Housing Authority
- National freely available tool developed for the Danish building sector
- First version launched in April 2015
- New beta version in January 2019 with focus on early design stages
- Over 3000 users, about 300-500 users each month

It is being used

About 3000 registered users in total



CONDITIONS

Short time to develop a robust tool for different users in Denmark

Classical tool structure

User input

Information about the building
- Area, reference study period, building type

Building components
- Building construction
  - Material production
  - Material end of life

Operational energy
- Heating
- Electricity

- Forecasting or static data

Calculation tool

Life cycle stages included
A1-A3, B4, B6, C3-C4

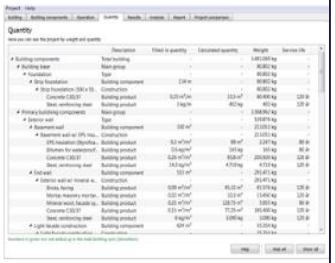
Building components
Sorting of data into group of components, material types etc.

Calculation rules
Material amounts (volume/mass), replacements etc.

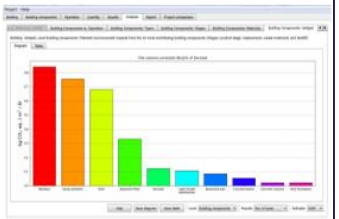
Databases
Ökobau database for building materials
Operational energy data

Results

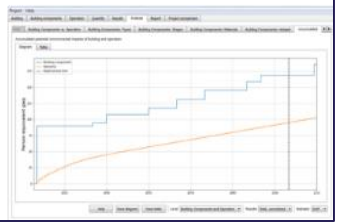
Material quantities



Results in numbers



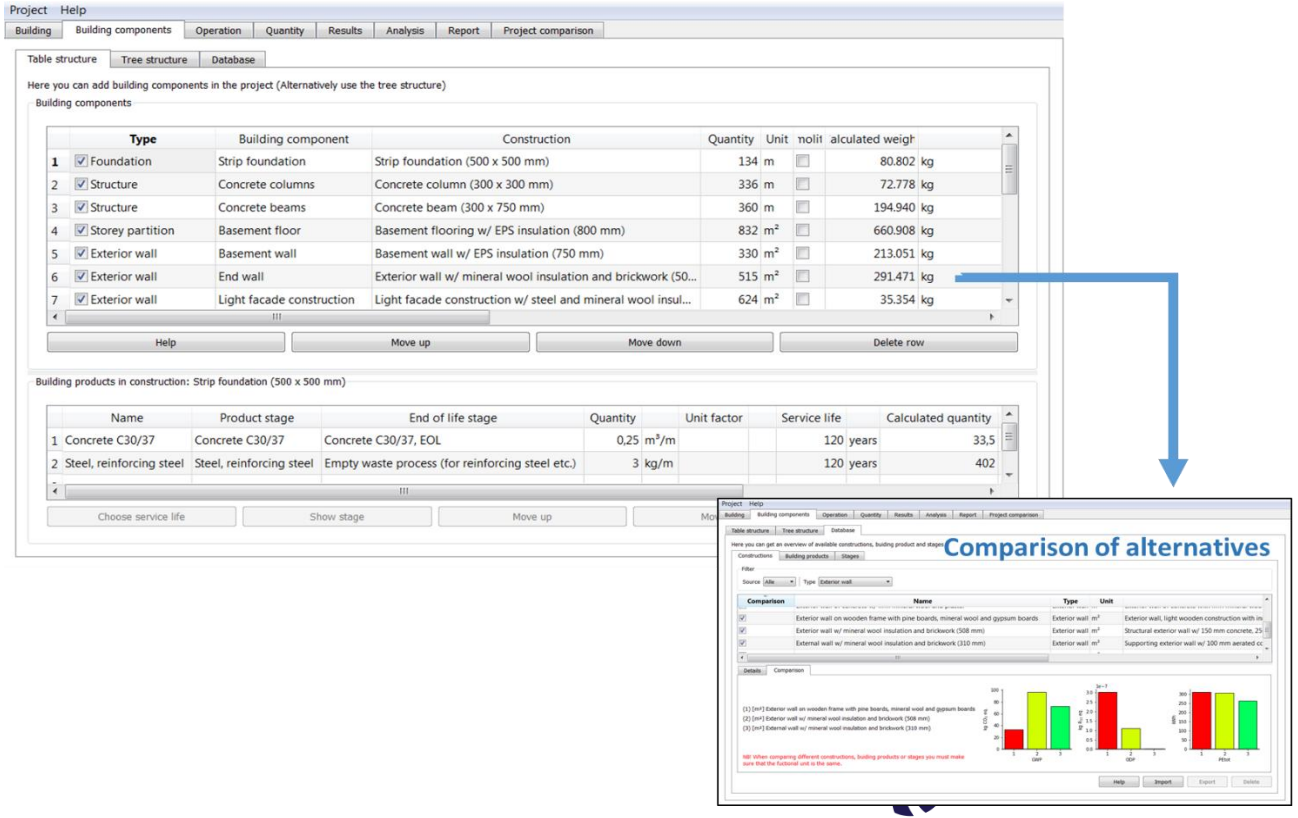
Selected figures for analysis and understanding consequences of building design and choices of materials



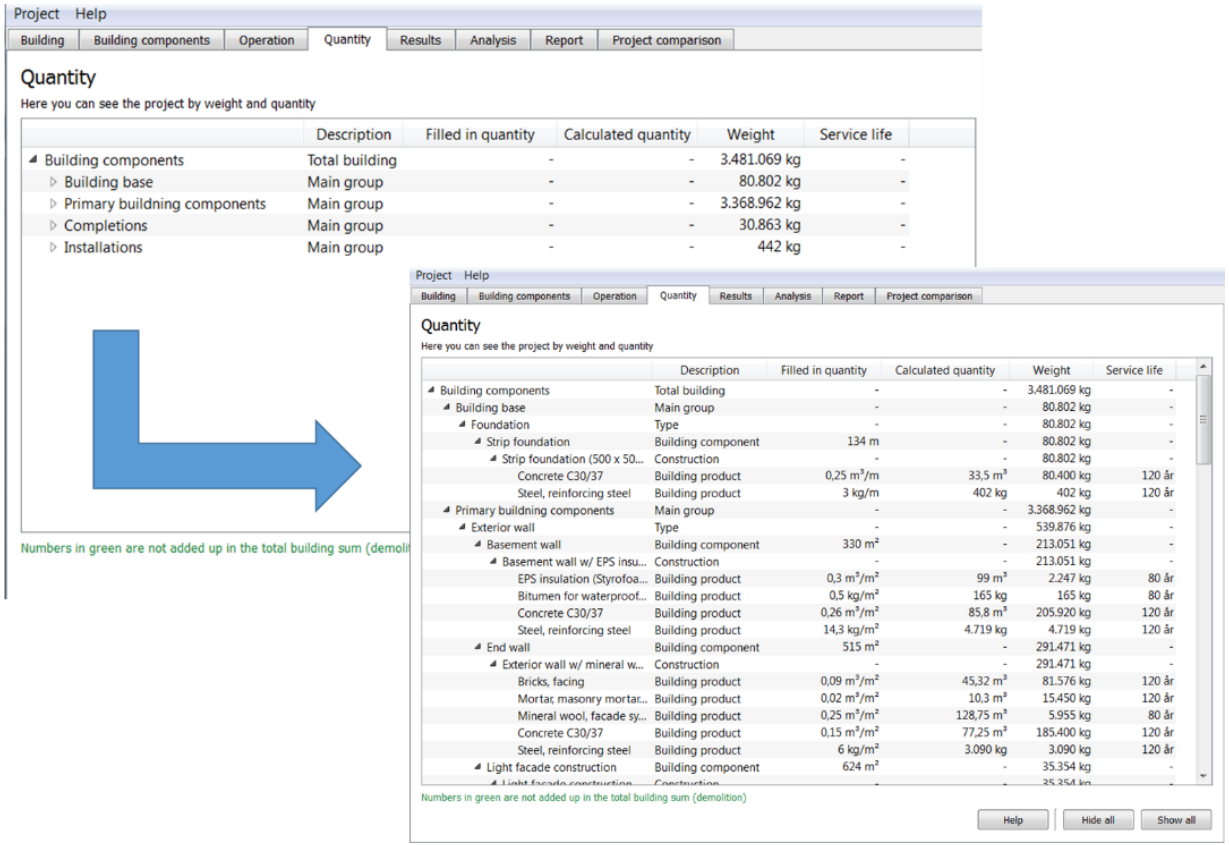
FOKUS in the tool development:

- Transparency
- Understand
- Learn
- Improve

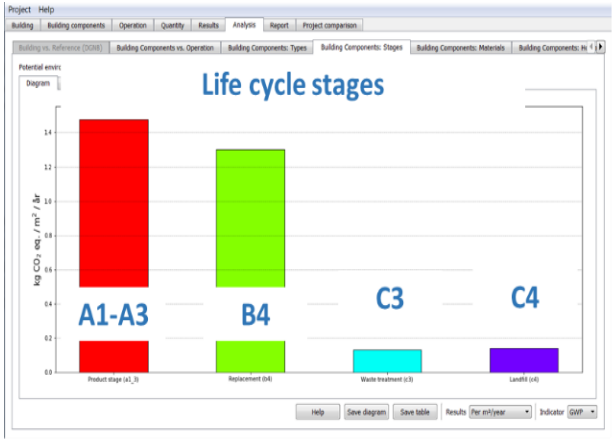
Comparing and choosing between alternatives

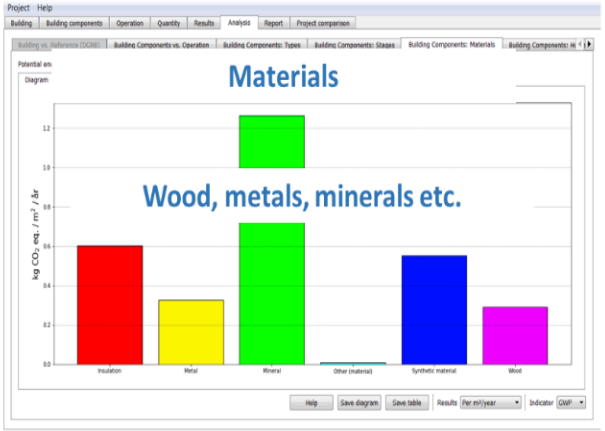


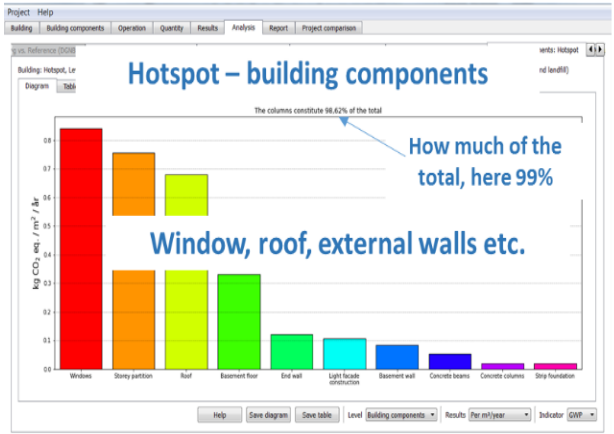
Quick overview of quantities and understand the massflow

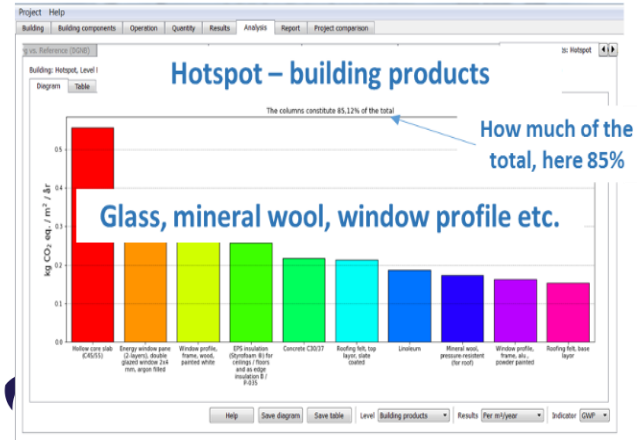


Analysis with pre-defined figures

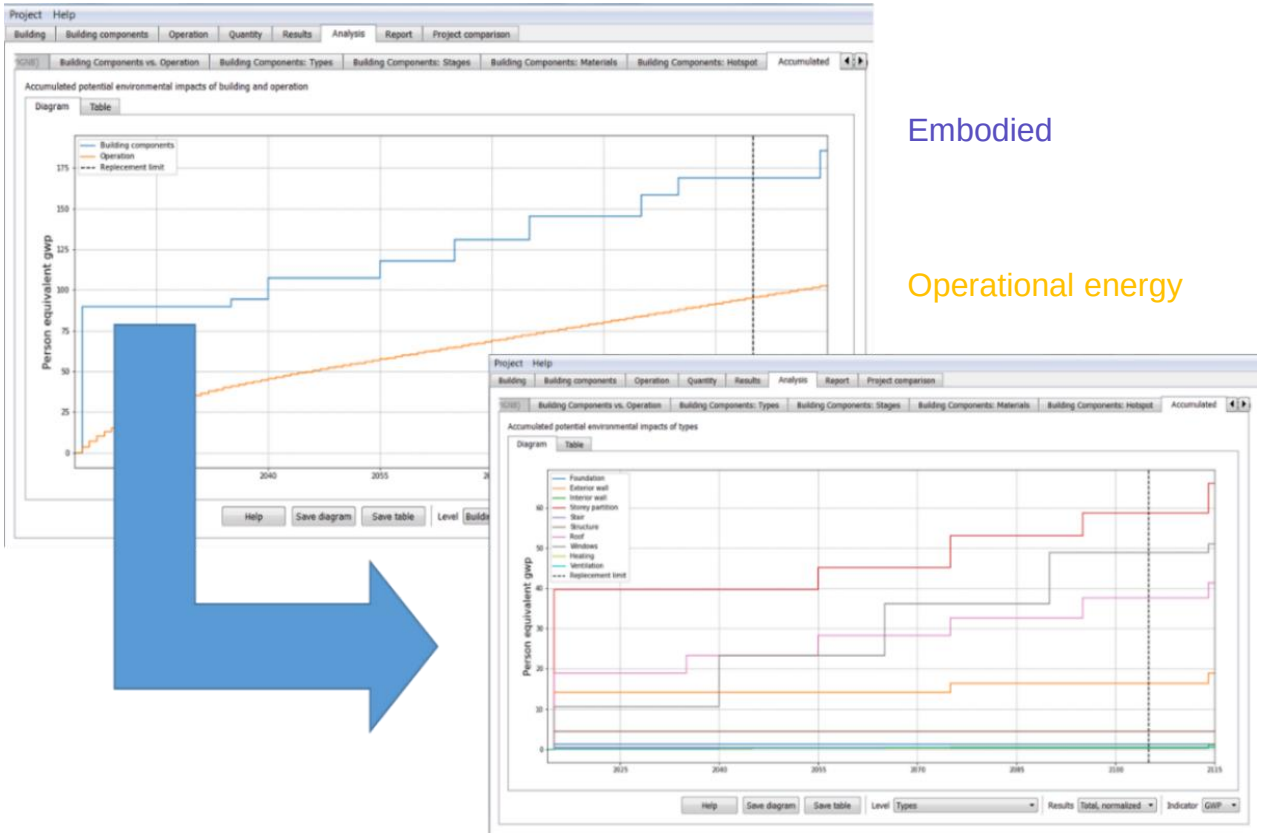








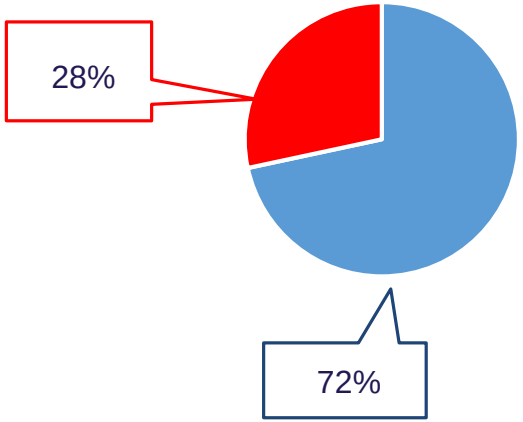
Last but not least: Understanding **WHEN, HOW MUCH** and **WHY**

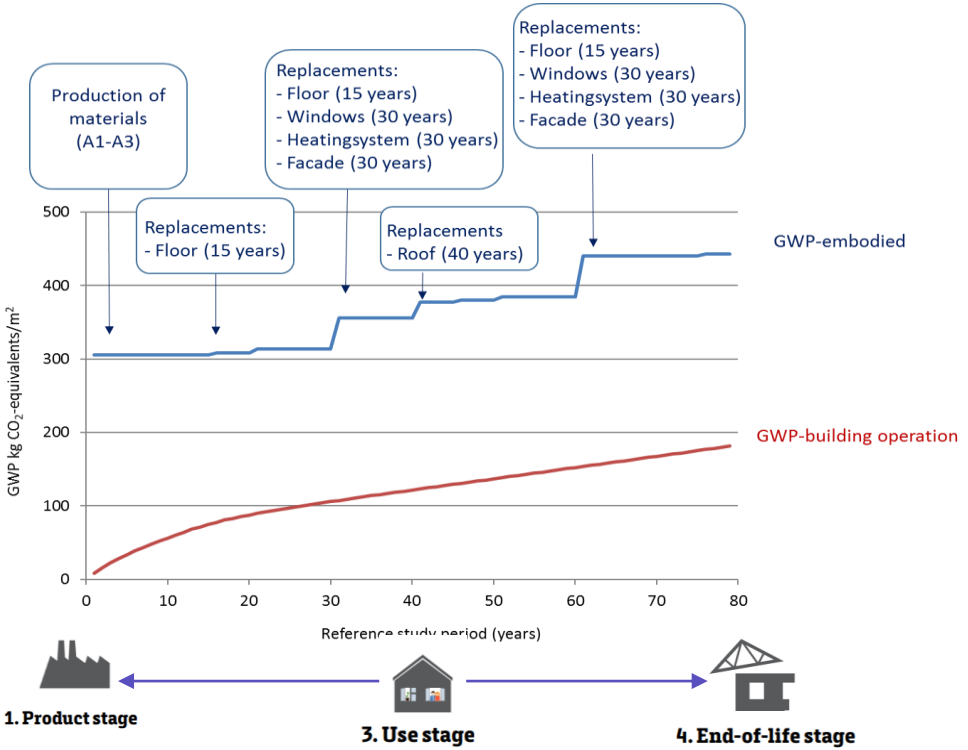


Embodied

Operational energy

Whole life carbon assessment for an office building – an example

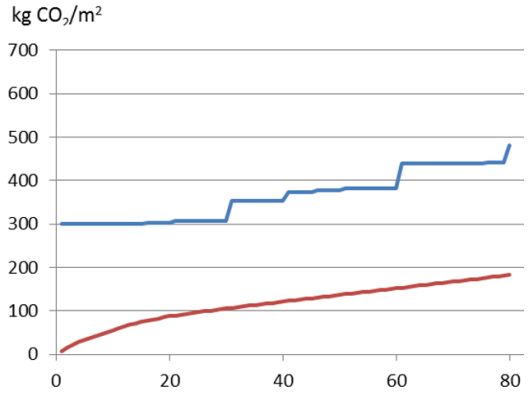


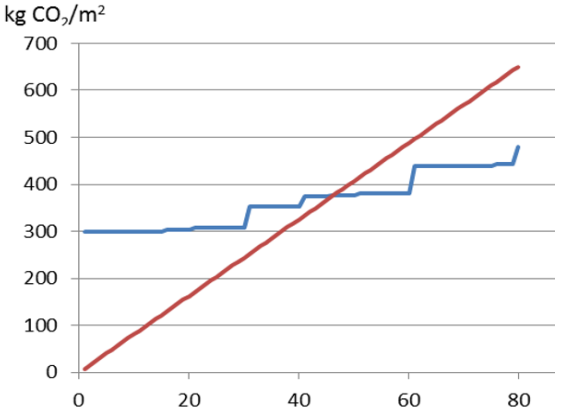


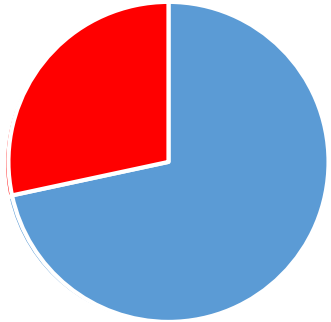
Not regulated

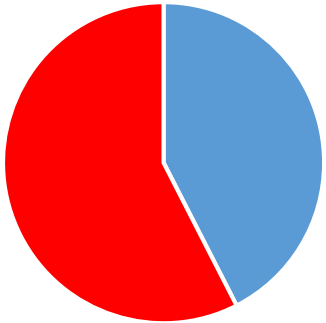
Regulated

Consequences of using static versus forecasting
- and how results are presented!

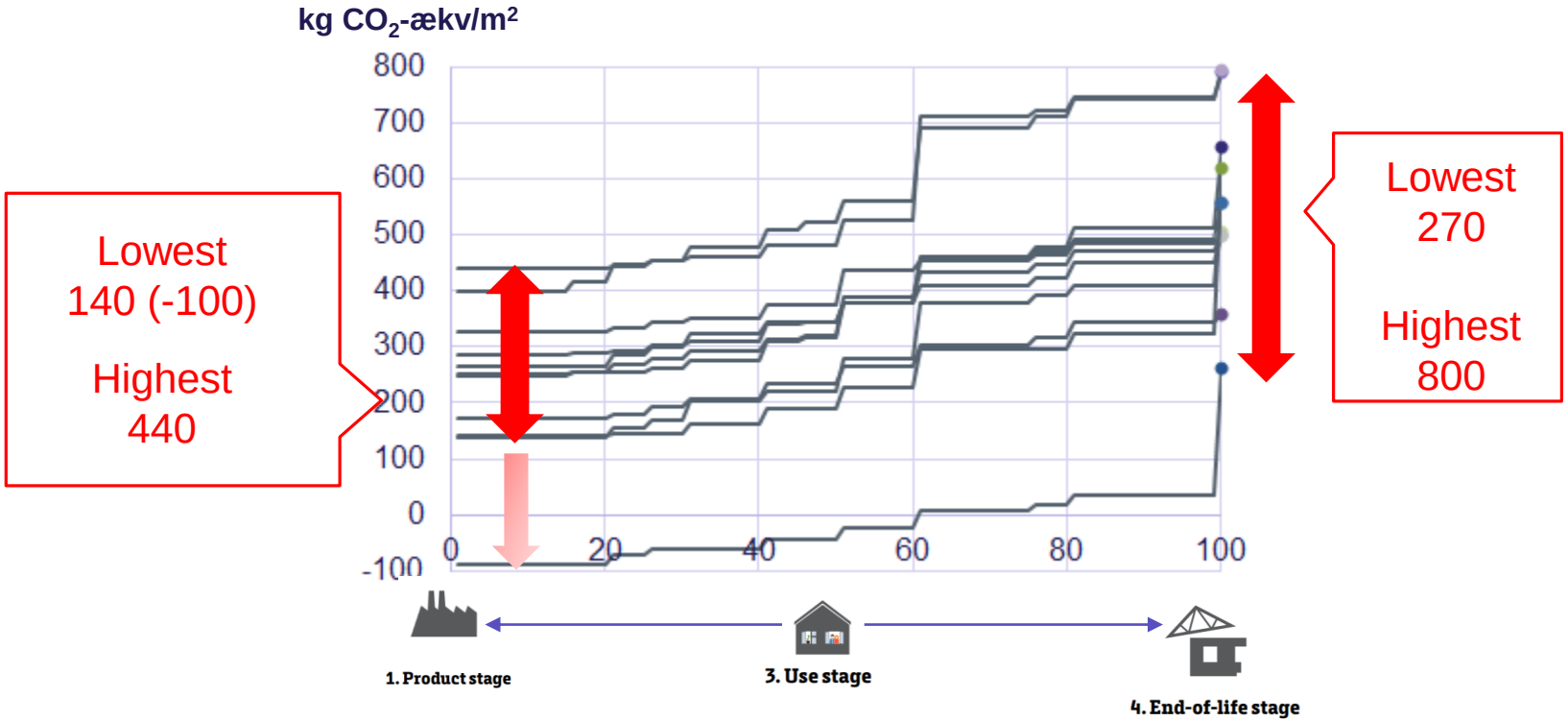








There is a large potential to reduce the embodied impacts



Our goals have been to:

- Increase building designer's **awareness**
- Let them **understand** where, in the building life cycle, reductions can be achieved
- Significant to focus on **simplifying** the process
- Finding ways of **communicating complex LCA results** to the users
- Perform **comparisons** of different construction solutions and material uses within the tool.
- Developing **predefined visualization** of results that were believed to qualify the designer to identify **hotspots** and to **understand** and mitigate the major impacts throughout the building's life cycle.
- Encourage the user to **shuffle around** between the **numerical results** and the **figures** in order to understand