THE DANISH BENCHMARK SYSTEM FOR BUILDINGS: ITS GOALS AND ITS EFFECTS

HARPA BIRGISDOTTIR

DANISH BUILDING RESEARCH INSTITUTE
AALBORG UNIVERSITY COPENHAGEN

Drivers for the use of buildings LCA and the need for benchmarks

- DGNB certification in Denmark
  - since 2011/2012

- Preparation of the Voluntary Sustainability Class in the Building Code
  - since 2014/still ongoing

Timeline

Adaptation of DGNB

GREEN BUILDING COUNCIL DENMARK

The Danish Government: Political strategy for buildings 2014
Vision for a **V**oluntary **S**ustainability **C**lass in the Building Code

SBi receives the Rockwool prize to work further with development of the VSC together with the building sector

Preparation of VSC by the agency (SBi and technical groups).
Suggestions delivered to the minister
No responds from the minister

2011 2012 2013 2014 2015 2016 2017 2018 2019 2020

Danish Excel LCA tool for DGNB certification developed by SBi

National LCA-tool LCAbyg developed by SBi and launched in April 2015
+
Several publications

Development of LCA benchmarks for VSC (and DGNB)

Left-wing Government

Right-wing Government

New Government

BENCHMARKS

Ongoing journey

Depending on methodology which is constantly being improved due to increased research and knowledge from application

”THE OLD METHOD”

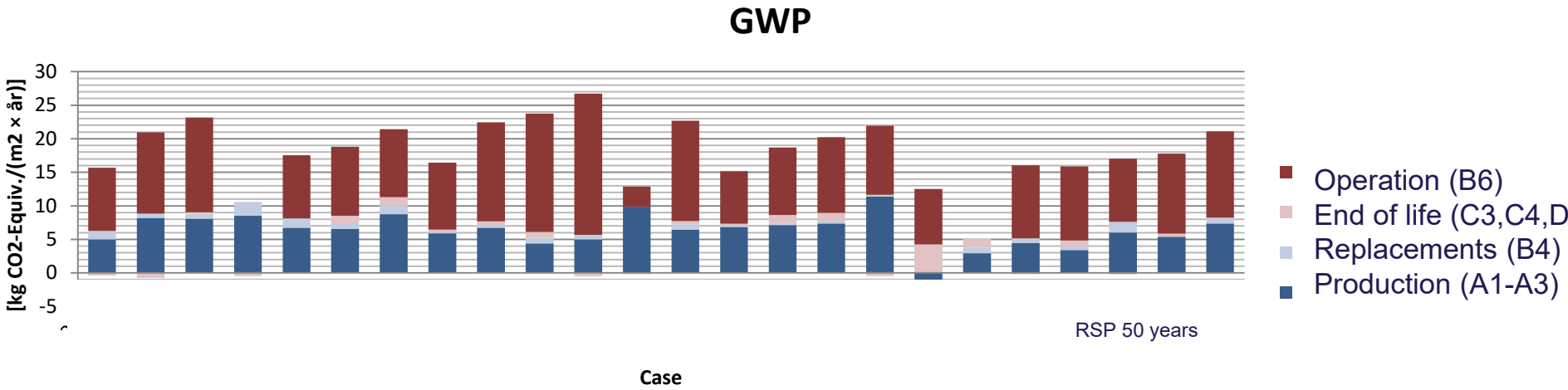
DGNB: 2011-2018 - using the Excel tool

- Method
  - Static energy approach, module D
    - 2012: German benchmarks for 50 years – only adjusted within GFA/NFA
  - Technical groups agreed on the need to accommodate long lasting materials in sustainable buildings – it was questioned if 50 years could reward that
    - 2014: Further adjustment of the German benchmarks

Short RSP	+	Long RSP
50 years		80-120 years
A1-A3, B4, C3-C4, D + B6		A1-A3, B4, C3-C4, D
Results weight 70%		Results weight 30%

Experiences with bencmarks from certification

Usually enough to lower operational energy
- No focus on embodied



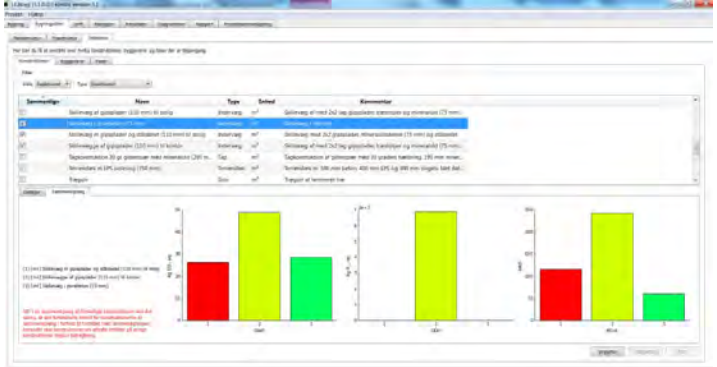
GREEN BUILDING COUNCIL DENMARK

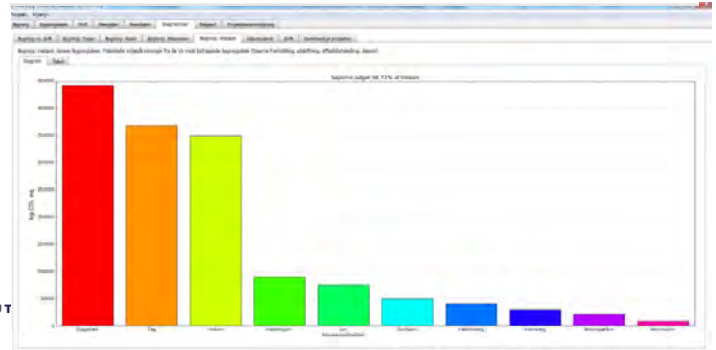
DGNB

THE FIRST STEPS TO
”THE NEW METHOD”

National tool - LCAbyg

- Developed by SBi 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





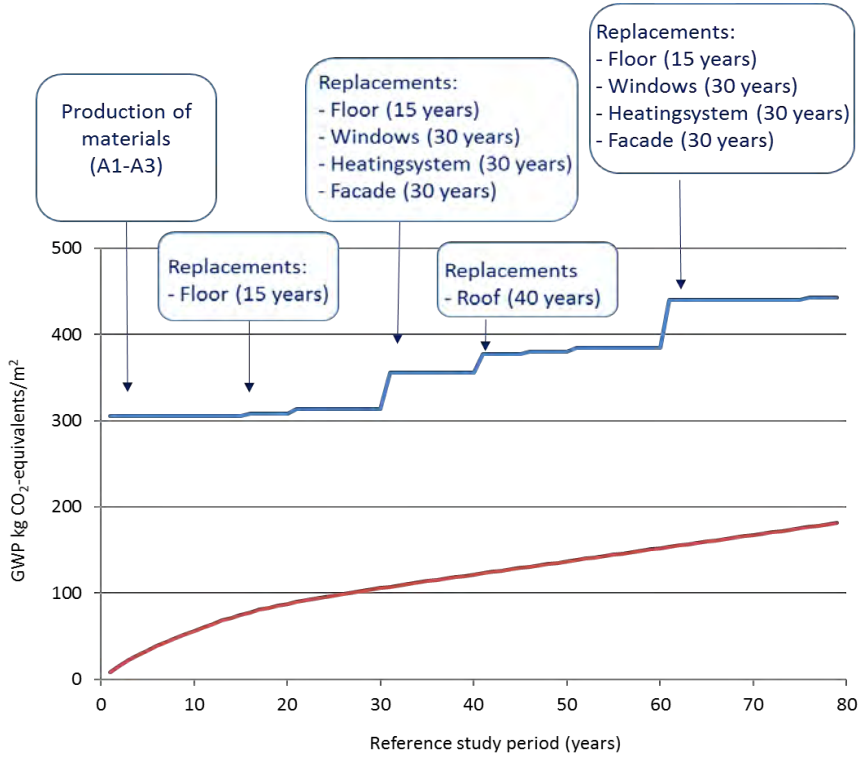
DGNB 2018 - using LCAbyg

- LCAbyg tool applied with the new methods
  - Long RSP (80-120 years)
  - Dynamic energy approach
  - Excluding module D
- Need for new benchmarks based on Danish cases
- First ”beta version of benchmarks” developed based on limited amount of building cases
  - 16 offices and 7 residential buildings

Life cycle assessment benchmarks for Danish office buildings. Rasmussen, F. N. & Birgisdottir, H., IALCCE 2018

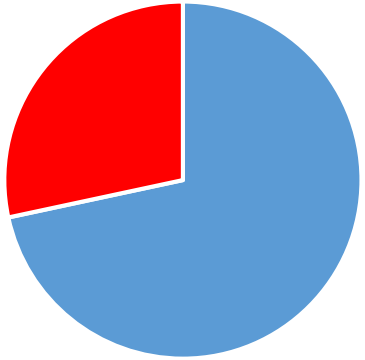
LCA benchmarks for residential buildings in Northern Italy and Denmark - Learnings from comparing two different contexts. Rasmussen, F. N., …. & Birgisdottir, H., Building Research and Information 2019.

Results for an office building based on this method

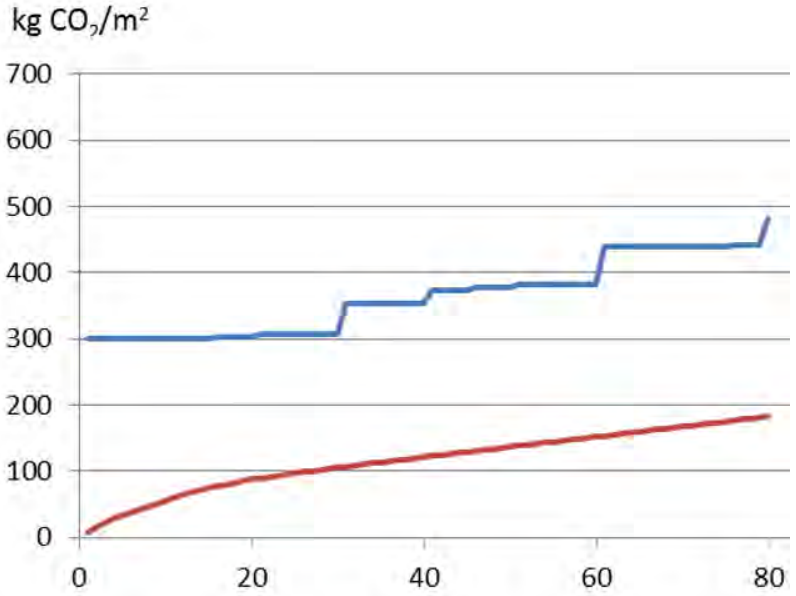


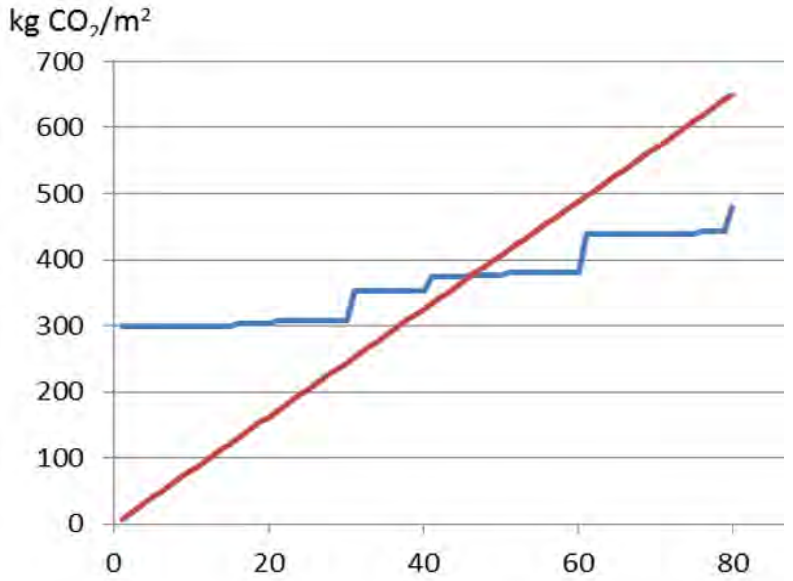
GWP-embodied

GWP-building operation

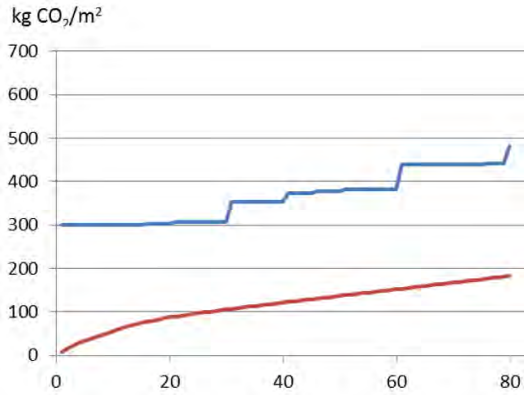


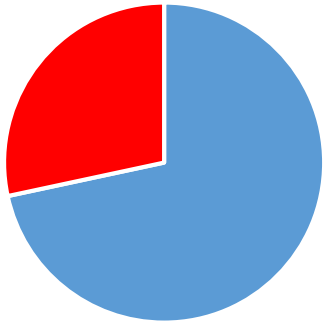
Consequences of using forecasting versus static

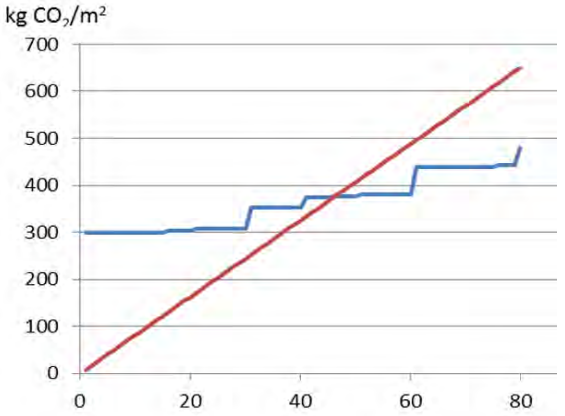


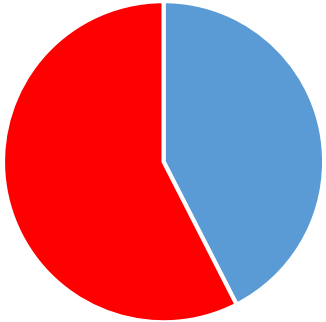


Consequences of how results are presented









NEW CROSSROADS

Need for benchmarks for the Voluntary Sustainability Class in the Building Code has asked for development of benchmarks based on larger set of cases and review of the method behind

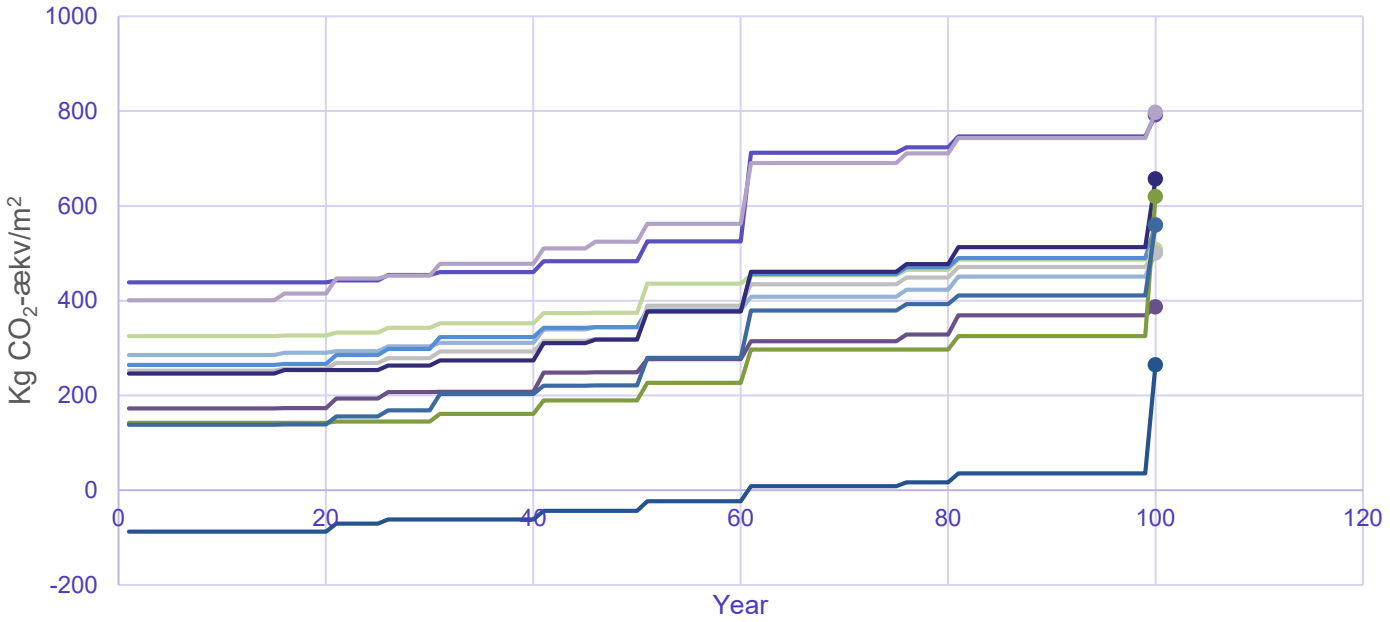
POSSIBILITIES FOR REEVALUATION OF ”THE NEW METHOD”

Year 2019 - Development of new set of benchmarks

- Recommendations on benchmarks for Danish buildings in use for VSC which also can be used for DGNB
- Expanding the pull of data behind

  Focus: Offices and Residential buildings
    - Residential (34 cases)
    - Offices (22 cases)
- Continue the development of a robust method
- Thorough description of methodology including the completeness of the LCA
- Reconsideration of RSP (50, 60, 80 or 100 years)

There is a large potential to reduce the embodied impacts



The goals and the effects

- The use of LCA in DGNB
  - Increased experience within the building sector with LCA
  - Drivers - Methods and tools have been developed
  - Building cases that can be used for development of benchmarks

- Preparation of the Voluntary Sustainability Class in the Building Code
  - Free available national tool for LCA has been developed (LCAbyg)
  - Evaluation of building cases and development of methodology description
  - Focus on initial impacts (construction), and focus also on embodied impacts
  - We are able to develop the requirements for buildings (voluntary or not) that can be improved over time