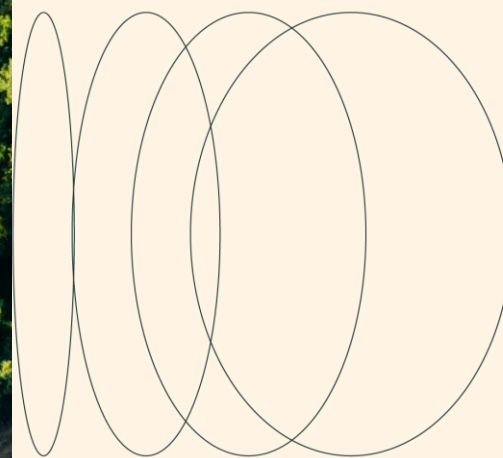


Methodology development for building life cycle assessment

Dissemination event

28.05.2026



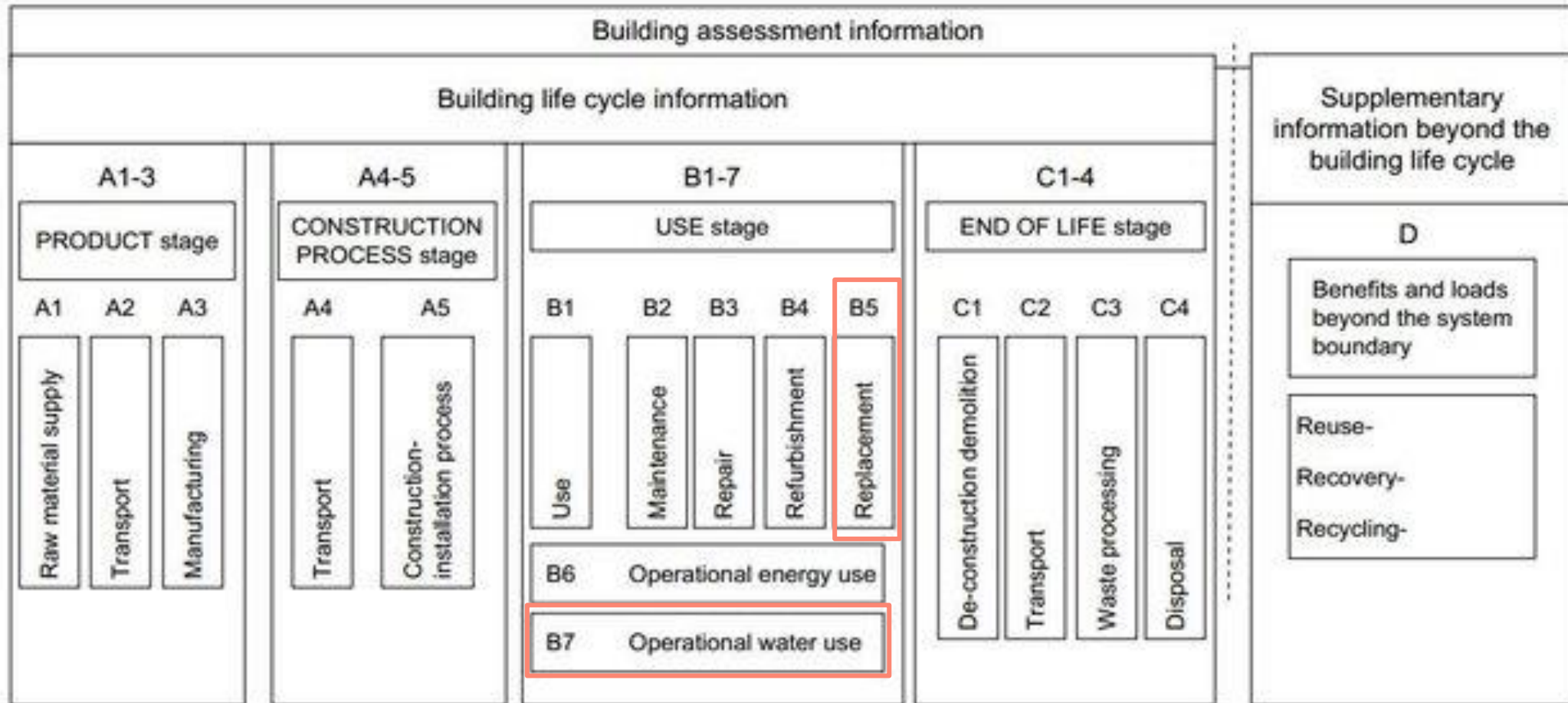


Overview of the methodology

Principles of Lithuanian method

- The objective of the planned regulation is to guide designers, engineers, developers and owners
- Based on standard EN 15978 and EPBD Delegated Act Annex (C(2025) 8723
- Is aligned with Leve(s) method and EU taxonomy framework
- Study period is 50 years
- **Both – renovated and new buildings**
- **Two stage calculation** – design and as-built phase

Included life-cycle stages



Calculation example

Etapas		
A1–A3 Product stage	$GWP_{A1-A3} = \sum m_{material} \times EF_{material}$	
	GWP _{A1–A3}	impacts of construction material production (kg CO ₂ e);
	m	mass of the material (kg);
	EF	emission factor of the material from the national emission database, the product environmental declaration or an equivalent-quality source (kg CO ₂ e/kg).

Calculation example

Etapas		
A5 Construction stage	$GWP_{A5} = GWP_{EP} \times GFA + \sum (GWP_{A1 - A3_{mat\ i}} + GWP_{A4_{mat\ i}} + GWP_{C2 - C4_{mat\ i}}) \times w\%_{mat\ i}$	
	w%	material loss factor from database. In the absence of more precise information, a default loss factor may be applied at the preliminary design stage;
	GWPEP	default impact value for construction site activities, from the national emission database
	GFA	Building gross floor area m2.

Data sources (module A)

module	Data need for the design phase	Data need for the as-built phase
A1-A3 Material Production	Bill of materials according to BIM or other method. National emission database will be used as material source	Material selection according to actually used materials/components. The methodology also defines the building components and elements to be included.

Data sources (module A)

module	Data need for the design phase	Data need for the as-built phase
A4 Transport to construction site	Generic values will be chosen from the national emission database	a) Primary choice of data (mandatory when available): data available under the Construction Products Regulation; b) Secondary choice of data (conditionally allowed): product-specific data calculated in accordance with standard EN 15804 or EN 50693 or a compatible standard; c) Tertiary choice of data: Average data for a product group in accordance with standard EN 15804 or EN 50693; d) Quaternary choice of data (fallback): generic national data and default values, only when higher-tier data is unavailable

Data sources (module A)

module	Data need for the design phase	Data need for the as-built phase
A5 Construction site emissions	Default values will be chosen from the national emission database	Data hierarchy based on Annex III of the EPBD delegated act. Project-specific data allowed, but not made mandatory on actual transportation distances. If project-based data is used, then include requirements to provide additional documentations to demonstrate this (e.g. delivery/shipping note in the results reporting section). Most viable, if such data is already collected and reported, e.g. via LEED or BREEAM certification. Otherwise, national generic data on distances from the national building emission database can be used.

Data sources (module B)

module	Data need for the design phase	Data need for the as-built phase
B1.1 Use	Default values from the national emission database	
B1.2 Carbonation	Default values from the national emission database	
B2 Maintenance	Default values from the national emission database	
B3 Repair	Default values from the national emission database	
B4 Replacement	Default values from the national emission database	

Data sources (module B)

module	Data need for the design phase	Data need for the as-built phase
B6 Operational energy	Energy performance calculation carried out in accordance with the EPBD and EPB standards during the design phase. Or default or generic values from the national building emission database, depending on data availability.	a) Data available under Ecodesign and energy labelling legislation. As according to the methodology - new buildings require the calculation of energy performance and the values from the energy performance calculations/certificate will be used. b) Generic national data and default values, only when higher-tier data is unavailable

Data sources (module C)

module	Data need for the design phase	Data need for the as-built phase
C1 Demolition	Default values from the national emission database	
C2 Transport	Default values from the national emission database	
C3 Reuse	Default values from the national emission database	
C4 Disposal	Default values from the national emission database	

Data sources (module D)

module	Data need for the design phase	Data need for the as-built phase
D1 Benefits - reuse	Default values from the national emission database	
D2 Exported energy	Default values from the national emission database	a) Data available under Ecodesign and energy labelling legislation b) Generic national data and default values, only when higher-tier data is unavailable

Buildings and building parts

- Typologies – For all building types, which needs Energy Performance Certificate
 - In future, particularly when establishing limit values, it may be appropriate to assess and analyse whether building-type-specific limit values should be introduced.
- Building parts and elements

Tier 1	Tier 2
Shell	Substructure
	Structure
	External architectural works (non-structural)
Core	Internal or under cover architectural works (non-structural)
	Building services and equipment: Water and wastewater-related systems
	Building services and equipment: Heating systems
	Building services and equipment: Dedicated cooling systems
	Building services and equipment: Ventilation systems
	Building services and equipment: Lighting systems
	Building services and equipment: Electrical services
	Building services and equipment - On-site renewable energy generation
	Life safety, fuel and movement systems
	Lifts and transport
	Waste disposal systems

Buildings and building parts

- Three level detail, according to EPBD annex 3 requirements

Tier 1	Tier 2	Tier 3
Shell	Substructure	Foundation piling
		Under piling
		Foundations
	Structure	Frames and slabs (above ground floor slabs)
		Tanks, pools and sundries
	External architectural works (non-structural)	Façade
		Roof

Indicators to express results

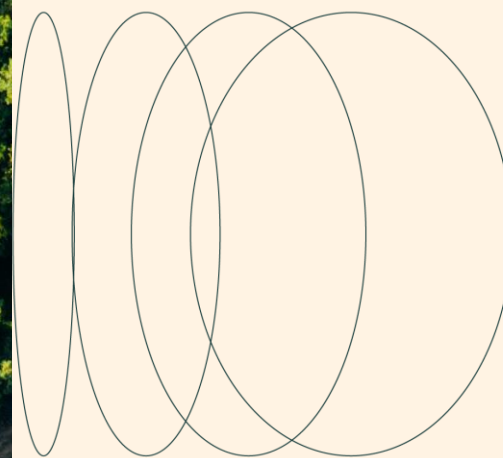
- For A1-A3 stage (material production) 4 indicators
 - GWP total, which is divided
 - GWPfossil
 - GWPbio
 - GWPluluc
- Other results only GWPtotal is needed

More detailed breakdown of GWP indicators within module A1–A3 helps identify building components with the highest impacts in order to support targeted reduction of building emissions at the source.

BIM comparability

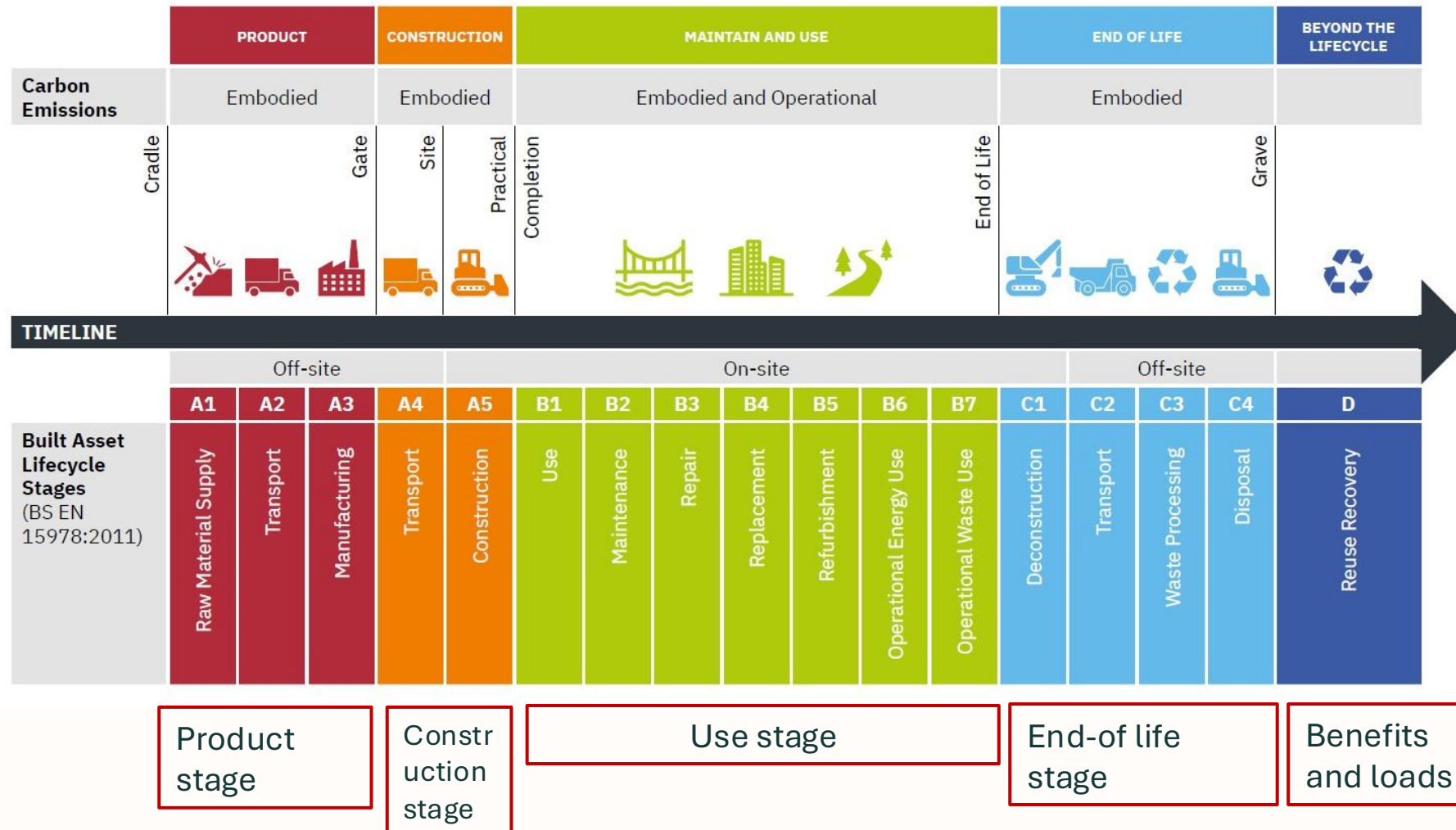
- For BIM to function, it is necessary that the names of materials correspond one-to-one with the descriptions used in the database.
- The building elements and technical equipment shall be aligned with NSIK classifiers.

Tier 1	Tier 2	Tier 3	NSIK – level 3
Shell	Substructure	Foundation piling	%BB50
		Under piling	%BB50
		Foundations	%AB30
	Structure	Frames and slabs (above ground floor slabs)	%AC30
		Tanks, pools and sundries	%CG10 or CNC
	External architectural works (non-structural)	Façade	%AD50
		Roof	



Examples of building LCA results

Building life-cycle impacts

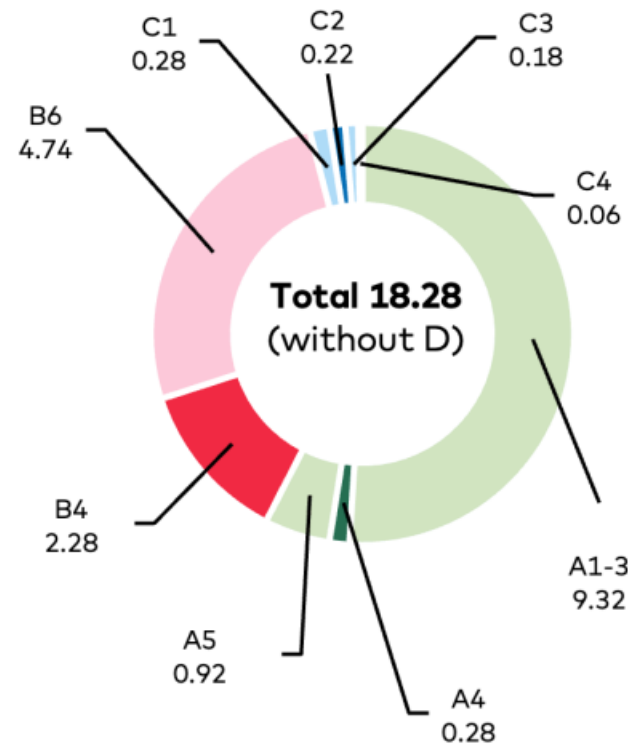


Building LCA results – office building

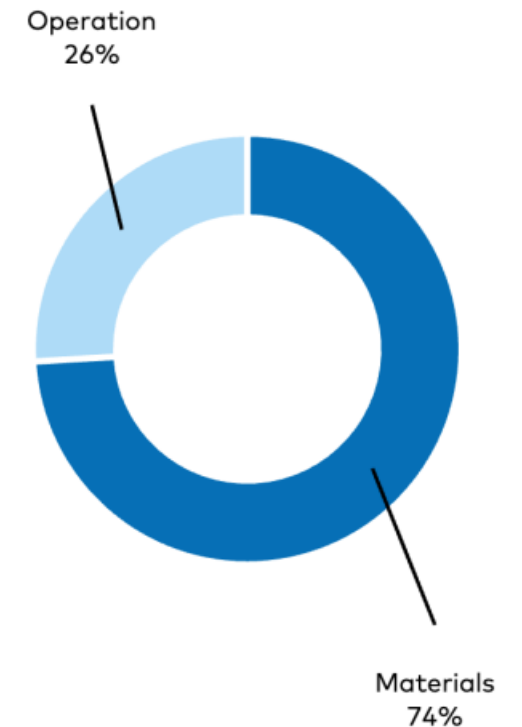
Finland	
Building use	Office
Year of completion	2024
Reference area	18,327 m ² (gross floor area)
Stories above ground	7
Basement area	900 m ²
Included LCA stages	A1-A5, B4, B6, C1-C4, D

Source: Best Practice Catalogue – Building LCA cases from the Nordic countries and Estonia, Nordic Innovation (2024).

LIFE CYCLE MODULES
[kgCO₂e/m² reference area * year]

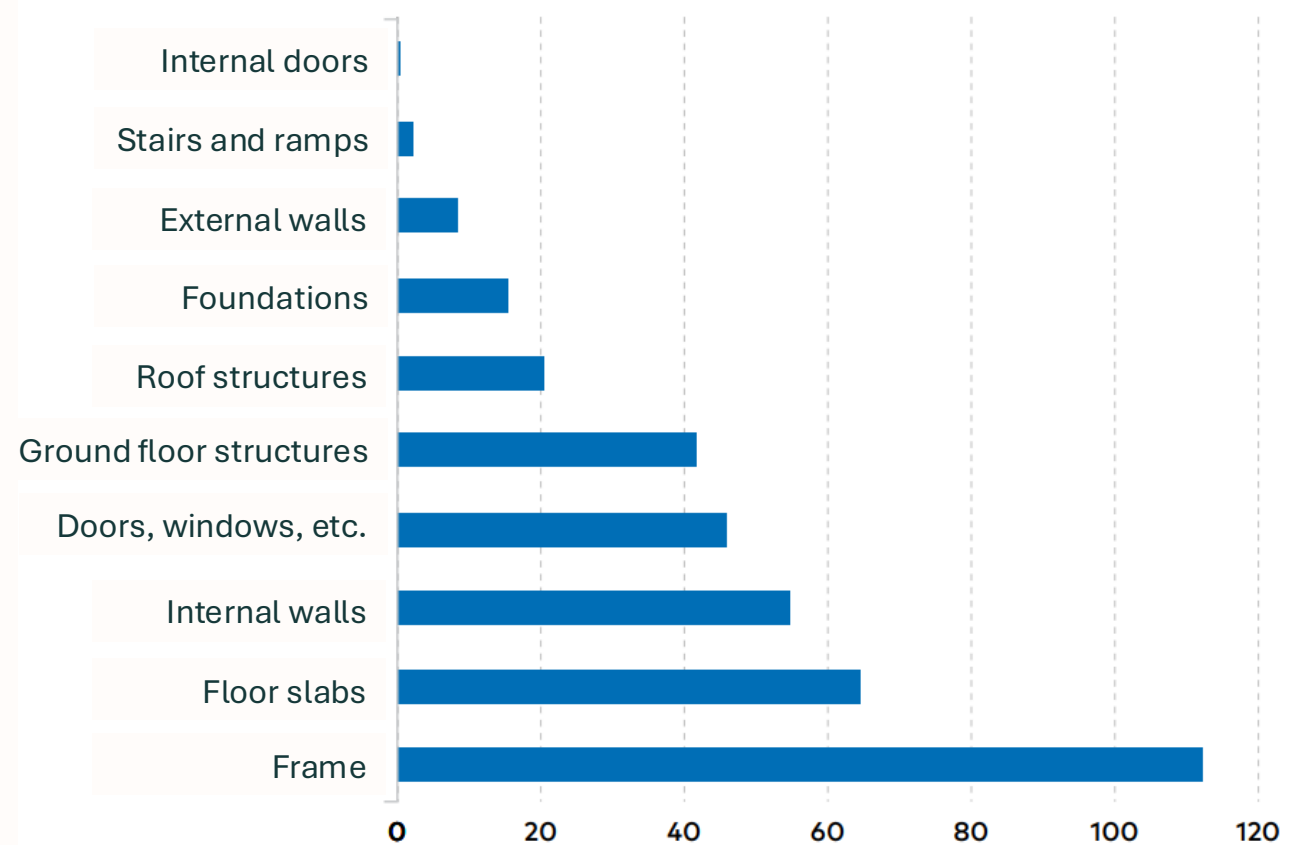


TYPE OF EMISSIONS
%



Building LCA results – office building

Finland	
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Basement area	900 m ²
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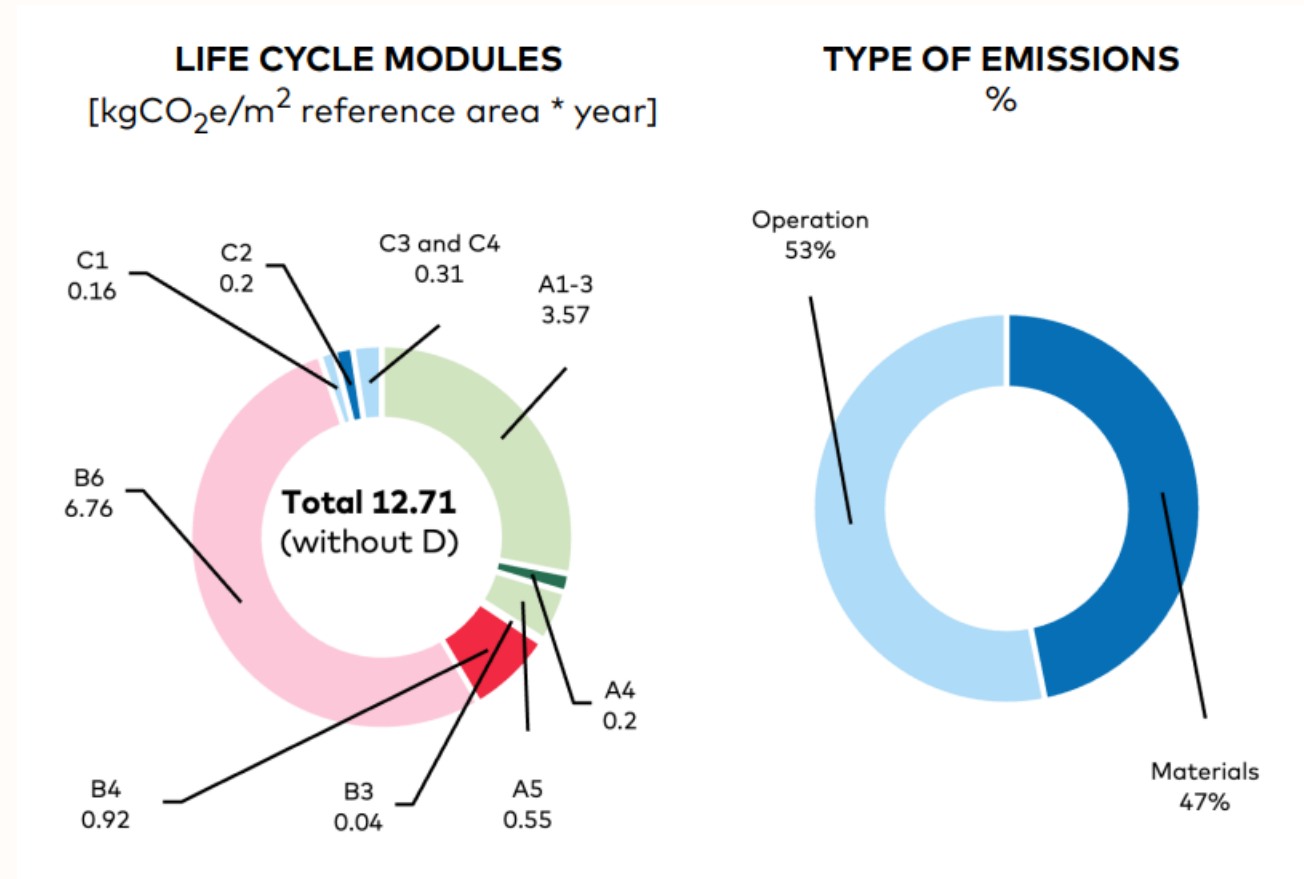


GWP / reference area [kgCO₂e/m² reference area]

Source: Best Practice Catalogue – Building LCA cases from the Nordic countries and Estonia, Nordic Innovation (2024).

Building LCA results – apartment building

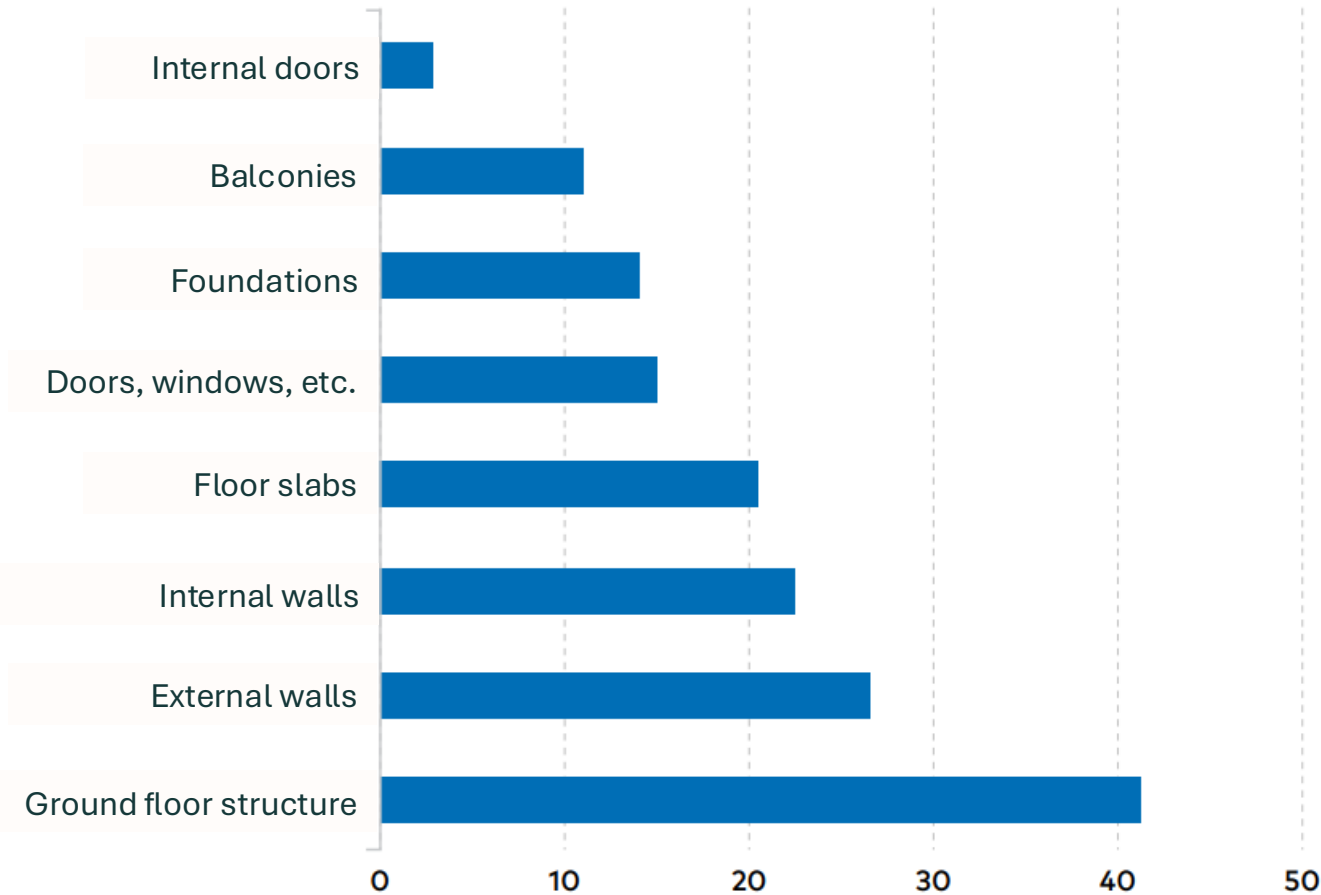
Finland	
Building use	Apartment
Year of completion	2021
Reference area	1,490 m ² (heated floor area)
Stories above ground	4
Basement area	1st floor
Included LCA stages	A1-A5, B4-B5, B6, C2-C4, D



Source: Best Practice Catalogue – Building LCA cases from the Nordic countries and Estonia, Nordic Innovation (2024).

Building LCA results – apartment building

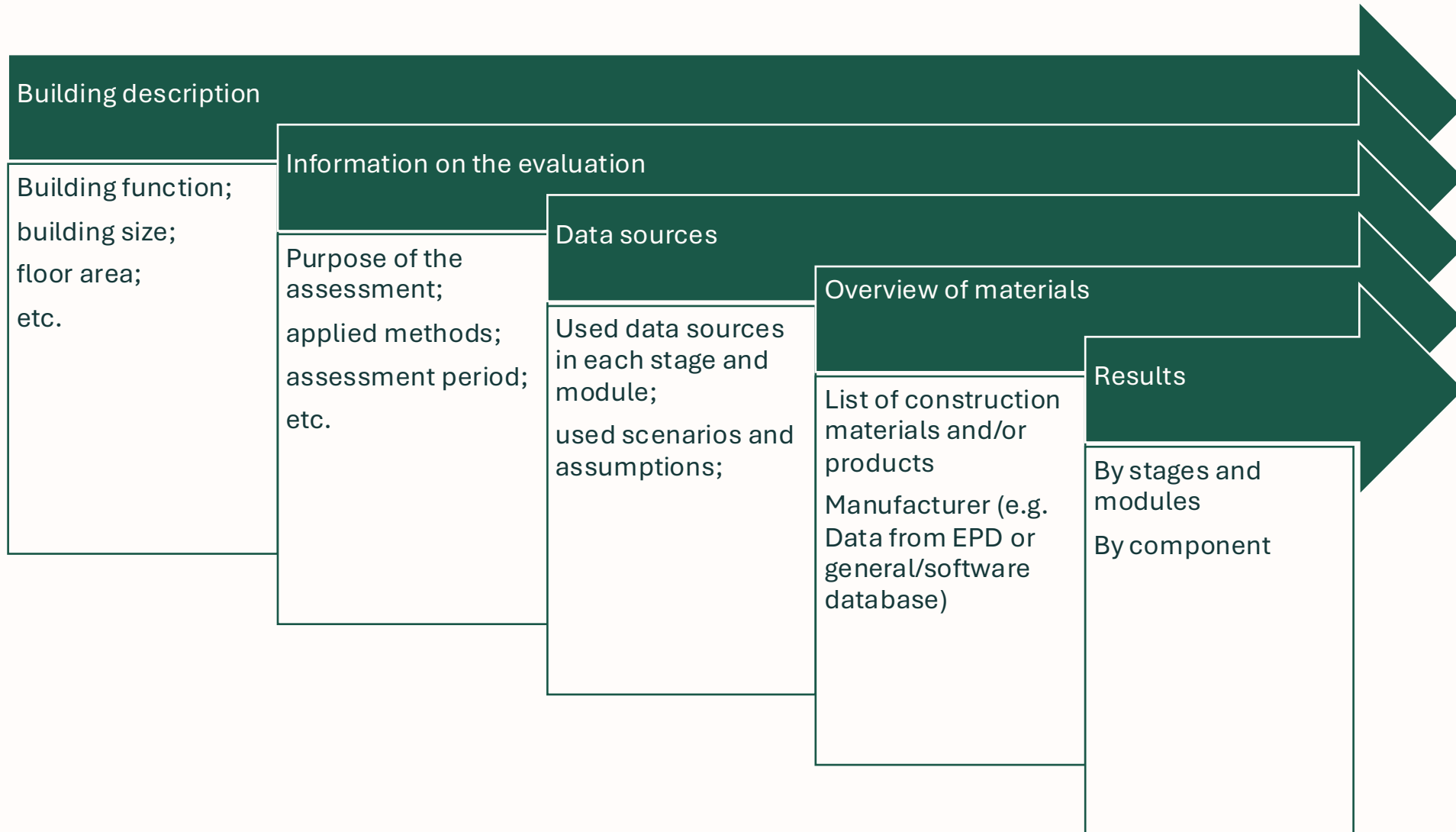
Finland	
Building use	Apartment
Year of completion	2021
Reference area	1,490 m ² (heated floor area)
Stories above ground	4
Basement area	1st floor
Included LCA stages	A1-A5, B4-B5, B6, C2-C4, D



Source: Best Practice Catalogue – Building LCA cases from the Nordic countries and Estonia, Nordic Innovation (2024).

GWP / reference area [kgCO₂e/m² reference area]

Report content



Reporting – results by components

Building components		Results	
Tier 1	Tier 2	t CO ₂ e	kg CO ₂ e/(m ² *a)
Shell	Substructure		
	Structure (Load-bearing structures)		
	External architectural works (non-structural) (e.g. External walls and façades, roof)		
Core	Internal or under cover architectural works (non-structural) (internal walls and doors)		
	Building services and equipment: Water and wastewater-related systems		
	Building services and equipment: Heating systems		
	Building services and equipment: Dedicated cooling systems		
	Building services and equipment: Ventilation systems		
	Building services and equipment: Electrical services		
	Building services and equipment: On-site renewable energy generation		
	Life safety, fuel and movement systems		
	Lifts and transport		
			

Reporting – results (other countries)

Denmark	Finland	Netherlands
Results by modules	Results by modules	Results by modules
Results by components	Results by components	Results by components
Energy use summary	Energy use summary	Results by material
Material quantity overview	End-of-life assumptions	Material quantity overview
Highest impact analysis	Carbon handprint (optional)	Results by environmental impact by category



SUSTINERE

