

TASK 2  
DATABASES AND  
MANAGEMENT OF  
DATA

31.10.2023  
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Construction



# Contents

A short introduction of the project

Why are we doing this?

What is an emissions database?

What is the project about?

What results to expect and when?



# LCA Databases and management of data

## Project purpose

- The main objective of the project is to seek a common Nordic understanding of the establishment and maintenance of databases that serve for environmental assessment of buildings.
- In addition, the project will generate some new data and formulate common Nordic practices.

## Team

- Core team with experience from common national emissions database work in 2020-2021
  - Swedish Environmental Research Institute (IVL)
  - Finnish Environment Institute (Syke)
  - Natural Resources Institute Finland (Luke) to complement Syke expertise in vegetation matters
- Experts to follow and contribute from Denmark, Estonia, Iceland and Norway
- Support from Authorities from Nordic countries and Estonia



# Why

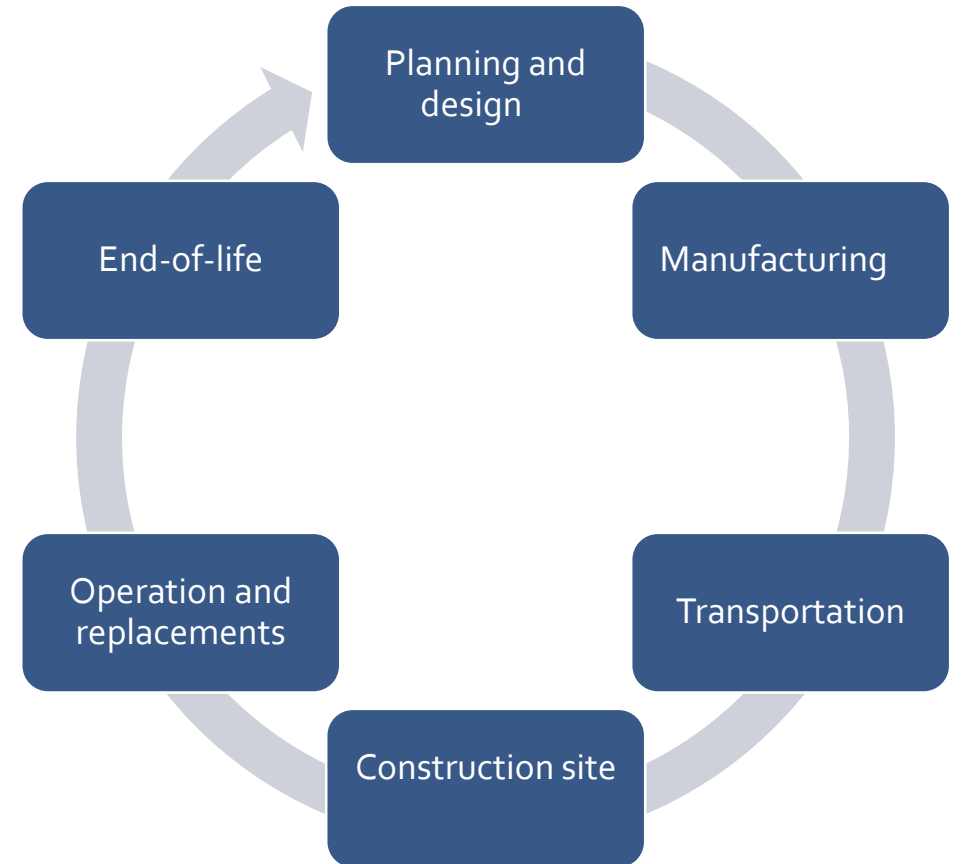
Environmental reasons – climate

Sustainable construction

- From energy-only to LCA
- Long process, lots of stakeholders

(European) regulation

- Official methods
- Requires reliable data



# Why – industry interviews (2019)

- Interviewed actors from different sectors:
  - Product Manufacturers
  - Designers
  - Construction companies
  - Environmental impact assessment programs and evaluation service providers
  - Design and modeling software providers
  - Cost accounting and project management software and service providers



- A good quality and transparent emissions database is necessary
- There is an interest to use the data in many phases of the process, also in early design and cost accounting for example
- An important opportunity exists to integrate emissions data into model-driven design software and construction project management tools
- Requirements for the database:
  - Availability, transparency, coverage, quality, interface and transferability, classification, continuous maintenance



# Nordic situation today

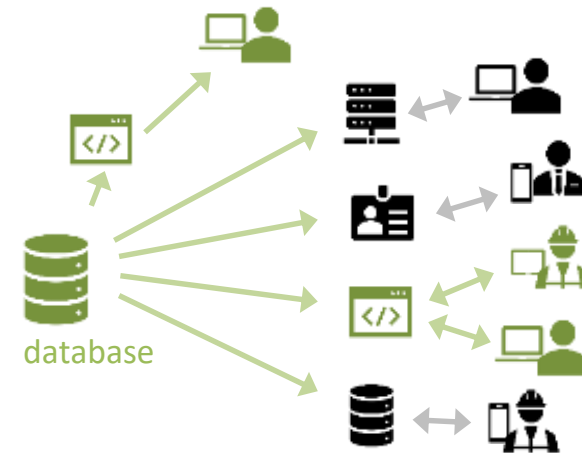
## Regulation and databases

- Most Nordic countries have regulation on low-carbon construction
- Emissions data is available
- Methods and data vary considerably

## Voluntary action

- Pilots and research
- Consultants
- Industry associations
- Manufacturing
- Rental equipment companies
- Builders
- Cities
- Investors

In short, lots of interest and many needs for good (enough) data

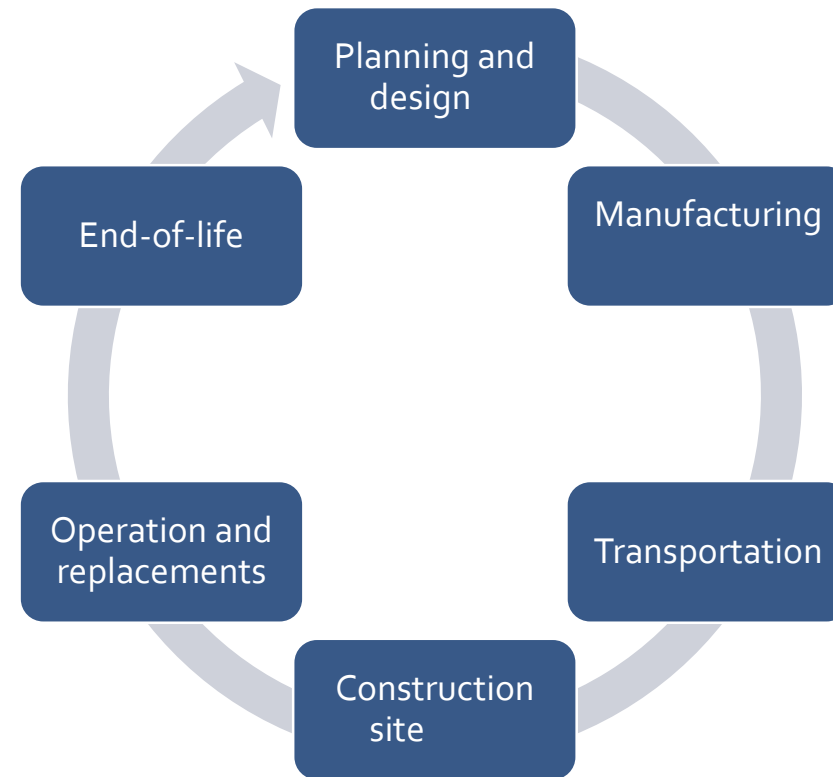


Information available and widely used in third party software and systems



# Users of the database are not LCA experts

- Designers (architect, structure, building technology)
- Product manufacturers
- Construction companies
- Environmental consultants
- Researchers
- Cost accountants
- Software developers
- Project management





# What is an emissions database?

- Provides typical data to enable the assessment of buildings with the help of common methods
- Corresponds to the main goals of the assessment methods
- Official data for many purposes



Search the climate database

Search

My list

[Categories](#) > [Building boards](#) > Gypsum, standard plasterboard

Export to Excel

Print

Add to my list

Version 02.04.000, 2023-01-24

## Gypsum, standard plasterboard

### Climate data for calculation for climate declaration

**A1-A3 building product's climate impact GWP-GHG, conservative value**  
0.284 kg CO<sub>2</sub>e/kg

**A4 transport climate impact GWP-GHG**  
0.0232 kg CO<sub>2</sub>e/kg

**A5 average waste climate impact GWP-GHG, conservative value**  
0.0368 kg CO<sub>2</sub>e/kg

### Other data

**A1-A3 building product's climate impact GWP-GHG, typical value**  
Not to be used for calculation for climate declaration  
0.227 kg CO<sub>2</sub>e/kg

**A1-A3 conservative factor**  
1.25

**A5 waste factor**  
1.12

**Technical service life**



# Different dimensions of emissions database

## Inputs, content items

- Building products
- Building services
- Transportation
- Processes
- Energy
- Building parts or installations

## Indicators

- GWP (fossil, biogenic, luluc, total)
- Potential GWP benefits
- Type and origin of materials
- Waste factor and service life
- Other environmental indicators

## Life-cycle modules

- A1 Raw material extraction and processing
- A2 Transport to the manufacturer
- A3 Manufacturing
- A4 Transport to the building site
- A5 Installation into the building
- B1 Use of application of the installed product
- B2 Maintenance
- B3 Repair
- B4 Replacement
- B5 Refurbishment
- B6 Operational energy use
- B7 Operational water use
- C1 De-construction, demolition
- C2 Transport to waste processing
- C3 Waste processing for reuse, recovery and/or recycling
- C4 Disposal
- D Benefits and loads beyond the system boundary



# GWP indicators



## Products

A1 –A3

kg CO<sub>2</sub>e /kg

## Transportation

A4

kg CO<sub>2</sub>e /kg of product  
kg CO<sub>2</sub>e /ton km

## Construction

A5

kg CO<sub>2</sub>e /kg of product  
kg CO<sub>2</sub>e /m<sup>2</sup>

## Energy

B

kg CO<sub>2</sub>e /kWh

## Product replacement

B

kg CO<sub>2</sub>e /kg

## Transportation

C2

kg CO<sub>2</sub>e /ton km

## Demolition and waste processing

C1, C3, C4

kg CO<sub>2</sub>e /m<sup>2</sup> ja /kg

+ division to fossil, biogenic and luluc



# Creation of typical data

- Selecting building products and other content items to cover a major share of all inputs used in different building parts and to represent a major share of the carbon footprint of a building.
- The GWP values and other indicators are based on publicly available information, mostly on relevant environmental product declarations.
- Validation methods should be open and same documentation method always used
- Process based on available data, industry expertise and neutral validation
  - Expert work to select and define data for each item
  - Industry experts to comment and refine the data
  - Official validation for each item to be included in database



# Maintenance of the data

- Keeping generic data up-to-date
  - Feedback and follow-up
    - Corrections to current content
    - New content
  - Systematic content updates
  - Low-carbon classification systems (i.e. concrete)
- Systematic update work
  1. gathering and assessing relevant new background data like EPD's and other product information and studies
  2. identifying outdated background data
  3. revisiting prior data and calculations, updating data and results where needed
  4. consulting relevant industry experts
  5. final validation and publishing

Type of concrete	GWP.REF	GWP.85	GWP.70	GWP.55	GWP.40
C20/25	210	180	145	115	85
C25/30	230	195	160	125	90
C30/37	255	215	180	140	100
C35/45	285	240	200	155	115
C45/55	320	270	225	175	130
C50/60	340	290	240	185	135



# TASK 2: Databases and management of data

## Project objectives

1. Common processes for the collection of typical data
2. Common approaches for the selection of life cycle scenarios of products
3. New data and principles with the focus on bio-based products and trees
4. Material data regarding existing/old buildings
5. Common understanding to ensure the interoperability of data

## Schedule

- January 2023 – end of March 2024
- Open webinar 31.10.2023
- Nordic results seminar early 2024
- Full published reports at the end of the project



# 1. Common processes for the collection of typical data

- Identifying all needs and documenting current knowledge
  - Review of European development and Nordic status
  - Identifying further issues to consider and agree upon
- Preparing a good base for Nordic discussions and conclusions
  - Common definitions and approaches to both product and process data
  - Common process for validation
- Topic based workshops
  - A series of workshops ongoing in Sweden, as a first market dialogue
  - Nordic workshops to follow
  - Finding common ground and issues where opinions differ



# Collection of typical data: Issues to be considered

- Requirements from assessment methods
- Selection of common indicators and use of indicators in different regulatory stages
- Principles for GWP biogenic and GWP luluc
- Use of conservative factors
- Possibilities to consider market data
- Definitions for typical and specific
- Approach for the definition of typical values for services
- Maintenance process
- Cycles of data renewal (for all product categories and processes)





# Effects of European development

- Lots of European level action that has links to low-carbon construction
- Product level
  - EN standards, EPD, PEF, CE marking, CPR, Acquis process, ESPR, DPP,...
  - Regulation on specific products and documentation
- Building level
  - Level(s), EN standards, taxonomy, EPBD, ...
  - Calculation methods on climate effects quite similar, but coverage and detail vary
  - “Where a national calculation tool exists”
- **Effects on generic databases**
  - More and better product level data for creating and maintaining typical data
  - EU-level development underlines the need for data on full lifecycle / all modules
  - Underlying, product level data and assessment methods will be more affected than the data in generic databases



# 2. Common approaches for the selection of life cycle scenarios of products

- Identifying all needs and documenting current knowledge
  - Review of European development and Nordic status
  - Identifying further issues to consider and agree upon
- Preparing a good base for Nordic discussions and conclusions
  - Common definitions and approaches to both product and process data
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# Life-cycle scenarios: Issues to be considered

- Comparison of approaches of setting scenarios in the Nordic countries
- Requirements from assessment methods
- Common material-type or material-group specific approaches for B, C and D modules
- Consideration of decarbonization regarding energy and/or materials
- Maintenance process, triggers for scenario update



# 3. New data and principles with the focus on bio-based products and trees

- Considerations for defining sustainable forestry
- Data for vegetation



# Considerations for defining sustainable forestry

- Identifying all needs and documenting current knowledge
  - Collecting and sharing of current research results
  - Identifying further issues to consider and agree upon
- Preparing a good base for Nordic discussions and conclusions
  - Finding right people, bringing together necessary forestry and LCA expertise
- Workshop in January 2024
  - Finding common ground and document issues where common conclusions can't be reached due to differing opinions or lack of data



# Data for vegetation

- Research and definition of new data
  - Investigated the impact of various factors on the carbon stocks and carbon sinks of tree species and woody plants and their impact on species groupings.
  - Examined the different possibilities of how tree growth dynamics and changes of carbon sink in time can be taken into account when producing individual values for database
  - Determined the typical tree life cycle scenarios covering e.g. plant nursery, planting, management and tree removal
  - Commenced calculation work for values to be entered into the emission database for construction
- 2nd user workshop in December to validate calculations
- Report, data for Finnish database and guidelines to repeat the data creation process



# 4. Material data regarding existing/old buildings

- Research and definition of new data
  - Discussion and definition of data needs and use cases – data for climate declarations and material reports for building refurbishment cases
  - Finding relevant sources for data
  - Robust classification of building types
  - Identification of representative structure types and typical materials contents
- Workshop
  - Schedule still open
- Report, data for Finnish database and guidelines to repeat the data creation process





# 5. Common understanding to ensure the interoperability of data

- Identifying all needs and documenting current knowledge
  - Interoperability of data across various tools and value chains
  - Gather database use cases and identify different stakeholders
  - Requirements for generic data so that its interoperability with relevant services, systems and software can be ensured
- Preparing a good base for Nordic discussions and conclusions
  - Common definitions, specifications and formats
  - Use case and stakeholder listing
- Workshops
  - Schedule still open
  - Links to other tasks



# Results – outputs and reports

Reports targeting building LCA experts

- Detailed discussion
- Nordic common understanding and discussion on unresolved issues

Actual new datasets for a real-world trial and learnings

- Data for existing buildings
- Data for vegetation

Short overall report for wider audience targeting decision makers and industry experts

- Why, what and how?
- Status and usage
- Nordic approach, conclusions and recommendations

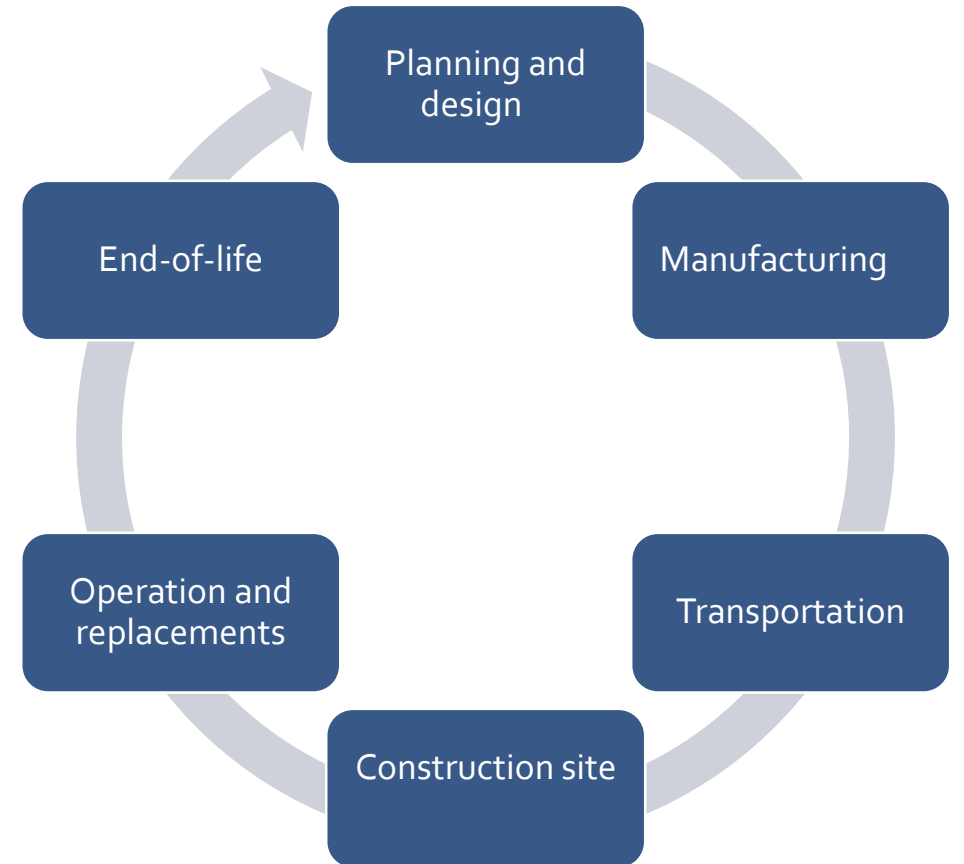


# Why

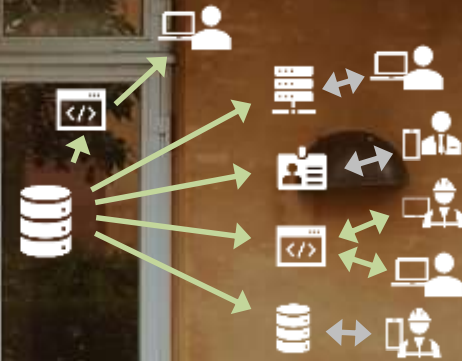
Lots of stakeholders  
Lots of action  
Lots of data sources  
Lots of tools  
Lots of calculations

We need a firm foundation

- Common assessment methods
- Common typical data



# One data, many uses



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