Learnings from Nordic Sustainable Construction

Expanded scope and harmonisation in LCA

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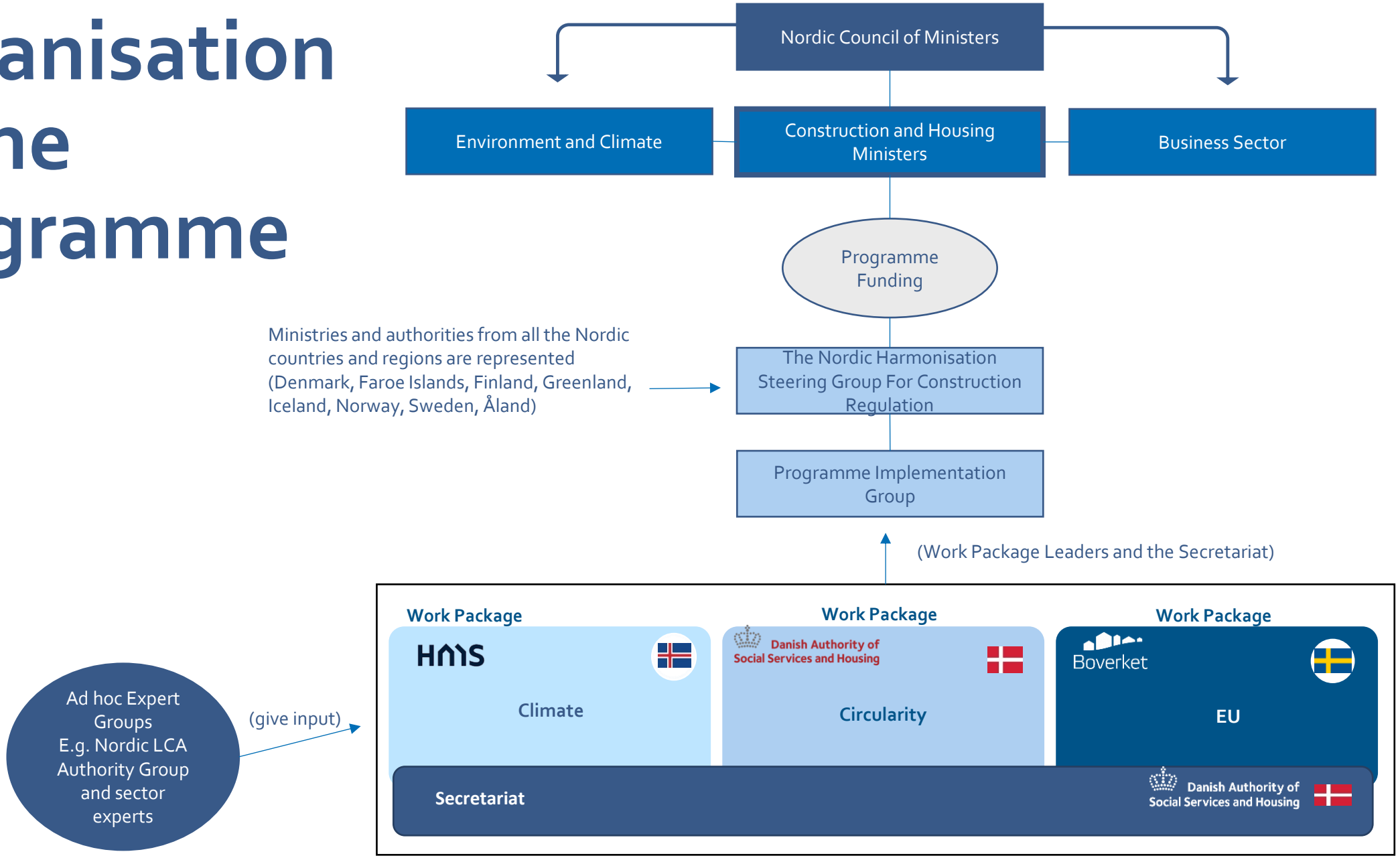
Nordic Sustainable Construction

Agenda

1. Overview of the programme
2. Harmonisation of LCA
3. Expanding the scope of LCA

Overview of the programme

Organisation of the programme



Tasks

Work Package
Climate

Task 1

LCA: Make the Implementation of Climate Regulation More Efficient

Task 1.1 Enhance consistency and transparency in LCA methodologies across the Nordics and identify opportunities for alignment

Task 1.2 Handling data gaps

Task 1.3 Streamlined BIM integration

Task 1.4 Expanded LCA scope

Task 1.5 Simplification of LCA processes

Task 1.6 Methodology for generic climate data

Task 2

Products: Foster Innovative, Low-Carbon and Nature-Based Solutions

2.1 Mapping Research and Development (R&D) Institutions and Innovations

2.2 Fostering collaboration to develop and scale green solutions

2.3 Supporting market scalability of green solutions.

Task 3

Climate Adapt Regulation: Effectively Address Climate Adaptation in Regulation and Practice

3.1 Mapping current practices and gaps

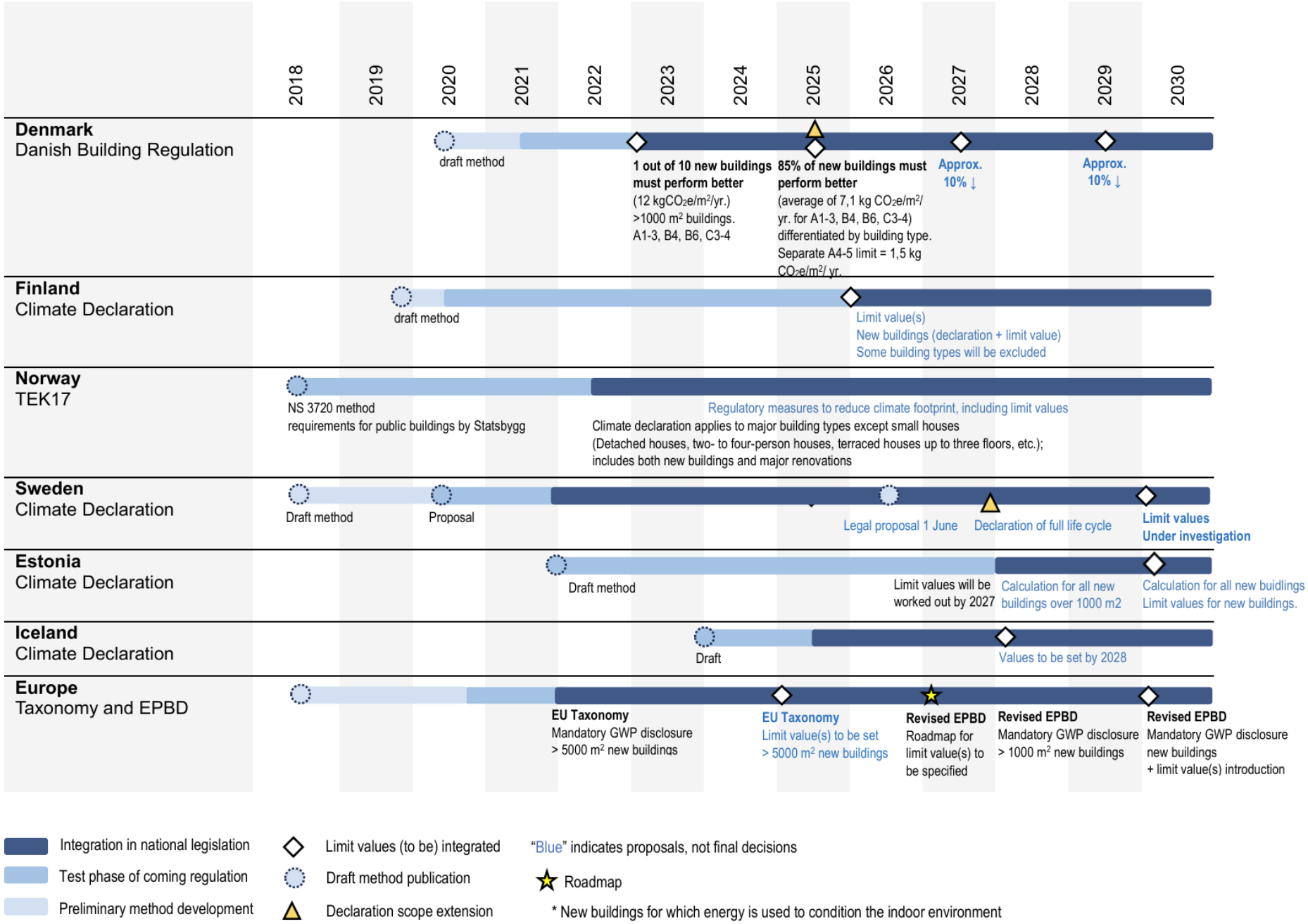
3.2 Guide for integrating adaptation and biodiversity into regulations

3.3 Identifying building-specific climate risks and systematising solutions.

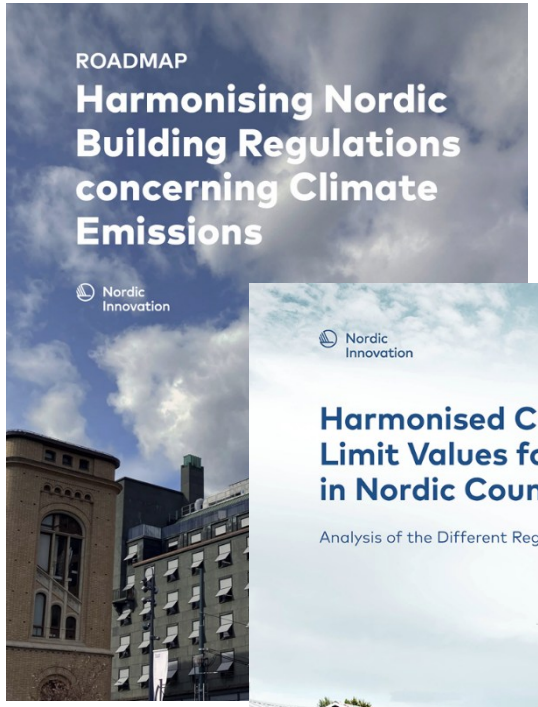
Harmonisation of LCA

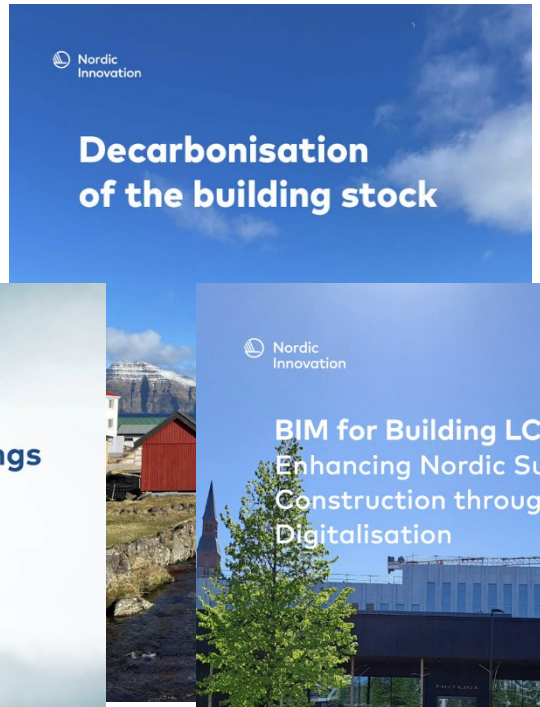
Timeline

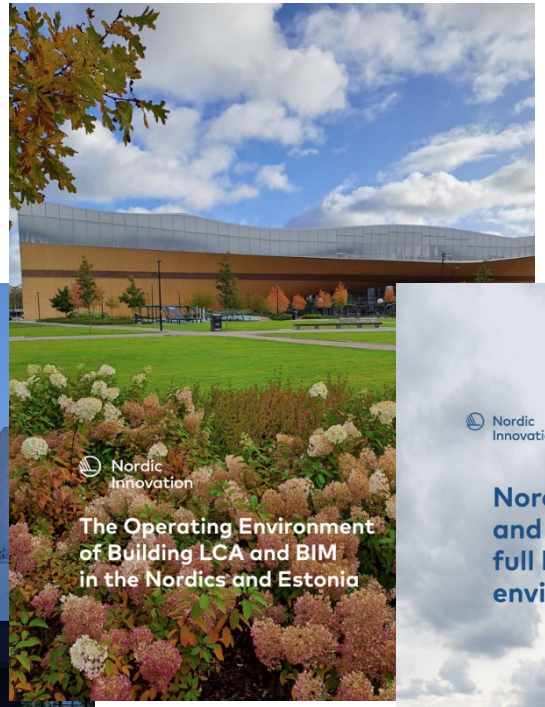
Timeline of climate declaration and limit values integration (as of March 2025).

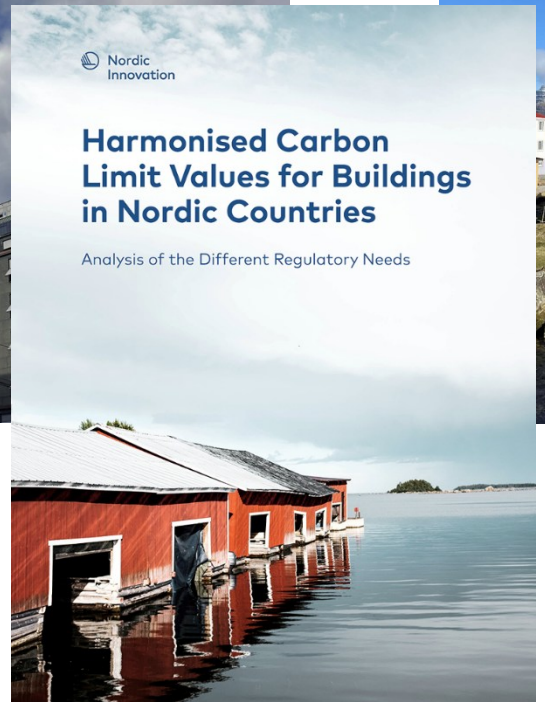


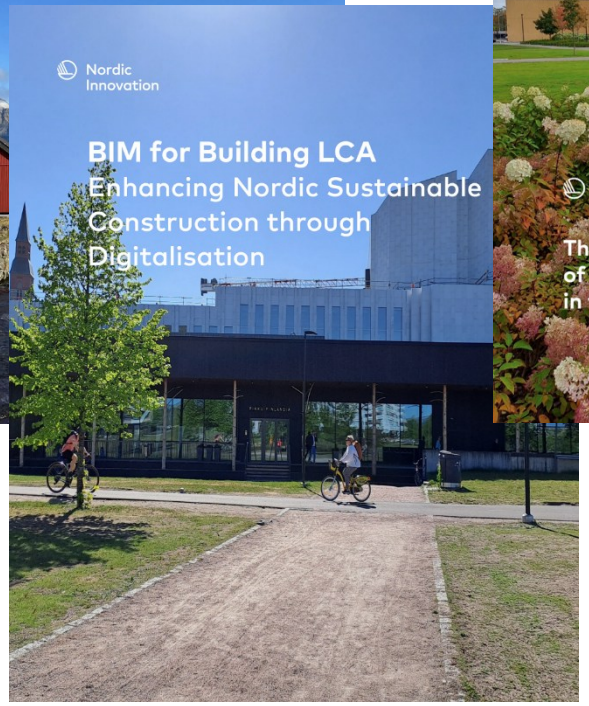
Building on previous work











Harmonisation

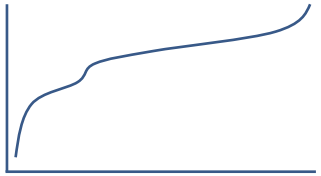
— kg CO_2-eq / m^2 / yr

GWP-20
GWP-100
GWP-500

AR4
AR5
AR6

GWP total
GWP fossil
GWP biogenic
GWP luluc
GWP-GHG / GWP-IOBC

Useful floor area
Heated floor area
Gross floor area
Net floor area
Composite w. weighting
---
m^3



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50 years

Phases included

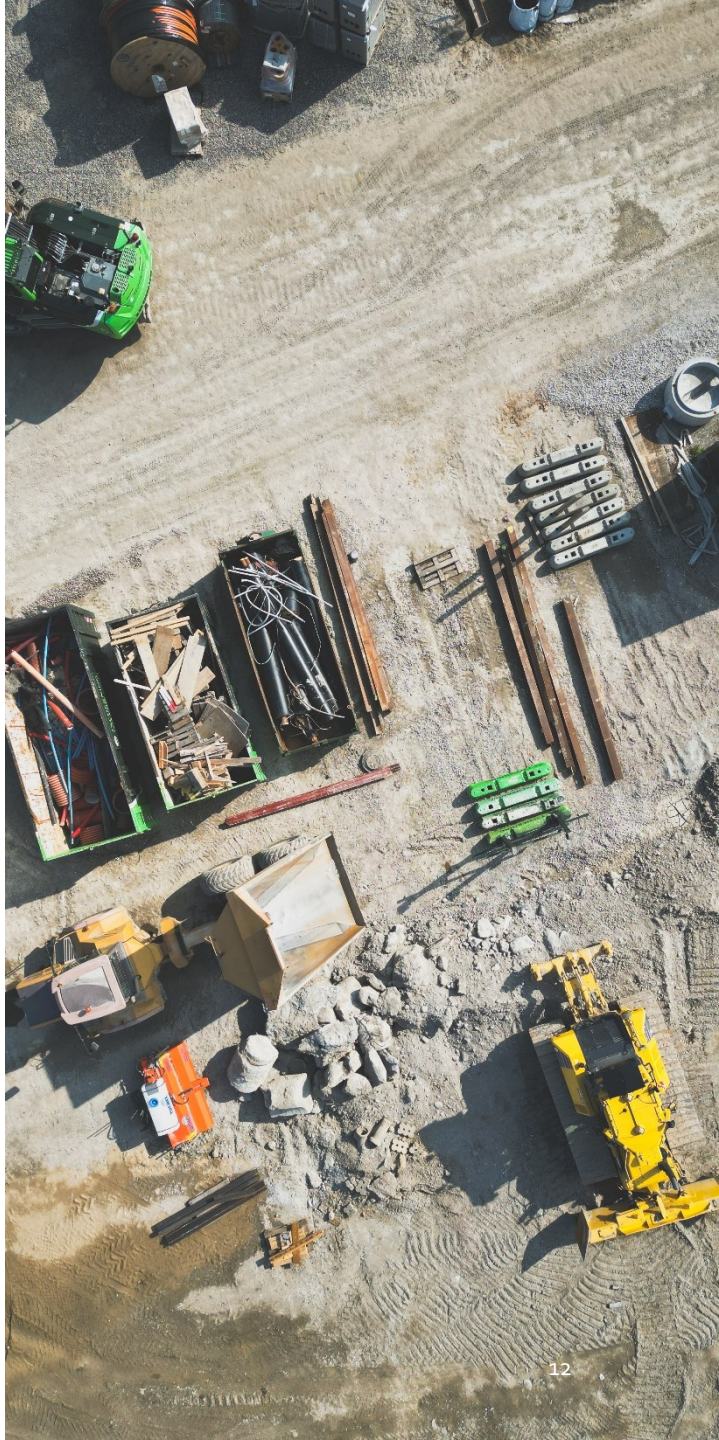
LCA phases included in national approach	A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D1	D2
Denmark	x	x	x	x	x				x		x				x	x	x	x
Sweden	x/f	x/f	x/f	x/f	x/f	f	f	f	f		f		f	f	f	f	f	f
Norway	x	x	x	x	x*		x		x									
Estonia	x	x	x	x	x				x		x		x	x	x			
Iceland	x	x	x	x	x				x		x		x	x	x	x	o	o
EU (EPBD)	x	x	x	x	x	x	x	x	x	o	x	o	x	x	x	x	x	x
Comment:	**Denmark:** D phase is not split up into D1 and D2. **Norway:** A5 is limited to emissions from waste. In our proposal for new requirements, we have suggested to include all of A5. **Iceland:** D phase is not split up into D1 and D2 **EU:** If B5 and B7 are included, they should be reported separately. **Estonia:** National methodology used for voluntary calculations. GWP-biogenic is mandatory for A1-A3 and C3, other modules are voluntary. GWP-biogenic in A1-A3 is o when the wood/timber used is not sustainably sourced.																	

Background data

Permitted background data	Boverkets Climadatabas	CO2data.fi	Gabi	EcoInvent	Ökobaudat	Undefined	Quality of data used is defined	Generic data from annex 2 table 7	Estonian material database
Denmark								x	
Sweden	x/f								
Finland		x							
Norway	x	x		x	x				
Estonia							x		x
Iceland						x			
EU (EPBD)							x		
Comment:	**Denmark:** Generic data from the Danish building regulations annex 2 table 7 or EPDs **Estonia:** Estonian material database (https://data.ghg.ee/) and national data on energy (www.kasvuhoonegaasid.ee), EPD or other product based assessments according to EVS-EN 15804. **Sweden:** Generic data for emission factors for product, emission factor for energy and fuels must come from Boverkets data base. In future default values for products and modules must come from Boverkets climate database.								

Decarbonisation scenarios

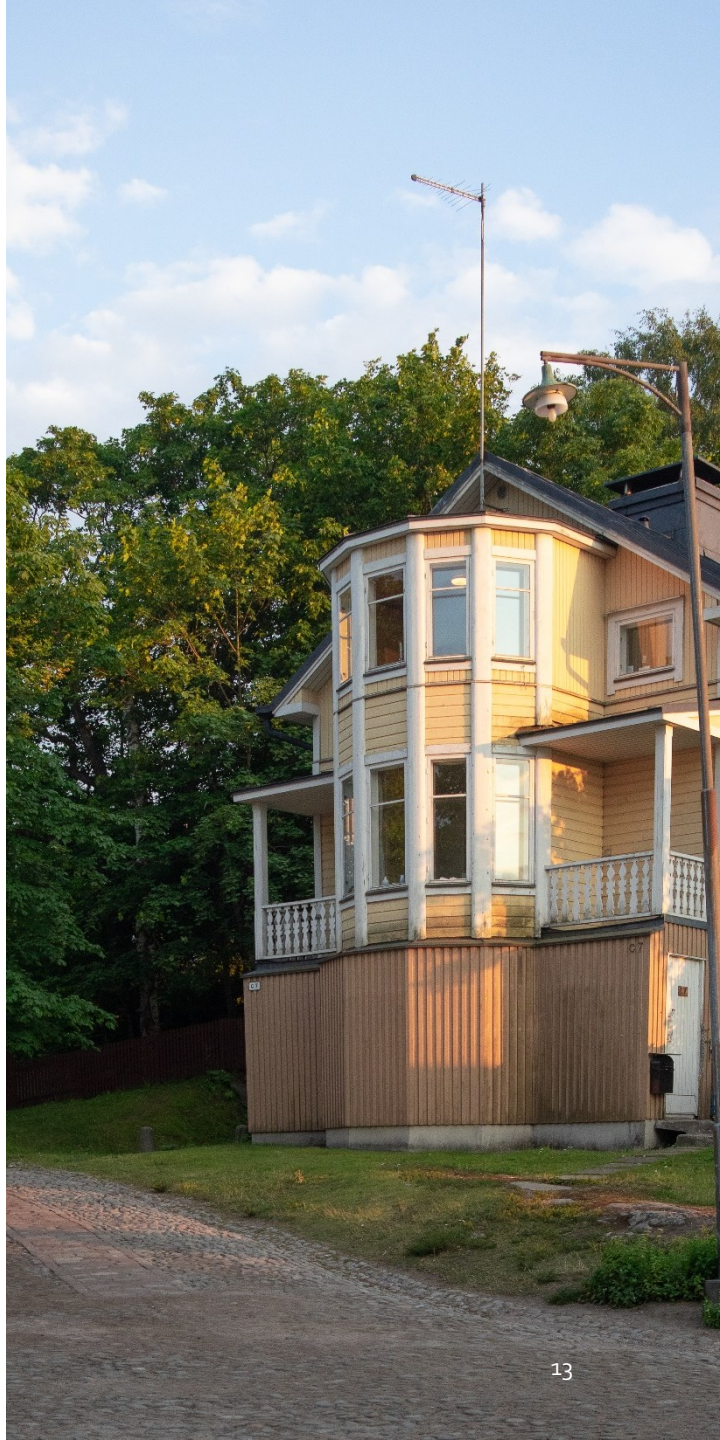
Decarbonisation scenarios B6	Country-specific	Other	Static	Undefined
Denmark	x			
Sweden	f			
Norway				x
Estonia	x			
Iceland			x	
EU (EPBD)	x	x	x	
Decarbonisation scenarios other phases	**Country-specific**	**Other**	**Static**	**Undefined**
Denmark	x			
Sweden	f			
Norway			x	
Estonia			x	
Iceland			x	
EU (EPBD)				



Defaults and reuse

National default values for selected processes	Technical systems (A_{1}-A_{3})	Transport distances (A_4)	Energy use (A_5)	Waste values (A_5)	Energy use (C_1)	Transport distances (C_2)	Waste handling shares (C_3-C_4)	Other
Denmark	o	o		o				
Sweden	f	x/f		x/f	f	f	f	f		
Norway		o	o	o				
Estonia		x	x			x	x	x	x
Iceland	x							
EU (EPBD)								

Phases where reused materials have o GWP	A_{1}-A_{3}	A_4	A_5	B_4	C_{1}-C_2	C_3-C_4
Denmark	x			x		x
Sweden	x/f					
Estonia	x	x				
Iceland	x	x	x	x	x	x
EU (EPBD)						



Processes included in phases

Included in A4-A5	Material transport (A4)	Equipment transport (A4)	Pre-construction activities (A5)	Construction activities (A5)	Ancillary materials (A5)	Waste (A5	Transport of workers (A5)	Undefined
Denmark	x	x		x	x	x		
Sweden	x/f			x/f		x/f		
Norway	x	x				x		
Estonia	x		x	x	x	x		
Iceland								x
EU (EPBD)	x			x	x	x		
Comment:	**Denmark:** Ancillary materials will only be a part of the calculation if the materials end as waste. **Iceland:** Not defined what should be included, or what is included in the default values for phases A4 and A5. Of special interest would be to understand how waste is handled in other country's regulations (e.g. factor on A1-A3 values or measured data, transport and waste handling etc.) **Norway:** Calculations shall be performed according to NS 3720:2018, which defines cut-off criteria as 5%, meaning that emissions that contribute with 95% of total emissions shall be accounted for.							

Included in B4	A1-A3	A4-A5	C1-C2	C3-C4
Denmark	x			x
Sweden	f	f		
Norway	x	x		
Estonia	x	x	x	x
Iceland	x			
EU (EPBD)	x	x	x	x
Comment	**Iceland:** Although not specifically defined in guidelines, it is acceptable to only add a factor on A1-A3 values depending on building material service lives. **Sweden:** A4 and A5 waste is included but not A5 energy.			

Biogenic carbon

Biogenic carbon accounting	Negative A module, counterbalanced in C module	Biogenic carbon is counterbalanced in A module	Biogenic carbon not accounted for	Undefined
Denmark	x			
Sweden	f		x/f	
Norway		x		
Estonia	x*			
Iceland				x
EU (EPBD)	x			
Comment:	**Iceland:** We have not yet analysed how the new CRCF (voluntary framework for certifying carbon removals) could be incorporated. **EU:** EPBD states that Member States shall address carbon removals associated with carbon storage in or on buildings. **Sweden**: Different approach for GWP-total for lifecycle-GWP and GWP-GHG for limit values. **Estonia:** there is a different approach. In A1-A3 GWP-biogenic (+1 $kgCO_2$), C3 (-1$kgCO_2$), when A1-A3 wood/timber not sustainably sourced, then A1-A3 (0 $kgCO_2$), C3 (-1$kgCO_2$).			

Building elements

Building elements included	Substructure	Structural frame	External envelope	Internal elements	Openings	HVAC systems	Water systems	Electrical systems	Automation & controls	Fire protection systems	Vertical transportation	Interior finishes	Furniture & fittings	External works
Denmark	x	x	x	x	x	x	x				x	x		
Sweden	x/f	x/f	x/f	x/f	x/f	f	f	f	f	f	f	f	f	
Norway	x*	x	x	x	x									
Estonia	x	x	x	x	x	x*		x			x			
Iceland	x	x	x	x	x	x	x	x	x	x	x	x		
EU (EPBD)	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Comment:	**Iceland:** It is planned to define level of detail, which is currently not done **Norway:** Direct foundation and piled foundation is included in GHG-calculations. n our proposal for new requirements, we have suggested to include stairs and balconies, HVAC systems, electrical systems and energy producing systems. **Estonia:** For HVAC systems or any technical systems, there is a default value per m2, excluding renewable energy systems													

Limit values and coverage

Which phases are/will be subject to limit values? Have there been discussions on weighting?	
Denmark	A1-A5, B4, B6, C3-C4. The limit values are divided into two limit values, one for A1-A3, B4, B6, C3-C4 and one for A4-A5.
Sweden	A1–A5
Norway	In our proposal for new limit values, we have suggested to include A1-A4, A5 (Waste), B2, B4.
Estonia	Not decided.
Iceland	Not decided.

Extent of construction sector covered by mandatory LCA regulations	
Denmark	All buildings except for unheated buildings under 50 m2 and the operational defense facilities.
Sweden	According to EPBD.
Norway	New construction and major renovation of apartment buildings and non-residential buildings. In our proposal for new requirements, we suggest to also include residental housing bigger than 1000 m2 (BTA).
Estonia	At the moment it is not compulsory to have LCA calculations for buildings
Iceland	All new buildings are covered, except those in Extent Class 1, which includes small structures with low risk to people, limited impact if damaged, few gather and no one resides permanently (e.g. sheds, garages, small storage units, or summer houses).
EU (EPBD)	All new buildings with a useful floor area larger than 1,000 m², and all new buildings from 1 January 2030.

Expanding the scope of LCA

Focus groups

- Three semi-structured focus groups
- Expanding LCA scope to renovation projects and including additional environmental impact categories beyond GWP
- Participants from across the Nordics and Estonia
- Top specialists from academia, government, LCA tools, and industry in each group
- Transcriptions analysed using reflexive thematic analysis
- Inductive and semantic coding, grouped into themes

Preliminary results from focus groups – LCA for renovations

- Requiring LCA for renovation projects increases visibility of climate impacts
- Limit values are premature
- Scope and methodological choices greatly impact results
- Scale of projects differ
  - Which topologies of renovations should be regulated
  - Align with regulatory trigger points
- Balance methodological rigor with operational feasibility
  - Could discourage renovation or create unneccessary administrative burden
  - Ensure the goal of the regulation is being met

Preliminary results from focus groups – additional impact categories

- Regulating circularity and biodiversity important
- Expanding beyond GWP introduces higher uncertainty
  - Lower data maturity for other indicators
- Risk of overloading LCA as a tool
  - End point indicators less transparent and more complex
  - Other policy tools likely better suited
- Local biodiversity and land-use impacts poorly aligned with building-level LCA
- Circularity depends on future scenarios
  - Speculative and uncertain

Next steps

- Methodological overview and collection of LCA averages from the Nordics
- Map data gaps and default values, define types of default values
- Analyse EU delegated regulations that solve data gap challenges
- Summary of methodology behind Nordic climate data creation and maintenance
- Report on feasibility of expanding the scope of LCA regulations
- Report and guidelines on BIM intigration and simplification of LCA processes

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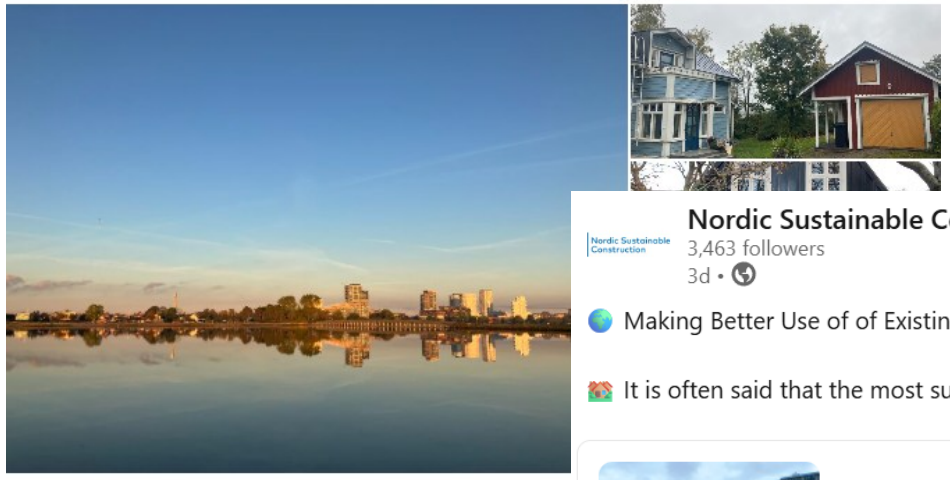

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Nordic Climate Forum for Construction 2025

28 OCTOBER

Events

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