Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

GREEN
BUILDING
COUNCIL
FINLAND

Aalto University

Programme

10:00 Official opening of the forum

Key Note Presentation by Principal Responsible Investment Specialist of the Bank of Finland, Anna Hyrske

Opening words by the Finnish Minister of Climate and Environment, Kai Mykkänen

10:40 Session 1: Policies for low carbon construction

Climate Impact of Construction: EU policy overview & Q&A by Policy Officer in DG GROW, EU Commission, Philippe Moseley

Whole Life Carbon Regulation in Finland and Nordic Collaboration by the Finnish Ministry of the Environment, Kirsi Martinkauppi

Policy updates from Nordic countries and Estonia

Nordic Policy Overview of Whole Life Carbon Regulation by the Head of Secretariat of Nordic Sustainable Construction, Helle Redder Momsen

12:30 Lunch

13:30 Session 2: Carbon budgets for buildings

From carbon budgets to limit values by Research Associate of KU Leuven, Dr. Martin Röck

Towards climate reporting of the building stock by Senior Specialist of Sweco Denmark, Morten Walbech Ryberg

Limit values: First experiences from Denmark by Specialist from the Danish Authority of Social Services and Housing, Helle Redder Momsen

Panel Discussion: How can the built environment support carbon neutrality?

14:45 Coffee break

15:15 Session 3: The business of carbon neutral construction

Market Outlook for Denmark by Director of the Danish Construction Federation, Anders Stouge

Market Outlook for Finland by Leading Specialist of Granlund consulting, Charlotta Nyholm

Market Outlook for Iceland by Project manager of green building Council Iceland, Katarzyna Jagodzinska

16:00 Closing Words

Greetings from the City of Helsinki by Deputy Mayor, Anni Sinnemäki

Closing Words By Dr. Matti Kuittinen of Aalto University, Maria Tiainen of the Ministry of the Environment and Miisa Tähkänen of Green Building Council Finland

16:30 End of forum

Official opening of the Forum

Opening words

Kai Mykkänen

Finnish Minister of Climate and Environment

Ministry of the Environment

Key note speech

Anna Hyrske

Principal Responsible Investment Specialist

Bank of Finland

Session 1: Policies for low carbon construction

Greetings

Josefina Lindblom / Philippe Moseley

Senior Policy Officer

European Comission

Whole Life Carbon Regulation in Finland and Nordic Collaboration

Kirsi Martinkauppi

Director of Buildings and Constructions Unit

Ministry of the Environment

Nordic Policy Overview of Whole Life Carbon Regulation

Helle Redder Momsen

Head of Secretariat of Nordic Sustainable Construction

Danish Authority of Social Services and Housing

Policy updates from Nordic countries and Estonia:

Björn Karlsson, Iceland

Ingunn Marton; Norway

Hannamary Seli, Estonia

Kristina Einarsson, Sweden

Helle Redder Momsen, Denmark

Climate impact of construction: EU policy context

Nordic Climate Forum for Construction, 15 September 2023

Philippe MOSELEY, Policy Officer, DG GROW Construction Unit

Climate policies

Nordic Climate Forum for Construction, 15 September 2023

Slides from DG CLIMA

EU Emissions Trading System (ETS)





- **Existing ETS**
  - Increase of emissions reduction (from -43% to ~~-61~~ - 62% by 2030 comp. to 2005)
  - Remove free allowances for aviation
  - Review of the Market Stability Reserve
  - Will now include maritime transport
- **New ETS : Emissions from transport and buildings keep rising (30% of EU emissions) -**
  - For road transport and buildings, operational as of 2025
  - Emissions reduction of 43% by 2030
  - Climate Social Fund to address possible social impacts

European Commission

A Social Climate Fund for a fair transition

- The **Social Climate Fund** will

Support households, transport users, and micro-enterprises affected by the impact of the new ETS

Support investments in energy efficiency and renovation of buildings, clean heating and cooling

Provide direct income support for vulnerable households

Help finance zero- and low-emission mobility

European Commission

Proposal for Framework for the voluntary certification of carbon removals in the EU

Principles in the framework

QU.A.L.ITY criteria

- **QU**antification
- **A**dditionality
- **L**ong-term storage
- Sustainabil**-ITY**

Credible certification

- **Third-party** verification
- **Reliable** certification schemes
- **Public** registries

Tailored certification methodologies – to be developed together with expert group

PERMANENT STORAGE

CARBON FARMING

CARBON STORAGE IN LONG-LASTING PRODUCTS

European Commission

Revision of the EPBD

Nordic Climate Forum for Construction, 15 September 2023

Slides from DG ENER

European Green Deal: central role of buildings

Long term vision for buildings' contribution to 2050 targets

Contribute to **reducing GHG emissions & final energy consumption** by 2030

Climate target plan

- by 2030 the EU should reduce **buildings' GHG emissions by 60%,** their **final energy consumption by 14%** and **energy consumption for heating and cooling by 18%.**

Renovation wave

- aims at **doubling renovations by 2030** and foster **deep renovations**

European Commission

Objectives of the EPBD revision

Twofold objective

→ Contribute to **reducing buildings' GHG emissions & final energy consumption by 2030**

→ Provide a long-term vision for buildings and ensure an adequate contribution to achieving **climate neutrality in 2050**

State of play EPBD

- ✓ Council General Approach 25 October 2022
- ✓ European Parliament – plenary vote on 14 March 2023
- ✓ Trilogues have started in May 2023

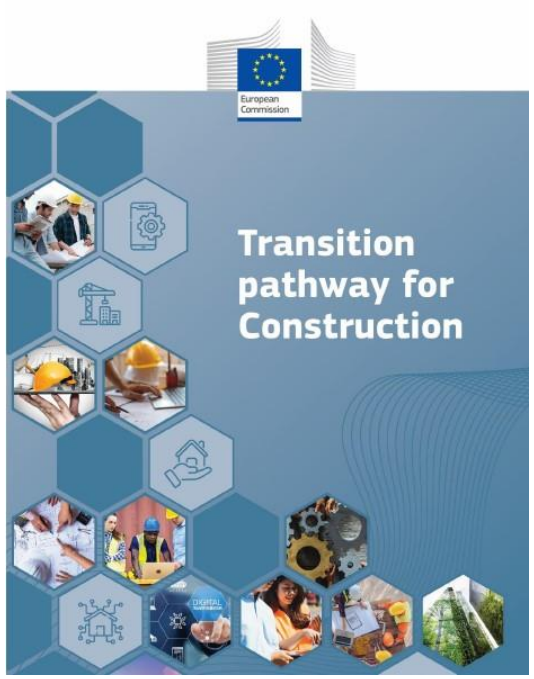
Green transition of construction: current initiatives

Nordic Climate Forum for Construction, 15 September 2023

Slides from DG GROW

Transition Pathway for construction

Transition Pathway (March 2023):
https://ec.europa.eu/docsroom/documents/53854



Call for commitments aligning with the Transition Pathway:
https://ec.europa.eu/eusurvey/runner/TransitionPathwayConstruction_Commitments

High Level Construction Forum
17 October: session on the green transition
- Life cycle emissions of construction,
- EU Taxonomy environment Delegated Act,
- CDW Management Protocol.

Sign up for HLCF mailing list:
https://ec.europa.eu/eusurvey/runner/d5823bdd-cd51-798d-ad6d-3807202c4903

European Commission

Construction Products Regulation revision

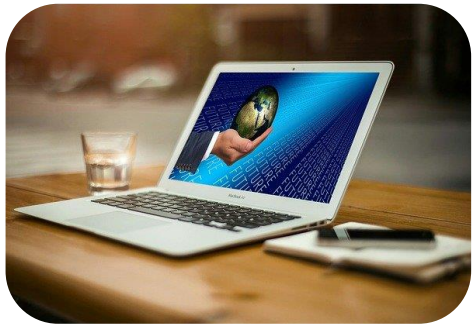
•Unlock growth and jobs potential

Improve competitiveness

Greening of manufacturing

Sustainable built environment

Circular economy



Digitalisation of construction

CPR review:
https://europa.eu/!Dy69pr

European Commission

Preparatory Action: Analysis of GHG emissions and removals of EU buildings and construction (2023-2025)

Overall objective: comprehensive overview of the effect on whole life cycle GHG emissions and carbon removals of the EU buildings sector and the associated construction, renovation and demolition activity.

Specific Objectives:

- 1. Model the whole life cycle impact of the EU building stock (and at national level) and the associated construction, renovation and demolition activity on GHG emissions and carbon removals.
- 2. Assess and compare strategies (across national and EU building stocks) for whole life cycle GHG reduction and carbon removal, within the perspective of reaching climate neutrality and resilience in 2050 without harming significantly other environmental goals.
- 3. Improve availabilty of data to analyse whole life cycle GHG reduction and carbon removals including a methodology for future monitoring.

Website https://c.ramboll.com/life-cycle-emissions-of-eu-building-and-construction

European Commission

Study ‘Measuring the application of circular approaches’

Study aimed to identify to what extent companies in the construction ecosystem are applying circular approaches in practice

- A majority of companies (70%) are applying circular approaches.
- Only a minority (38%) are measuring this.
- Recommended 19 indicators to measure circularity in construction
- Drivers and barriers to measurement identified.

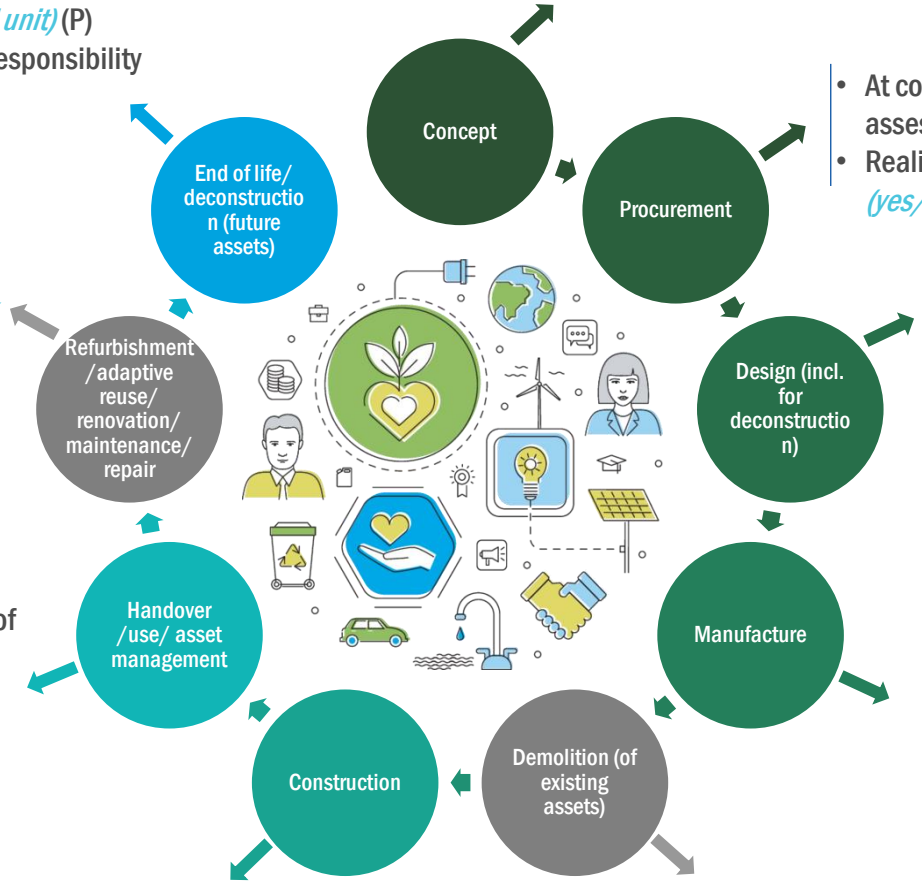
Final study report: https://europa.eu/!fJdBhh
Annexes: https://europa.eu/!qHKTfc

European Commission

Study ‘Measuring the application of circular approaches’

- Reused/recycled content *(% by mass)* (B)
- Average age at demolition *(Years)* (U)

- Residual value per unit product/material at end of life *(euros per functional unit)* (P)
- Part of an Extended Producer Responsibility system *(yes/no)* (P)



- At concept stage: comparison of asset life cycle assessment *(kgCO2 eq/ m2/yr)* (B)
- Realistic end of life scenarios developed *(yes/no)* (P)

- Designed for disassembly/deconstruction *(% reuse potential by mass)* (B)
- Average reused and recycled content in new buildings/infrastructure (circular inputs) *(% by mass)* (O)

- Construction related waste generated through refurbishment cycles *(tonnes/100K Euros (project value))* (B)
- Refurbishment/transformation rate of buildings/infrastructure portfolio *(% of buildings/infrastructure refurbished/year)* (O)

- Remanufactured/reused content *(% by mass)* (P)
- Reused, recycled and secondary content input (manufacturer level) *(% by mass)* (O)

- Effective utilisation of building (e.g. levels of occupancy) or asset; intensiveness of use *(hours of utilisation/m²)* (B)
- Predicted service life of buildings/infrastructure portfolio *(average number of years)* (O)

- Wastage rate at installation *(% by mass)* (P)
- Construction waste generated on and off site *(tonnes/100K Euros (project value)* (B)

- Hazardous waste generated at demolition *(% by mass)* (B)
- Average age at demolition *(years)* (U)

Indicator level of application:

P: Product level
B: Building/asset level
O: Organisational level
U: Urban level

The two stages in grey are not necessarily a part of the ecosystem – as they might occur or not.

European Commission

Study: Background data collection for future EU end-of-waste criteria of construction and demolition waste

- Waste Framework Directive, Art.6 (End-of-Waste)
- Commission is required to assess need for EU-wide EoW criteria.
- Study (2023-2024) aims to produce priority ranked list of waste streams for possible development of EU-wide end-of-waste and by-product criteria.

Study website: https://eu-cdw-eow-prioritylist-tauw-group.hub.arcgis.com/
Study ends Q1 2024

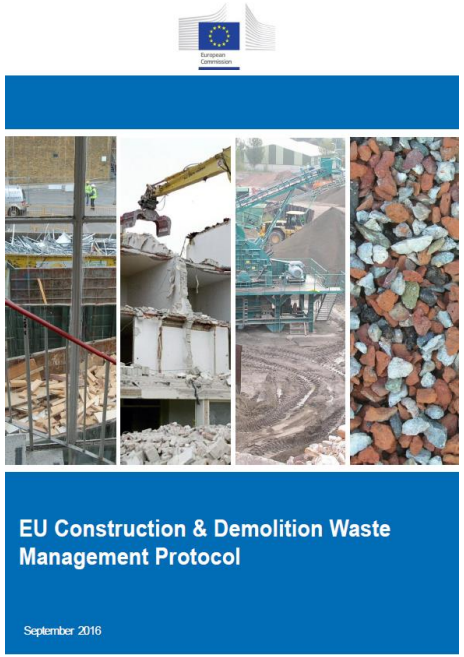
European Commission

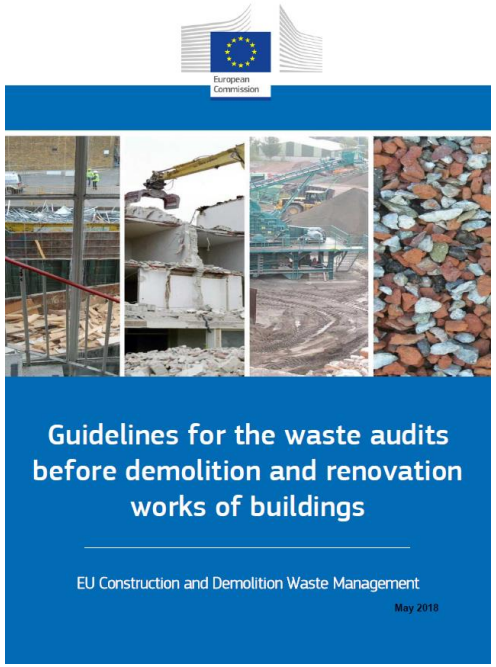
EU Construction & Demolition Waste Management Protocol

EU CDW Management Protocol (2016)
Guidelines for waste audits (2018)
Voluntary guidance documents (link), now being revised and updated

Revision now underway. It will aim to reflect recent policies (e.g. CEAP, Taxonomy, CPR), technical developments

Collaboration/co-creation with Member States and stakeholders expected during 2023-2024





European Commission

Whole Life Carbon roadmap and Level(s)

Nordic Climate Forum for Construction, 15 September 2023

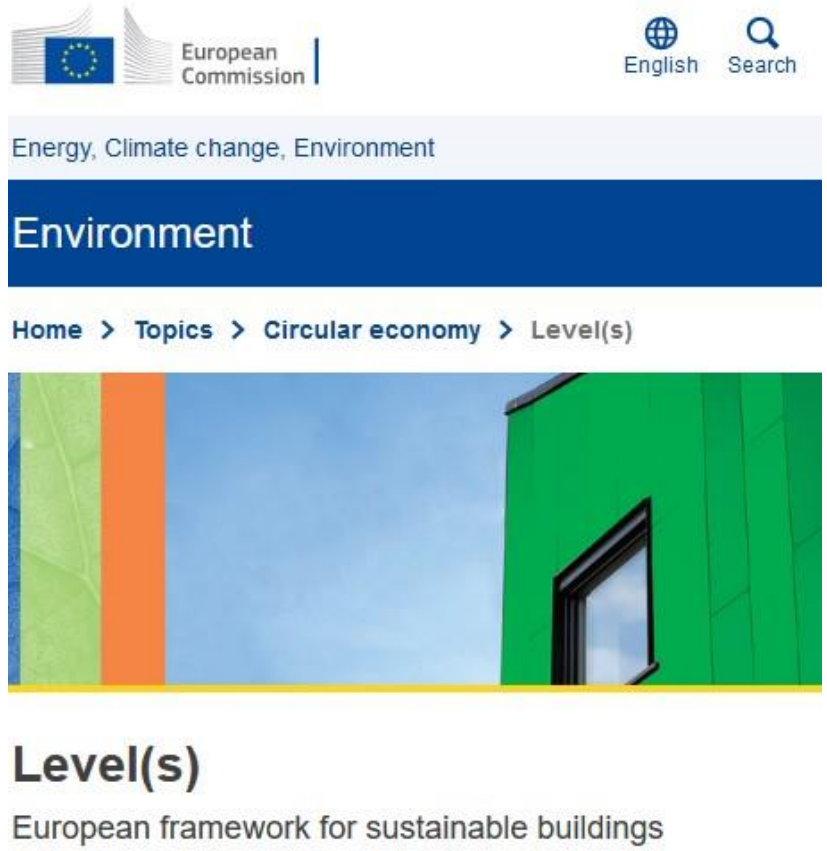
Slides from DG ENV

Roadmap development

- Finalisation of support study, setting out baseline and scenarios https://c.ramboll.com/whole-life-carbon-reduction
- Expert working group supporting contractor to validate scenarios and clarifying actions for sector transition
- Public consultation over the summer, seeking opinion on key areas of action as well as for policy guidance.
- Roadmap presented in Staff Working Document

Level(s) framework for sustainable building

- Level(s) as a basis for measuring and reporting on whole life carbon and circularity
- Level(s) appearing in legislation (e.g. EED, EU Taxonomy, EPBD)
- Importance of maintaining and updating Level(s) – contractor appointed



Thank You! Merci! Gracias! Diolch!

https://single-market-economy.ec.europa.eu/sectors/construction_en

EU Construction Ecosystem

Whole Life Carbon Regulation in Finland and Nordic Collaboration

Nordic Climate Forum 15.9.2023

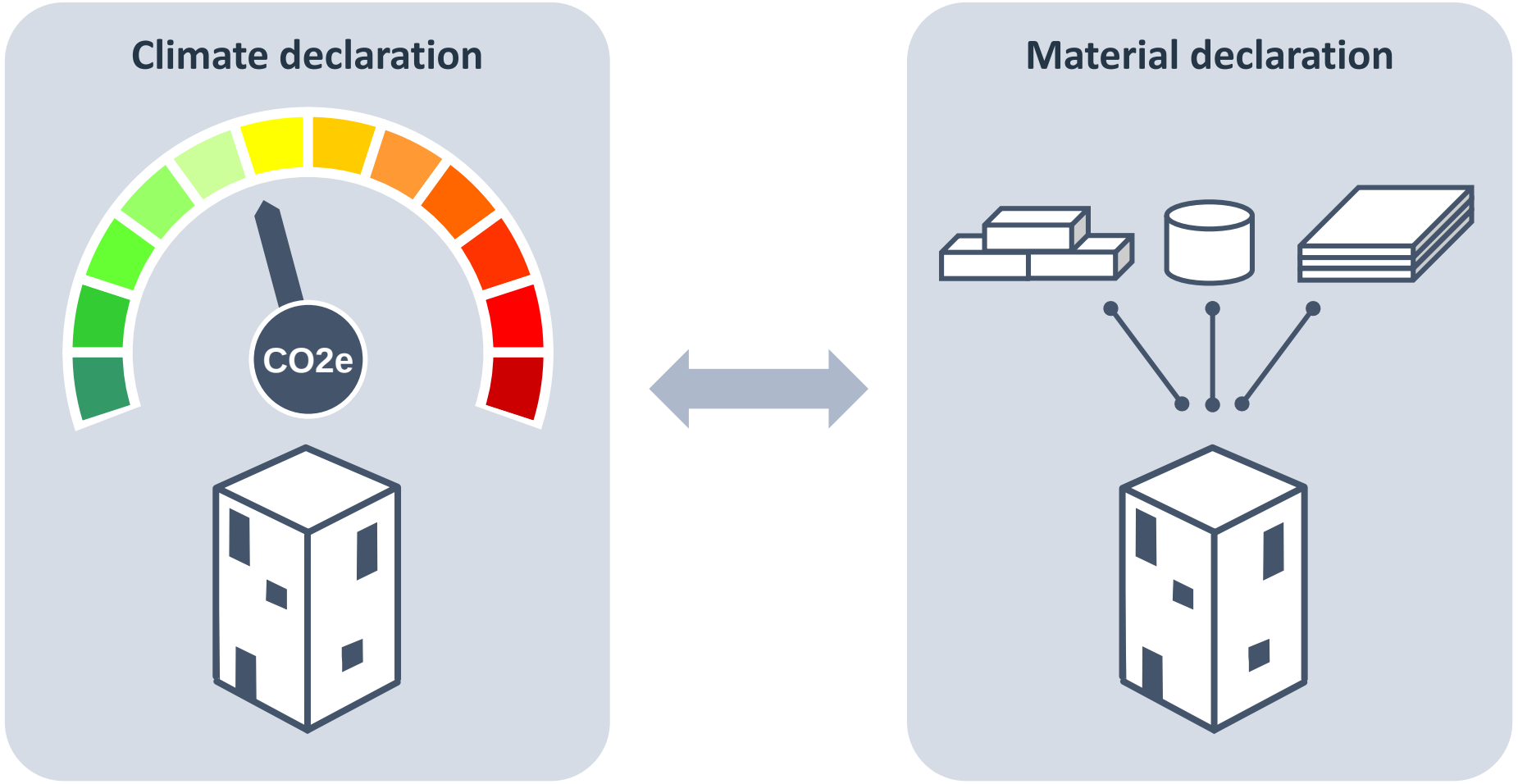
Kirsi Martinkauppi

Director, Buildings and Construction Unit

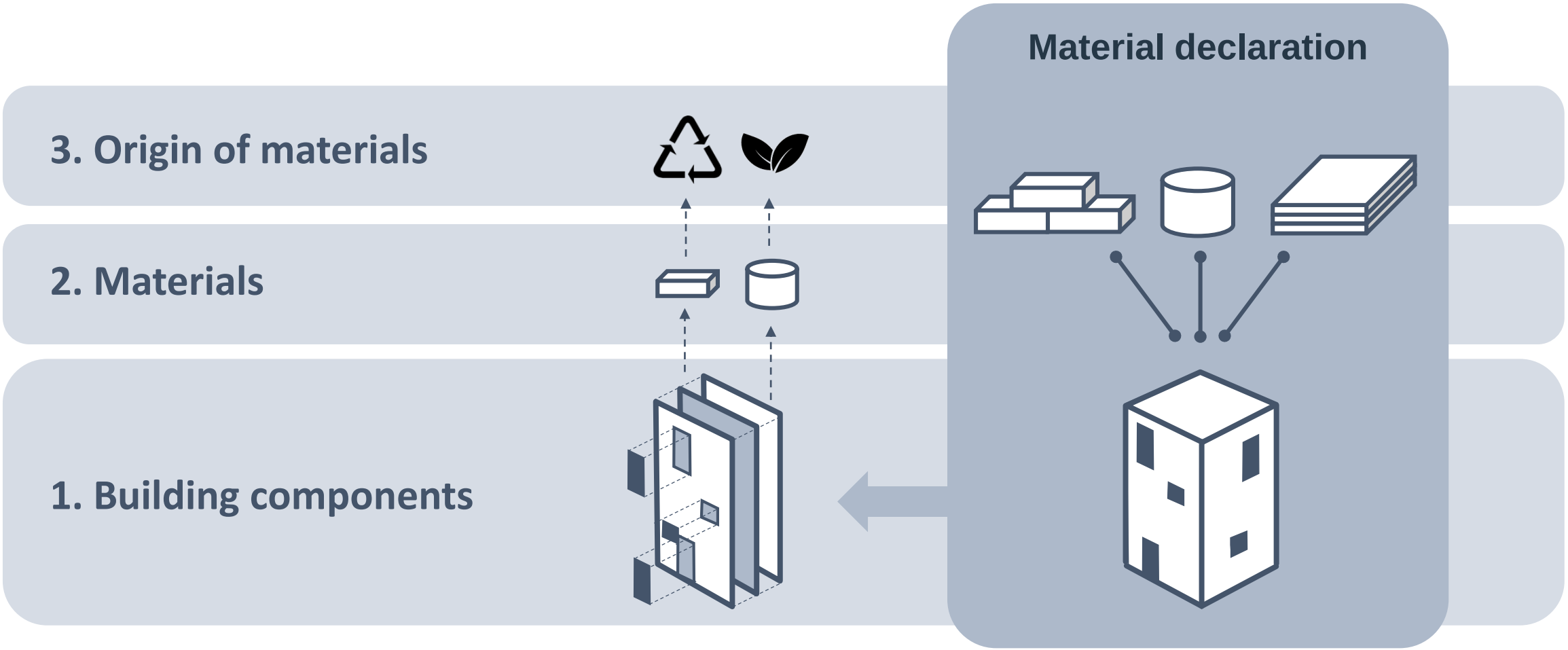
Essential changes in new Construction Act 1.1.2025

- **The fight against climate change will be introduced as part of construction legislation**
  - New essential technical requirements for the building about life cycle and low carbon
- **A simpler construction permit system and higher construction permit threshold to facilitate construction:**
  - One form of permit, construction permit
  - The permit threshold is higher than before
  - A construction permit is applied for in data model format or otherwise in a computer-readable format
- **Improving the quality of construction:**
  - Responsibility for the overall implementation to the principal contractor
- **Qualification register for the qualifications of designers and foremen.**

Planned regulation in Finland:
Climate declaration + material declaration

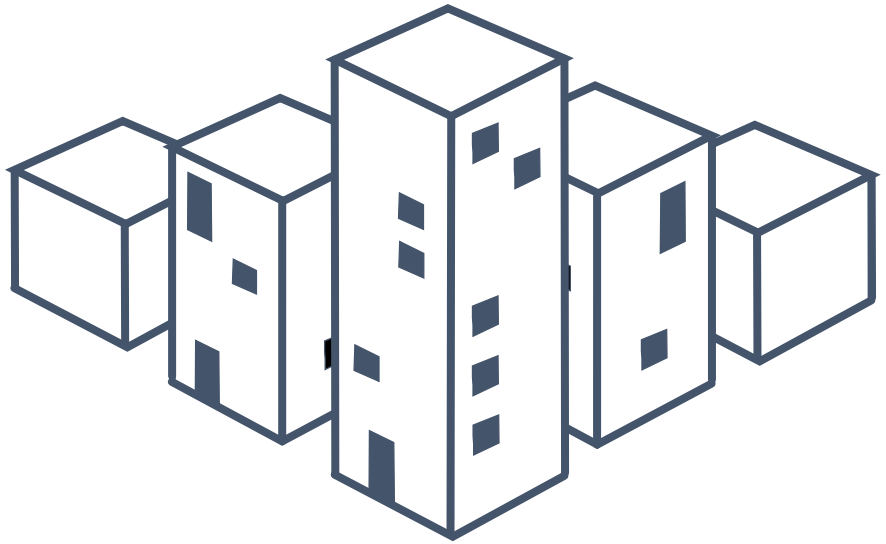


Planned regulation in Finland:
Climate declaration + material declaration



Whole life carbon limits for buildings before 2025

Material production | **Construction** | **Use and replacement** | **End-of-life**



System boundaries

Material production	Construction	Use			End-of-life
A1 Raw material supply	**A4** Transport to site	**B1** Use in building	**B2** Maintenance	**B3** Repair	**C1** Demolition
A2 Transport	**A5** Construction activities	**B4** Replacement	**B5** Refurbishment	**B6** Operational energy use	**C2** Transport
A3 Manufacturing		**B7** Operational water use	**B8** Users activities		**C3** Waste management
					C4 Final disposal

Nordic declaration on low-carbon construction and circular economy 10 October 2019

- A strong commitment to continuing actions promoting carbon neutrality also in construction
- The goal is to be a global pioneer in low-carbon construction solutions
- Development of EU legislation to facilitate the recycling of construction products

⇒ Active Nordic cooperation launched on the basis of the declaration.

⇒ Good opportunity to influence EU legislation

⇒ Joint annual Nordic Climate Forum

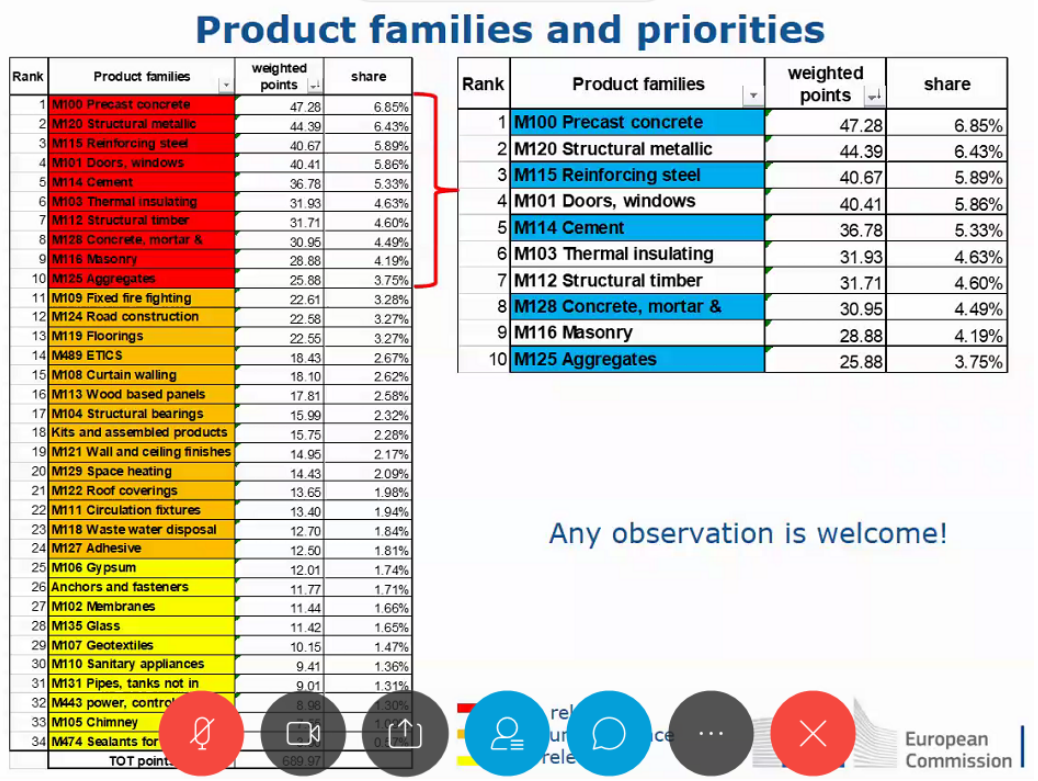
https://www.norden.org/fi/declaration/pohjoismainen-julkilausuma-vahahiilisesta-rakentamisesta-ja-rakennusalan

Current status for the revision of the Construction Products Regulation (CPR)

- Commission proposal for the new CPR on 30 March 2022.
- The regulation proposal has been discussed in the period of the Czech Republic, Sweden and Spain.
- The Council reached an overview of the content of the CPR on 30 June 2023.
- The European Parliament adopted its position on the Commission's proposal on 11 July.
- The council's working group last met on 20 July. 2 meetings are planned for October.
- Trilogies going on.
- From Finland's point of view, the position of the Council's working group is excellent:
  - The position of the CPR Acquis Group is established to take into account the legislative needs of the Member States;
  - Reuse of construction products is covered, but Member States can regulate nationally until the products are included in a harmonized product standard.
  - Environmental sustainability is included.
  - Member states have the opportunity to regulate nationally if something critical is missing from the harmonized product standard.

EU CPR revision /Acquis work – technical specifications

- **Part of CPR revision work / link to circular economy actions**
- **Harmonised technical spesifications are basis for the revised CPR**
- **Need to incorporate BWR 7 and regulatory needs of the Member States**
- **Real oppoturnity for co-op**



What will change in the EPBD

- Article 7(2):Member States shall ensure that the life-cycle Global Warming Potential (GWP) is calculated in accordance with Annex III and disclosed through the energy performance certificate of the building.
- The directive proposal includes proposals with schedules:
    - the zero-emissions of new buildings
    - the obligation to improve the energy efficiency of the existing buildings with the worst energy efficiency within a deadline,
    - the addition of solar energy systems to buildings.
- In addition, changes are proposed:
    - energy certificates,
    - obligations to install electric vehicle charging points and automation systems
    - inspections of heating and air conditioning systems.
- A national building renovation plan should be drawn up and a building renovation passport put into use.
- Energy repairs should be encouraged with funding and other support measures.
- In May 2022, a new article concerning solar energy in buildings was added to the proposal as part of the RePowerEU actions.

Current status of the EPBD

- Commission proposal on 15 December 2021 + RePowerEU
- The directive proposal has been discussed in the Council's energy working group during the presidencies of France, the Czech Republic, Sweden and Spain.
- The Council reached a general view on the content of the directive on 25 October 2022.
- On March 14, 2023, the European Parliament approved its position on the draft directive for negotiations with the Council.
- The trilogies started during the Swedish presidency on June 6, 2023 and continued during the Spanish precidency on August 31, 2023. The third trilogy is expected on October 6, 2023. In addition the President of the Council, the Parliament and the Commission hold technical level negotiations continuously, where a preliminary agreement has already been reached on several easier articles.

Nordic Policy Overview of Whole Life Carbon Regulation

Helle Redder Momsen
15 09 2023

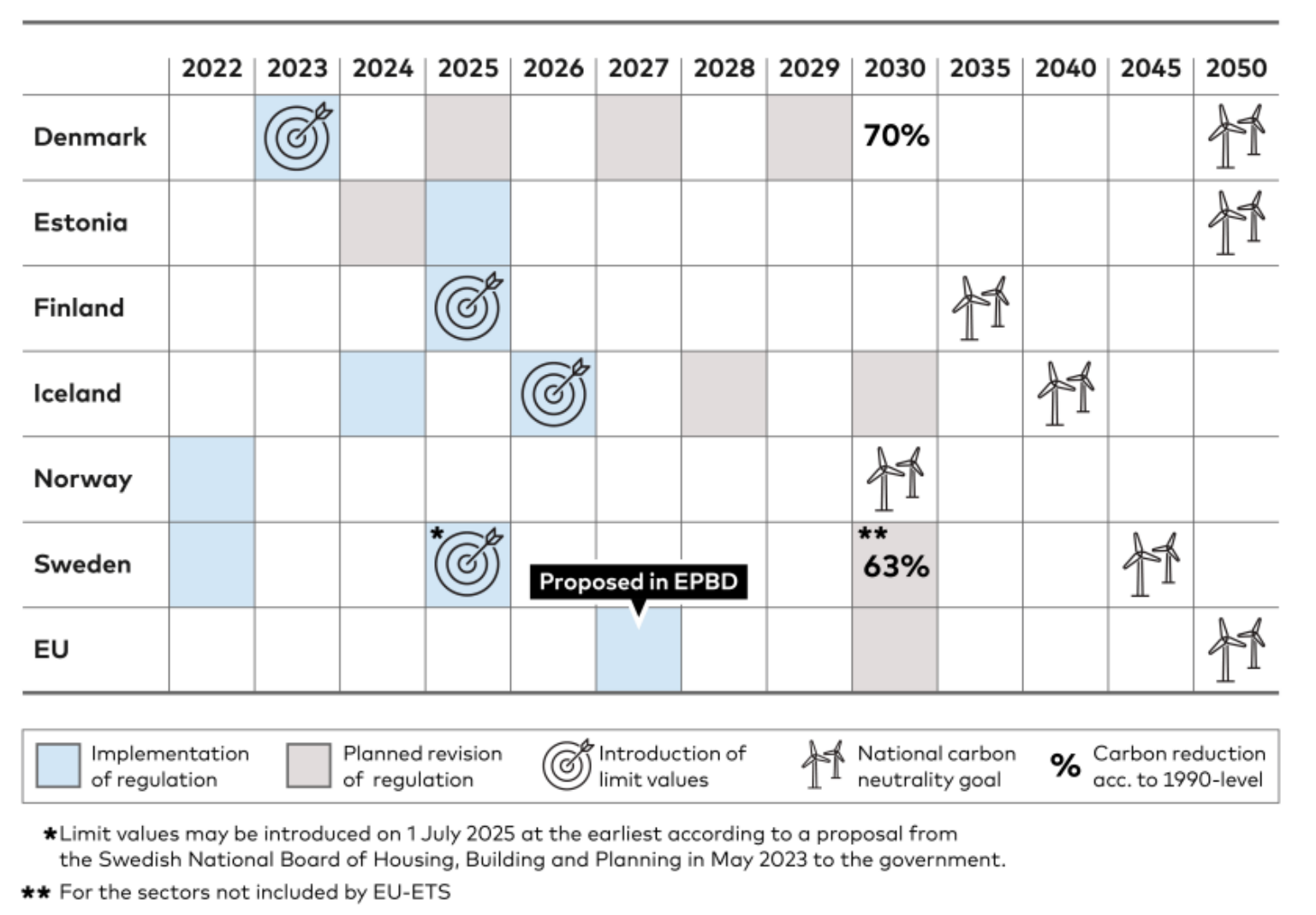
Nordic Sustainable Construction

It began with a Vision

Nordic Sustainable Construction

[Nordic Harmonisation of Life Cycle Assessment | Nordic Sustainable Construction]

Nordic LCA + limit value implementation



Harmonisation potential in Nordic countries

Priority aspects/ Low-hanging fruits

a) **Life cycle scope and building scope**
need for consistency with approaches defined at the EU level; future changes in European standards, if not considered, could be costly/confusing for practitioners

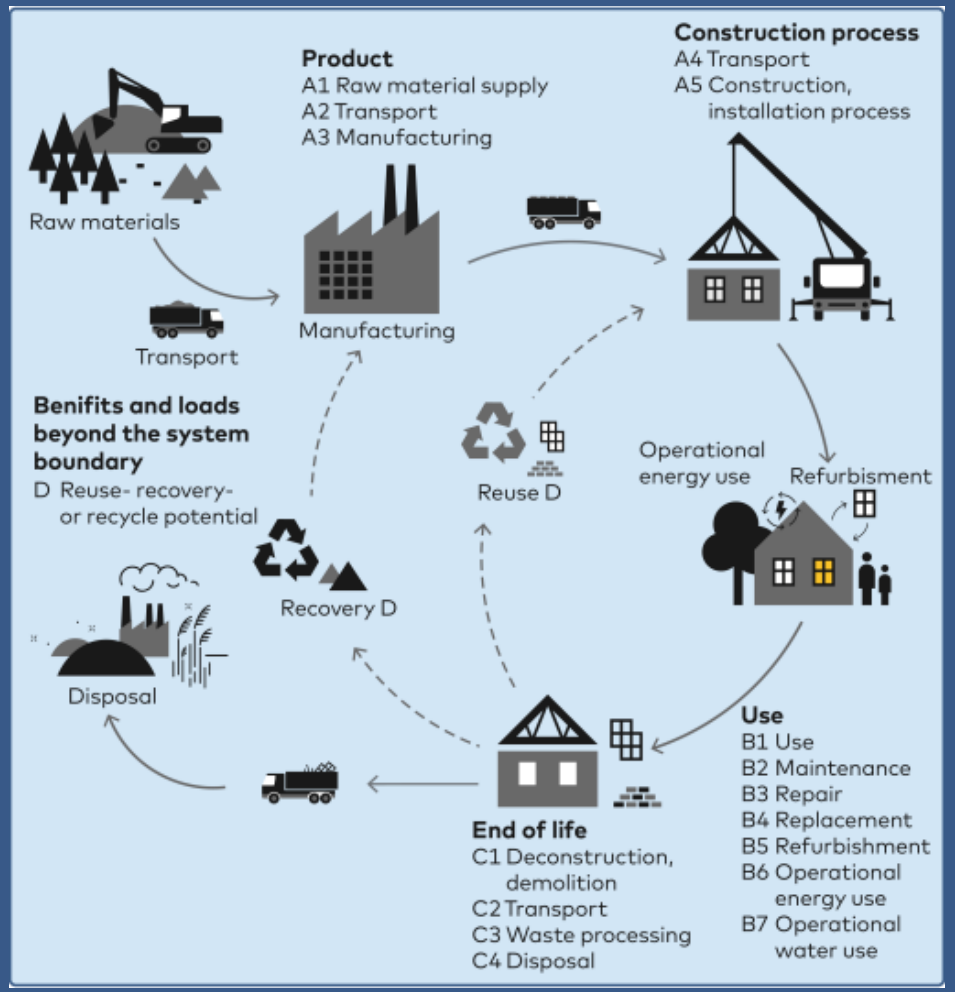
a) **Reference unit/floor area metric**
need for conversion factors from one unit to the other and/or reporting of various areas as separate items, if harmonization cannot be achieved

a) **Structure of generic environ. databases**
need for national databases with similar levels of detail

a) **Reporting formats for results**
reporting results with and without biogenic carbon, use of comparable building model classification

A buildings life cycle

according to the standard EN 15978



Nordic overview of included LCA modules

Included life cycle stages		Denmark	Estonia	Finland	Iceland	Norway	Sweden	Level(s)
A	A1-A3	√	√	√	√	√	√	√
	A4 Transport to site	√	√	√	√	√	√	√
	A5 Construction	√	√	√	√	√*	√	√
B	B1 Use in building							√
	B2 Maintenance					√	√	√
	B3 Repair							√
	B4 Replacements	√	√	√	√	√	√	√
	B5 Refurbishment							√
	B6 Energy	√	√	√	√		√	√
	B7 Water							√
C	C1 Demolition works		√	√	√		√	√
	C2 Transport		√	√	√		√	√
	C3 Waste management	√	√	√	√		√	√
	C4 Final disposal	√	√	√	√		√	√
D	Additional	√	√	√	√			√

*Only waste included

Overview of the included life-cycle modules (according to standard EN15978) in the current introduced or proposed national building LCA models and in Level(s). The darker blue indicates what is already implemented or will be implemented while the lighter blue indicates proposed scope of future regulation.

Life cycle stages and modules included according to current and upcoming regulations		Upfront embodied carbon			Use-stage embodied carbon					Operational carbon					EoL embodied carbon				Beyond the building system	
		A1-3 Product stage	A4 Transport to site	A5 Construction works	B1 Use in building	B2 Maintenance	B3 Repairs	B4 Replacements	B5 Refurbishment	B6.1 Regulated operational energy use	B6.2 Unregulated operational energy use, building -related	B6.3 Unregulated operational energy use, user-related	B7 Operational water use	B8 Users activities not covered in B6 and B7	C1 Demolition works	C2 Transport	C3 Waste management	C4 Final disposal	D1 Reuse, recovery, recycling potential	D2 Exported utilities potential
Denmark	BR18	X	included in the voluntary sustainability class		-	-	-	X	-	X	-	-	-	-	-	-	X	X	X*	X*
Estonia	Proposed method for climate declaration (2022)	X	X	X	-	-	-	X	-	X	-	-	-	-	X	X	X	X	-	-
Finland	Proposed method for climate declaration (2021)	X	X	X	D5*	-	-	X	-	X		-	-	-	X	X	X	X	D1 * D2 *	D3*
Iceland	Method under development (2023)	X	X	X	-	-	-	X	-	X	X	?	-	-	X	X	X	X	X	?
Norway	TEK17	X	X	only waste	-	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-
Sweden	Klimadeklaration 2022	X	X	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Limit values 2025 Klimadeklaration 2027 (proposal)	X	X	X	-	X	-	X	-	X	-	-	-	-	X	X	X	X	-	-
Europe	Level(s): Simplified reporting option 1	X	X	X	X	X	X	X	X	X	(X)	X	X	-	X	X	X	X	-	-
	Level(s): Simplified reporting option 2	X	X	X	X	X	X	X	X	X	(X)	X	X	-	X	X	X	X	X*	X*

Limit value scope

Limit value scope (proposal)

Climate declaration scope

Optional scope

Included building parts		Denmark	Estonia	Finland	Iceland	Norway	Sweden		Europe
		BR18	Proposed draft method for climate declaration (2021)	Climate declaration	Climate declaration proposal (under development)	TEK17	Climate declaration 2022	Limit values 2025 Climate declaration 2027 (Boverket's proposal)	LEVEL(s)
Site preparation		-	-	soil stabilization and site reinforcement elements	-	-	-	reported separately from 2027	?
Substructure	Foundations	X	X	X	X	X	X	X	X
	Piling	X	X	X	X	X	-	reported separately from 2027	?
	Basement walls	X	X	X	X	X	X	X	X
	Ground floor structure	X	X	X	X	X	X	X	X
Superstructure (external elements)	Frame (columns, beams)	X	X	X	X	X	X	X	X
	External walls, façade	X	X	X	X	X	X	X	X
	External doors, windows	X	X	X	X	X	X	X	X
	Balconies	X	X	X	X	-	X	X	X
	Roof structures	X	X	X	X	X	X	X	X
Superstructure (internal elements)	Internal walls, load- and non- load bearing	X	X	X	X	X	X	X	X
	Floor slabs	X	X	X	X	X	X	X	X
	Internal doors	X	X	X	X	X	X	X	X
	Stairs and ramps	X	X	X	X	-	X	X	X
Internal finishes	Wall and ceiling interior finishes and coverings	X	X	X	X	X	-	X	X
	Flooring materials	X	X	X	X	X	-	X	X
	Suspended ceilings	X	X	X	X	X	X	X	X
Building services	Lifts and escalators	X	X	X	X	-	-	(X)	X
	Electricity system	-	-	X	X	-	-	X	X
	HVAC system	X	X	X	X	-	-	X	X
	Renewable energy systems	X	X	X	X	-	only building integrated solar panels	All panels, in 2025	X
	Water system	X	X	X	X	-	-	X	X
	Sewage system	X	-	X	X	-	-	X	X
	Other systems (e.g. firefighting)	-	-	X	X	-	-	X	X
External works		only if included in the area definition	-	only external structures on yard	-	-	-	-	X
Furnishing	Fixed furniture	-	-	X	-	-	-	only for building types in Group 1	X
	User furniture	-	-	-	-	-	-	-	-

Limit value scope

Limit value scope (proposal)

Climate declaration scope

Country/ Region	(in place or proposed) Regulation	RSP	Floor area definition	External wall thickness	Within the building enclosure								Outside the building enclosure			
					Primary functions	Secondary functions (e.g. circulation areas, storage)	Internal walls and columns	Basement/ cellar	Stairs	Common facilities (in multi-units, incl. staircase, lift, vertical voids)	Enclosed car park connected to building	Attic	Rooftop terrace	Plantrooms on roof	Balcony	External area including car park
Denmark	Danish Building regulation (BR18) – embodied part	50	reference area	X	X	X	X	If ceiling height > 1.25 m	X	counted for all floors	included with 50%	Only if > 1.5 m high	included with 25%	X	included with 25% (for external areas only when connected to the building)	
	Danish Building regulation (BR18) – operational part	50	heated gross floor area	X	Included if heated		X	If ceiling height > 1.25 m Included with 40%	-	counted for all floors	-	Only if > 1.5 m high	-	-	-	-
Estonia	Proposed method for climate declaration (2021)	50	heated net floor area	-	Included if heated		X	Included if heated	?	?	?	?	?	?	?	?
Finland	Proposed method for climate declaration (2021)	50	heated net floor area	-	Included if heated		X	X	X	-	X	X	X	X	X	-
Norway	TEK17	50	gross floor area	X	X	X	X	Included if > 1.9m high for a width of ≥ 0.6m	-	-	X	Included if > 1.9m high for a width of ≥ 0.6m	Included in enclosed by glass	X	-	-
Sweden	Klimadeklaration 2022	N/A (50)	gross floor area	X	X	X	X	X	-	-	X	Included if > 1.9m high for a width of ≥ 0.6m	-	X	X	-
	Swedish Building regulation (BBR29) Operational energy calculation	50	heated net floor area	-	Included if heated		X	X	X	Included if heated	-	Included if heated	-	-	-	-
Europe	Level(s) – Office	50	IPMS 3 Useful floor area	-	X	X	X	If in exclusive use	-	-	-	-	Separate item	-	Separate item	-
	Level(s) – Residential	50	IPMS 3B Useful floor area	-	X	X	X	Separate item	Only on ground floor	-	Separate item	Separate item	Separate item	Separate item (unless common facility)	Separate item	-

Comparability of limit values across borders?

- **Not possible to compare them today**
- **Nordic approaches are already more aligned than other European declarations**, e.g. the Dutch and French regulations which both have unique features in their approaches
- **Differences are normal and expected**, e.g. in the environmental data used, scenarios for energy supply, transport, waste handling

Comparability of limit values across borders?

- **Some level of consistency is necessary,** if one country uses future scenarios while another uses only present values, their assessments will be incomparable

- **If scopes cannot be harmonized, to facilitate comparison, countries could provide a high level of detail,** e.g. disaggregation per life cycle stage and building part. This way, the values could be recalculated with a different scope and for the purpose of comparison with other countries

Creating regulation: Key steps to consider

1. **Build up competence**
   start with using a voluntary declaration and consider industry's feedback from that experiment; create a knowledge basis
2. **Secure stakeholder involvement**
   consult industry actors throughout the process
3. **Build up a database of generic data and standard values**
   provide generic environmental data and standard values (e.g. for building parts) to use alongside the climate declaration; make them conservative to incentivize creation and use of EPDs
4. **Improve the availability and digitalization of EPDs**
   foster digitalization efforts and machine-readability to enable efficient use of environmental data; PDF format is not user-friendly
5. **Ensure the availability of appropriate tools**
   recommend one or more appropriate assessment tools to practitioners

Creating regulation: Key steps to consider

6 Create a case basis for the limit values

gather and process detailed data from the climate declarations, and any voluntary schemes beforehand, to facilitate learning and definition of limit values; define building archetypes or a sample of cases with characteristics as representative of the recent national building stock as possible

7 Start with a limited scope

initially, focus on a limited but well-defined scope and make plans to fill in the gaps as experience increases and Europe-wide standardization progresses

8 Check whether differentiation of limit values is needed

investigate whether one limit value should be applied to all buildings or differentiations per type or size are necessary

9 Establish a suggested limit values pathway

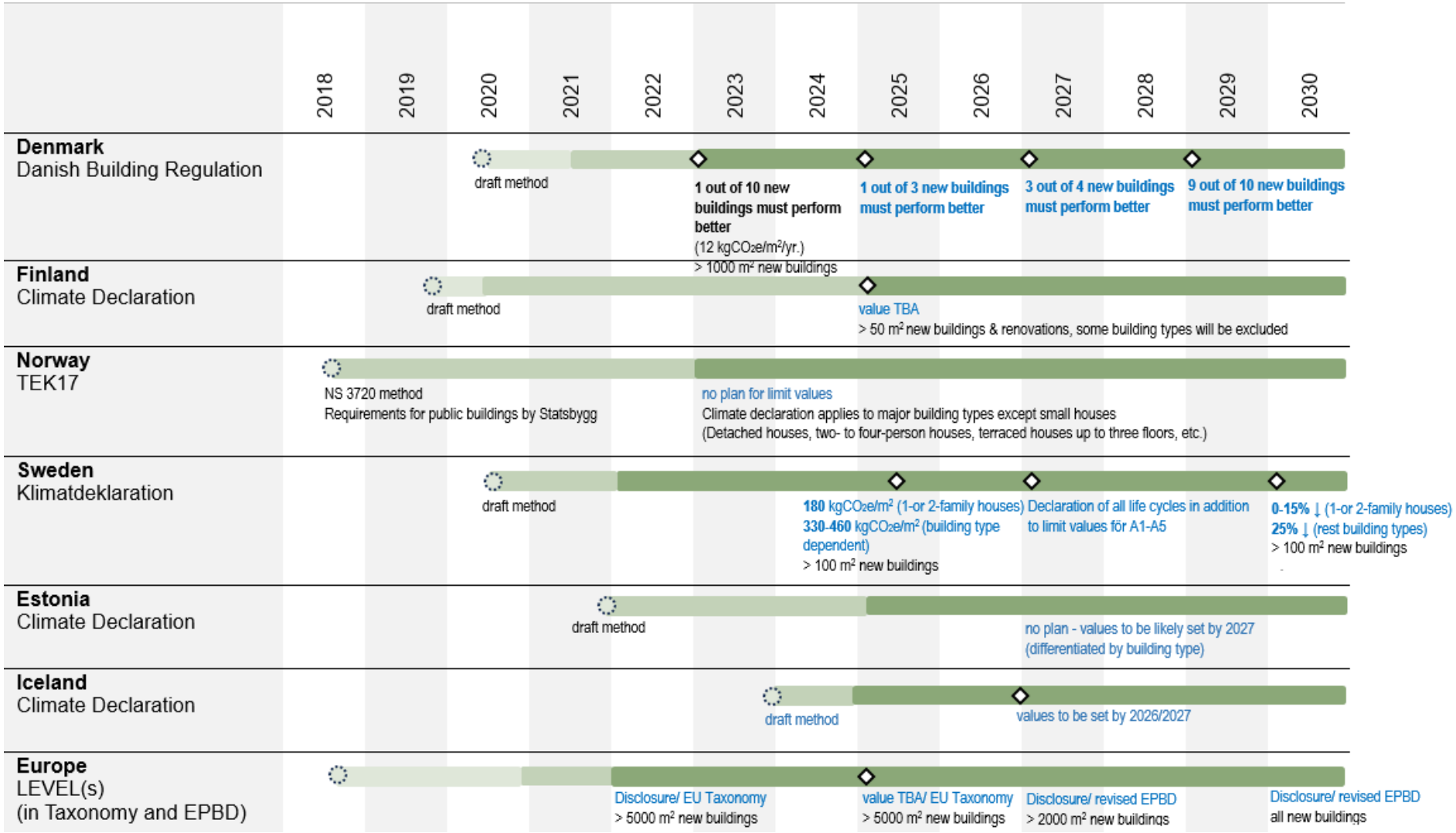
set initial limit values at a level that can be attainable by a big share of new buildings, and a suggested reduction path; set monitoring mechanisms

10 Expand the regulation to renovations

consider limit values for renovations and building types not included at first

Timeline of Climate Declaration and Limit Values integration

(September 2023)



"**Blue**" indicates proposals, not final decisions.

Thank you

Ministry of the Environment Finland

Nordic Innovation

Form Design Center

Government of Iceland
Ministry of Infrastructure

Danish Authority of Social Services and Housing

Nordic Sustainable Construction - financed by Nordic Innovation, an organisation under the Nordic Council of Ministers

Want to know more?

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Or write us an e-mail: Nordicsustainableconstruction@sbst.dk

Policy Update - Norway

INGUNN MARTON

15.09.2023

Climate Partnership

- This spring the building construction industry was invited to a dialogue on climate partnership.
- The Norwegian Building Authority leads a fast-working group to prepare a knowledge base for the construction industry.
  - Eight workshops will be carried out in August/September.
  - The plan is to deliver the knowledge base this fall

Kick off April 2023

Greenhouse gas emissions calculation for buildings (TEK17 § 17-1)

Greenhouse gas calculation for apartment and commercial buildings must be compiled based on the method in NS 3720:2018 *Method for greenhouse gas calculations for buildings*.
The greenhouse gas calculation must as a minimum include modules A1-A4, B2 and B4 for building elements stated in the building parts table. In addition, the waste from the construction site must be included in the greenhouse gas calculations

Module	Building Life Cycle Information
A1-A3	Product Stage
A4	Transport to site
B2	Maintenance
B4	Replacement

Building part	Building element
215 **216**	Pile foundation Direct foundation
22	Load-bearing systems
23	External walls
24	Internal walls
25	Slabs
26	Roof

economy (TEK17 chap 9)

- Products suitable for reuse and material recovery shall be chosen. Buildings must be designed and built with subsequent dismantling in mind as far as possible.
- For existing apartment and commercial buildings* a survey must be carried to whether any of the building fractions to be removed are suitable for reuse.
  A separate reuse report must be prepared.

*subject to application

Regulations in Norway – use of fossil energy

Prohibited to use

- fossil fuel to heat new buildings from 2016
- fossil oil to heat existing buildings from 2020
- fossil oil for heating and drying on construction sites from 2022

www.dibk.no

NORWEGIAN BUILDING AUTHORITY

Thank you for your attention

INGUNN MARTON, inm@dibk.no

Følg oss på:

REPUBLIC OF ESTONIA
MINISTRY OF CLIMATE

Estonia's Path to Sustainability

Calculating Carbon Footprint and Achieving Climate Neutrality

Hannamary Seli
Head of Sustainable Construction
Department of Construction & Living Environment

September 15, 2023

Updates from Estonia

REPUBLIC OF ESTONIA
MINISTRY OF CLIMATE

STUDIES	**2022:** Initial carbon footprint calculation methology published
	2023: 'Estonian Construction Roadmap 2040' introduced by the industry
POLITICAL CHANGES	**2023:** New government's action programme for 2023-2027 approved
	2023: Ministry of Climate was founded on July 1
POLICY UPDATES	**2023:** Climate Law is being developed
	2024: Climate Law presented to the Parliament in Sept 2024
	2024: Revision of regulations
	2025: Introducing mandatory LCA calculation for new buildings
POLITICAL DECISIONS	**2030:** Achieving 100% renewable electricity target
	2050: National Goal of Climate neutral Estonia

REPUBLIC OF ESTONIA
MINISTRY OF CLIMATE

Thank You

Hannamary Seli
Head of Sustainable Construction
Department of Construction and Living Environment
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September 15, 2023

Climate declaration of buildings in Sweden

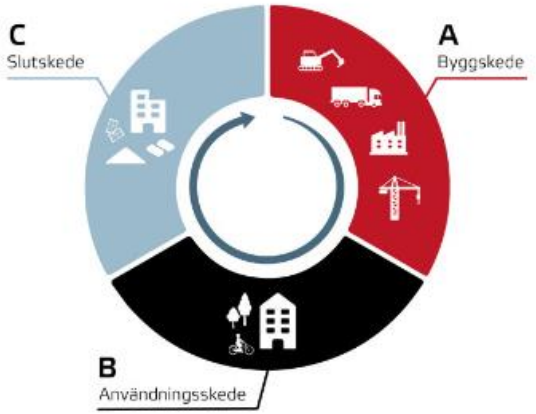
Regulation from January 2022
Proposal for limit values earliest 2025
Proposal for extended climate declaration 2027

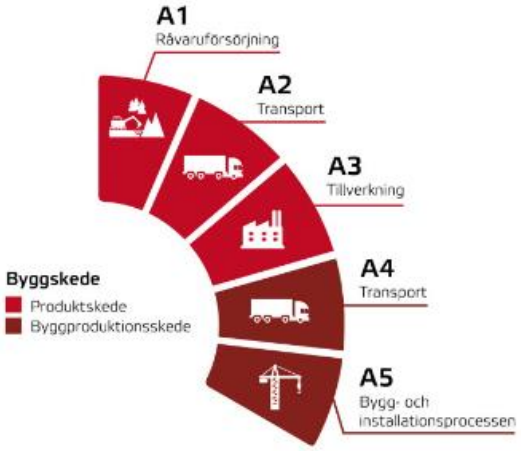
Kristina Einarsson

Project manager, Expert Environment and Climate, M.Sc

Regulation from January 2022

- **Climate declaration for new buildings**
- Applies to new buildings
- The developer is responsible to register a climate declaration at Boverket before final clearance from the municipality.
- Climate impact from all construction products in the buildings envelope, load-bearing structures and interior walls must be calculated.
- Climate impact from module A1-A5 in kg CO_2e/m^2 GFA is included.
- The developer need to save the basis for 5 years.
- Boverket is responsible for supervision that the climate declaration complies with the rules, and can request the basis.





Buildings covered - all new buildings under construction with exceptions

- **Included i.a.:**
- Multi-dwelling blocks
- Singel-family houses if the developer is a manufacturer, contractor or real estate company
- Office buildings
- Preschools
- School
- Special housing
- Car park
- Garage
- Museum
- Gymnasium
- Church
- Hotel
- Restaurant
- Trade premesis

- **Exceptions i.a.:**
- Industrial buildings
- Buildings 100.0 m^2 or less
- A developer who is a private individual and is not constructing a building in business

- Not refurbishment, extension or relocation

Background for system boundaries

- Important **starting points** that influenced the design of the regulation (2017):
- A **complete** LCA for a building was complex, difficult and time consuming
- Possible to introduce **without further investigations**
- Cover basically **all buildings**
- Focus on **a limited calculation** of where the climate impact was greatest
- In this way, **spread the learning** of **LCA** and **climate impact** of buildings to actors in the construction sector
- Introduction of a new regulation that can be built on

Proposal for limit values

Earliest from 1 July 2025

Limit values are introduced:

- Starting point regulation from 2022
- Applies to new buildings and for module A1-A5 in kg CO_2e/m^2 GFA
- Additions – technical equipment, fixed interior design and interior finishes. Default values may be used, provided by Boverket.
- Solar cells are not included in the limit value but need to be reported in the climate declaration

Motive for limit values: most important to reduce climate impact, climate calculation is required in the early stages of a construction project

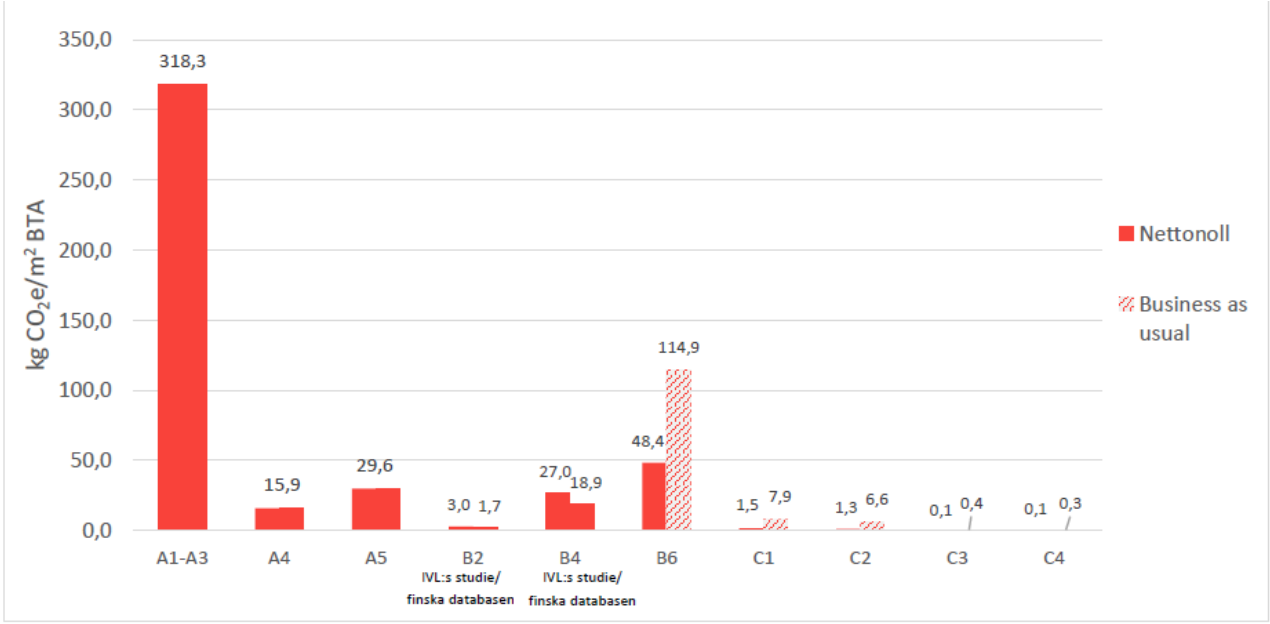
	Building type	Limit value (kg CO_2e per m^2 GFA)
Group 1	Multi-dwelling blocks	375
	Offices	385
	Education excluding preschools	380
	Preschool	330
	Single-family houses	180
	Specialist housing	385
Group 2	Other buildings	460

Report with proposals (ENG)

Limit values for climate impact from buildings and an expanded climate declaration – Boverket

Motive to limit values for modul A1-A5

- steer towards reduced emissions from **construction products** used under construction (A1-A3)
- there are other policy instruments for energy use (B6), national (BBR), EU (ZEB, EPBD, fit for 55)
- A1-A5 is verifiable in the present
- the use stage is based on scenarios, which limits the steering



- **Preliminary results, new study in Sweden from September 2023 at Boverket by WSP**
- Climate impact from multi-dwelling blocks close to the median in a Swedish study from KTH for calculated life cycle modules reported in kg CO_2e/m^2 GFA with an analyzed life cycle of 50 years. For module B2 and B4 the results is based on values from IVL's study and from the Finnish climate database. For module B6 and C1-C4, net zero energy scenario and business as usual are reported.

Proposal for extended climate declaration

1 January 2027

Extended climate declaration is introduced:

- Full life cycle (A1-A5, B2, B4, B6, C1-C4)
- Same building elements as from 2025
- Additional parts are groundworks and ground improvements
- Climate declaration for certain **refurbishment** that require a building permit

Reason for 2027: Timing adjusted to EU and revision of EPBD. Adjustment of system boundaries may be necessary based on EU regulation.

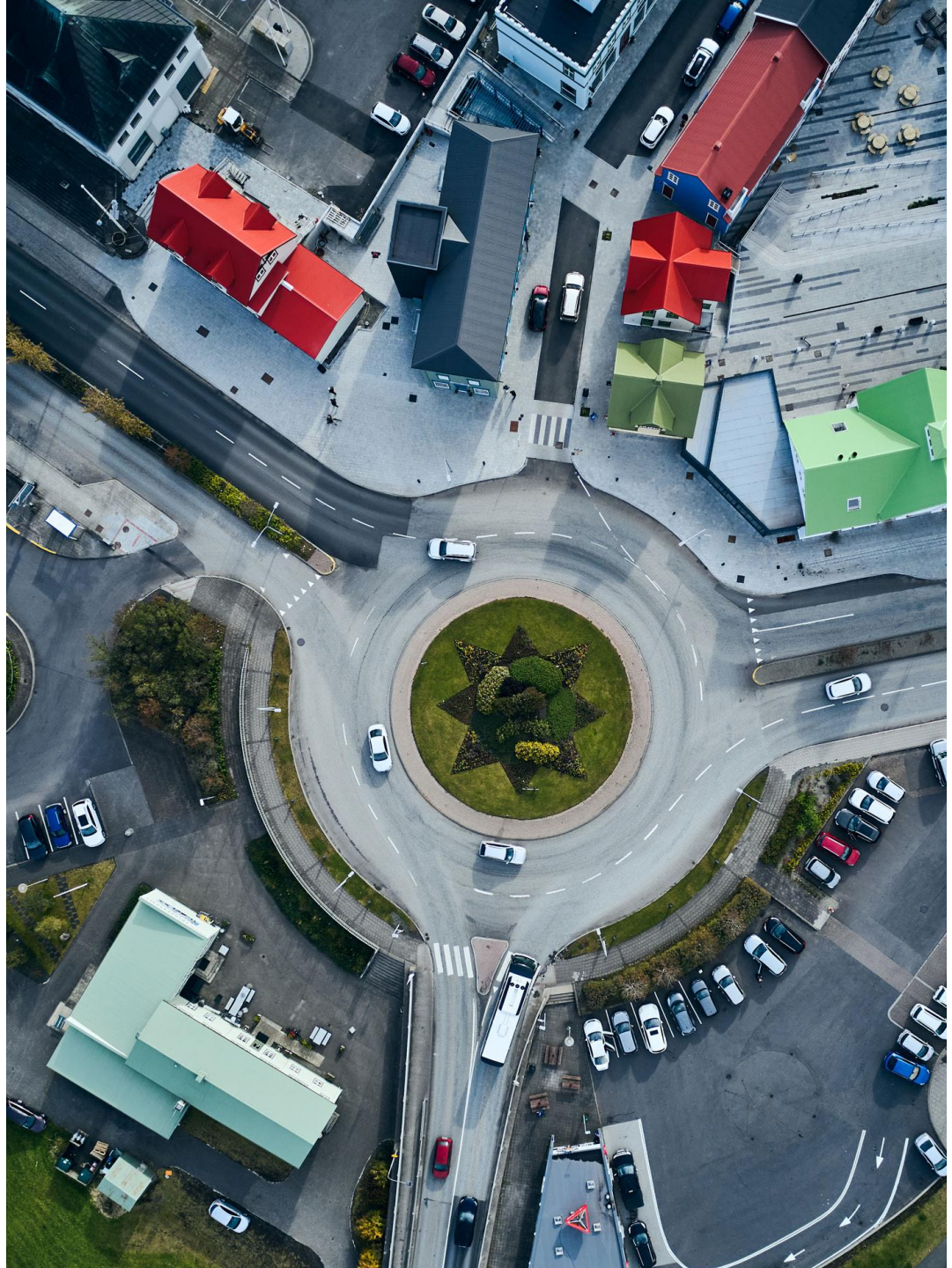
Impact assessment

- **Reduced climate impact** from buildings being erected
- An **increase in competence**
- **Increased administrative costs** especially for developers and contractors
- **Increased complexity** in the regulation on climate declaration of buildings
- Slightly **increased costs** for building **materials**
- Construction product **manufacturers** are indirectly **affected**
- The **state** receives the **largest** administrative **costs**
- Relatively **small** increase of **cost** for the **municipalities**

More information

- **Information about climate declaration (ENG)**
- Climate declaration for new buildings - Boverket – Boverket
- **FAQ (ENG)**
- Questions and answers about climate declarations - Boverket - Boverket
- **Climate database from Boverket (ENG)**
- Climate database from Boverket - Boverket – Boverket
- **Report with proposals (ENG)**
- Limit values for climate impact from buildings and an expanded climate declaration – Boverket
- **Guidance about regulation on climate declaration (SWE)**
- Klimatdeklaration – en handbok - Klimatdeklaration - Boverket

- **Contact**: kristina.einarsson@boverket.se



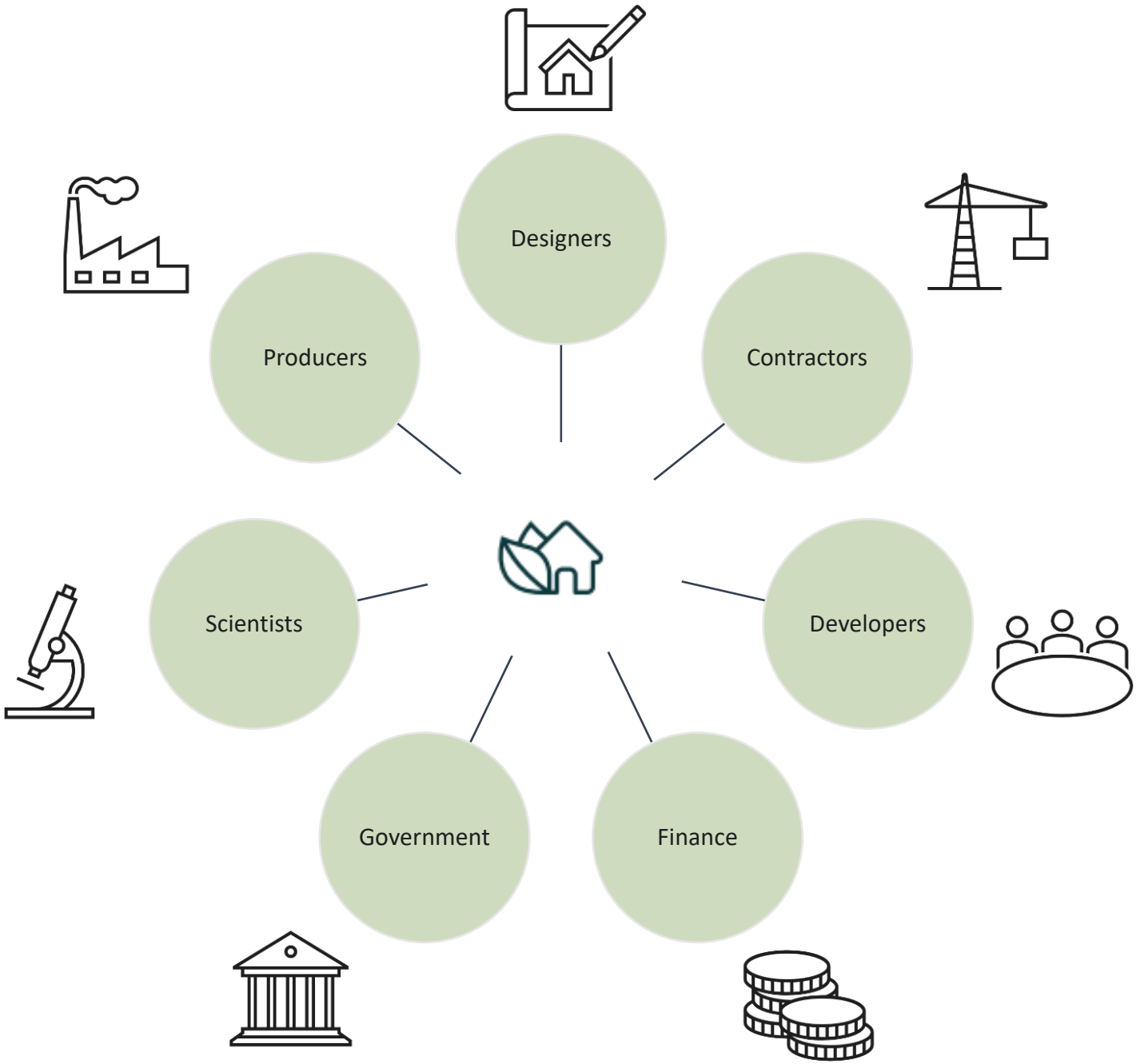
Icelandic Sustainable Constructions

Status september 2023 and Roadmap 2030

Many actions ongoing simultaneously:

- Project „Build a greener future“, wide cooperation, have defined Goals for 2030
- Roadmap with 74 Actions (28 finished, 37 ongoing, end of 2023)
- Ongoing Nordic Sustainable Construction
- Ministry of Infrastructure leading work on new Building Regulations, to finish end of 2024

Stakeholders from the whole value-chain



Roadmap for Sustainable Constructions 2030

bgf.is

I. PART: Emission (18 page)

II. PART: Goals and Actions (102 pages)

III. PART: Summary - Emission, Goals & Actions (9 pages)

Vegvísir að vistvænni mannvirkjagerð 2030

I. hluti (18 bls)

Losun

Lestu þennan hluta til að vita meira um kolefnislosun íslenskra bygginga.

Smelltu hér til að nálgast I. hluta

II. hluti (102 bls)

Markmið og aðgerðir

Lestu þennan hluta til að vita meira um markmið um vistvænni mannvirkjagerð og aðgerðirnar svo þau markmið náist.

Smelltu hér til að nálgast II. hluta

III. hluti (9 bls)

Samantekt: Losun, markmið og aðgerðir

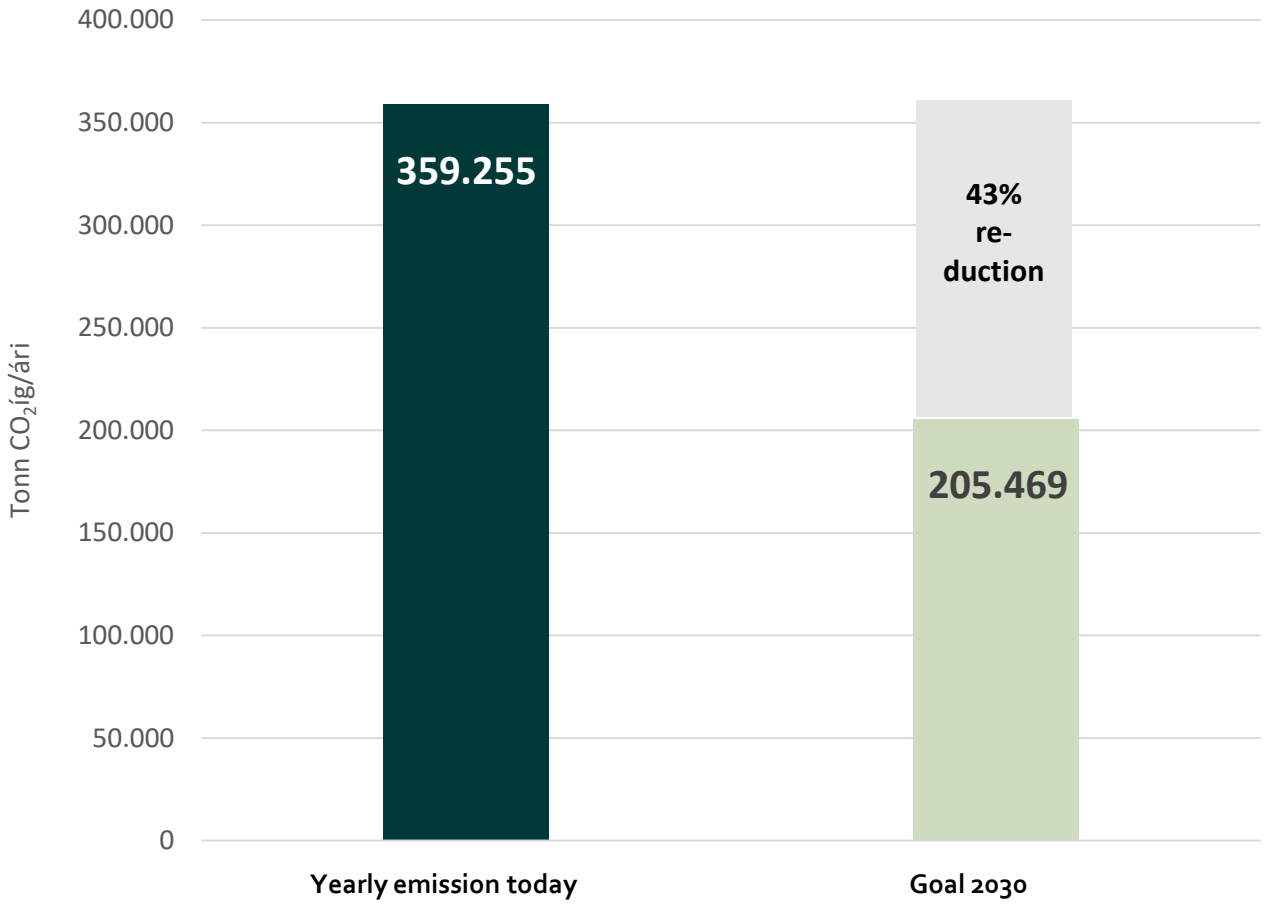
Byrjaðu hér! Lestu þennan hluta til að fá yfirsýn yfir losunina, markmiðin og aðgerðirnar í I. og II. hluta.

Smelltu hér til að nálgast III. hluta

Click here for Summary in English

Roadmap for Sustainable Constructions 2030

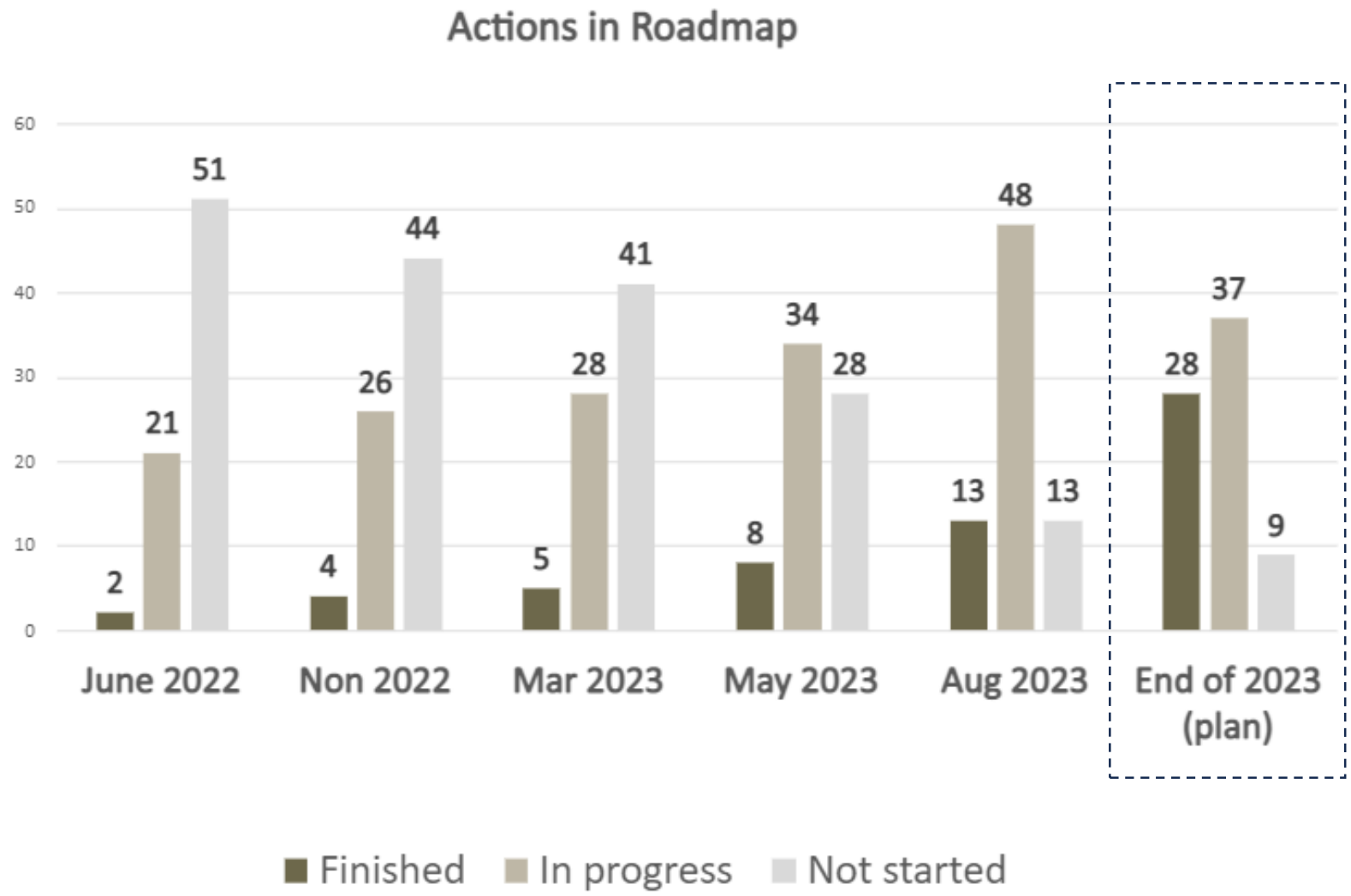
Goals



August 2023


1. Byggingarefni
1.1. Steypukafli byggingarreglugerðar endurskoðaður
1.2. Rannsóknir á vistvænu byggingarefni
1.3. Átak um rétta geymslu og meðhöndlun byggingarvara
1.4. Gagnabanki um umhverfis- og loftslagsáhrif byggingarefna
1.5. Uppbygging á úrvinnslu skógarafurða
1.6. Þróun á loftslagsvænni steypu
2. Framkvæmda-svæði
2.1. Greining á samsetningu vinnuvélaflotans
2.2. Betri upp-lýsingar um vinnuvélaflotann
2.3. Samtal um orkuskipti á vinnuvélum
2.4. Umbunarkerfi í Rvk fyrir vistvæna orkugjafa á frkvsv.
2.5. Lykilhugtök um umhverfisáhrif frkvs. skilgreind
2.6. Samtal um trygga orkuinnviði frá upphafi framkv.
2.7. Fordæmi: Framkvæmda-svæðis án losunar
2.8. Skoða nýskrán. á oliuknúnum vinnuvélum
3. Notkunartími mannvirkja
3.1. Upplýsingar um raunnotkun hita, rafmagns og vatns
3.2. Samræmdir orkuútreikningar og orkuflokkar bygginga
3.3. Krafa um orkuútreikninga
3.4. Fræðsla um orkusparnað í byggingum
3.5. Krafa um loftþéttleikapróf virkjuð
3.6. Leiðbeiningar um hönnun hita-, kæli- og loftræstikerfa
3.7. Rannsóknir á orkunýtingu eldri bygginga
3.8. Samræmdir varma- og rakaflæðisútreikningar
3.9. Skoða kröfu um stýrð loftræstikerfi með varmaendurvinnslu
3.10. Krafa um orkunýtni nýbygginga
3.11. Stefna um vistvænt viðhald opinberra bygginga
3.12. Virkja Handbók hússins
3.13. Leiðbeiningar um vistvænt viðhald
4. Lok líftíma / Hringrásarhagkerfið
4.1. Sölutorg fyrir jarðveg og jarðefni (Mölundur)
4.2. Rannsóknir og leiðb. um nýtingarmöguleika byggingarúrgangs
4.3. Kynningarátak um nýjar flokkunarkröfur byggingarúrgangs
4.4. Aðgengileg svæði undir notað byggingarefni
4.5. Greinargerð hönnuða um hámarksnýtingu byggingarefna
4.6. Leyfi til niðurrifs skráð í Mannvirkjaskrá
4.7. Skil á rauntölum um magn byggingarúrgangs
4.8. Byggingarregluverk endurskoðað m.t.t. hringrásar
4.9. Leiðbeiningar um endurnýtingu byggingarefna
4.10. Leiðbeiningar um ábyrgt niðurrif
4.11. Áhersla á byggingastarfsemi í Saman gegn sóun
5.1 Lífsferils-greiningar
5.1.1. Losun framkvæmda Vegagerðarinnar metin með uppsprettugreiningu
5.1.2. Lífsferilsgreiningar á BREEAM-vottuðum nýbyggingum Rvk-borgar
5.1.3. Samræmd aðferðafræði við gerð lífsferilsgreininga bygginga
5.1.4. Fræðsluefni um lífsferilsgreiningar
5.1.5. Skilyrði fyrir útreikninga á kolefnisspori opinberra verkefna
5.1.6. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka skilgreind
5.1.7. Kolefnishlutlaus bygging fyrir íslenskar aðstæður skilgreind
5.1.8. Grunnviðmið fyrir kolefnisspor ólíkra mannvirkjaflokka uppfærð
5.1.9. Skilyrði fyrir útreikninga á kolefnisspori mannvirkja á almennum markaði
5.1.10. Krafa að kolefnisspor opinberra verkefna sé 30% lægra en grunnviðmið
5.1.11. Krafa að kolefnisspor almennra verkefna sé 30% lægra en grunnviðmið
5.1.12. Grunnviðmið fyrir kolefnisspor allra verkefna uppfærð og lækkuð
5.2 Umhverfis-vottun
5.2.1. Fjárhagslegur og umhverfislegur ávinningur vottana
5.2.2. Leiðb. um Svansvottunarviðmið
5.2.3. Umhverfis-vottaðar byggingar í Mannvirkjaskrá
5.2.4. Fleiri umhverfisvottuð mannvirki í RVK
5.2.5. Reglulegt námskeið fyrir fagaðila um vottunarkerfi
5.2.6. Fræðsla til sveitarfélaga um vottanir
5.2.7. Fræðsla til birgja um vottanir
5.2.8. Aðlaga vottunarkerfi að ísl. aðstæðum
5.3 Loftslagsvæn byggð og landnotkun
5.3.1. Fyrirliggjandi innviðir í Reykjavík samnýttir
5.3.2. Leiðbeiningar um útfærslu 20 mínútna hæja og hverfa
5.3.3. Handbók um skipulag og hönnun í kringum hringrásarhagkerfið
5.3.4. Landsskipulagsstefna 2015–2026 endurskoðuð
5.3.5. Löggjöf um skipulag rýnd m.t.t. til loftslagsmála
5.3.6. Leiðbeiningar og gagnabanki um loftslagsmiðað skipulag
6. Hvatar til umskipta
6.1. Tillaga til fjármálaráðuneytis um opinbera hvata fyrir vistvæna mannvirkjagerð
6.2. Umræða meðal sveitarfélaga o.fl. um græna fjárhagslega hvata
6.3. Grænt húsnæði framtíðarinnar hjá Reykjavíkurborg
6.4. Leiðbeiningar og sýnidæmi um umhverfisskilyrði í opinber útboð
6.5. Umhverfisvænar kröfur og valforsendur í útboð á vegum FSRE
6.6. Lánaframboð opinb. fjármálast. til vistvænnar mannvirkjagerðar
6.7. Skoða samræmd viðmið fyrir græna fjármögnun
6.8. Samkeppnissjóður fyrir byggingariðnaðarinn (Askur)
6.9. Verðlaun fyrir vistvæna mannvirkjagerð (Græna skóflan)
6.10. Átaksverkefni um vistvæn skref innan byggingariðnaðarins

Byggjum grænni framtíð



Participants in the 74 actions

Status in Iceland:

- Many actions ongoing simultaneously
- Iceland will introduce minimum values regarding LCA, probably within a year or so
- Iceland follows other Nordic countries closely, and all Nordic cooperation, especially Nordic Sustainable Construction
- Concerns: Robustness of Nordic LCA methodology, we recommend repeatability studies

Session 2: Carbon budgets for buildings

From carbon budgets to limit values

Dr. Martin Röck

Research Associate

KU Leuven

Towards climate reporting of the building stock

Morten Walbech Ryberg

Senior Specialist

Sweco Denmark

Carbon budgets: First experiences from Denmark

Helle Redder Momsen

Specialist

Danish Authority of Social Services and Housing

Panel Discussion: How can the built environment support carbon neutrality?

Helle Redder Momsen/ Danish Authority of Social Services and Housing

Iina Oilinki / City of Helsinki

Lauri Linkosalmi / Stora Enso

KU LEUVEN

Nordic Sustainable Construction

From Carbon Budgets to Limit Values

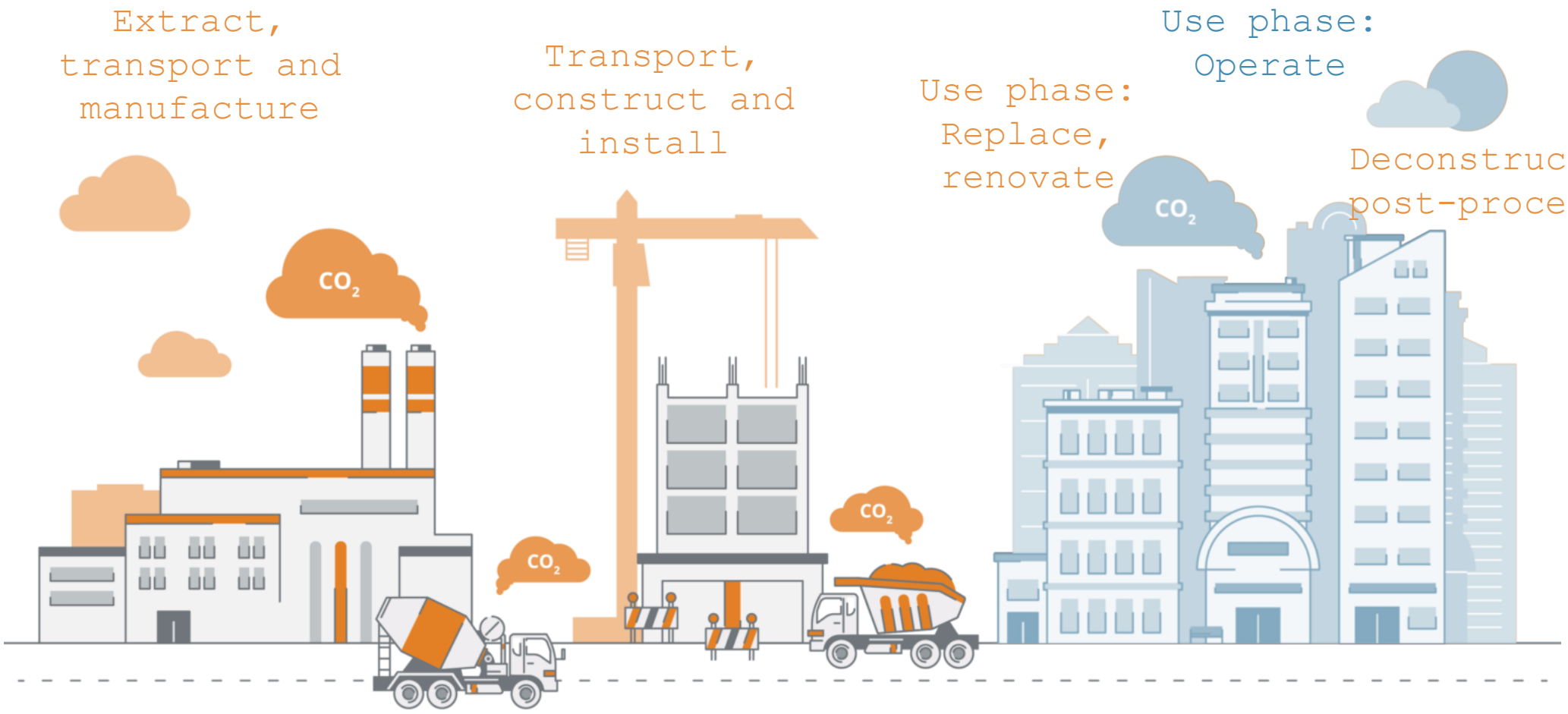
- Embodied Carbon Emissions and How To Tame Them

Dr. Martin RÖCK
Research Associate
KU Leuven

Nordic Sustainable Construction Forum
Helsinki, Finland - 15/09/2023

The Crucial Role of Embodied Carbon in the Building Life Cycle

Types of carbon in buildings



Embodied carbon

Emissions from material production and processing, transport

Operational carbon

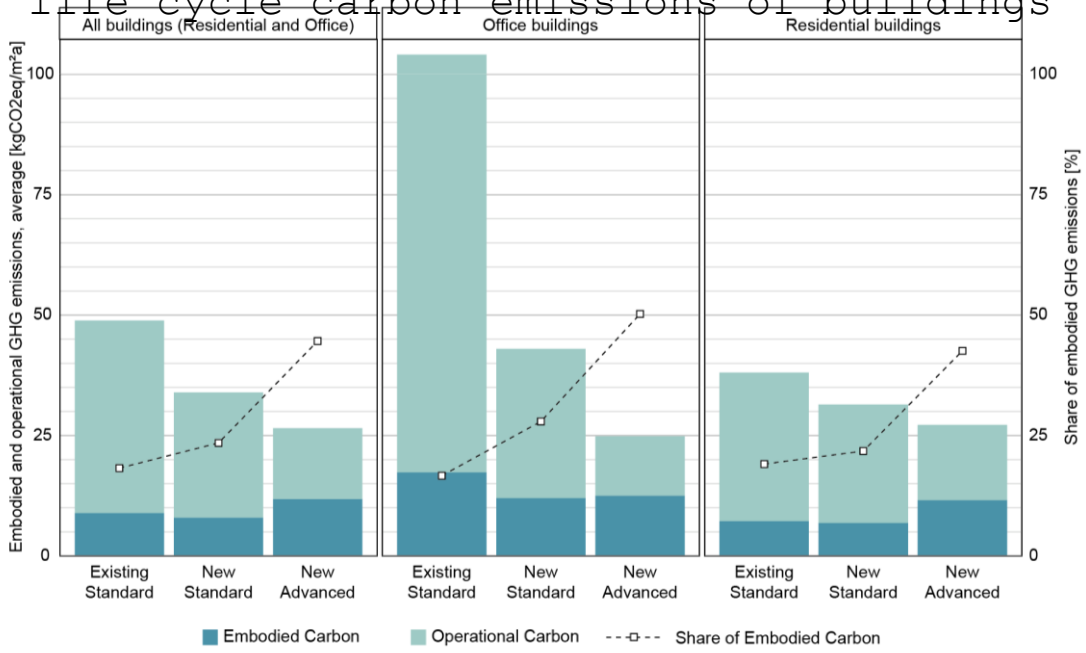
Emissions from energy, water use, mobility

Figure adapted from: Types of carbon in buildings. https://www.carboncure.com/concrete-corner/what-is-embodied-carbon/, Last access 14 Sept 2023

Embodied carbon: The hidden challenge

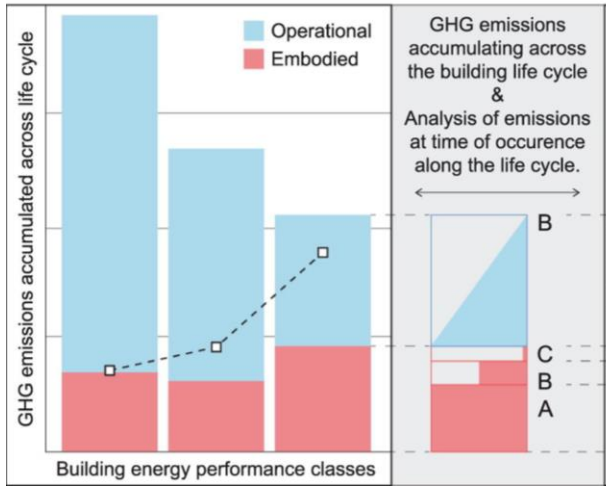
- Global meta-analysis assessing >650 (238) building LCA studies
  - Typology: Residential and office buildings
  - Performance: Existing; New (std / adv)
- Whole life carbon emissions are declining, due to energy efficiency
- Embodied GHG emissions are increasing (relative and absolute)
- Embodied carbon share 50%(-90%) of building life cycle emissions
- New building practice hardly meets life cycle-related climate targets

Global trends in embodied and operational, life cycle carbon emissions of buildings



Röck M, Ruschi Mendes Saade M, Balouktsi M, Nygaard Rasmussen F, Birgisdottir H, Frischknecht R, Habert G, Lützkendorf T, Passer A. Embodied GHG Emissions of Buildings – The Hidden Challenge for Effective Climate Change Mitigation. Applied Energy, 2020. https://doi.org/10.1016/j.apenergy.2019.114107

… for effective climate change mitigation



- Temporal dynamics of carbon emissions: continuous vs. spikes
- Upfront embodied and operational break-even after >35 years in-use
- 'Upfront carbon spike' dominates timeframe for effective mitigation
- Reveals importance of reducing embodied carbon 'invested' today
- Address building whole life carbon in design codes and regulation

Röck M, Ruschi Mendes Saade M, Balouktsi M, Nygaard Rasmussen F, Birgisdottir H, Frischknecht R, Habert G, Lützkendorf T, Passer A. Embodied GHG Emissions of Buildings – The Hidden Challenge for Effective Climate Change Mitigation. Applied Energy, 2020. https://doi.org/10.1016/j.apenergy.2019.114107

Building Materials and the Climate

- **Building materials** are set to dominate climate change
  - Urbanization is rising and policy action is urgently needed to shift building material life cycles towards regenerative methods

- **Solutions exist!** Three principles for material decarbonization
  - Avoid
  - Shift
  - Improve

- **Whole life-cycle** approach for decarbonization of building construction and operation

United Nations Environment Programme and Yale Center for Ecosystems + Architecture, *Building Materials and the Climate*. 2023. https://wedocs.unep.org/20.500.11822/43293

Building Materials and the Climate

1. **AVOID** Waste, Build (with) Less and Improve Circularity
   - Scale circular design, recycling and re-use at each phase of the building life cycle.
   - Avoid New Extraction via Circular Material Economy, Prioritize Reuse and Recycling
2. **SHIFT** to Bio-Based, Building Materials and Regeneration
   - Evolve business-as-usual forestry: sustainable materials require regenerative resource management, incentivize biodiversity.
3. **IMPROVE** Non-Renewable Building Materials, Processes
   - Supply of reused and recycled materials will need to catch up with growing demand.
   - Facilitate Decarbonization of Conventional Non-Renewable Materials Globally

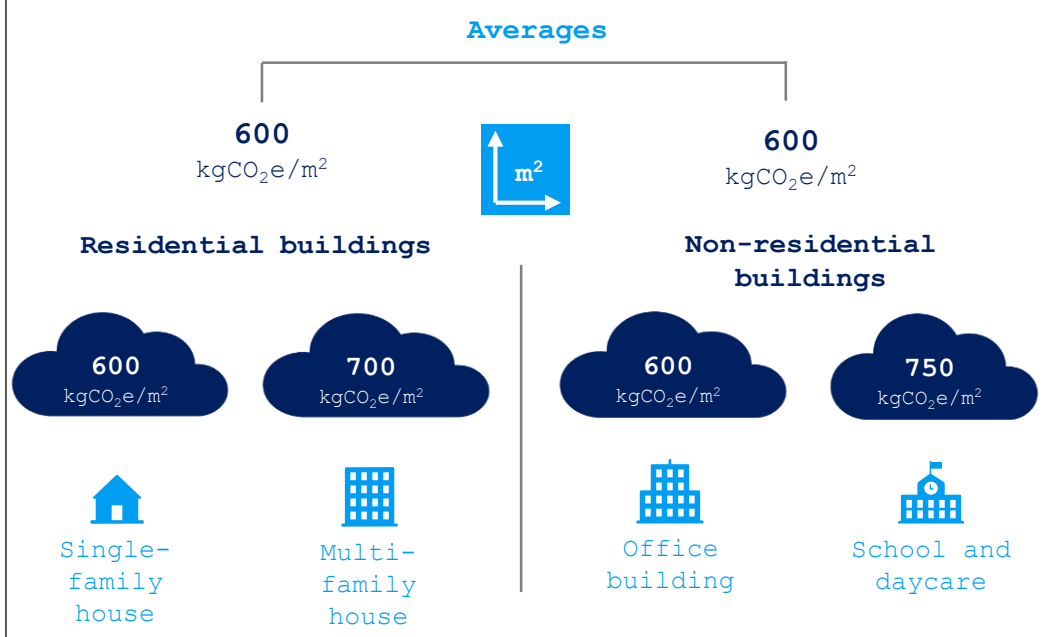
United Nations Environment Programme and Yale Center for Ecosystems + Architecture, *Building Materials and the Climate*. 2023. https://wedocs.unep.org/20.500.11822/43293

Whole Life Embodied Carbon Metrics to support European Climate Policy

Embodied carbon baseline benchmarks

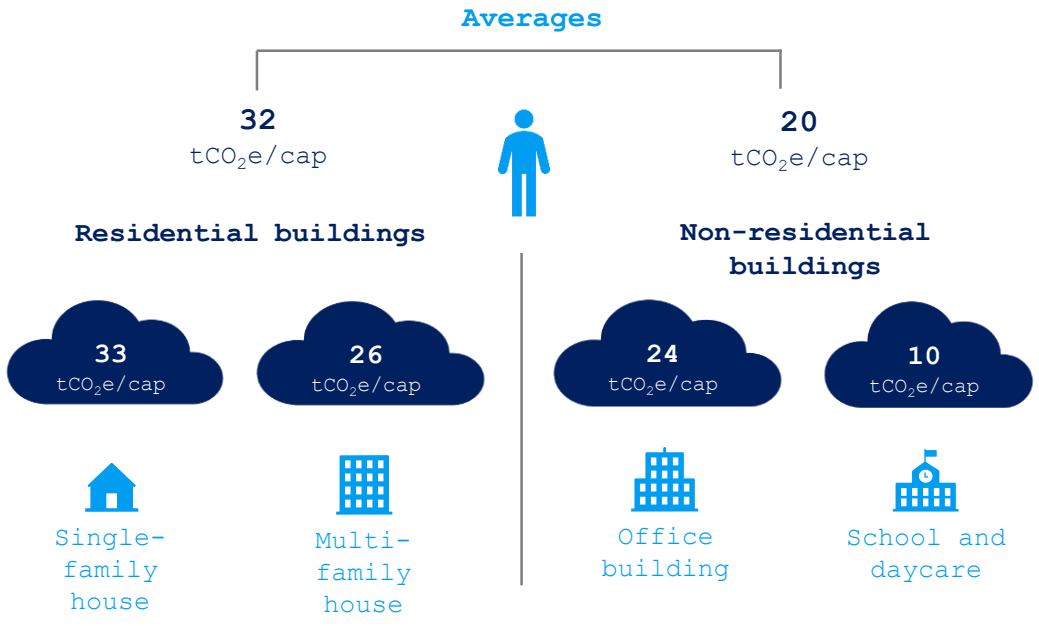
Life cycle embodied carbon per square meter (m^2)

In kg of CO_2e per m^2



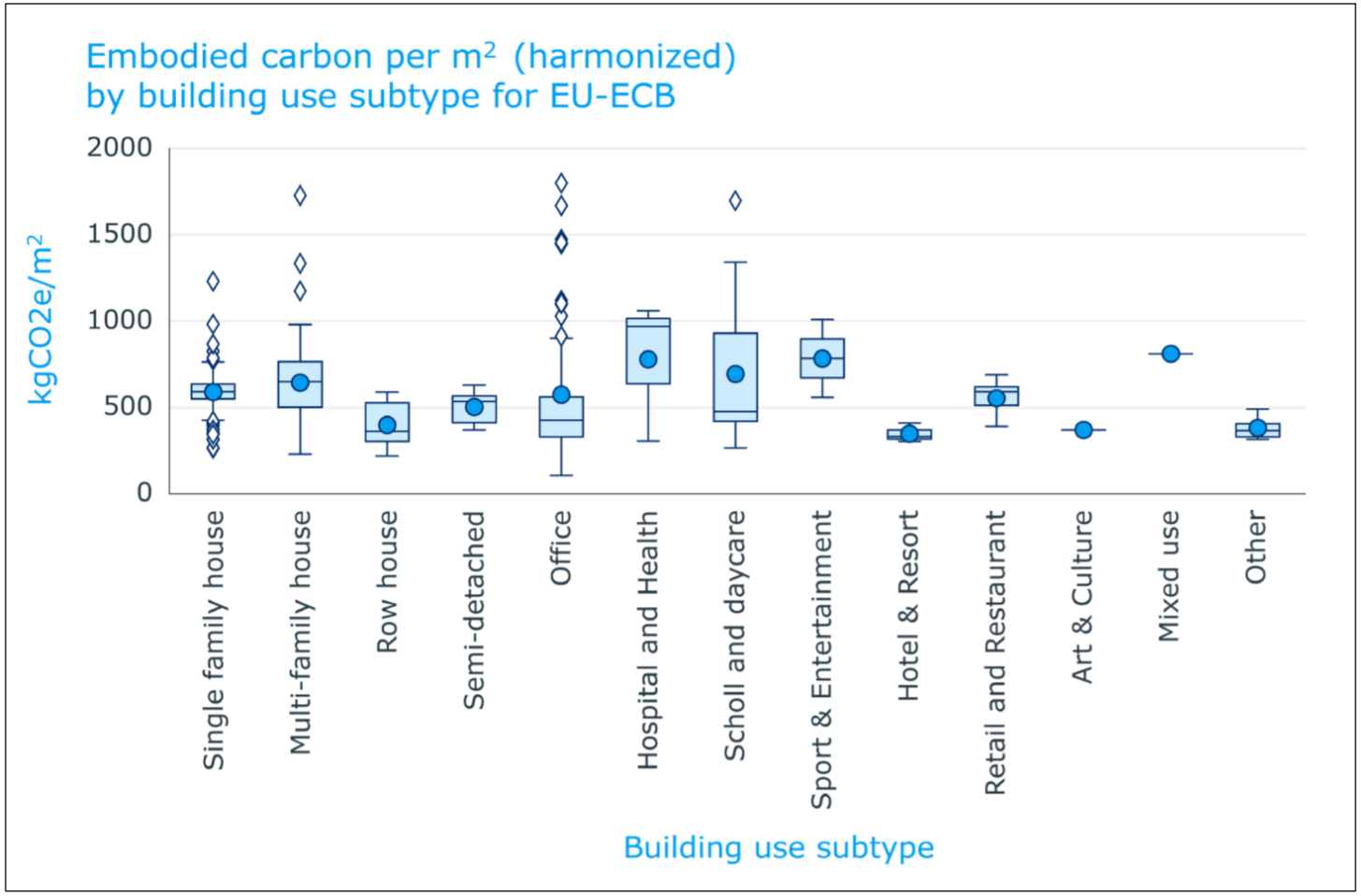
Life cycle embodied carbon per capita (cap)

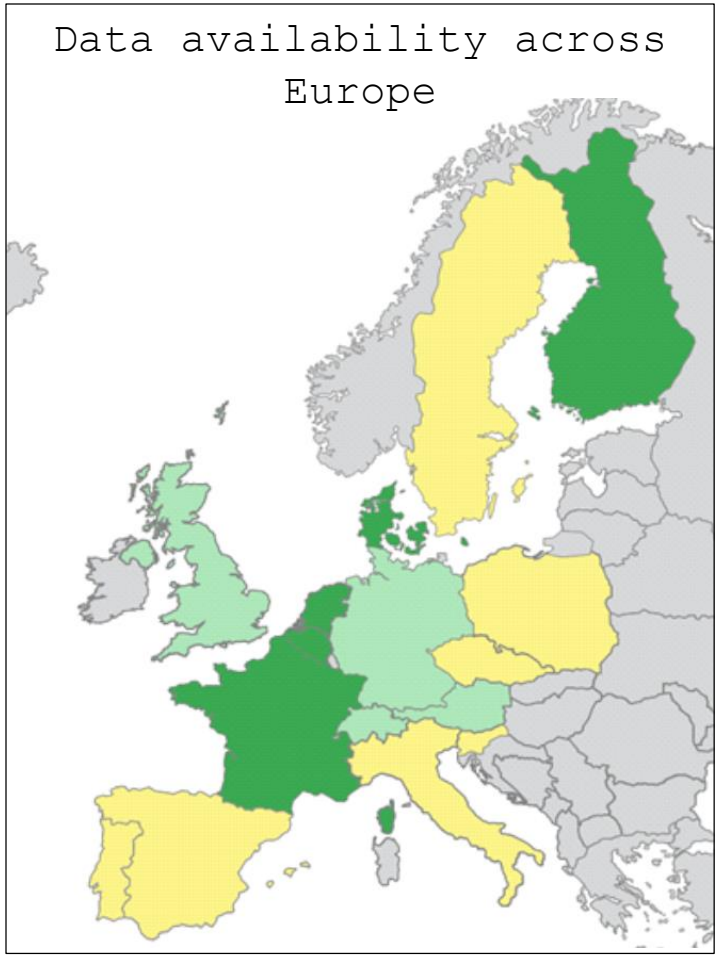
In tones of CO_2e per cap



Röck M, et al. Benchmarking whole life embodied carbon of buildings at scale: data-driven baseline analysis for buildings across Europe. Informed by Röck M, et al. Towards Embodied Carbon Benchmarks for Buildings in Europe - #2 Setting the Baseline: A Bottom-up Approach. 2022.

… for buildings across Europe

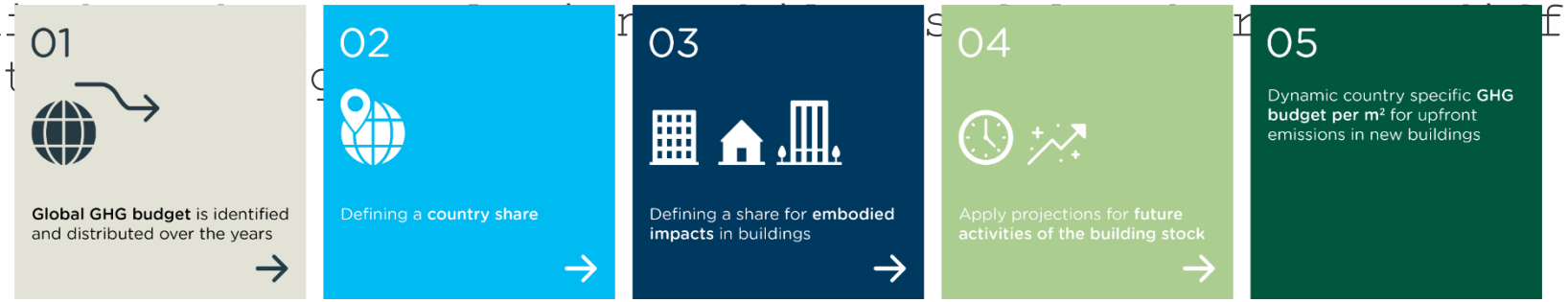




Röck M, et al. Benchmarking whole life embodied carbon of buildings at scale: data-driven baseline analysis for buildings across Europe. Informed by Röck M, et al. Towards Embodied Carbon Benchmarks for Buildings in Europe - #2 Setting the Baseline: A Bottom-up Approach. 2022.

Carbon budgets for buildings

- **Carbon budgets are important mental model in whole life carbon debate**, relate to need for sustainable development within environmental boundaries
- **A carbon budget quantifies the remaining GHG emissions** and allocation to different activities, quantifying how much can be emitted to stay within limits
- **Allocation principles are crucial** for downscaling and require choices that influence the budget – e.g., climate justice, generational justice, North/South
- **Carbon budgets are hardly used** for building target setting and embodi[illegible]ferent ways t[illegible]

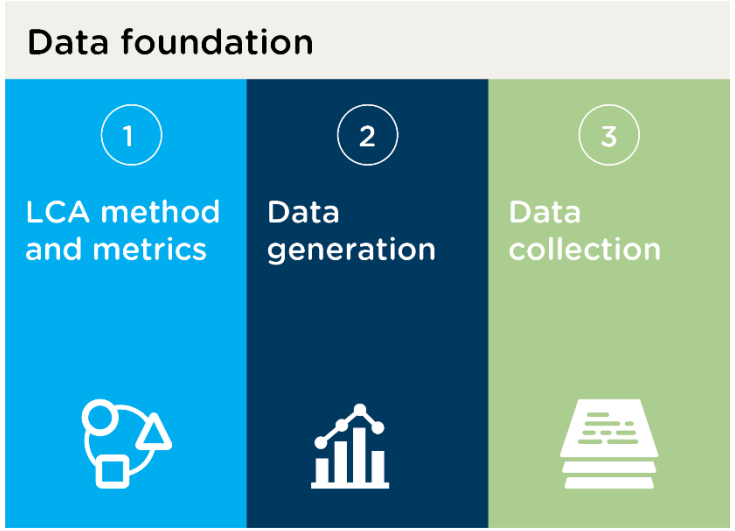


Habert et al., "Carbon Budgets for Buildings: Harmonizing Temporal, Spatial and Sectoral Dimensions." Buildings & Cities, 2020. DOI: https://doi.org/10.5334/bc.47

Horup et al., "Towards Embodied Carbon Benchmarks for Buildings in Europe – #3 Defining Budget-Based Targets: A Top-down Approach." 2022. DOI: https://doi.org/10.5281/zenodo.6120882

Towards target values for buildings

- **Collaborative efforts to create the evidence base** through LCA methods and tool, building LCA data generation and analysis – the data foundation
- **Bring together bottom-up and top-down** considerations on embodied and whole life carbon to regulate effectively
- Define **Paris-aligned pathways** for climate neutrality to give clarity to stakeholders and ensure buy-in and reduction commitment by industry leaders and society



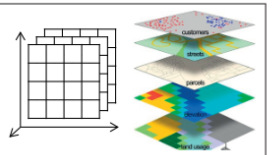
Tozan et al., "Towards Embodied Carbon Benchmarks for Buildings in Europe – #4 Bridging the Performance Gap: A Performance Framework." 2022. DOI: https://doi.org/10.5281/zenodo.6120874

Insights from Supporting an EU Roadmap for Reducing Whole Life Carbon of Buildings

EU building stock whole life carbon study

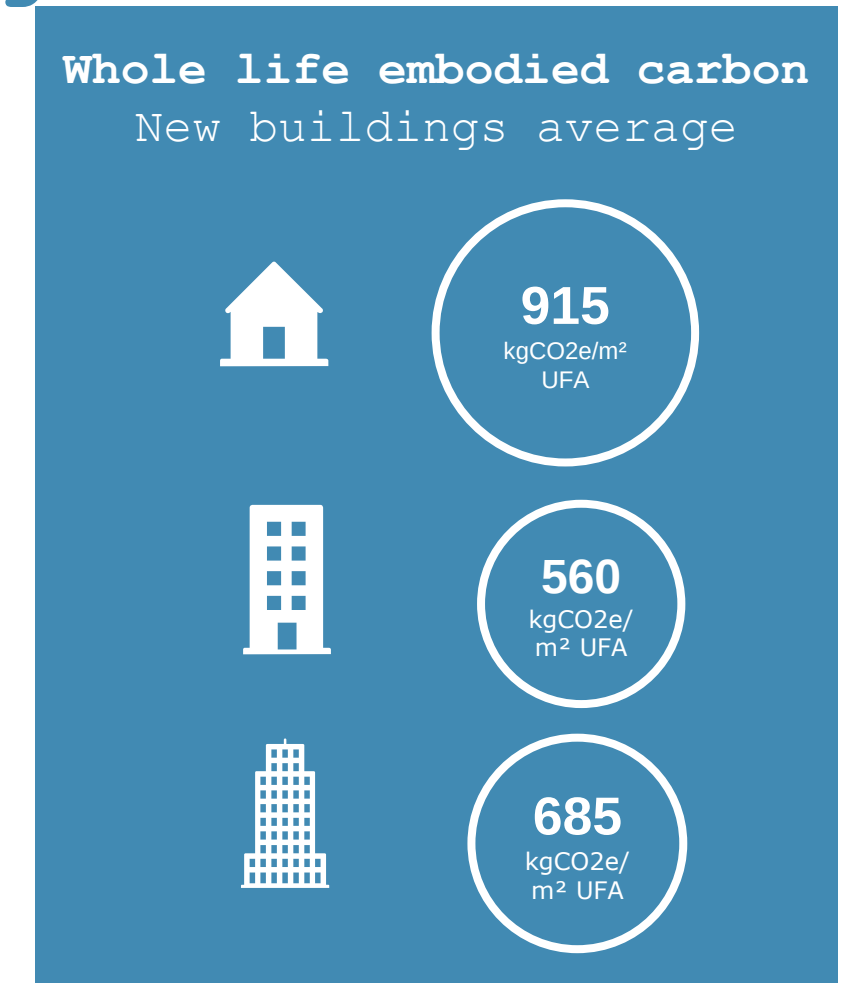
Building stock data - characterization and activities

- Definition of representative building archetypes from regional averages
- Building stock activities [m²] (operation, renov., demol., new construction)



At building level, embodied carbon drives WLC of new and renovated buildings

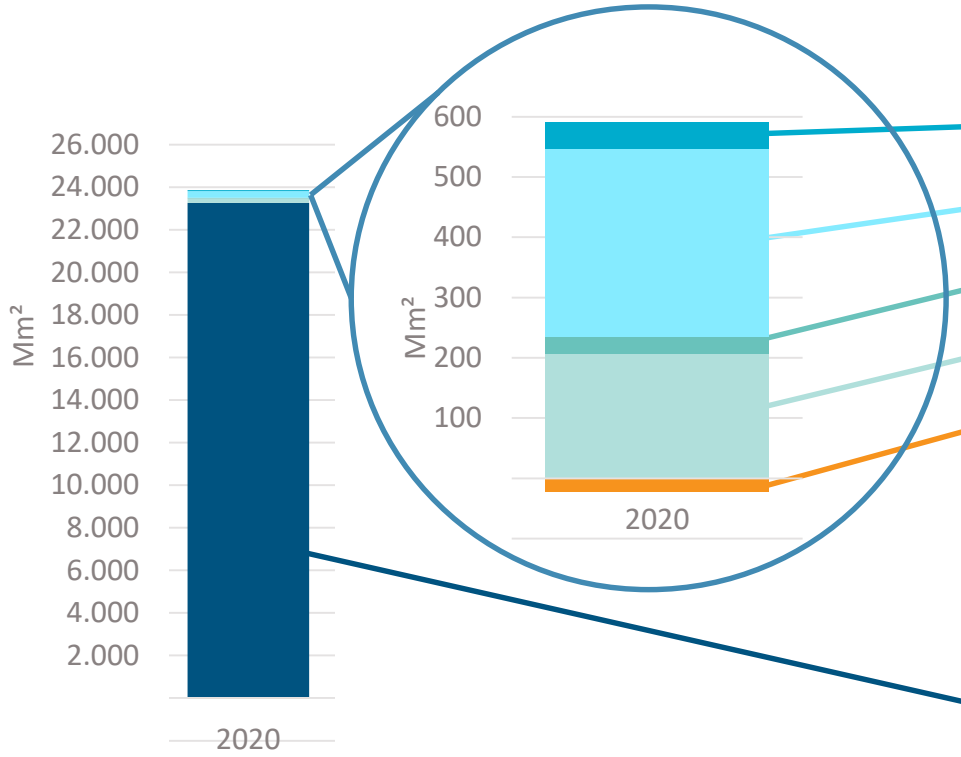
- **Advanced energy performance results in lower whole life carbon**
  - Clear trend in absolute results across all regions and building types modelled
  - Different ways to achieve advanced energy performance, more or less material intensive
- Embodied emissions make up (avg)
  - **34% of WLC in new standard** buildings (1/3),
  - **74% of WLC in new advanced** buildings (3/4)
  - Ranging above 90% in extreme cases
- **84% embodied carbon upfront**
- Refurbishment embodied carbon
  - Shows large differences between the typologies and measures applied, different renovation depths
  - Higher EC per m² for single-family houses and offices than for multi-family houses



Le Den X, Steinmann J, Kovacs A, Kockat J, Toth Z, Röck M, and Allacker K. "Supporting the Development of a Roadmap for the Reduction of Whole Life Carbon in Buildings." European Commission - DG ENV, 2023.

…but, at the building stock level, most floor area is in existing buildings

Base year



Building stock activity levels

0.2% advanced Construction

1.3% standard Construction

0.1% advanced Renovation

0.9% standard Renovation

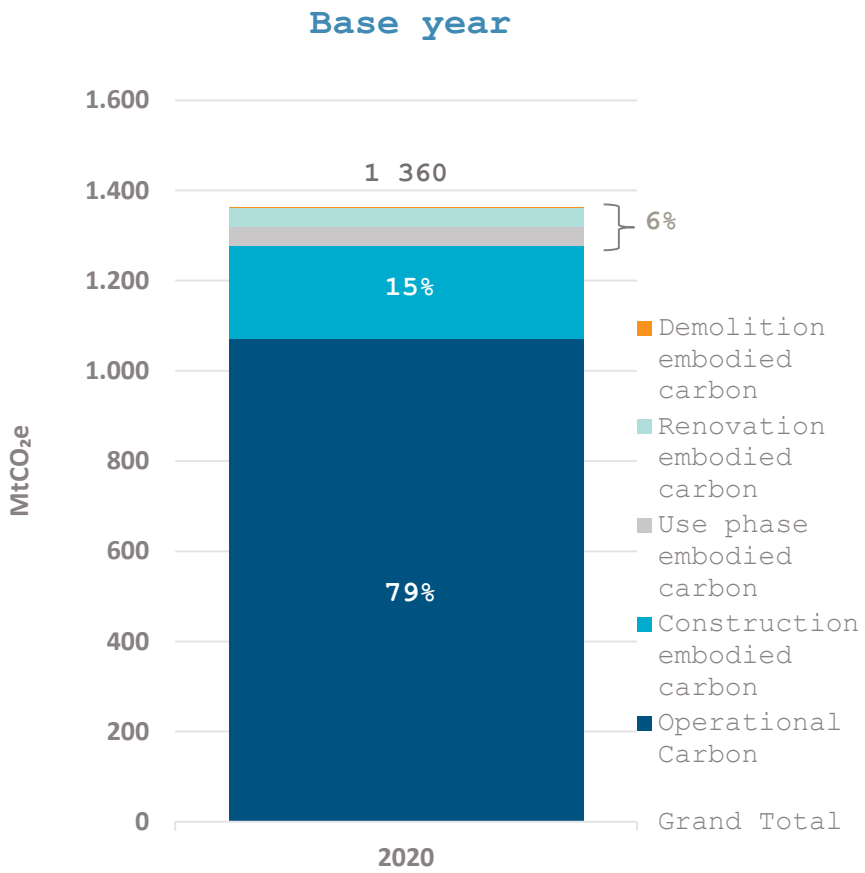
-0.1% Demolition

97.4% Buildings in use

Heated floor area; Based on AMBIENCE/ HotMaps 2022

Le Den X, Steinmann J, Kovacs A, Kockat J, Toth Z, Röck M, and Allacker K. "Supporting the Development of a Roadmap for the Reduction of Whole Life Carbon in Buildings." European Commission - DG ENV, 2023.

EU building stock emits 1,360 $MtCO_2e$, ~40% of EU emissions in base year (2020)



- **79% operational** vs. **21% embodied** emissions at EU building stock level
- **71% embodied emissions upfront**, for material extraction, production.
- Use phase embodied emissions (maintenance/repair, renovation) account for 14% each.
- Majority of embodied emissions are caused by just 3% of floor area.

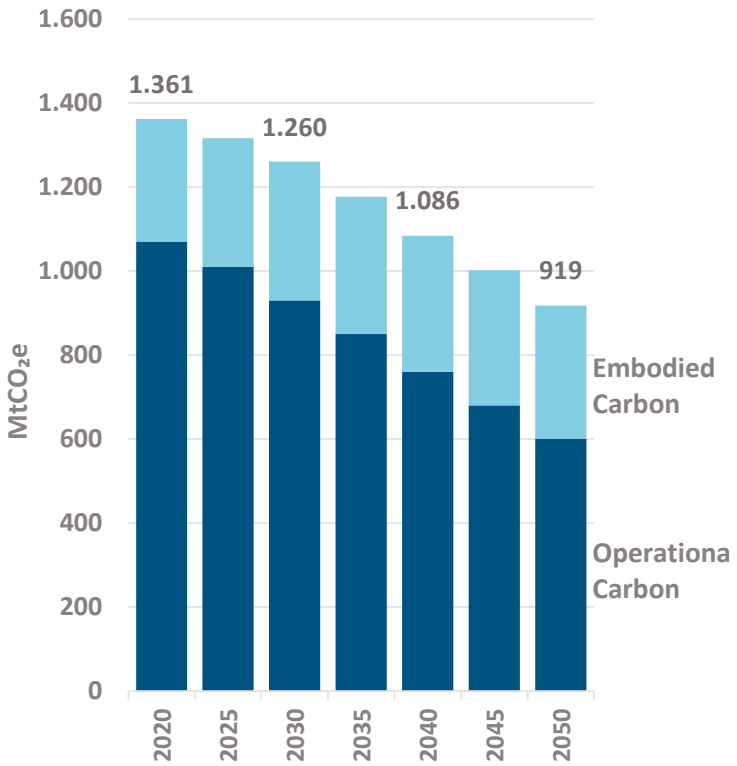
Building stock scenario analysis

Solutions
- Improve
- Shift
- Avoid

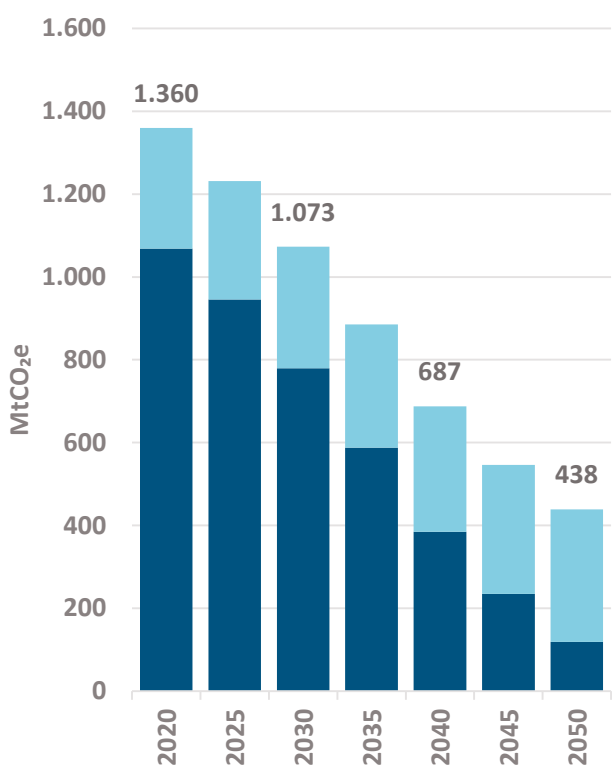
TECH-Build

LIFE-Build

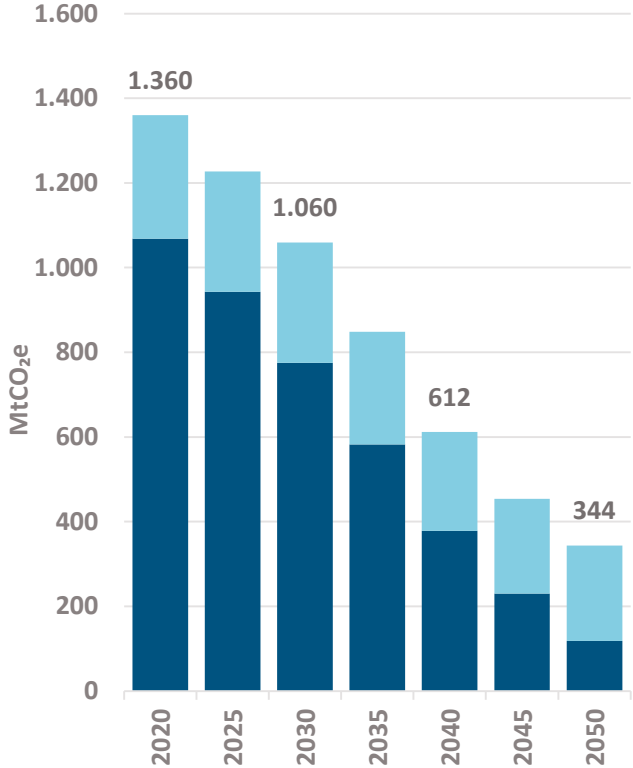
BAU



TECH-Build



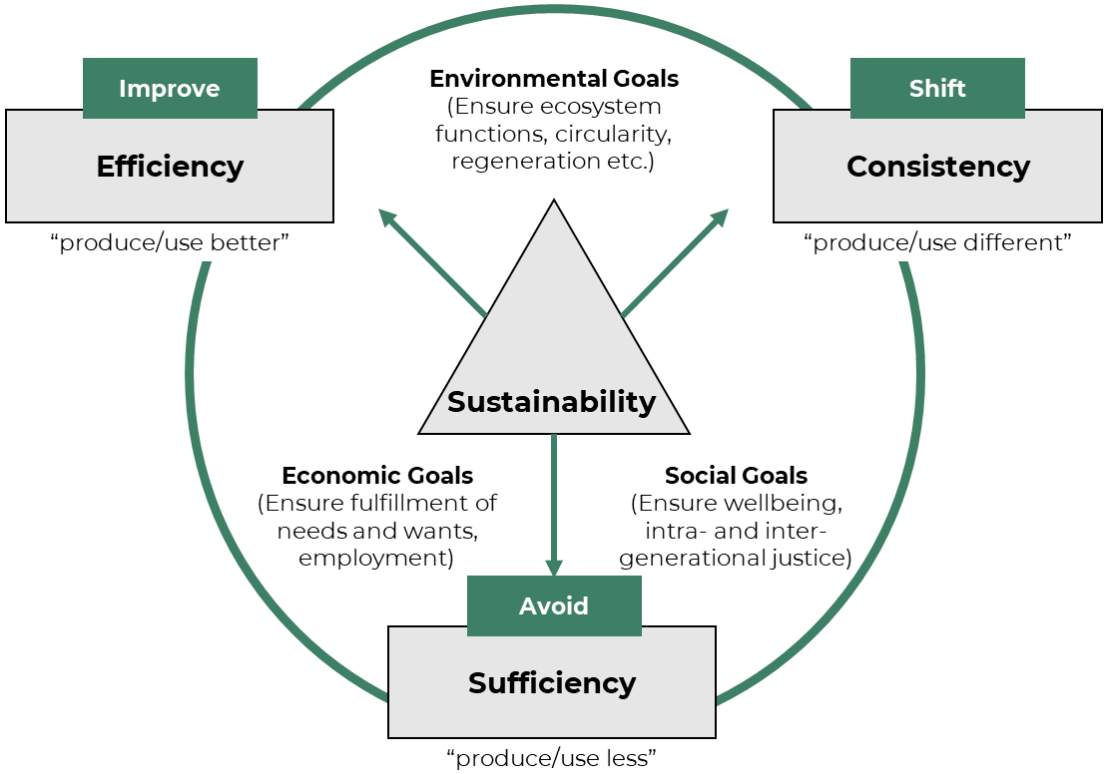
LIFE-Build



Le Den X, Steinmann J, Kovacs A, Kockat J, Toth Z, Röck M, and Allacker K. "Supporting the Development of a Roadmap for the Reduction of Whole Life Carbon in Buildings." European Commission - DG ENV, 2023.

Key takeaways

- Embodied carbon is the hidden challenge for effective mitigation
- Many solutions readily available to reduce embodied carbon and WLC
- EU: More, holistic effort is required
  - Decarbonize space heating,
  - High renovation rates and depths,
  - Improve, shift, and avoid material use,
  - Circular, cascading use of (bio-)materials
  - Sufficiency now, use existing buildings
- Global North: "All hands on deck!", deliberate shift of resources from new construction to energy retrofit
- Global South: Shift and improve construction for built environment to enable just transition, wellbeing



Own figure: Röck, Martin. "Building Data Models for Scalable High-Definition Life Cycle Assessment – Metrics, Methods, and Models to Support a Regenerative Built Environment." PhD thesis, KU Leuven, TU Graz, 2023.

Consultation: Whole life carbon roadmap


EUSurvey

Login | Help | Language

Public consultation for a roadmap for the reduction of whole life carbon emissions of buildings in the EU

Fields marked with * are mandatory.

Disclaimer

The European Commission is not responsible for the content of questionnaires created using the EUSurvey service - it remains the sole responsibility of the form creator and manager. The use of EUSurvey service does not imply a recommendation or endorsement, by the European Commission, of the views expressed within them.

Pages

Introduction | About you | Current engagement | EU policies | Possible areas for action | Supportive policies | Whole life carbon values | Concluding question

Introduction

Background

In the European Climate Law, the EU has set the target to reduce its net greenhouse gas emissions by at least 55% by 2030 compared to 1990 levels, and to become climate-neutral by 2050. The buildings and construction sector is a major consumer of both materials and energy, making it an important contributor to overall greenhouse gas emissions. While the operation of buildings is responsible for about 40% of the EU's total energy consumption, and for 36% of its greenhouse gas emissions from energy[1], buildings also contribute to greenhouse gas emissions at other stages of their life cycle, before they are occupied (manufacture and construction) and afterwards, at end of life. The International Resource Panel (IRP), in its Resource Efficiency and Climate Change Report, 2020, and the UN Environment Emissions Gap Report 2019, conclude that the carbon emissions related to the use of materials in construction is estimated to account for about 10% of total yearly greenhouse gas emissions worldwide. The Renovation Wave called for the EU to make our buildings more energy-efficient and less carbon-intensive over their full life-cycle and more sustainable.

The so-called 'whole life carbon' approach to buildings combines the greenhouse gas emissions from the material production and transport, caused by the construction process phase and processes at end of life (also called "embodied carbon"), and the greenhouse gas emissions linked to the operation of the building during its lifetime (also called "operational carbon")[2]. This approach could support Europe's path to climate neutrality in the buildings and construction sector by promoting whole life carbon reduction solutions in the sector, complementary to the existing policies that decarbonise material production, electricity generation, and operation emissions of buildings.

As part of the Renovation Wave, the Commission committed to develop a roadmap leading up to 2050 for reducing whole life-cycle carbon emissions in buildings." The present consultation is designed to inform the Commission's work on this roadmap.

Public consultation

The consultation opened on 17 July and runs **until 15 September.**

Have your say today!

https://ec.europa.eu/eusurvey/runner/Whole-life-carbon-of-buildings-consultation

KU LEUVEN

Nordic Sustainable Construction

"We need to learn, but we need to waste no time with our learning"
Donella Meadows

Let's Tackle Whole Life Carbon Now!

Dr. Martin Röck
martin.roeck@kuleuven.be
www.martinroeck.com



EU building stock whole life carbon study

Building stock data

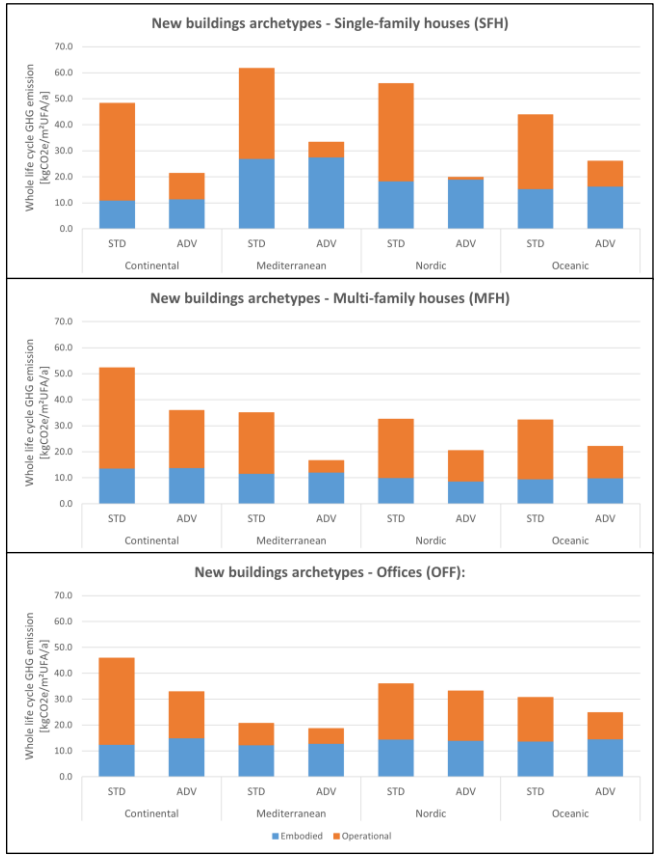
- EU Countries (27+2)
- Clustered by region (EPBD)
- Economy-wide scenarios
- Projections (2015 – 2050)

Activities

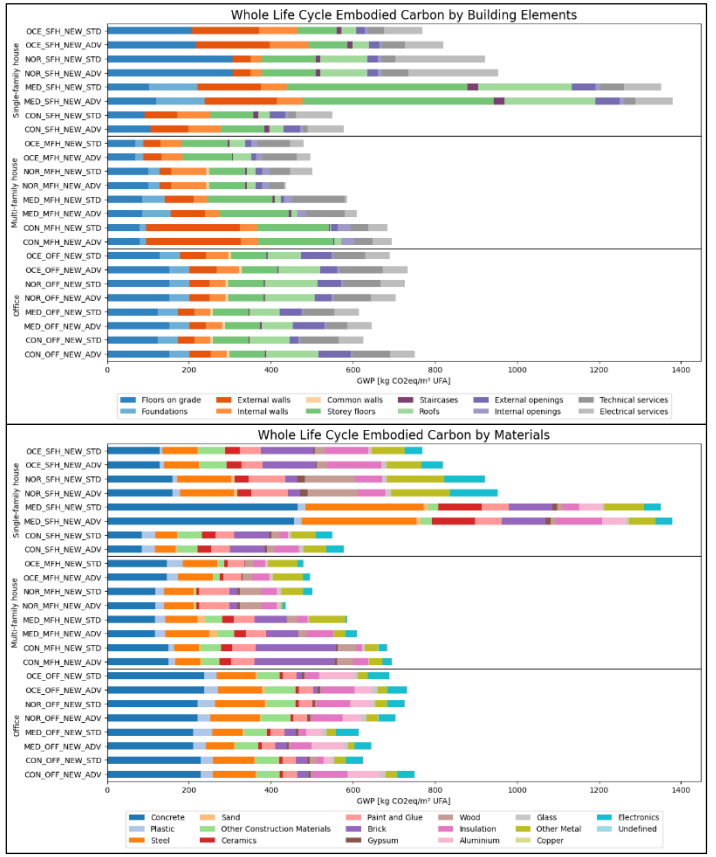
- Existing building operation
- Energy retrofit
- Deconstruction, demolition
- New building construction

Le Den X, Steinmann J, Kovacs A, Kockat J, Toth Z, Röck M, and Allacker K. "Supporting the Development of a Roadmap for the Reduction of Whole Life Carbon in Buildings." European Commission - DG ENV, 2023.

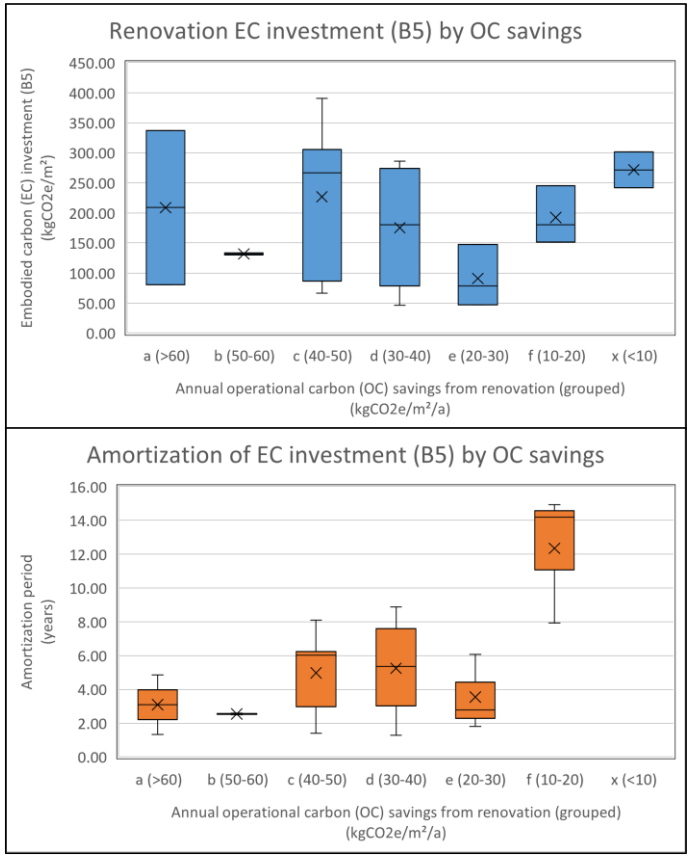
Building level baseline analysis



Whole Life Carbon Benchmarks



Embodied Carbon Contributions



Embodied Carbon Payback

Own figures: Röck, Martin. "Building Data Models for Scalable High-Definition Life Cycle Assessment – Metrics, Methods, and Models to Support a Regenerative Built Environment." PhD thesis, KU Leuven, TU Graz, 2023.

Le Den X, Steinmann J, Kovacs A, Kockat J, Toth Z, Röck M, and Allacker K. "Supporting the Development of a Roadmap for the Reduction of Whole Life Carbon in Buildings." European Commission – DG ENV, 2023.

Towards climate reporting of the building stock

Morten Ryberg, Sweco Danmark
morten.ryberg@sweco.dk

Ministry of the Environment Finland

Nordic Innovation

Form Design Center

Government of Iceland
Ministry of Infrastructure

Danish Authority of Social Services and Housing

Nordic Harmonization of LCA

SWECO

BUILD DEPARTMENT OF THE BUILT ENVIRONMENT
AALBORG UNIVERSITY

LCA SUPPORT

EFLA

Task 4 - GHG limit values and reporting the decarbonization of the Nordic building stock

Task 4.2

Process for monitoring the decarbonization of the building stock

REVIEW INPUT, ANALYSE, DEVELOP RECOMMENDATIONS

Overview of approaches for modelling and monitoring building stocks' CO2-eq emissions

Reviewing methods, mapping data

Recommendations on processing and management of existing and/or planned statistics

Recommendations on needs for other statistical data for monitoring

SYNTHESIS OF FINDINGS

Process and work plan for monitoring decarbonization of the building stock.

Account for national conditions and potential for harmonization of approaches across countries

1. Carbon emission reporting in structured database on building level for all buildings

2. Material information on building level paired with emission factors for materials

3. Building stock information (areas, year, building type, etc.) paired with national emission factors for building types


Building stock information (area, type, year, etc.)

X


Carbon emissions for materials based on building type

=


Building stock carbon monitoring

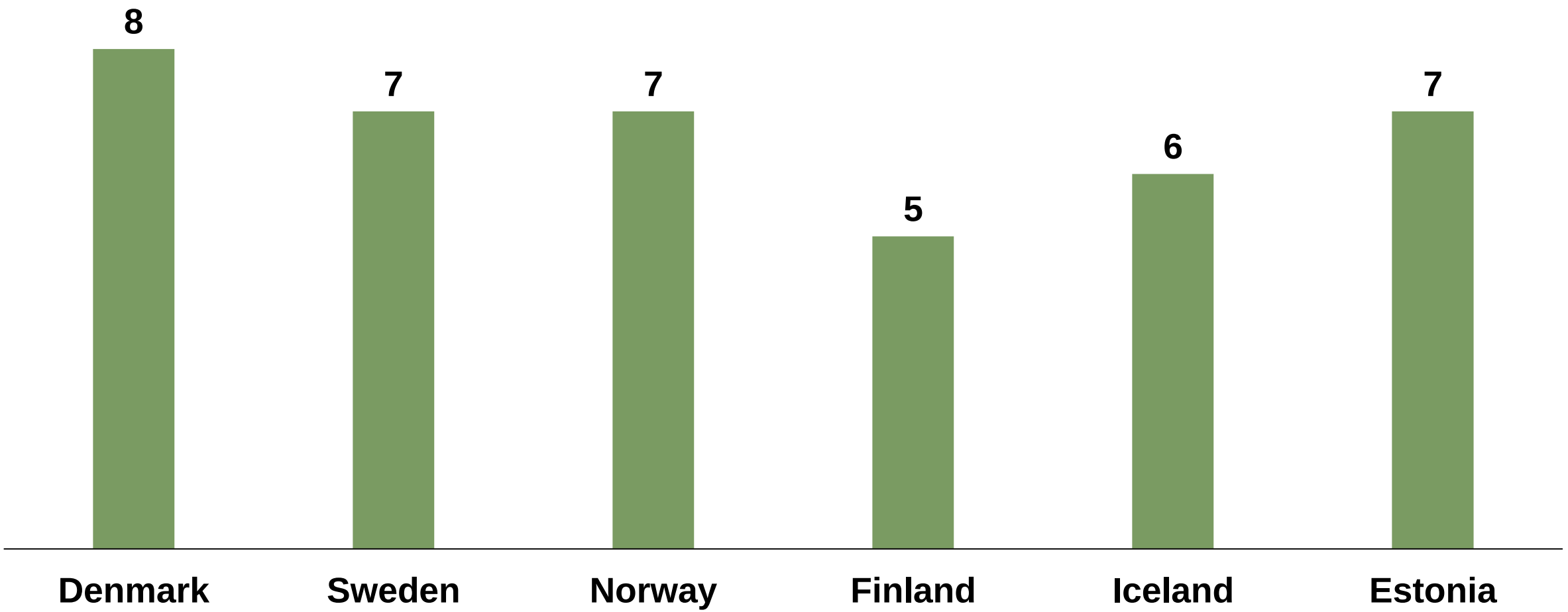
Database information gathering

#	Database name	Brief description	Responsible organization	Link to organization	Link to database	Datatype	Relevant key data	Coverage area	Accessibility	Access cost	Format	Responsible for datainput	Update freequenzy	Integration	Legal c
1	BBR - Building and Housing Register	In BBR (Building and Housing Register), you can find information about all buildings and residences in Denmark. There is a lot of information available for each individual building, such as its location, its usage, size, and age	Ministry of Taxation (Skatteministeriet (Vurderingsstyrelsen))	https://vurdst.dk/	https://bbr.dk/forside	Building register	Area Facade material Roof material Type of heating Number of floors	Nationwide	Public	Free	Structured database	Building owner	Continuosly	No	
2	Protected and listed buildings	FBB is the register of Protected and listed buildings in Denmark maintained by the Danish Agency for Culture and Palaces. FBB contains information about approximately 7,100 protected buildings in the country and about 370,000 buildings whose preservation value has been assessed. Additionally, FBB includes basic information about over 4 million buildings in Denmark. This information is sourced from the Building and Housing Register (BBR) and is automatically updated.	Ministry of Culture (Kulturministeriet (Slots- og kulturstyrelsen))	https://slks.dk/	https://www.kulturarv.dk/fbb/index.htm	Register for preserved buildings	Area Facade material Roof material Type of heating Number of floors Material description	Nationwide	Public	Free	Structured database	Data comes from BBR and Ministry of Culture	Continuosly	No	
3	Waste data system (ADS)	The Waste Data System is a web-based database that collects information about waste streams in Denmark. According to the Waste Data System Order, companies responsible for waste treatment are required to report to the Waste Data System. During reporting, they need to specify the source of the waste, the type of waste, and how the waste should be treated. Companies reporting waste data have the ability to edit and retrieve their own waste data, while certain waste data is publicly accessible.	Ministry of Environment (Miljøministeriet (miljøstyrelsen))	https://mst.dk/	https://www.ads.mst.dk/Default.aspx	Waste register	Type of waste (sector) Type of waste (category) Amount of waste	Nationwide	Public	Free	Structured database	Companies responsible waste treatment	Minimum yearly. Also possible to update continuosly	No	
4	Energy label	Energy labeling makes the energy consumption of buildings visible and serves as a type of product declaration. The energy performance certificate also provides an overview of energy-related improvements	Ministry of Climate, Energy and Utilities (Klima-, Energi- og forsyningsministeriet (Energistyrelsen))	https://ens.dk/	https://old.sparenergi.dk/forbruger/vaerktoejer/find-dit-energimaerke	Energy label register	Calculated energy demand	Nationwide	Public	Free	Structured database	Energy labeling of buildings can only be carried out by companies that are certified to perform energy labeling. Certification requires a quality management system	Continuosly	No	

Front page | DK | ICE | EST | FIN | NOR | SWE

SWECO

The database landscape



SWECO

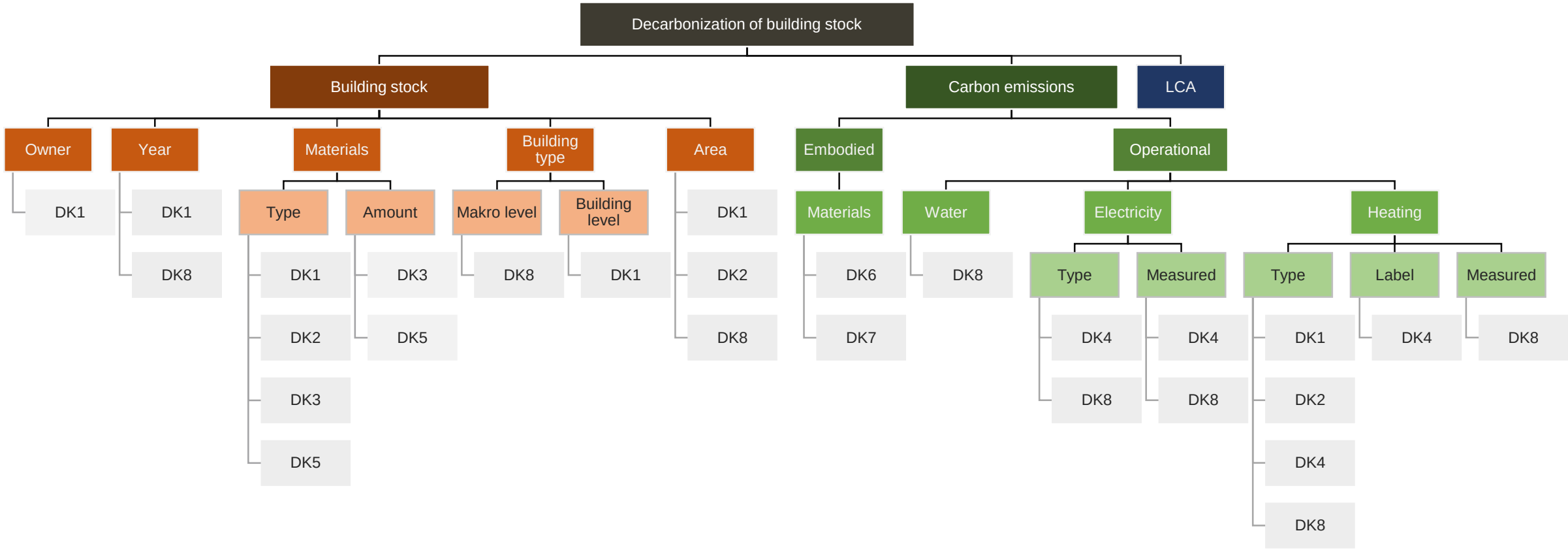
Database mapping – key attributes

- Owner
- Year
- Materials
- Building type
- Area

- Embodied (materials)
- Operational (Heating, ventilation, etc.)
- Full LCA

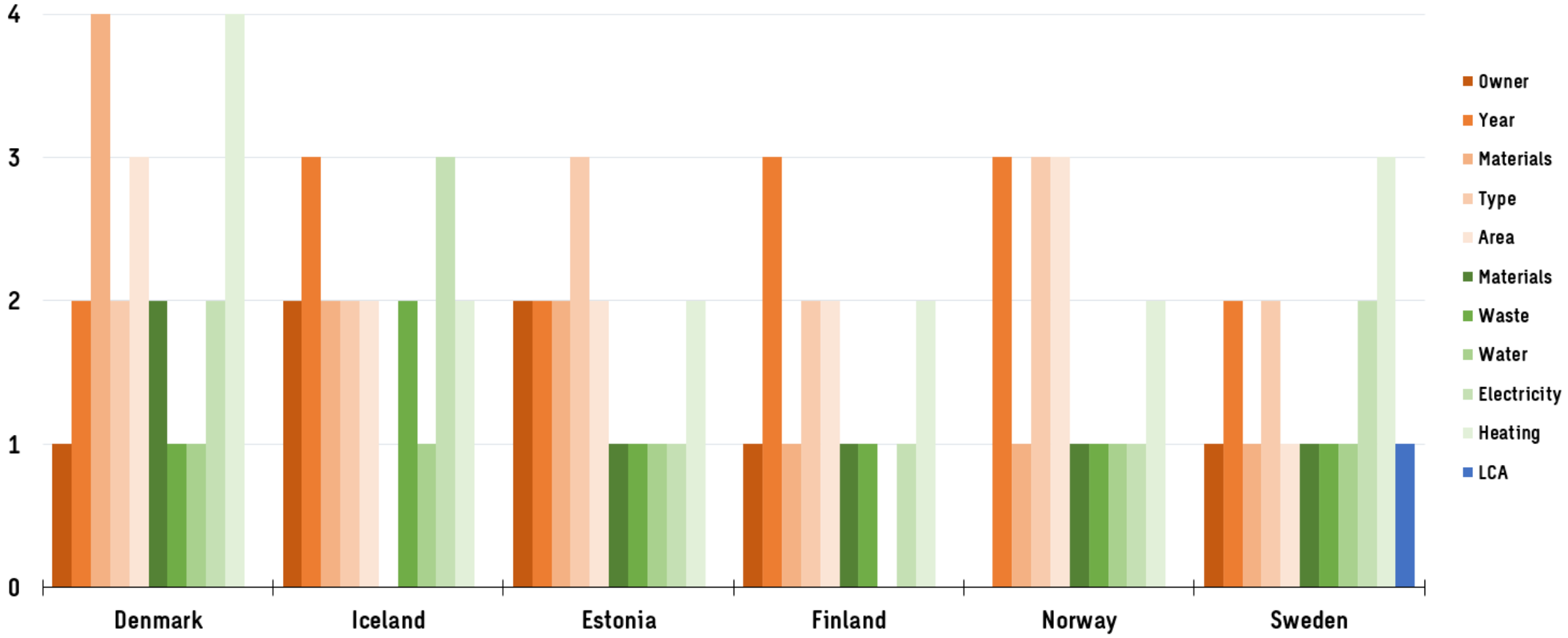
SWECO

Database mapping – Denmark



SWECO

Amount of databases covering the key attributes



SWECO

1

Sweden is the only Nordic country with a database that contains information about embodied and/or operational CO2-eq on building level. The database structure is new and doesn’t contain information about existing buildings.

This structure could be a potential recommendation for a future a bottom-up approach to monitoring carbon emissions on the building stock in the Nordic countries.

2

Results shows that all of the Nordic countries has databases that covers almost all the key attributes. Many of the attributes are covered with more than one database.

Next step is to perform a quality assessment of the databases to ensure that the databases have a high enough quality to be used as a recommendation for monitoring.

Next steps

1. Database quality assessment
2. Review of existing building stock modelling approaches
3. Recommendations on processing and management of existing and/or planned statistics
4. Recommendations for other statistical data for monitoring
5. Process and work plan for monitoring decarbonization of the building stock

Transforming society together

Danish Authority of Social Services and Housing

Limit values: First experiences from Denmark

Helle Redder Momsen

15.09.2023

Viden til gavn

Agenda

1 The path towards limit values in Denmark

2 Status of todays legislation

3 Challenges and lessons learnt

4 Future limit values and other focus

The path towards limit values in Denmark

Process for implementation of LCA requirements and limit values in the Danish building code

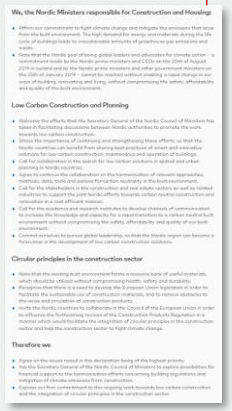
Reference value study by BUILD, looking into impacts from 60 buildings

The government's *climate partnership* gives recommendations for implementation of limit values

Nordic colaboration on Low Carbon Construction and Circular Principles in the Construction Sector

2019

2020


We, the Nordic Ministers responsible for Construction and Housing:

- Affirm our commitment to fight climate change and mitigate the emissions that arise from the built environment. The high demand for energy and materials during the life cycle of buildings leads to unsustainable amounts of greenhouse gas emissions and waste.
- Note that the Nordic goal of being global leaders and advocates for climate action – a commitment made by the Nordic prime ministers and CEOs on the 20th of August 2019 in Iceland and by the Nordic prime ministers and other government ministers on the 15th of January 2019 – cannot be reached without enabling a rapid change in our ways of building, renovating and living, without compromising the safety, affordability and quality of the built environment.

Low Carbon Construction and Planning

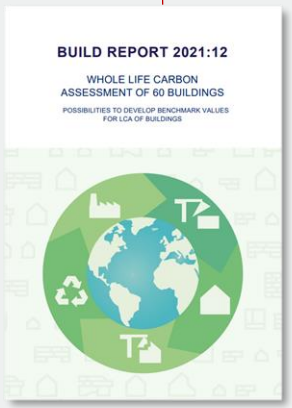
- Welcome the efforts that the Secretary General of the Nordic Council of Ministers has taken in facilitating discussions between Nordic authorities to promote the work towards low-carbon construction.
- Stress the importance of continuing and strengthening these efforts, so that the Nordic countries can continue sharing best practices of smart and innovative solutions for low-carbon construction, maintenance and operation of buildings.
- Call for collaboration in the search for low-carbon solutions in spatial and urban planning in Nordic countries.
- Agree to continue the collaboration on the harmonization of relevant approaches, methods, data, tools and policies for carbon neutrality in the built environment.
- Call for the stakeholders in the construction and real estate sectors as well as related industries to support the joint Nordic efforts towards carbon neutral construction and renovation in a cost efficient manner.
- Call for the academia and research institutes to develop channels of communication to increase the knowledge and capacity for a rapid transition to a carbon neutral built environment without compromising the safety, affordability and quality of our built environment.
- Commit ourselves to pursue global leadership, so that the Nordic region can become a forerunner in the development of low carbon construction solutions.

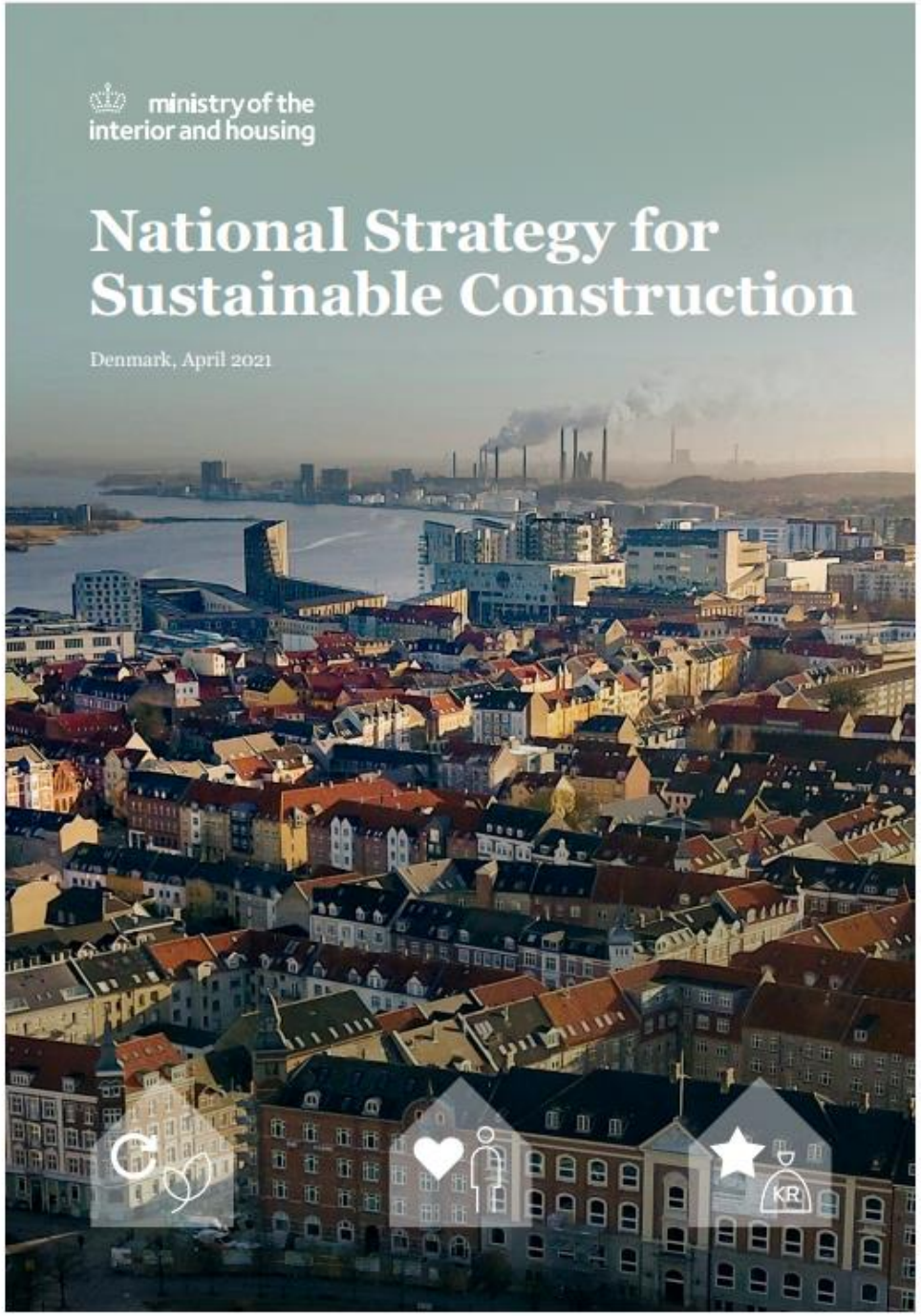
Circular principles in the construction sector

- Note that the existing built environment forms a resource bank of useful materials, which should be utilized without compromising health, safety and durability.
- Recognize that there is a need to develop the European Union legislation in order to facilitate the sustainable use of construction materials, and to remove obstacles to the reuse and circulation of construction products.
- Invite the Nordic countries to collaborate in the Council of the European Union in order to influence the forthcoming revision of the Construction Products Regulation in a manner which would facilitate the integration of circular principles in the construction sector and help the construction sector to fight climate change.

Therefore we

- Agree on the issues raised in this declaration being of the highest priority.
- Ask the Secretary General of the Nordic Council of Ministers to explore possibilities for financial support to the harmonization efforts concerning building regulations and mitigation of climate emissions from construction.
- Express our firm commitment to this ongoing work towards low carbon construction and the integration of circular principles in the construction sector.

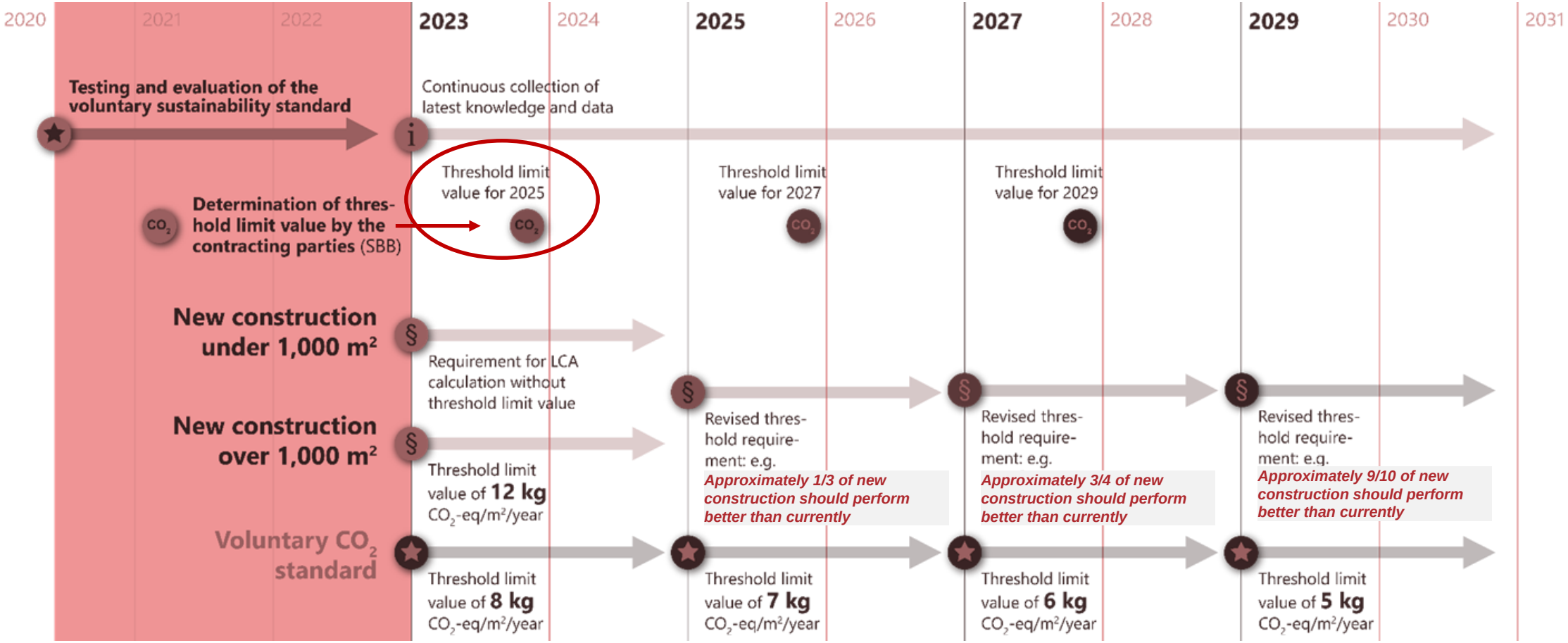




National strategy for sustainable construction

- Based on broad political agreement
- 21 initiatives to support sustainable development of the construction sector
- The strategy is implemented from 2021-2029
- Establishment of a coordinating forum consisting of stakeholders in the construction sector

Staged phasing and tightening of the CO_2-criteria



Process for implementation of LCA requirements and limit values in the Danish building code

Reference value study by BUILD, looking into impacts from 60 buildings

Broad political agreement on National Strategy for sustainable construction, here under limit values for CO2

National hearing

Notification

Inforcement of Climate regulation in the Danish building code

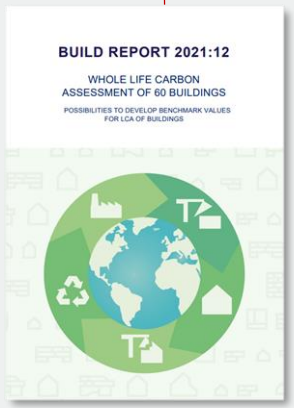
Adjustment of legislation, data for reused products

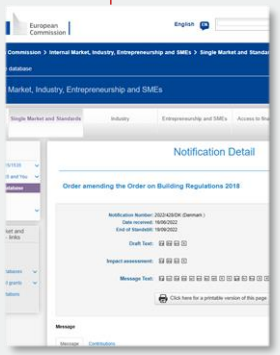
2021

2022

2023

2024





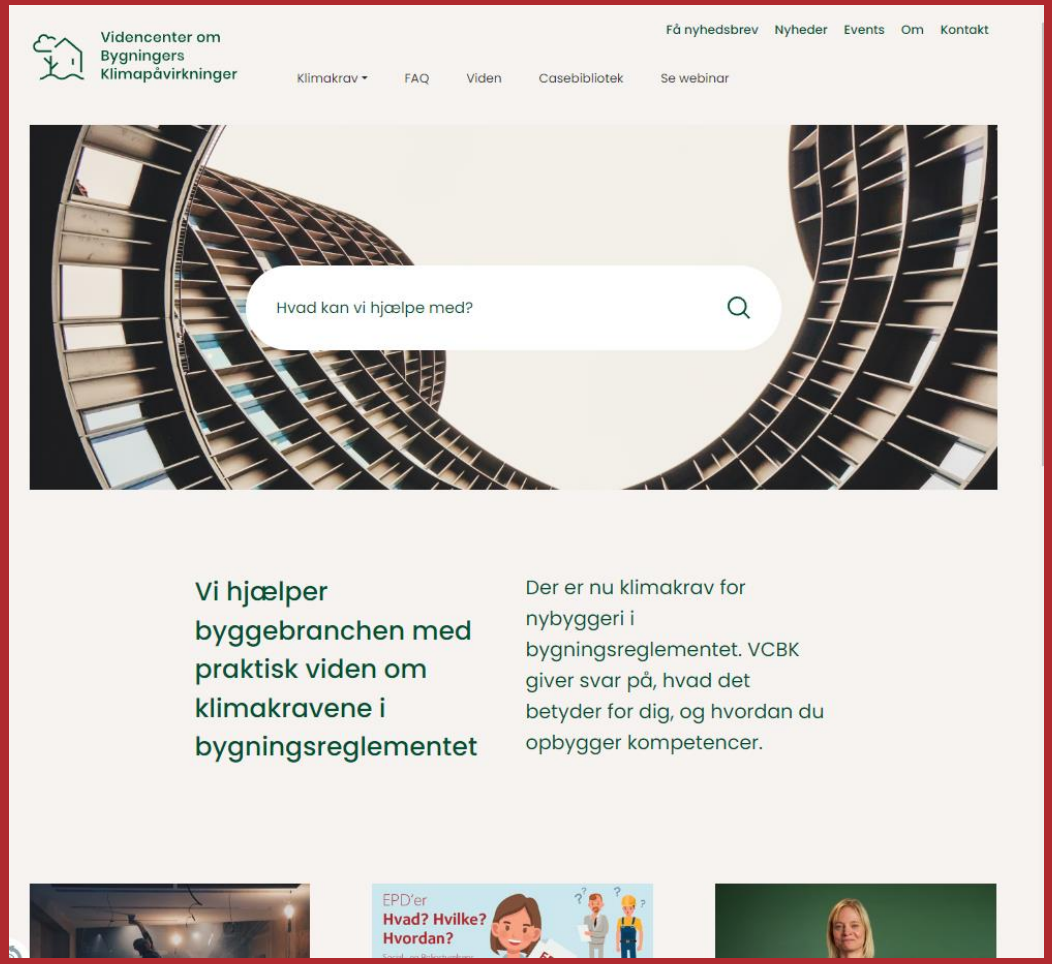
Status of todays legislation

Overview of the LCA legislation

Climate legislation of buildings has been introduced in the Danish building code from 2023

- Calculation method based on the standard EN15978
- Modules of the Life Cycle include, A1-3, B4, B6 and C3-4 and D
- Fixed definition of which building parts to include in the calculation
- Fixed set of product data to be used in calculation. Alternative option to use product specific EPD's (Environmental Product Declaration)
- Fixed emission factors for energy use
- Certain building functions which need *more* or *specific products*, can exceed the limit value

Stage	Moduler	
Product	A1	Raw material supply
	A2	Transport
	A3	Manufacturing
Construction process	A4	Transport
	A5	Construction-installation process
Use	B1	Use
	B2	Maintenance
	B3	Repair
	B4	Replacement
	B5	Refurbishment
	B6	Operational energy use
	B7	Operational water use
End of life	C1	De-construction demolition
	C2	Transport
	C3	Waste processing
	C4	Disposal
Beyond the system boundary	D	Reuse-, Recovery- Recycling-potential



Implementation

Who is the knowledge center?

- Support building industry with the new legislation
- Webinars, Info, competences etc.

Where is the industry today?

- Few have handed in the documentation yet, limited experiences
- Many are working with it and we see a push of development in the industry and the whole value chain
  - *Courses*
  - *Tools are developed*

Tools

- Every tool which use the described method can be used

Challenges and lessons learnt

Challenges

Data

- Challenging to ensure systematic collection of data to gain experience

Quality of calculations

- Limited control with calculations. Concern among stakeholders that CO2 results can differ

Enforcement

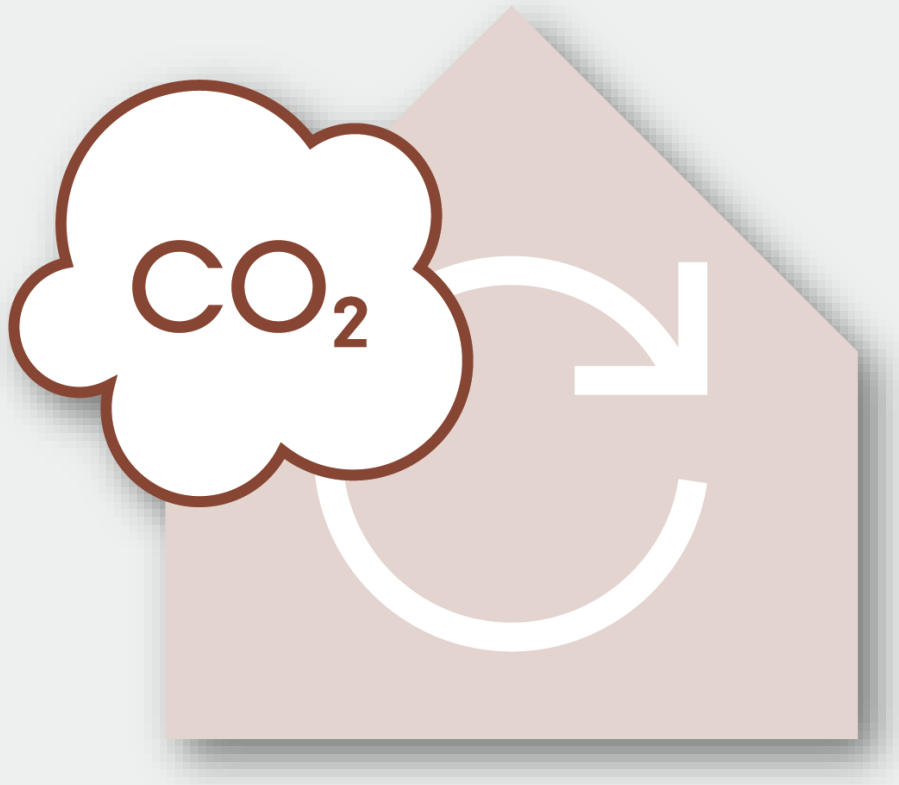
- Limited opportunities to enforce compliance after completion of a building

Balance

Detail and preciseness vs. work load and effect

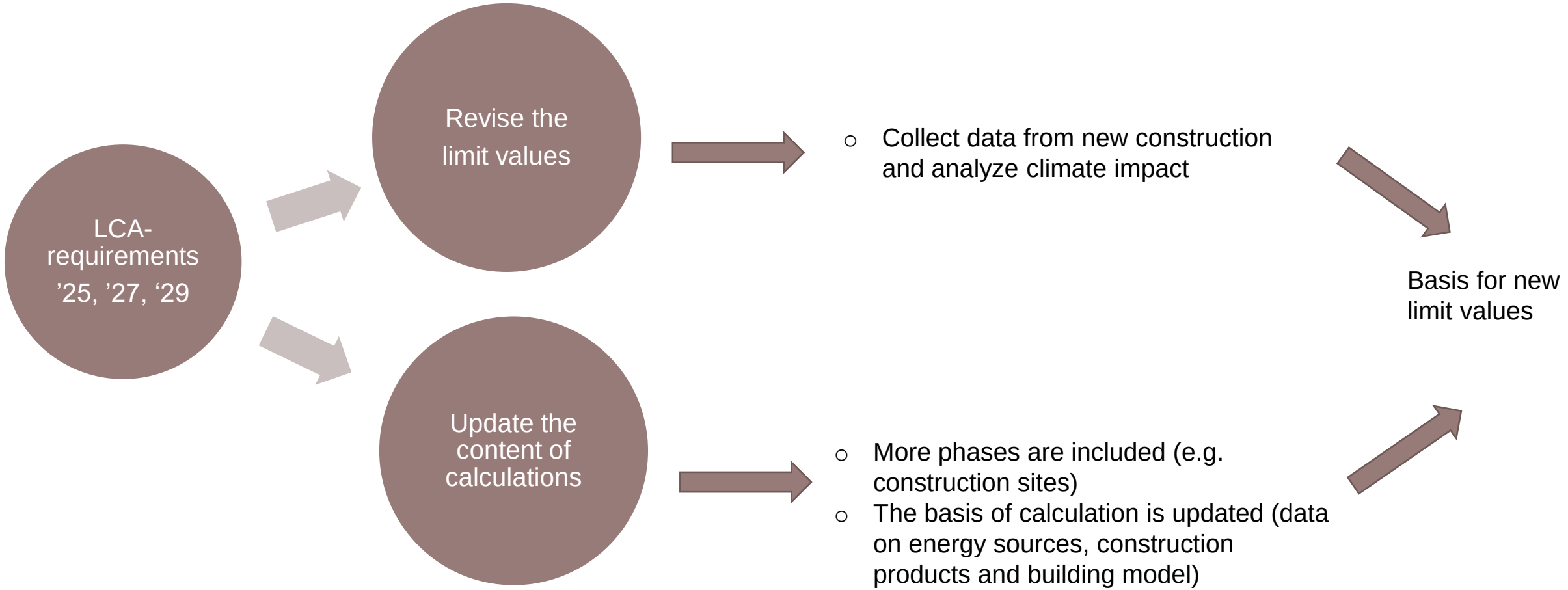
Lessons

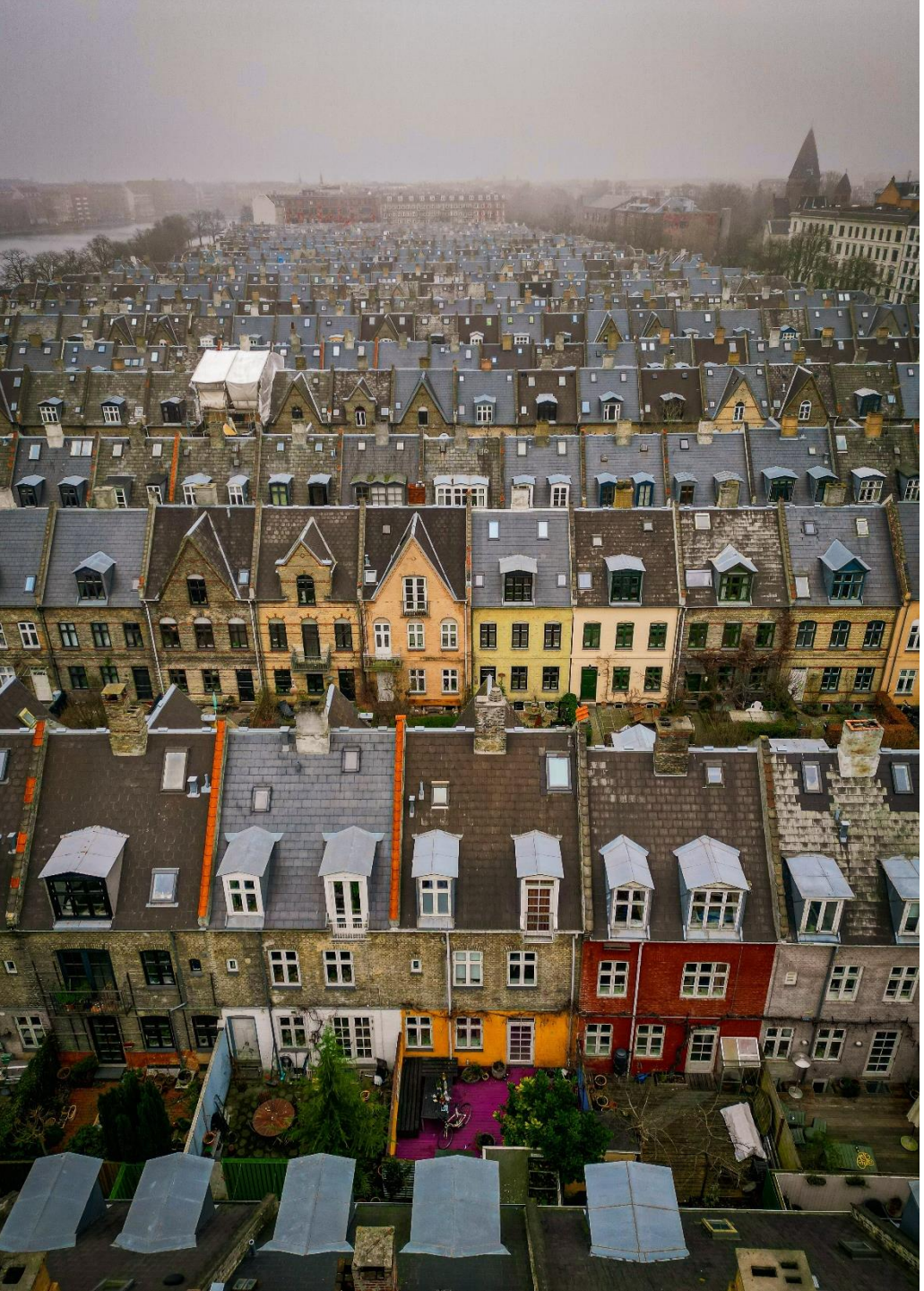
- Important with open dialogue with the sector
- Transparency of coming regulation
- LCA tools have been developed
- Net works established (own initiatives)
- Increase in education
- Ensure knowledge and information to relevant stakeholders
- Regulation has had a positive impact on change



Future limit values & other focus

Development of new climate requirements with threshold limit values





Limit values 2025

Cases which represent the Danish building mass (over 160 cases)

- *Materials, size, building types*

Analysis

Difference in impacts related to size of building?

Difference in impacts related to building type?

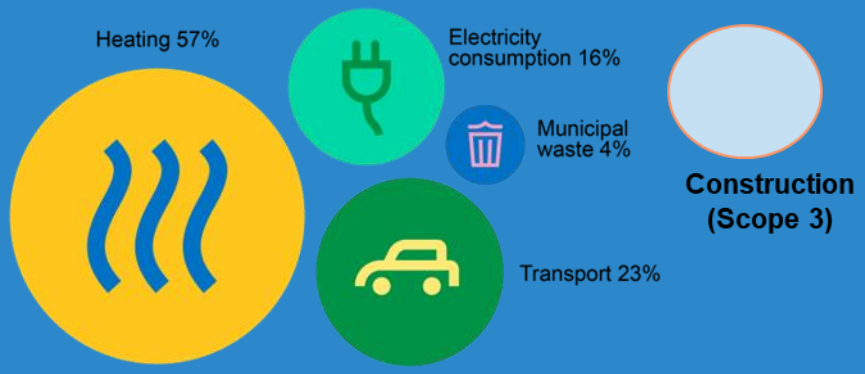
Future focus

- Renovation is on the agenda
- Difficult to find LCA cases, we start a case collection
- Difficult to find a model for limit values for renovations as they differ a lot
- Information campaign to increase renovations instead of demolition
- Focus on reuse of structual systems

Panel Discussion

Local context Helsinki

Emissions



Power to act

- Owns 63 % of land and 20 % of buildings
- Every 6th person lives in a city owned apartment
- Nearly 34 percent of Helsinki's land area consists of green space managed by the city
- Planning monopoly
- Responsible for 2/3 of services to citizens
- Right to collect taxes
- 6 billion euro annual budget, 700.000 surplus
- Strong local democracy
- Easy collaboration with state and private sector
- Carbon neutrality target 2030 set by city council-> strategic key target for the whole city

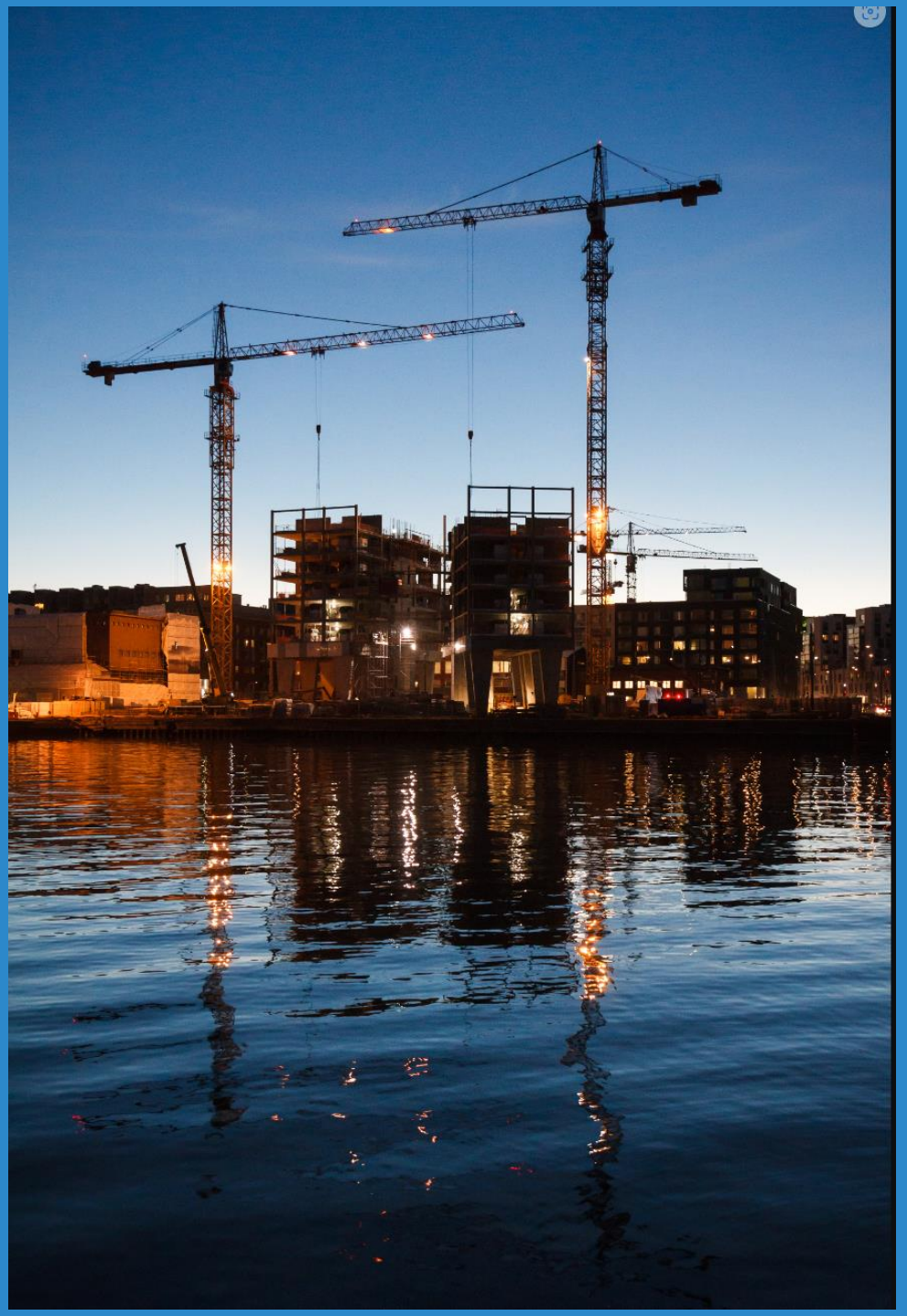
Helsinki

What does this mean for guiding the construction sector ?:

- High ambition level for target (= reduction of emissions)
  - No unnecessary guidance on tools used ->no added difficulty or costs. Room for innovation and market discovery
- Ensuring impact and efficiency of guidance
  - If there’s too many regulations or guidance documents we can not effieciency of impact on emissions
  - Mutually/centrally decided rules for guidance to avoid contradictory goals and fluffy instructions

- ***Energy efficiency class has been used for main guidance- > now moving to lifecycle carbon footprint***

- Carbon footprint limit for new residential buildings- 16 /m²/a in 50 year timeframe
  - ✓ room for market innovations
  - ✓ many different combinations from building materials to heating systems
- Low Carbon Concreate in all infrasturcture contracts (GWP85 -> GWP60)
- Project areas to be prebuilt with -50% emissions



Session 3: The business of carbon neutral construction

Market Outlook for Denmark

Anders Stouge

Director

Danish Industry

Market Outlook for Iceland

Katarzyna Jagodzinska

Project Manager

Green Building Council Iceland

Market Outlook for Finland

Charlotte Nyholm

Leading Specialist

Granlund Consulting

WHAT ACTIONS ARE THE DANISH CONSTRUCTION INDUSTRY TAKING TO MAKE CONSTRUCTION PART OF THE SOLUTION TO A GREEN TRANSITION

Danish Construction Federation

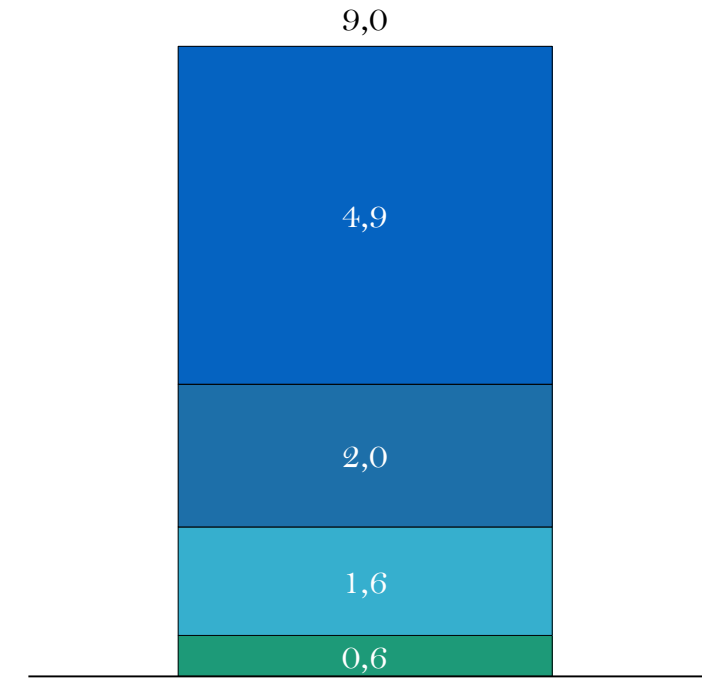
The Danish construction sector

- Adds approximately 1% to the building stock annually.
- Renovates approximately 0.5% annually.
- Demolishes 0.3 percent of the building stock per year, equivalent to 2-3 million square meters.
- In terms of quantity, concrete, brick, and wood currently dominate in Danish construction.

Danish Construction Federation

Emissions | CO2 emissions from the construction sector in 2021 were ~9 million tons (approx. 20% of DK's total emissions)

(Plus 4,6 mio. tons CO2 from imported building materials)



Million tons of CO2 from construction in 2021

Energy consumption for operating buildings, e.g. heating, lighting, ventilation.

Energy-related emissions for the production of building materials, e.g. **energy** consumed in the extraction of gravel and stone, wood industry, cement production, etc.

Process emissions for the production of building materials, especially cement production

Emissions from **energy consumption** in building and construction, i.e. the building and construction process itself, e.g. drying, heating, diesel for machinery on the construction site,

Source: Ea Energianalyse (not published - yet)

Customers ”love” it!

PensionDanmark leads the way and has suceeded in combining sustainability, responsibility and returns when investing in real estate.

A GREENER JERUDAN (ENVIROMENT)

Decarbonising real estate

We cannot ignore the environmental footprint of real estate, as it is responsible for 37% of global GHG emissions. The sector urgently needs better ways to construct and operate buildings. Nrep is committed to lead and accelerate the way towards a carbon neutral sector.

We pledge to decarbonize our real estate portfolio by 2028 – encompassing both operational and embodied carbon.

Industriens Pension is building green homes in the new Odense district

Danish Construction Federation

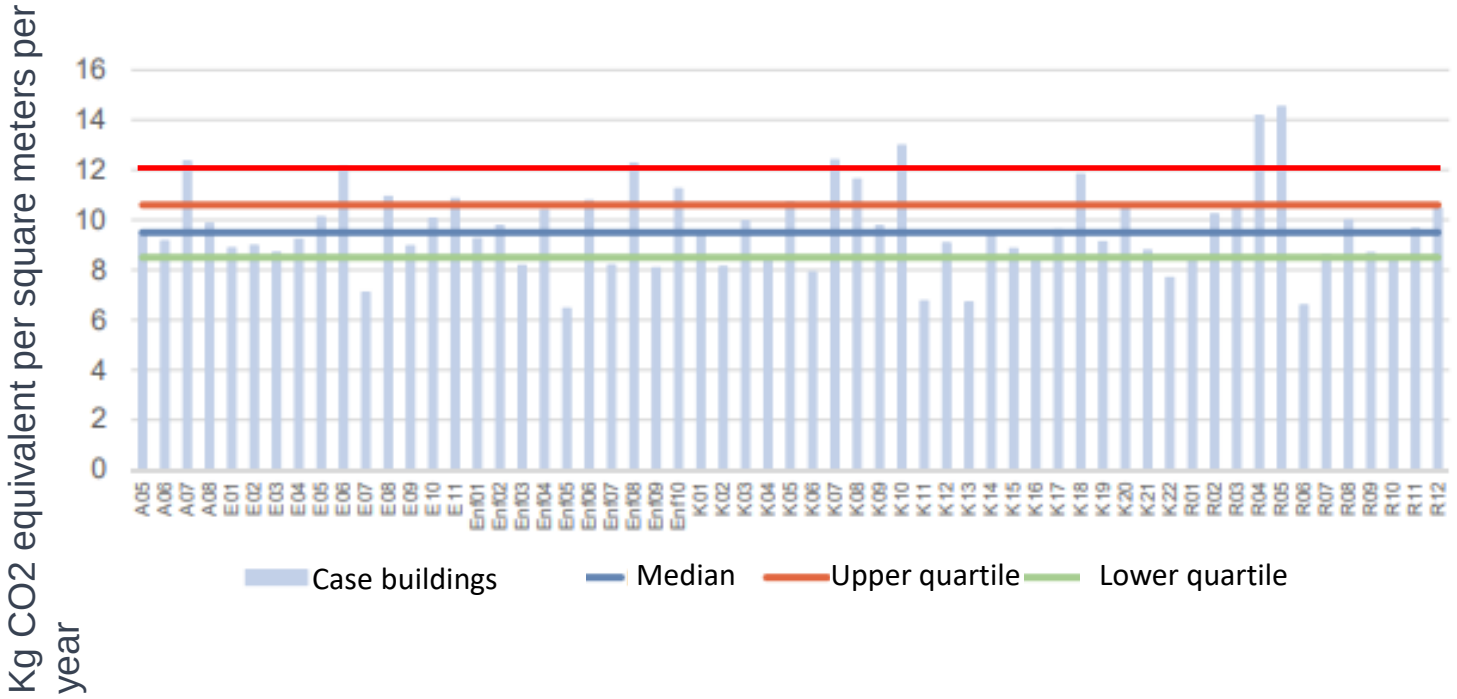
New Climate Regulation 2023

1. All new buildings climate impact must be documented through an LCA-calculation

2. New buildings over 1,000 m2 must adhere to a limit of 12 kg CO2-eq/m2/year.

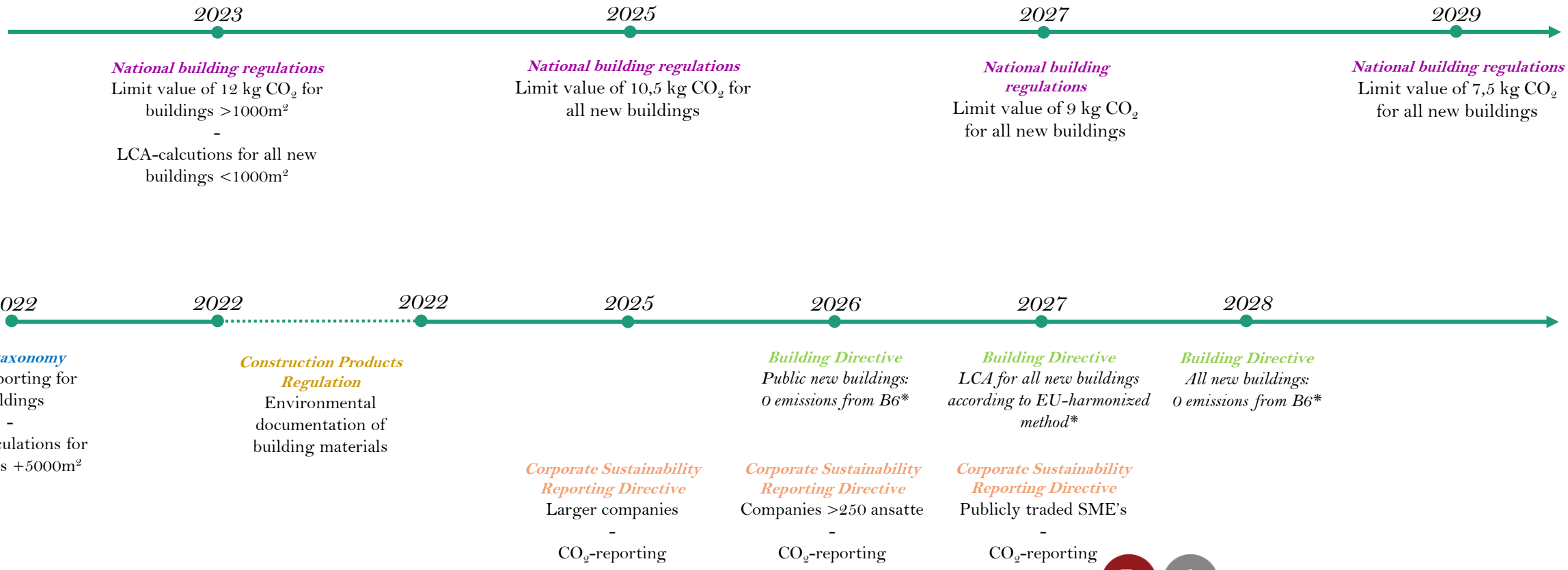
DI Byggeri

60 case buildings CO2 and reference values



Danish Construction Federation

LCA, Climate requirements, social conditions, governance, Reporting requirements going forward



Danish Construction Federation

*Possible outcome of the ongoing negotiations of the EPBD

Incorporating the external transportation and construction site into the LCA calculations

- Transport (A4) and waste on construction sites (A5) makes the biggest contributions to Co2e emissions in A4 and A5 LCA-modules
- Based on a large-scale study of Danish construction projects

Table 7. Reference values for the climate impact for transport A4 and the construction installation process A5. All values are measured in $kgCO_2e/m^2y$. * Sum is adjusted for missing electricity, fuel and waste data.

		25% Quartile	50% Quartile (Median)	75% Quartile
Module A4	Transport	0.15	0.28	0.33
Module A5	Electricity	(0.11)	0.19	0.38
	Heating	(0.07)	0.12	0.18
	Fuel	(0.04)	0.08	0.29
	Waste	(0.35)	0.49	0.67
	Sum	0.49	0.77	1.17
	Adjusted *	0.56	0.96	1.21
A4 + A5	Sum	0.64	1.05	1.50
	Adjusted *	0.71	1.24	1.54

The sum of A4 and A5 contributes with **1.24 kg CO2e/m2*y** to the LCA calculations (median value)

Danish Construction Federation

THE DANISH CONSTRUCTION SECTOR'S ACTION TANK FOR SUSTAINABILITY

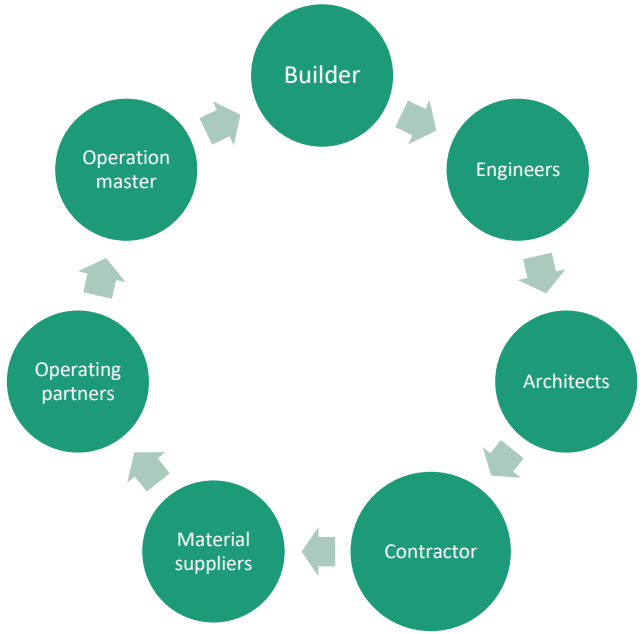
Danish Construction Federation

Partner organizations and memebes of the construction action tank for sustainability

The partner organizations:

- Danish Association of Construction Clients
- Danish Association of Architectural Firms
- Danish mechanical and electrical contractor association (TEKNIQ)
- Danish Association of Consulting Engineers (FRI)
- MOLIO
- Danish Construction Federation (DI)

Construction value chain



Others invited to the action tank

Pension companies, Insurance companies, Authorities, Banks, Demolishers

Danish Construction Federation

AIM

The construction sector must **take the lead** and drive a wider, greener and far more far-reaching transformation that will affect the entire construction value chain.

The construction sector **needs clear frameworks and clear conditions**. Therefore, we must clarify what we must document, which solutions and technologies we can use, how we do it, when and who is responsible.

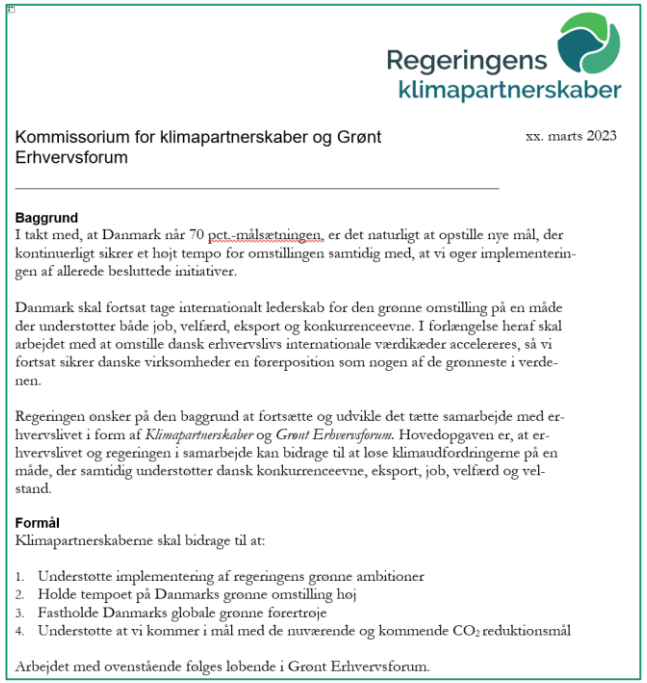
Collaboration is central in getting the entire value chain on the same page and find common answers and solutions to the climate challenge and sustainability in a broader sense, so that the extensive transition can be realized.

The baseline is the climate partnership and Molio's Top Leader Action tank, the future EU regulation, climate neutrality 2045, the evaluation of the 2030 target, reports and analyzes from DK and the EU as well as members of the councils insight and knowledge.

Danish Construction Federation

Update and further development of The Climate Partnership with Danish Government

Green businessforum				
Chairmanship	Business organisations	The trade union movement	The climate partnership	Organisations
Minister for Industry, Minister of Climate and Minister of Economy	DI, Green power DK, the chamber of Commerce, the Agriculture & Food Council	The Danish Trade Union Confederation, Danish metalworkers union, 3F	All 14 chairmans of the climate partnerships	Concito and The Danish Council on Climate Change



Regeringens klimapartnerskaber

Kommissorium for klimapartnerskaber og Grønt Erhvervsforum

xx. marts 2023

Baggrund
I takt med, at Danmark når 70 pct.-målsætningen, er det naturligt at opstille nye mål, der kontinuerligt sikrer et højt tempo for omstillingen samtidig med, at vi øger implementeringen af allerede besluttede initiativer.

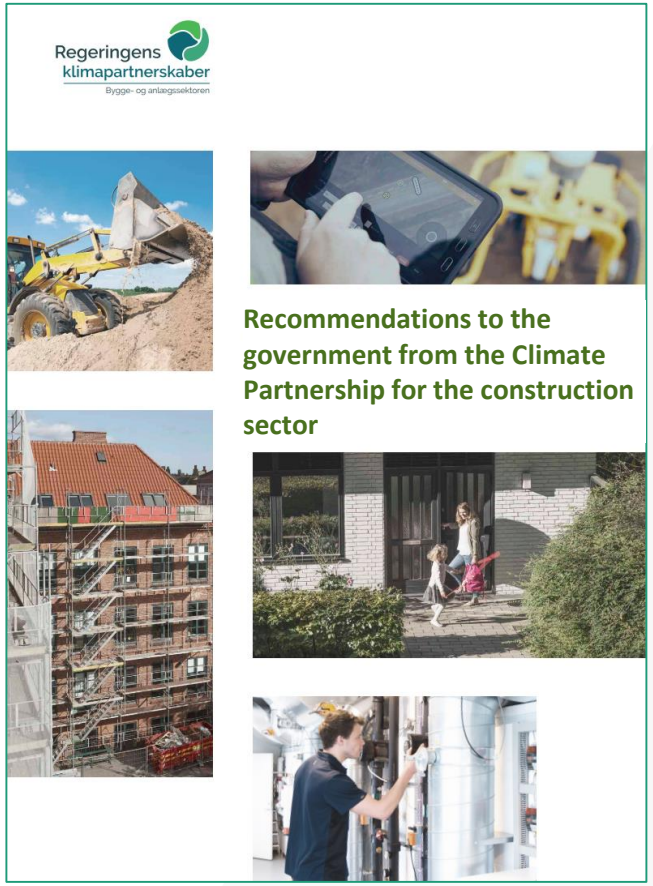
Danmark skal fortsat tage internationalt lederskab for den grønne omstilling på en måde der understøtter både job, velfærd, eksport og konkurrenceevne. I forlængelse heraf skal arbejdet med at omstille dansk erhvervslivs internationale værdikæder accelereres, så vi fortsat sikrer danske virksomheder en førerposition som nogen af de grønneste i verdenen.

Regeringen ønsker på den baggrund at fortsætte og udvikle det tætte samarbejde med erhvervslivet i form af *Klimapartnerskaber* og *Grønt Erhvervsforum*. Hovedopgaven er, at erhvervslivet og regeringen i samarbejde kan bidrage til at løse klimaudfordringerne på en måde, der samtidig understøtter dansk konkurrenceevne, eksport, job, velfærd og velstand.

Formål
Klimapartnerskaberne skal bidrage til at:

1. Understøtte implementering af regeringens grønne ambitioner
2. Holde tempoet på Danmarks grønne omstilling høj
3. Fastholde Danmarks globale grønne førertrøje
4. Understøtte at vi kommer i mål med de nuværende og kommende CO_2 reduktionsmål

Arbejdet med ovenstående følges løbende i Grønt Erhvervsforum.

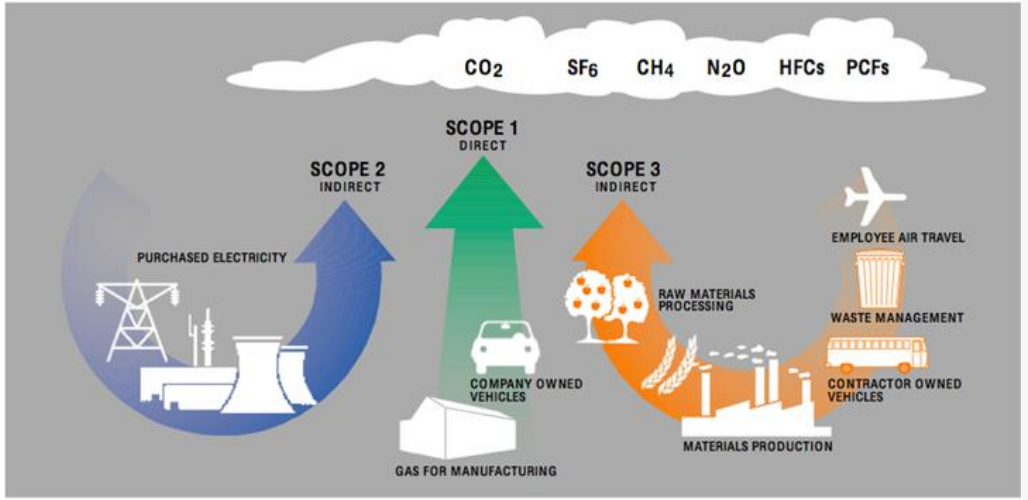


Danish Construction Federation

Updating the Climate Partnership report

Anchoring and interaction between the analytical track and the sector

- A consortium consisting of Round and EA Energianalyse prepares an analytical framework
- New baseline study qualifies the sector's climate and sustainability impact in relation to scope 1, 2 and 3 + sustainability variables.
- Initiatives and levers are developed in close collaboration with the action tank's working groups
- To the extent that it is possible, recommendations and levers are quantified in relation to climate and sustainability impact.
- All recommendations and levers are gathered in the updated Climate Partnership report, as the sector's input for, fx. Green Business Forum

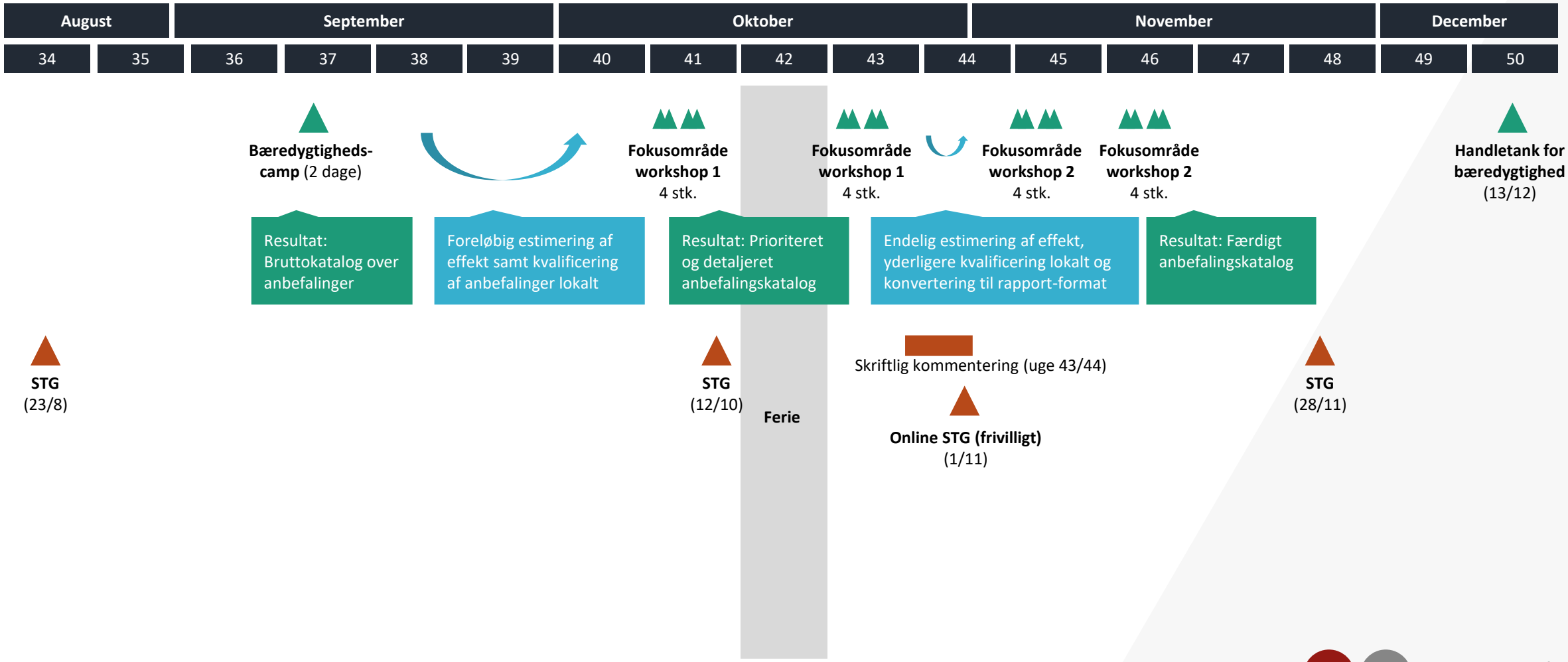


Focus areas for the action tank

1. The core narrative of construction
2. Innovation and market
3. The public sector as an accelerator for sustainability
4. Sustainable financing
5. Rules and framework for green construction
6. Data and digitalisation
7. Cooperation in construction
8. Circular economy
9. Biodiversity

Danish Construction Federation

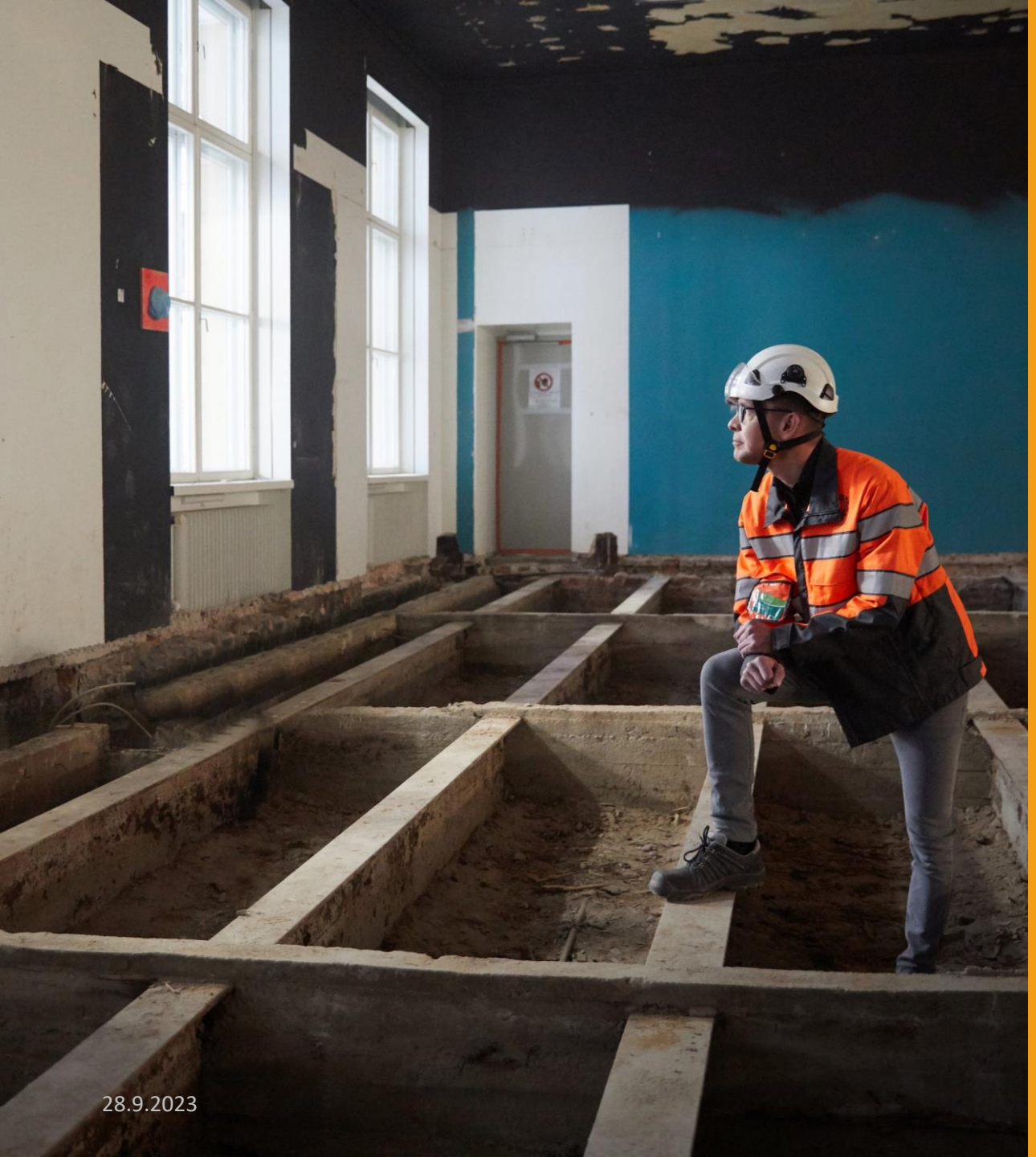
Proces



DI Byggeri

THANK YOU

FIRST MEETING IN THE ACTION TANK, 6. JUNE



Market Outlook for Sustainable Construction in Finland

Granlund Market Survey 2023

Charlotte Nyholm

Architect, M.Sc.

Chief Specialist, Sustainable Construction

Granlund

28.9.2023

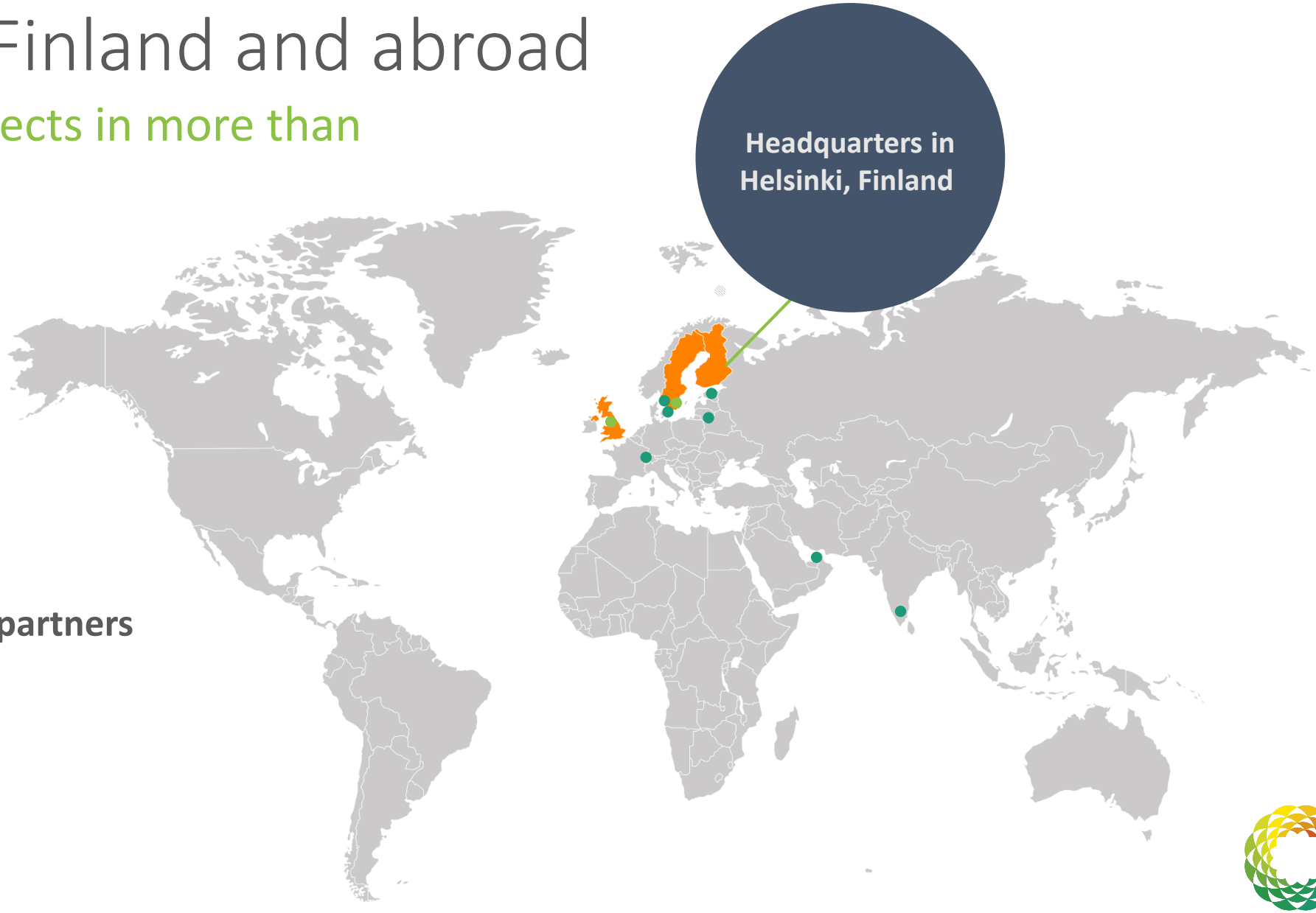
Granlund

Who we are

Granlund

Granlund in Finland and abroad

Customers and projects in more than **30 countries**



- **Our offices**
- **Granlund Manager partners**

Granlund

Our business areas

DESIGN

Market leader
in MEP design

SERVICES AND CONSULTANCY

Strong expertise in property, energy and environmental consulting

CONSTRUCTION MANAGEMENT AND SUPERVISION

Project management, cost control and monitoring

SOFTWARE

Granlund Manager
brings property management
to a new level

PROPERTY MANAGEMENT

Supporting housing companies in the Helsinki metropolitan area

Our strengths

ENERGY

SUSTAINABILITY

DATA AND DIGITALISATION

PRODUCTIVITY

Granlund

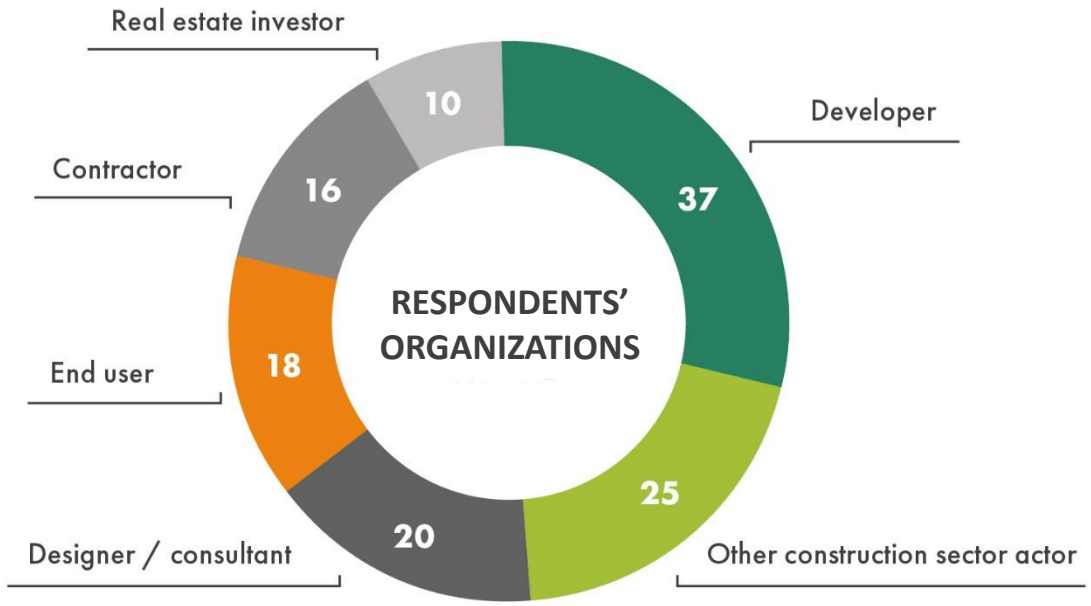
Market Survey 2023

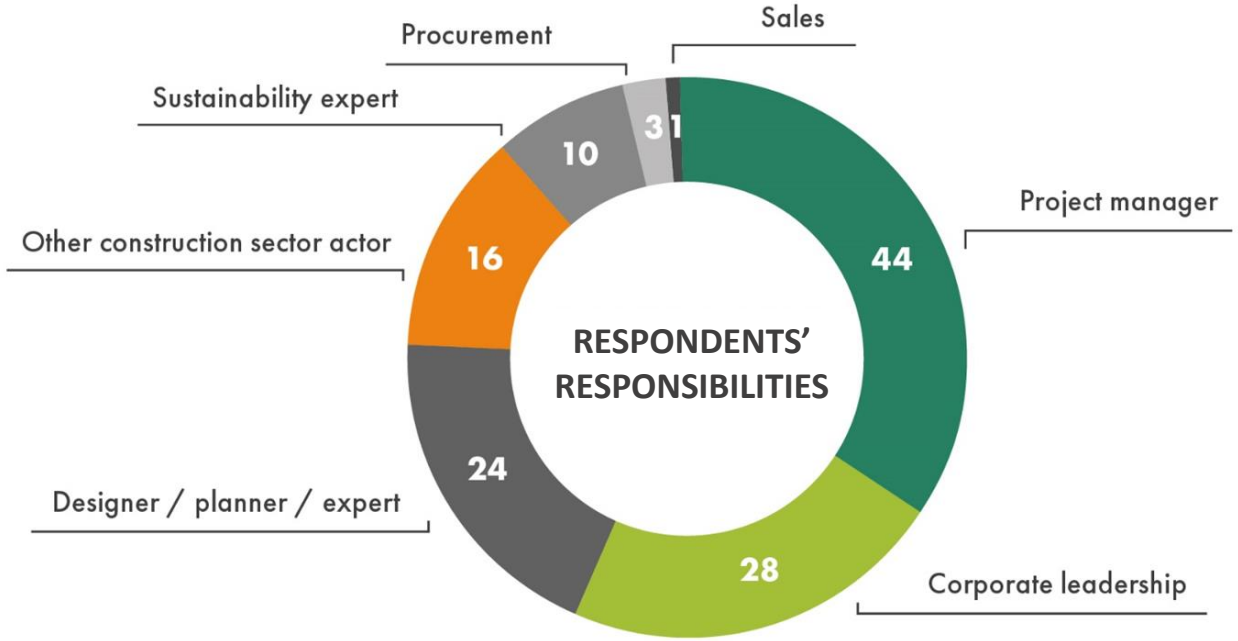
Granlund

Market Survey

- Web-based survey in March-April 2023 aimed at real estate and construction professionals
- **Aims:**
  - To establish the current state of environmentally sustainable construction as well as future trends
  - Highlight the prerequisites and challenges associated with achieving sustainability targets
- **Themes**: environmental sustainability generally and carbon footprint specifically

126 RESPONDENTS





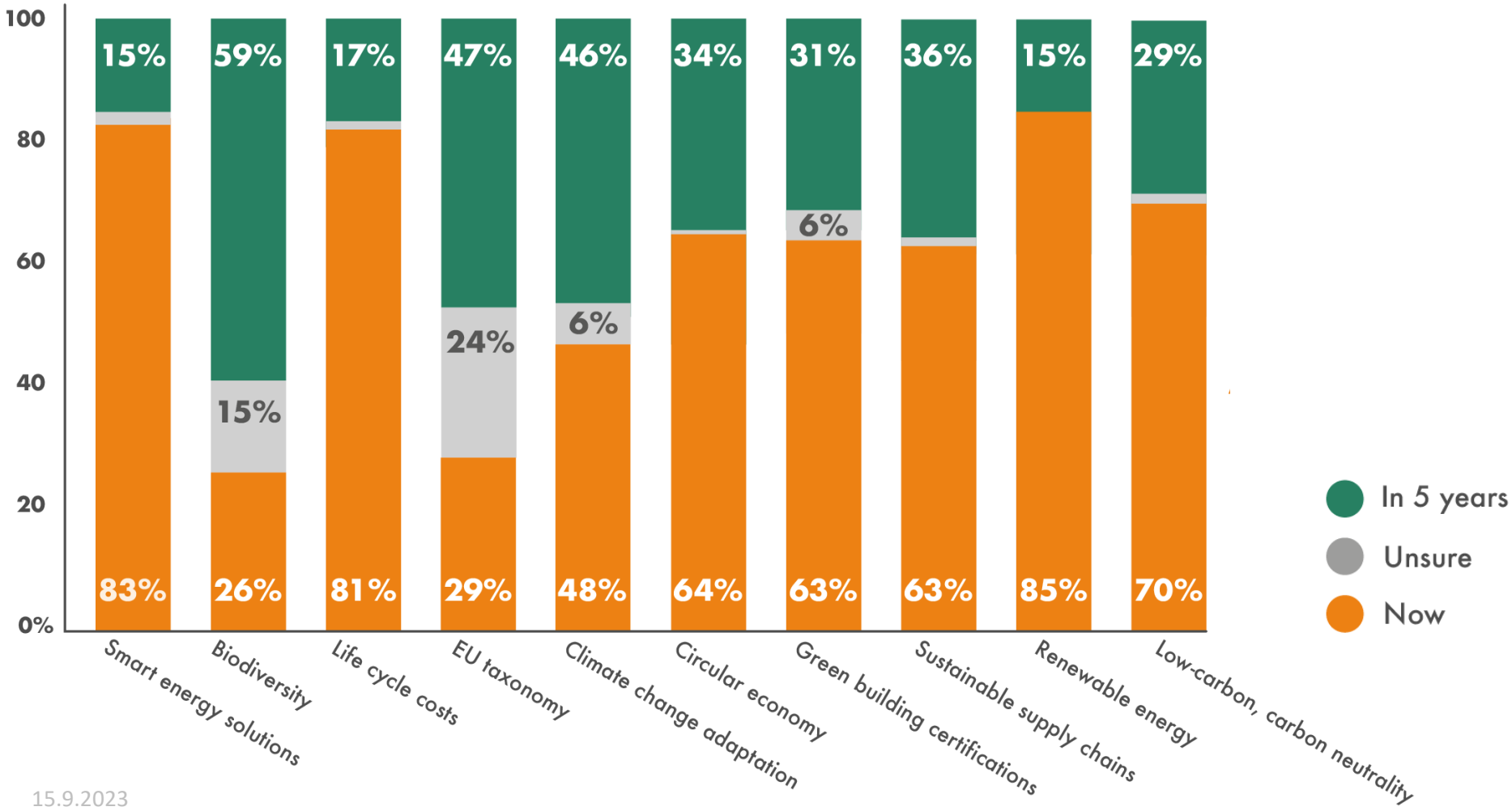
Environmental Sustainability

Granlund

Current trends: Energy and low-carbon construction

ALL RESPONDENTS

Which of the following do you consider trends in environmental sustainability in the construction sector now / in five years?



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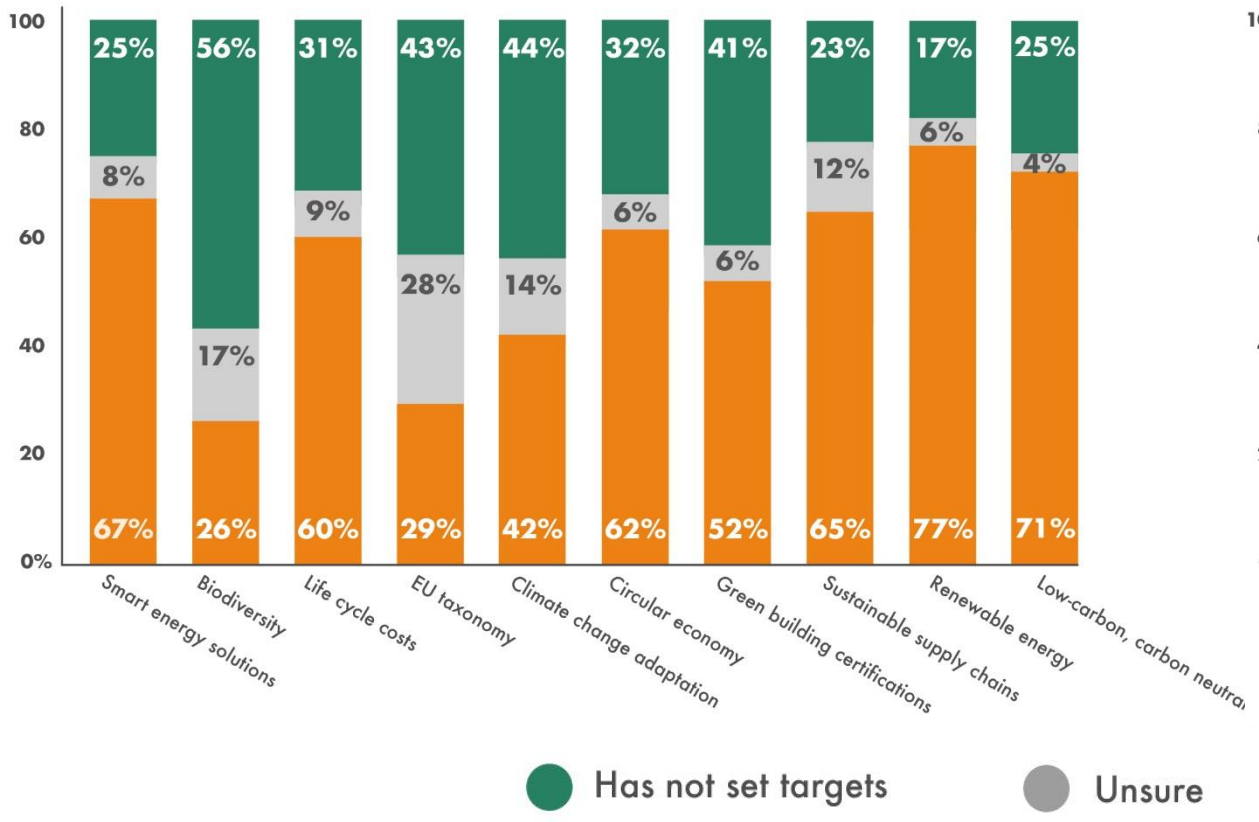
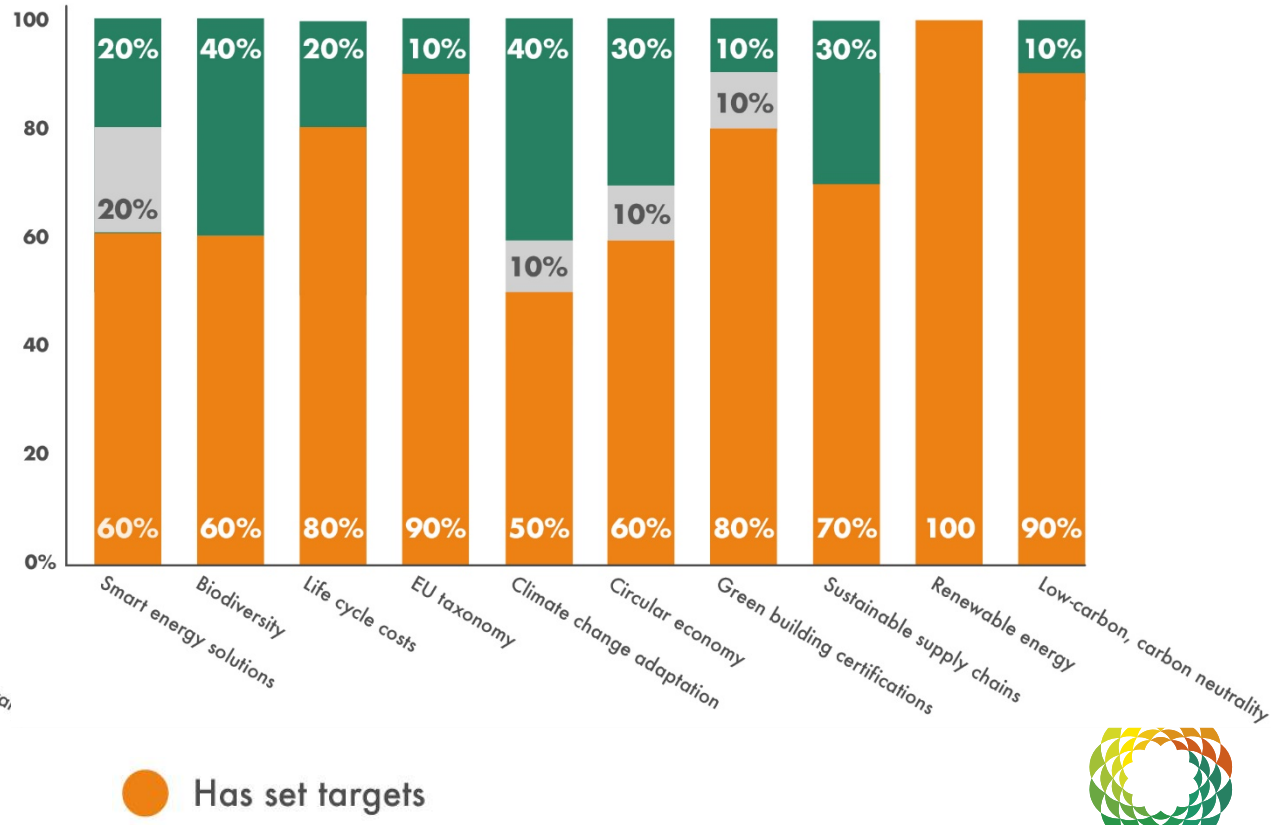
Real estate investors set more diverse targets

ALL RESPONDENTS

REAL ESTATE INVESTORS

For which of the following areas of environmental sustainability has your organization set targets?





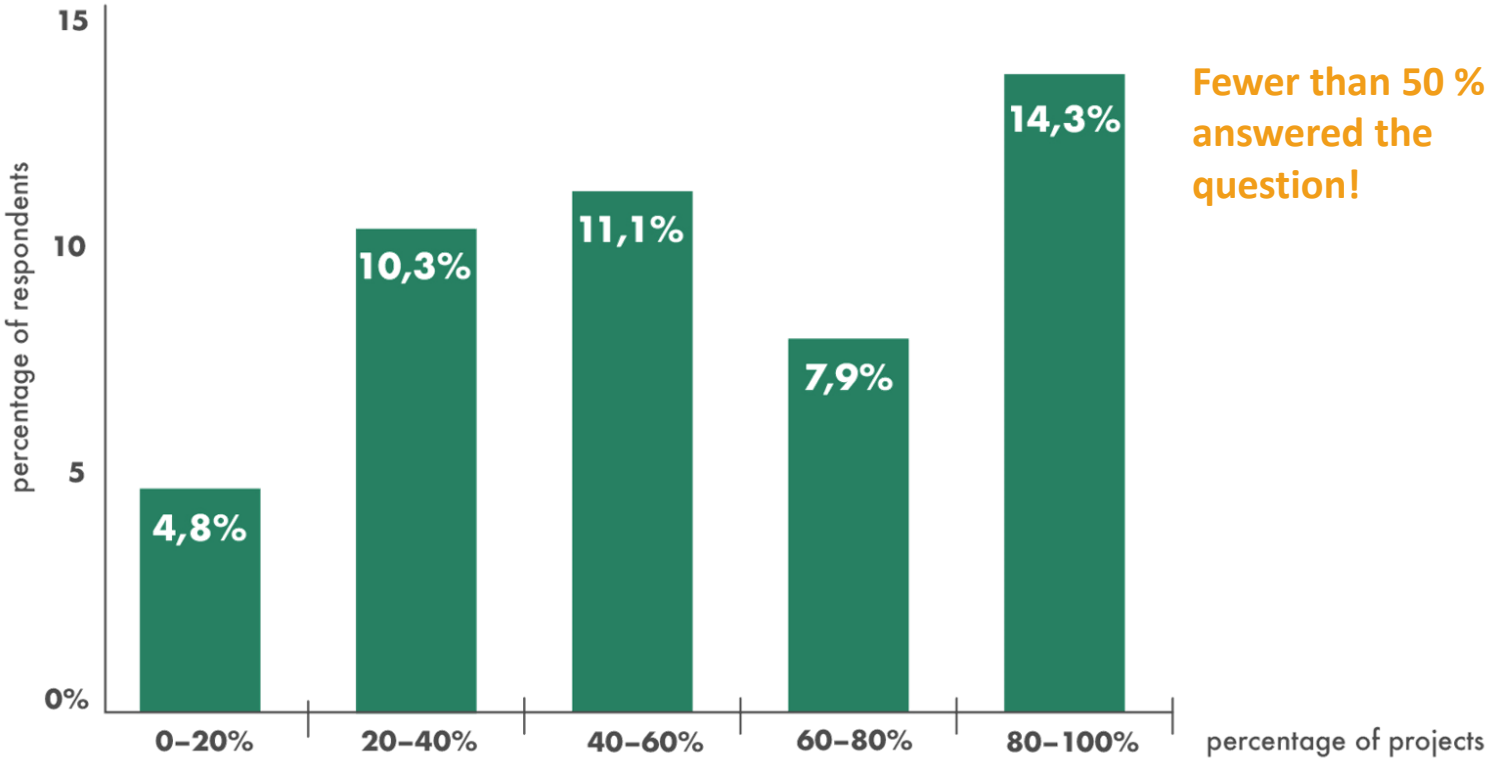
Has not set targets Unsure Has set targets

Granlund

Respondents uncertain about targets being met

ALL RESPONDENTS

In how many of your organization's projects have the targets for environmental sustainability been met?



Fewer than 50 % answered the question!

Granlund

Need for clearer targets and better communication

- Respondents say targets should **include measurable indicators** that are interpreted the same way by all stakeholders.
- Environmental sustainability **targets must be followed up** as closely as budgets and schedules.
- **Communication**: Are we on track to meeting our targets? If not, what can be done?

Granlund

Respondents' requests for clients

1. Include **sustainability targets at the start** of the project
2. Environmental sustainability as a criteria/ point scoring metric in **procurement and competitions**
3. **Tie sustainability targets to recompense** in projects the way that finishing on schedule or under budget already are sometimes.

CONSTRUCTOR:

If targets were clearly defined at the start of the project, they would be included in tenders, contracts and recompense systems. These things really motivate constructors to consider environmental sustainability along with costs during all stages of the project.

Granlund

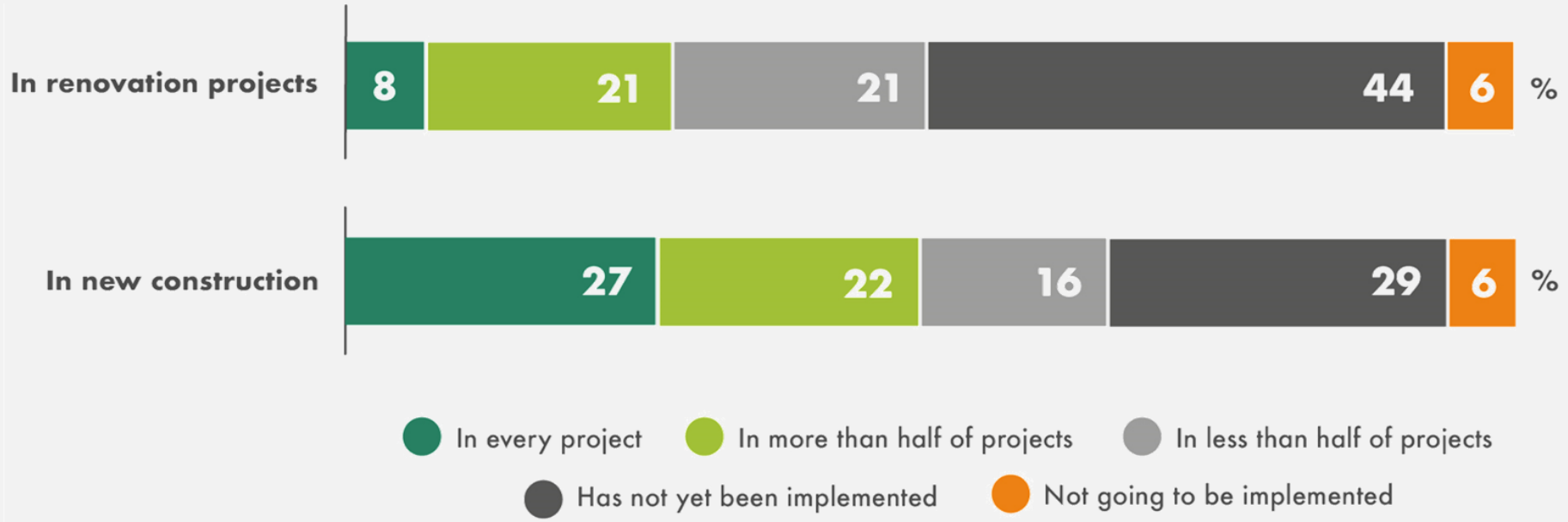
Carbon footprint and LCA

Granlund

LCA is calculated more often in new construction than in renovation projects

ALL RESPONDENTS

How often does your organization commission an LCA calculation?



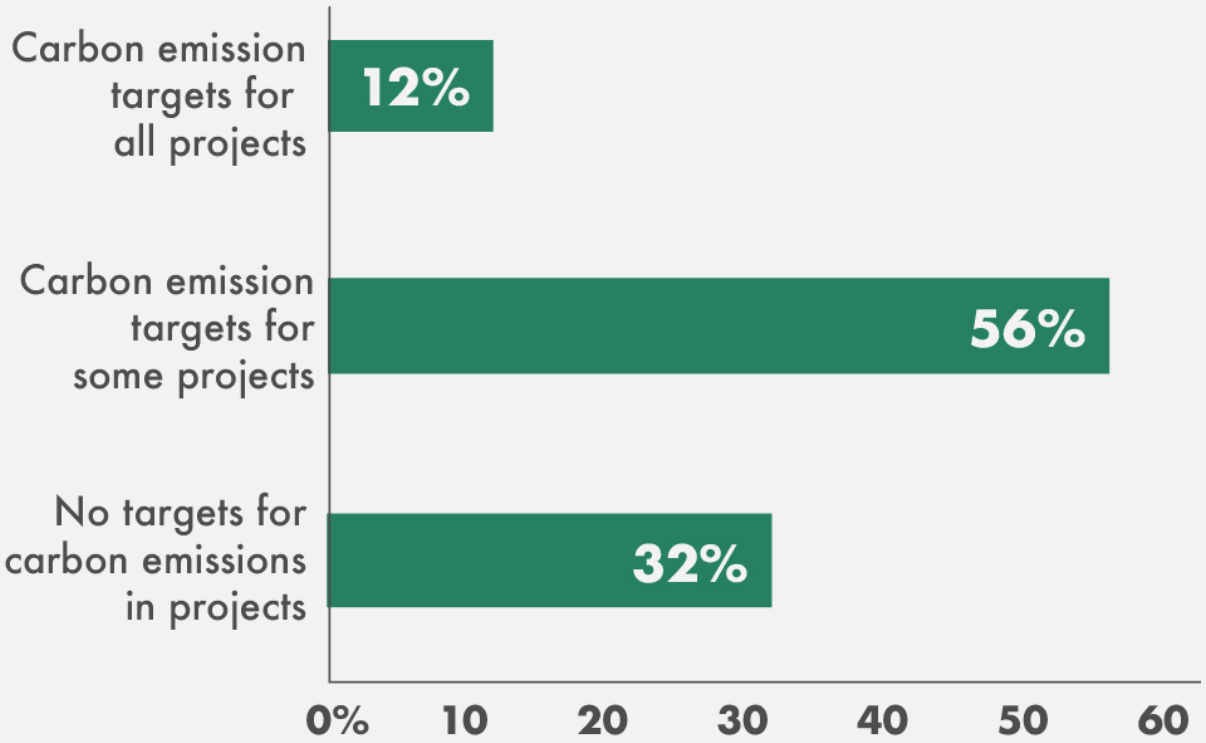
Legislation will require calculations for many building types as of 2025.

Granlund

Most respondent organizations sometimes set carbon emission targets for projects

ALL RESPONDENTS

In how many of your organization's projects are targets set for carbon emissions?

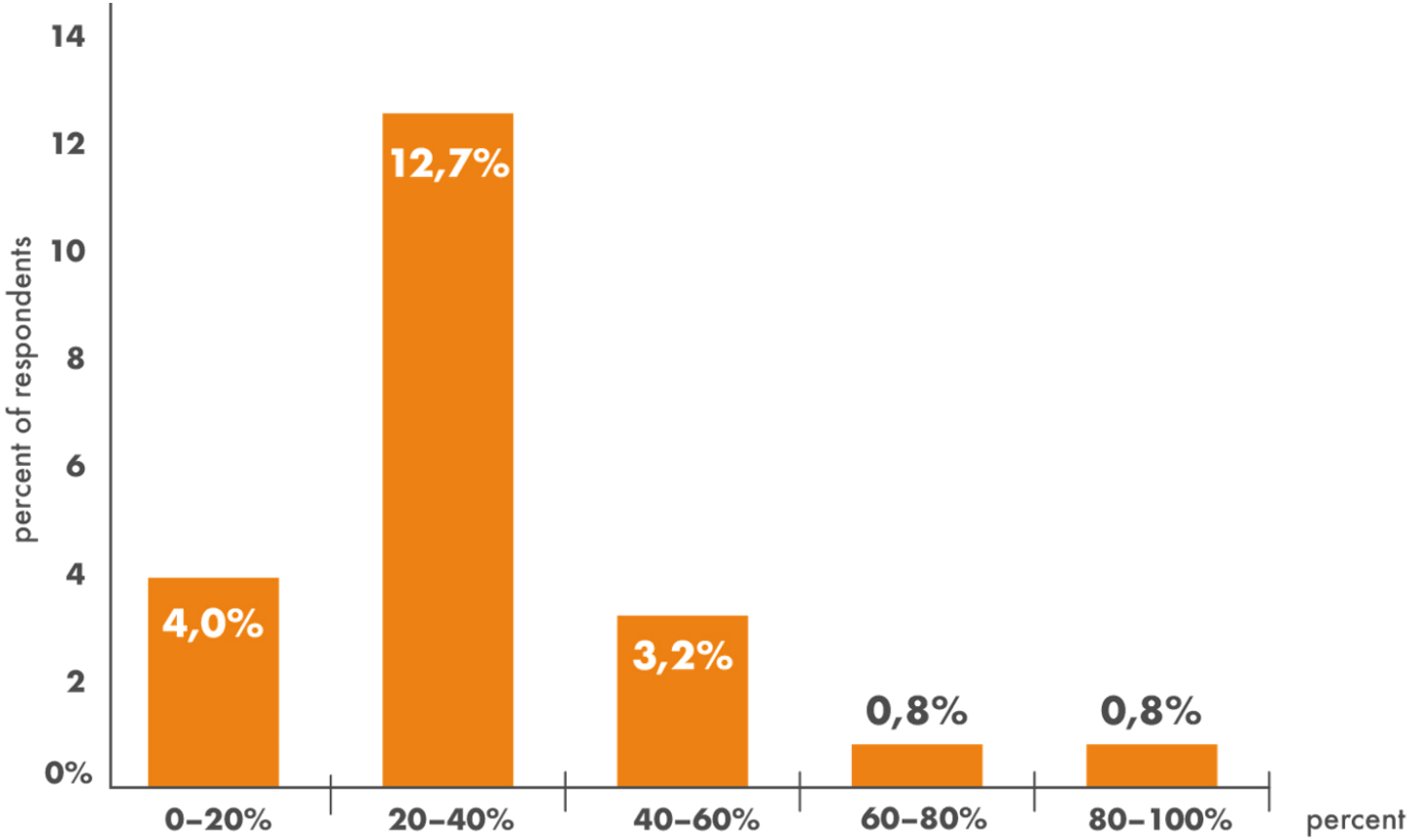


Granlund

Reductions can be achieved, when targets are set and followed up

ALL RESPONDENTS

How large are the carbon emissions reductions your organization typically achieves when striving for them?



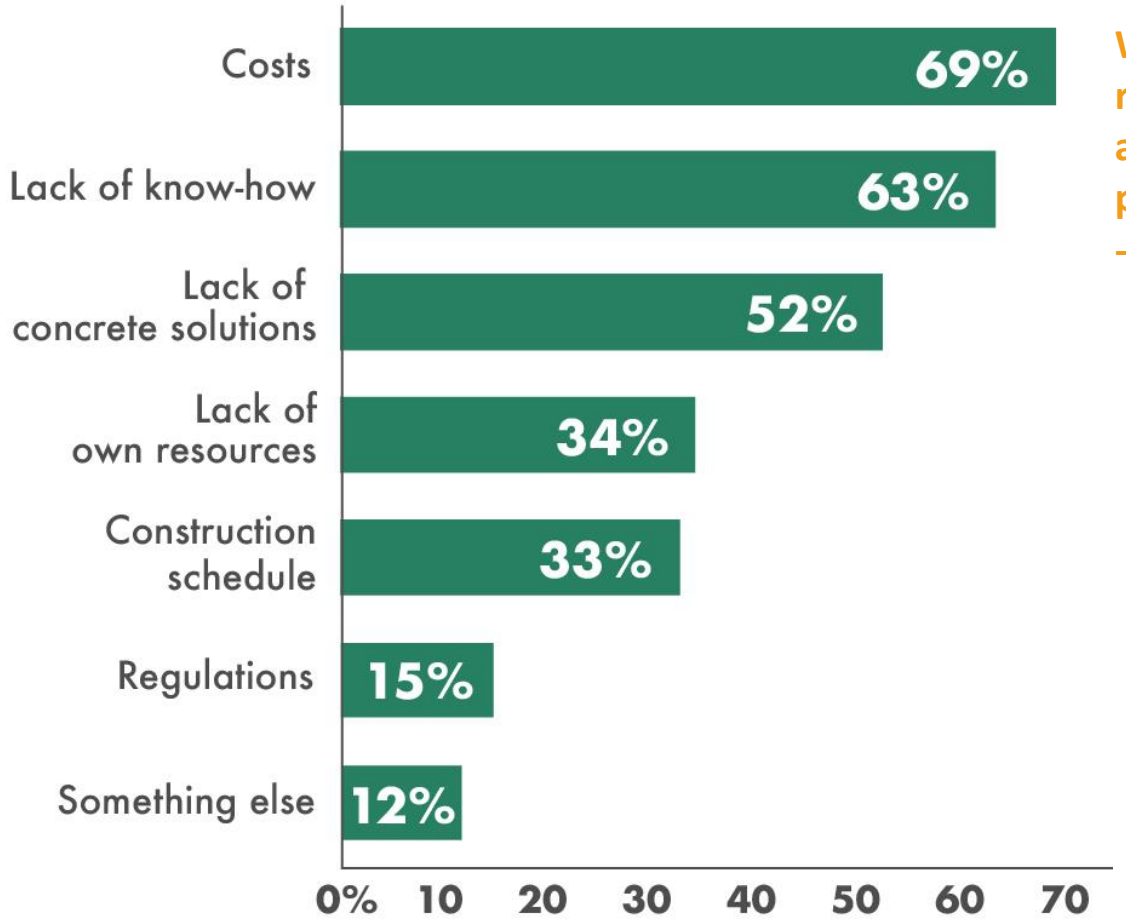
Most common carbon reduction strategies:

- Energy efficiency improvements
- Source of energy
- Low carbon materials

Circular economy solutions still fairly uncommon (e.g. retaining existing building parts or use of recycled materials)

Granlund

Costs perceived to be the biggest obstacle to achieving carbon emission reduction targets



When asked how much carbon reduction measures cost, answers range from 0-100% of project budget.
-> More information needed!

Granlund

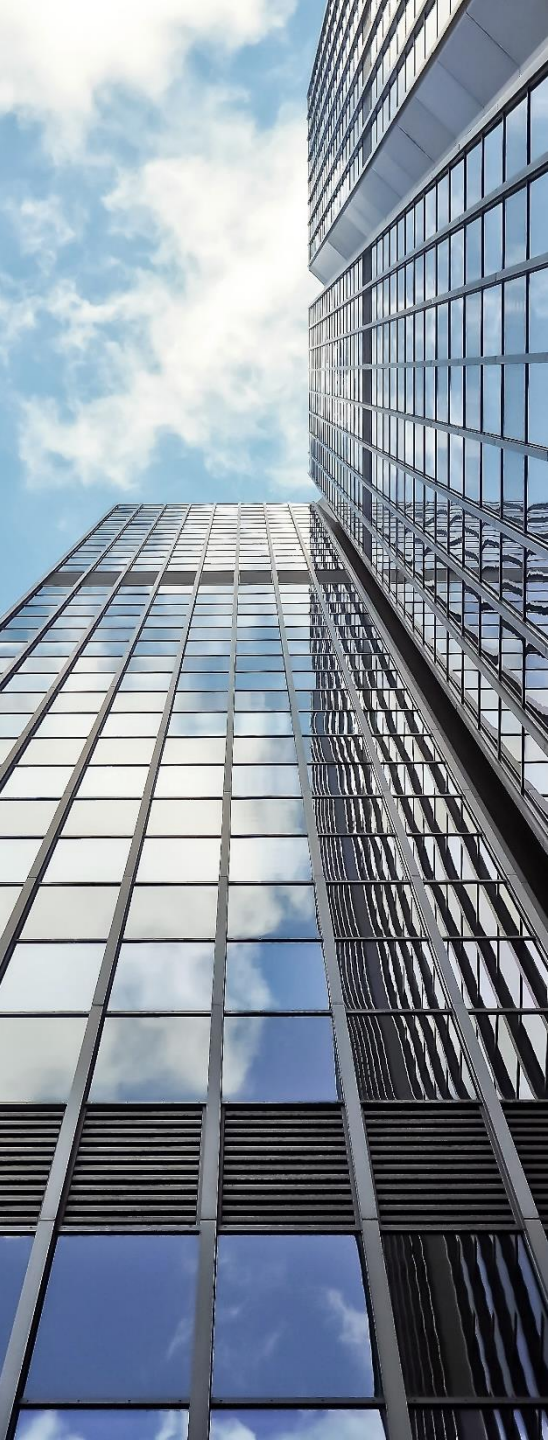
Key takeaways

1. Energy is already in focus for the vast majority of respondents
2. In the coming years, we will see more attention paid to biodiversity, EU taxonomy, climate change adaptation and circular economy.
3. Clients hold a lot of power! Set measurable targets and follow up.
4. LCA calculations will become more common due to legislation. Will carbon footprint reduction targets also?
5. Assumptions are made about costs of low carbon solutions. Lack of knowledge in organizations.

Kiitos!
Tack!
Tak!
Takk!
Takk fyrir!

Let’s solve the green transition together!

Granlund



GRÆNNI BYGGÐ
GREEN BUILDING COUNCIL ICELAND

Icelandic market's response to carbon neutral construction

Katarzyna Jagodzińska

15/09/2023


Photo: Einar H. Reynis

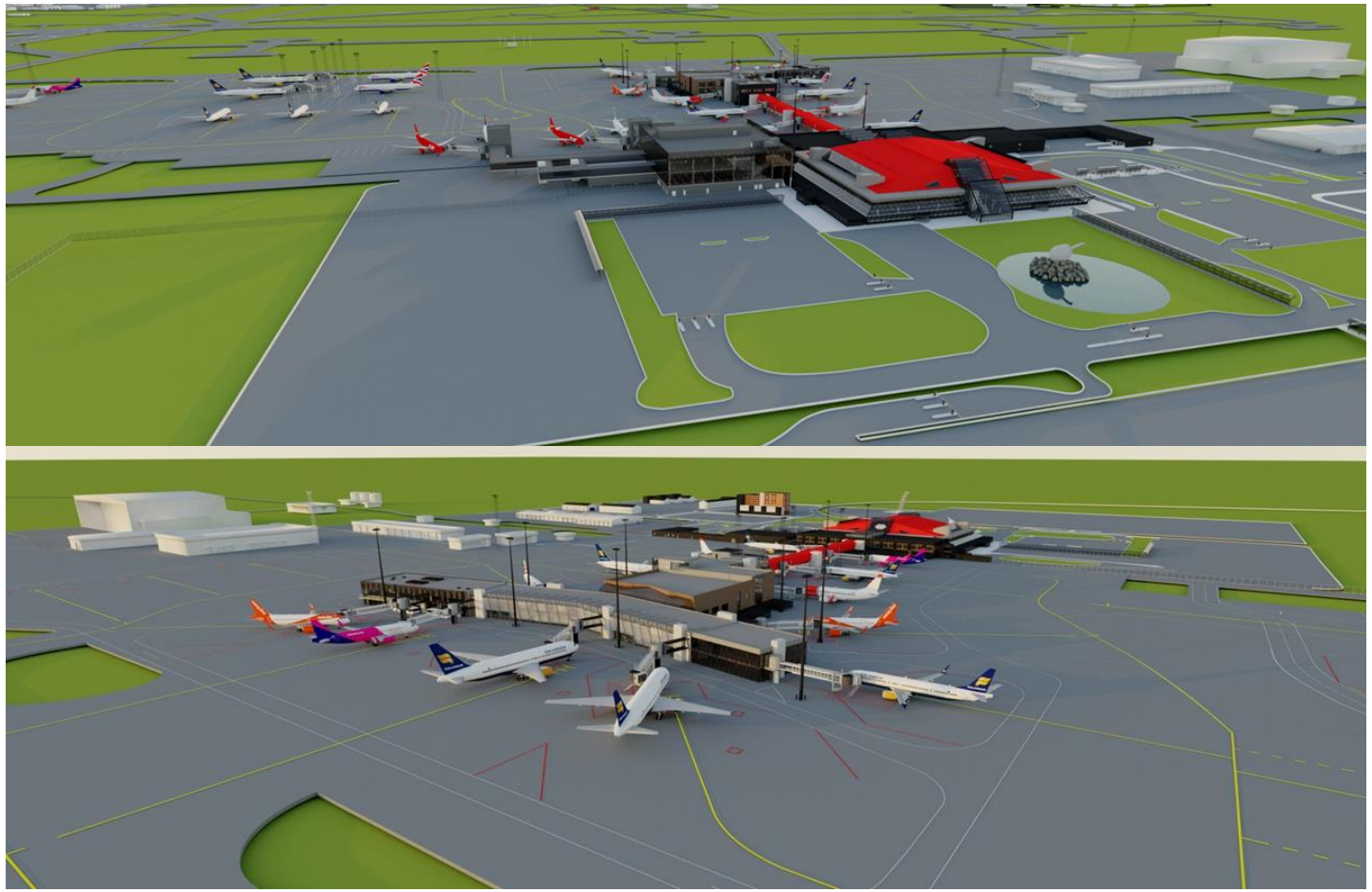
Byggjum grænni framtíð

74 actions that support more sustainable constructions

In May 2022: 21 action items in preparation or under way | 2 actions completed | Not started

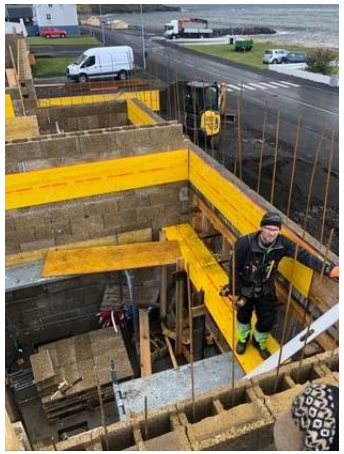
1. Building materials	**1.1.** Chapter on concrete in building regulation reviewed	**1.2.** Research of eco-friendly building materials	**1.3.** Initiative on correct storing and handling of building materials	**1.4.** Databank for ecological and climatic effects of building materials	**1.5.** Development of process of wood products	**1.6.** Development in eco-friendly concrete
2. Construction stage	**2.1.** Composition analysis of industrial machinery fleet for constructions	**2.2.** Further information gathered on industrial machinery fleet	**2.3.** Discussions about energy transition in industrial machinery	**2.4.** Reward system in Reykjavik for eco-friendly energy sources on construction sites	**2.5.** Concepts about environmental impact at construction sites defined	**2.6.** Conversation on secure energy infra-structure from the beg. of constructions	**2.7.** Show-case: Zero-emission construction site	**2.8.** Check new registration of industrial machinery fuelled by oil
3. Use stage	**3.1.** Information on actual consumption of heat, electricity and water	**3.2.** Coordinated energy calculations published and classification of energy efficiency	**3.3.** Requirement of energy calculations	**3.4.** Education on energy savings in buildings	**3.5.** Requirement of atmospheric density tests activated	**3.6.** Instructions on the design of heating, cooling and air conditioning systems	**3.7.** Research of energy utilisation of older buildings	
	3.8. Coordinated calculations of heat- and moisture fluctuation published	**3.9.** Check requirements* for controlled ventilation systems with heat recycling	**3.10.** Requirement of energy efficiency of new buildings	**3.11.** Policy on eco-friendly maintenance of public buildings	**3.12.** Activate the "House Manual" in the Building registry	**3.13.** Instructions for eco-friendly maintenance		
4. End of lifetime / Circular economy	**4.1.** Marketplace for soil and mineral products (Mölundur)	**4.2.** Research and instruction on utilisation of building waste	**4.3.** Promotional effort for new recycling requirements for building waste	**4.4.** Accessible areas for used building materials	**4.5.** Report of designers on maximum utilisation of building materials	**4.6.** Permits for demolition registered in the Building registry		
	4.7. Actual figures on building waste returned	**4.8.** Regulatory framework for construction reviewed with regards to circular economy	**4.9.** Instructions for recycling and reusing building materials	**4.10.** Instructions for responsible demolition	**4.11.** Emphasis on construction in the project Together against waste			
5.1. Life-cycle assessment	**5.1.1.** Emissions of The Icelandic Road Administration constructions evaluated with source analysis	**5.1.2.** LCA on BREEAM-certified new buildings of Reykjavik Municipality	**5.1.3.** Coordinated LCA-methodology of buildings published	**5.1.4.** Educational materials on LCA for buildings	**5.1.5.** Requirements for carbon footprint calculations (LCA) in public projects	**5.1.6.** Baseline criteria for carbon footprint of different building categories defined		
	5.1.7. Carbon neutral building for Icelandic conditions defined	**5.1.8.** Baseline criteria for carbon footprint of different building categories updated	**5.1.9.** Requirements for carbon footprint calculations (LCA) in general market	**5.1.10.** Requirement that the carbon footprint of public projects is 30% lower than the baseline (limit value)	**5.1.11.** Requirement that the carbon footprint of general projects is 30% lower than the baseline (limit value).	**5.1.12.** Baseline criteria for carbon footprint of all projects updated and lowered		
5.2. Environmental certifications	**5.2.1.** Financial and environmental benefits of environmental certifications	**5.2.2.** Instructions on Nordic Swan Ecolabel criteria	**5.2.3.** Environmentally certified buildings in the Building registry	**5.2.4.** More environmentally certified buildings in Reykjavik	**5.2.5.** Professional courses on certification systems	**5.2.6.** Education for municipalities about certifications	**5.2.7.** Education for suppliers about certifications	**5.2.8.** Adjust certification systems to Icelandic conditions
5.3. Eco-friendly urban areas	**5.3.1.** Existing infrastructure in Reykjavík used together	**5.3.2.** Instructions on planning of 20 minute towns and neighbourhoods	**5.3.3.** Manual on organisation and design around the circular economy	**5.3.4.** National Planning Strategy 2015–2026 reviewed	**5.3.5.** Legislation on planning revised with respect to climate issues	**5.3.6.** Instructions and databank about climate-focused planning		
6. Incentives for transition	**6.1.** Proposal for the Ministry of Finance on public incentives for eco-friendly construction	**6.2.** Discussion within municipalities and others about green financial incentives	**6.3.** The green housing of the future in the City of Reykjavik	**6.4.** Instructions and samples of environmental criteria for public tenders	**6.5.** Environmentally friendly requirements and selection criteria for tenders conducted by the Government Property Agency			
	6.6. Loan supply of public financial institutions for eco-friendly building	**6.7.** Check coordinated criteria for green financing	**6.8.** Competition fund for construction industry (Askur)	**6.9.** Awards for eco-friendly construction (Græna skóflan)	**6.10.** Initiatives for eco-friendly steps within the construction industry			

https://byggjumgraenniframtid.is/



https://www.isavia.is/en/corporate/construction-at-keflavik-airport

PAGO

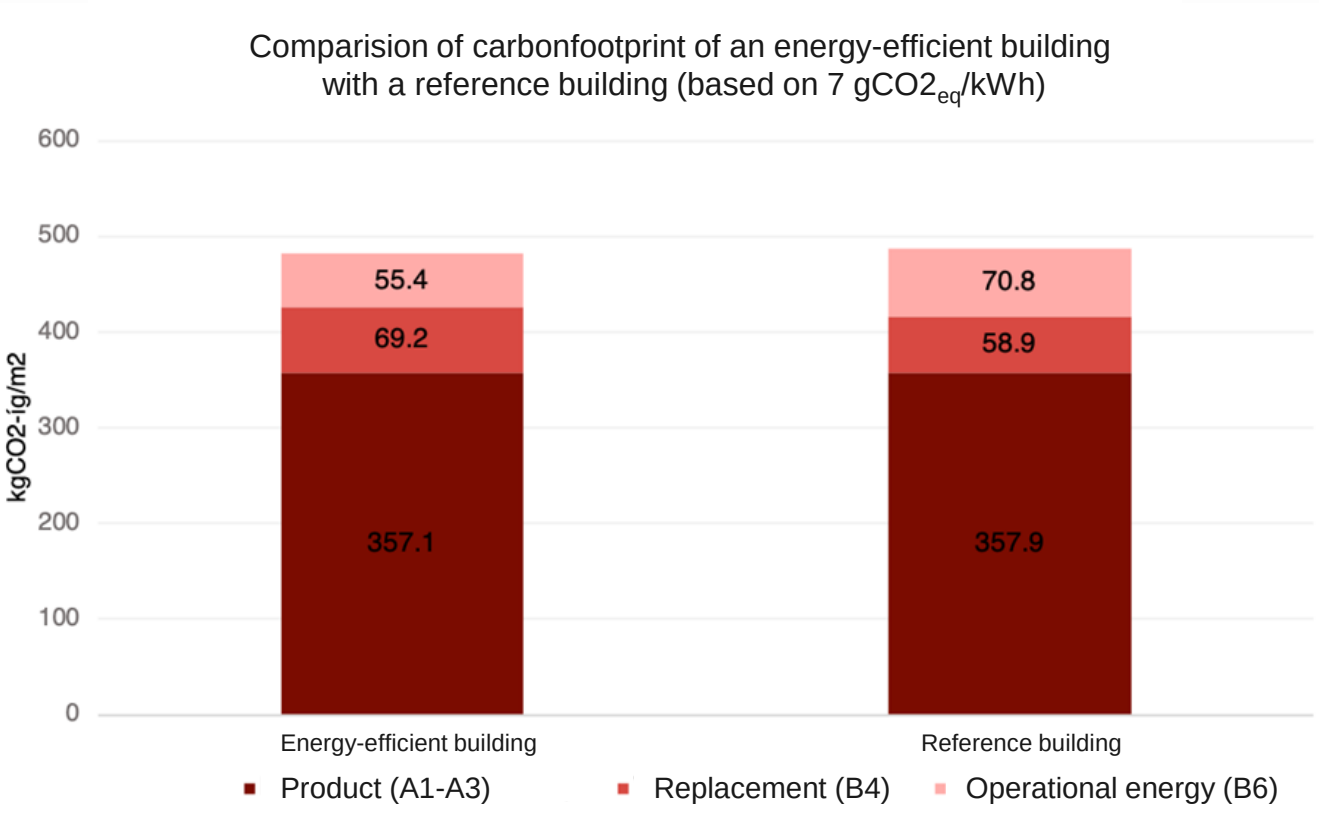


Ólöf Salmon Guðmundsdóttir, PAGO hús ehf

lúdika

Anna Karlsdóttir and Jan Dobrowolski, Lúdika

Certification



GBCI, Áhrif byggingarefna og orkunýtingar á kolefnisspor bygginga - Report

Hafnarfjörður

Reykjavíkurborg

BREEAM®

NORDIC SWAN ECOLABEL

Byggjum grænni framtíð

Emissions of Icelandic buildings by phases in reference year and emission goal of 2030.

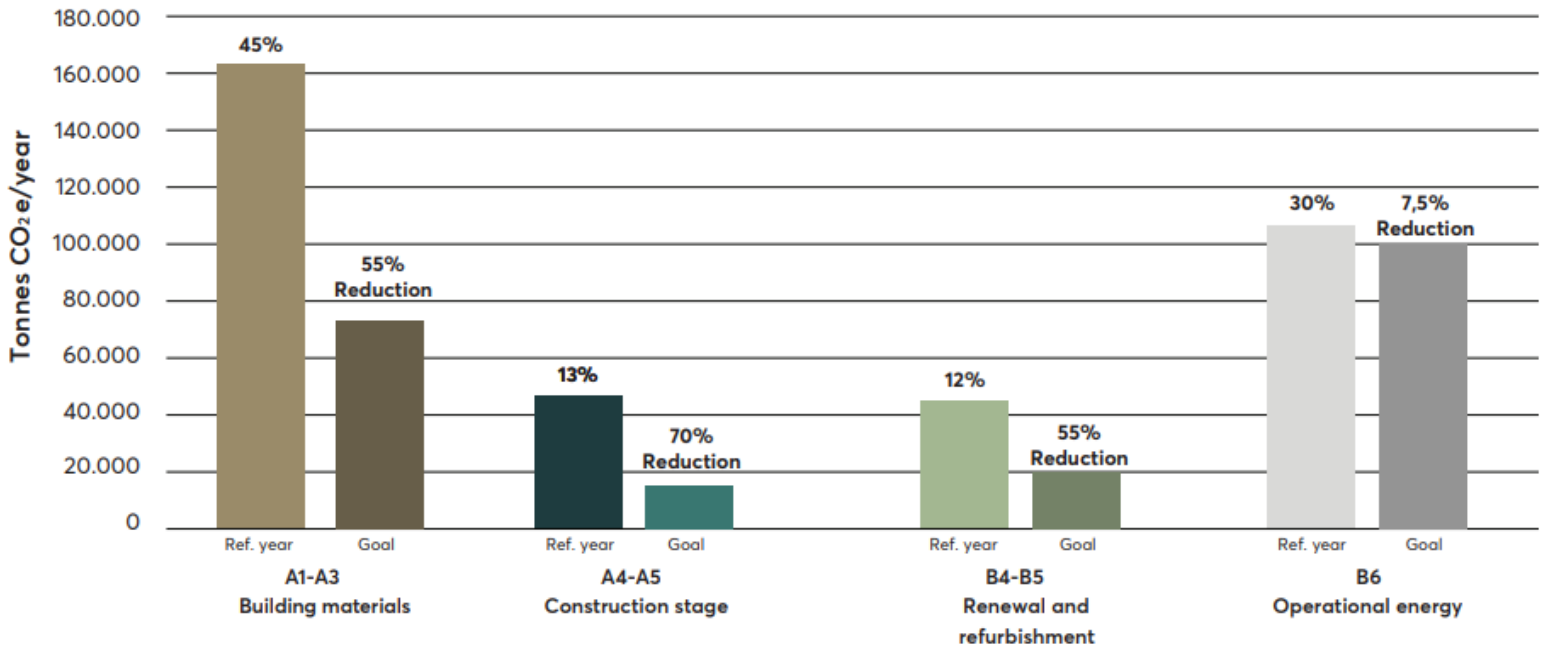
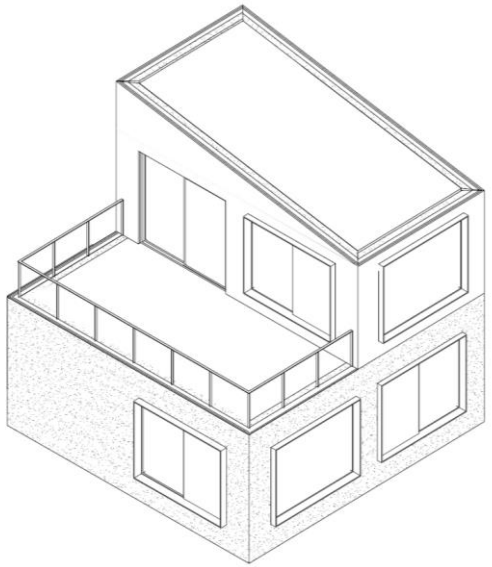
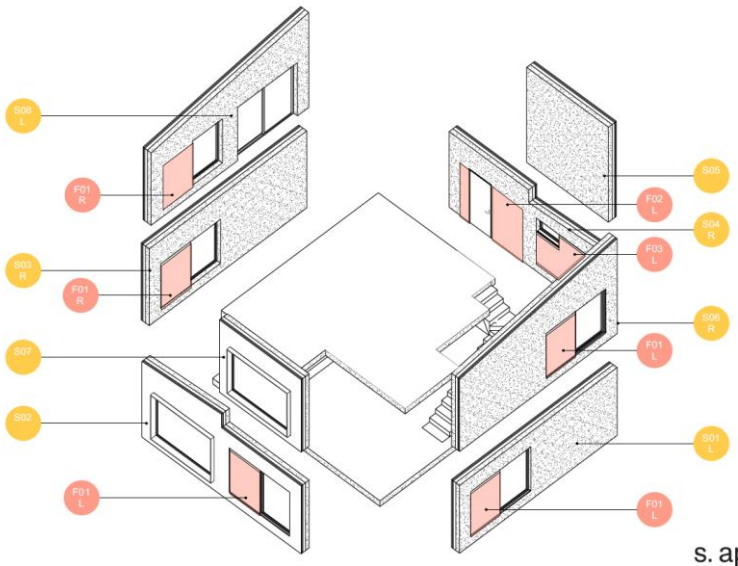


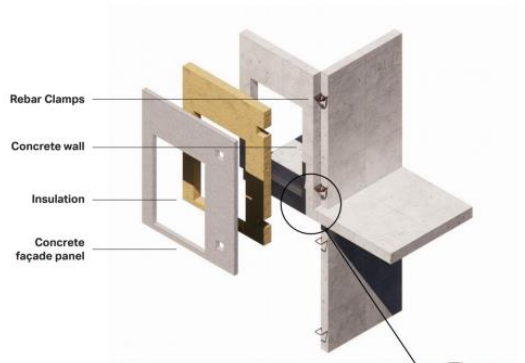
Figure 2: Emissions of Icelandic buildings by phases in reference year and emission goal of 2030.

https://byggjumgraenniframtid.is/





s. ap ar



Rebar Clamps
Using rebar clamps to connect lightly adapted BM Vallá elements. See more on page XX.

s. ap arkitektar

Basalt fibre reinforced polymer rebar

Hrafnhildur Sif Hrafnsdóttir, Askur – mannvirkarannsóknarsjóður, HMS

Timber vs concrete

ASK ARKITEKTAR

http://www.landmotun.is/archives/2317

JAKOB + MACFARLANE

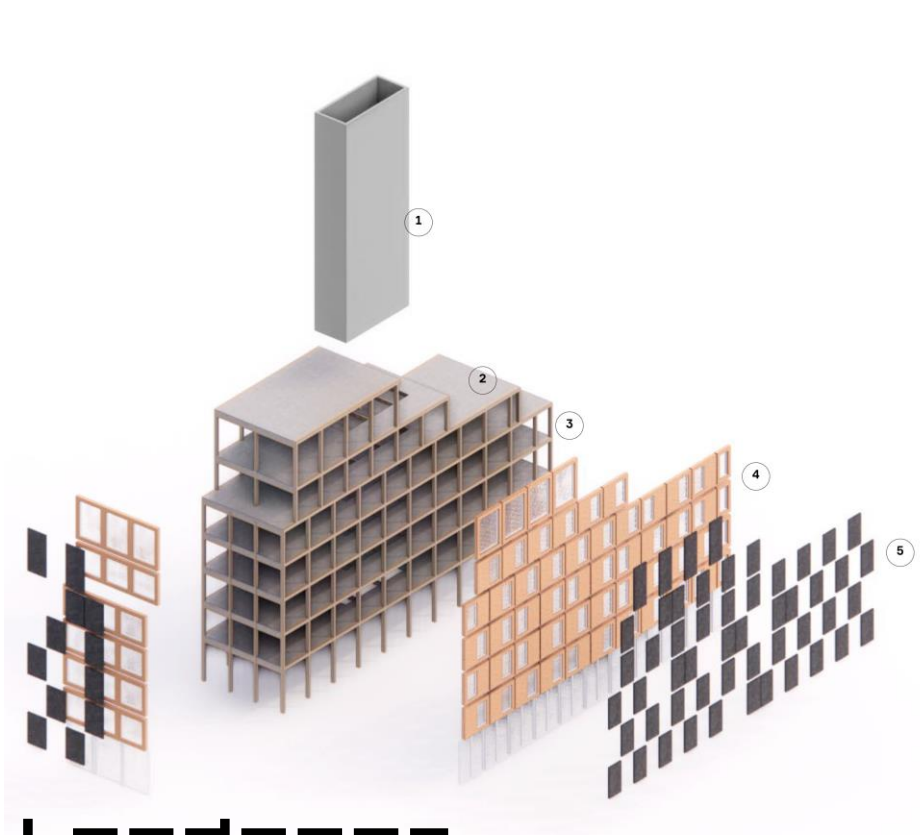
T.ark

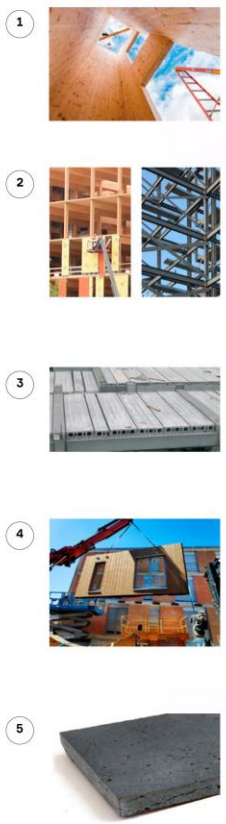
EFLA

LANDSLAG

https://www.c40reinventingcities.org/en/professionals/winning-projects/artun-malarhofi-1286.html

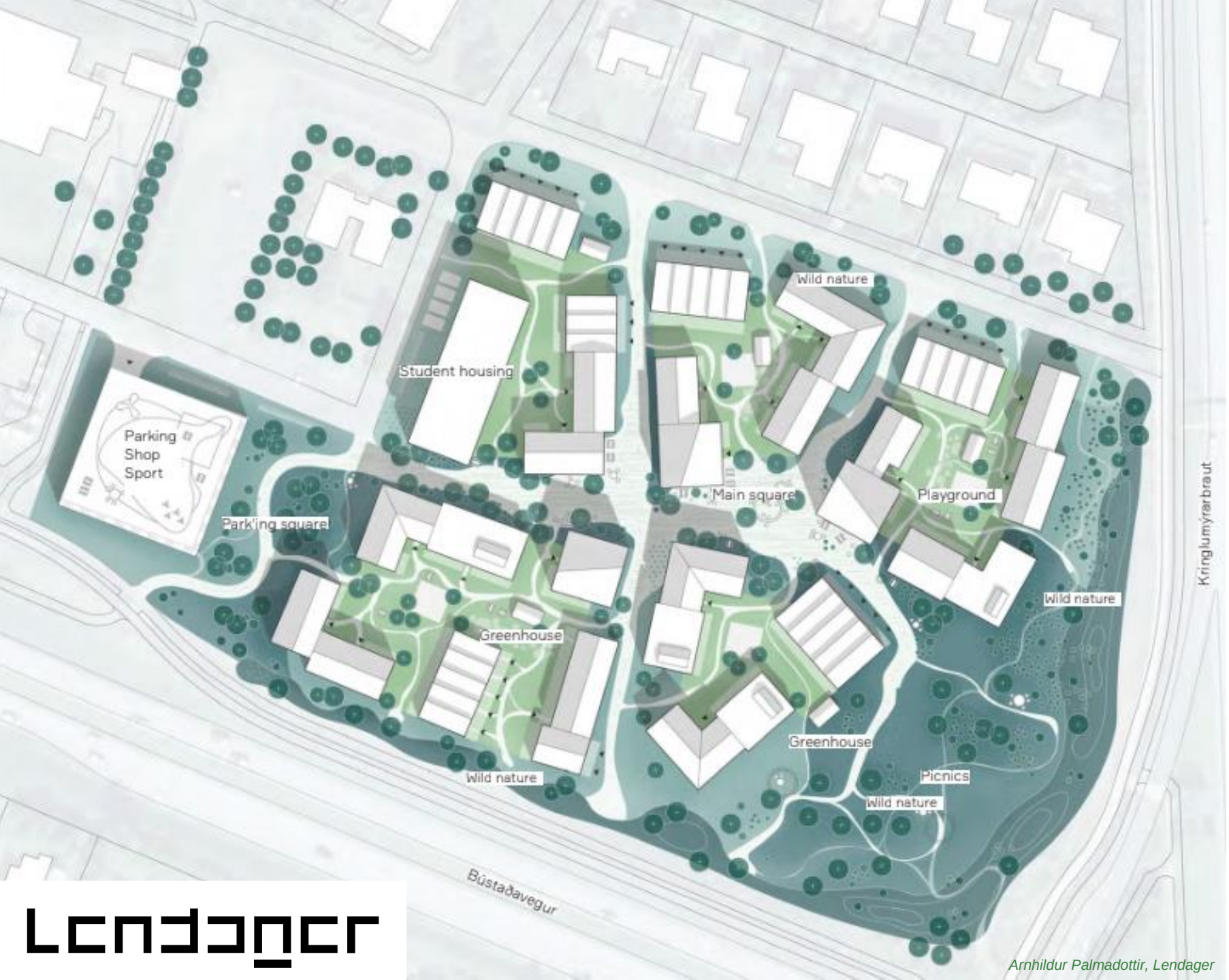
Timber vs concrete cont.





43

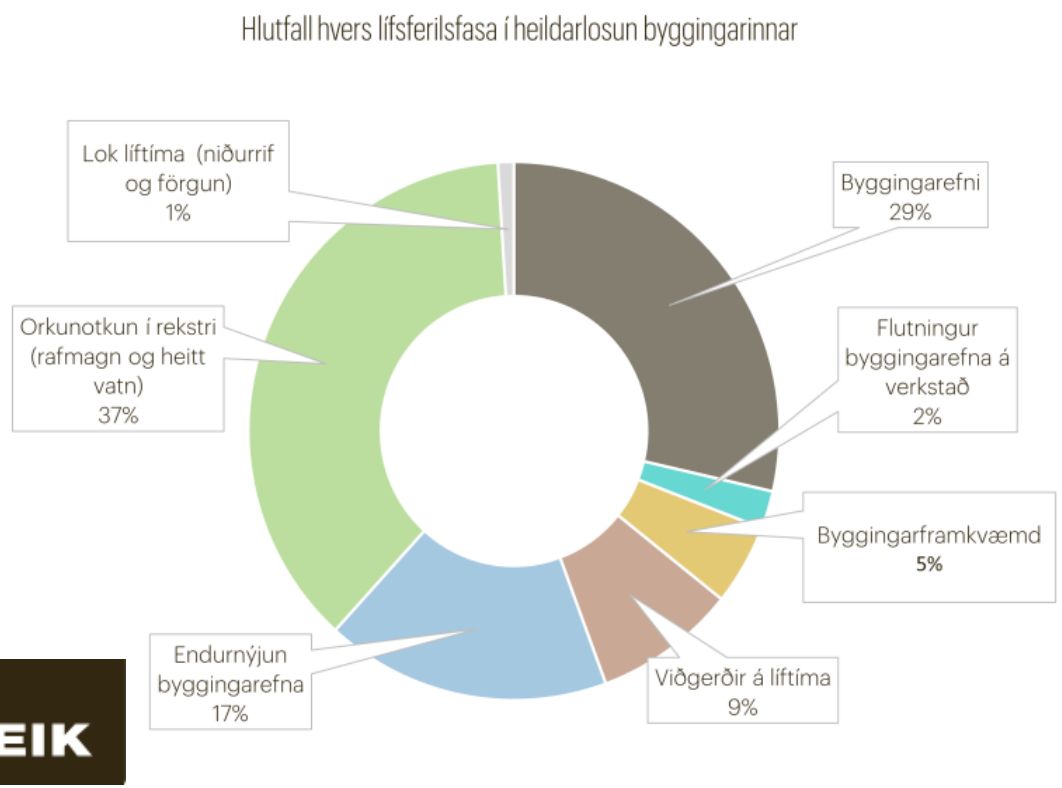
Arnhildur Palmadottir, Lendager



Lendager

Arnhildur Palmadottir, Lendager

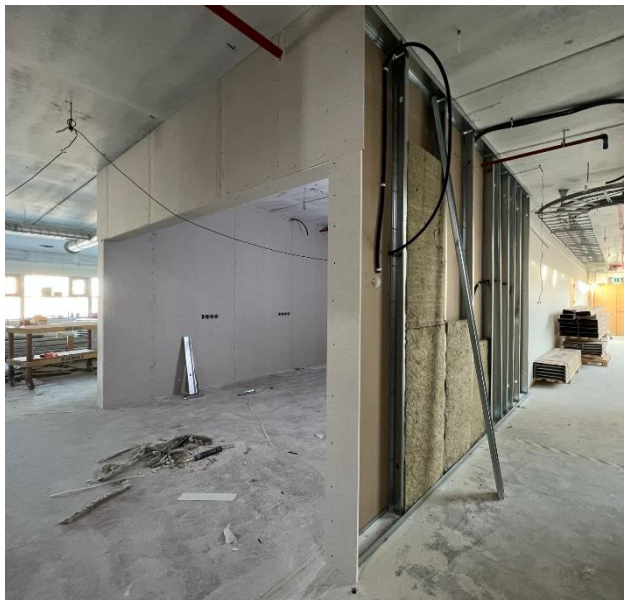
Real estate companies



[Sustainability report Eik 2022]

https://www.reitir.is/is/sogur/me%C3%B0-%C3%BEvi-a%C3%B0-fylgja-krofum-breeam-communities-sta%C3%B0alsins

Real estate companies cont.



https://www.reginn.is/reginn/frettasafn/almennar-frettir/endurnyting-i-framkvaemdum/
Małgorzata Lisowska, Reginn

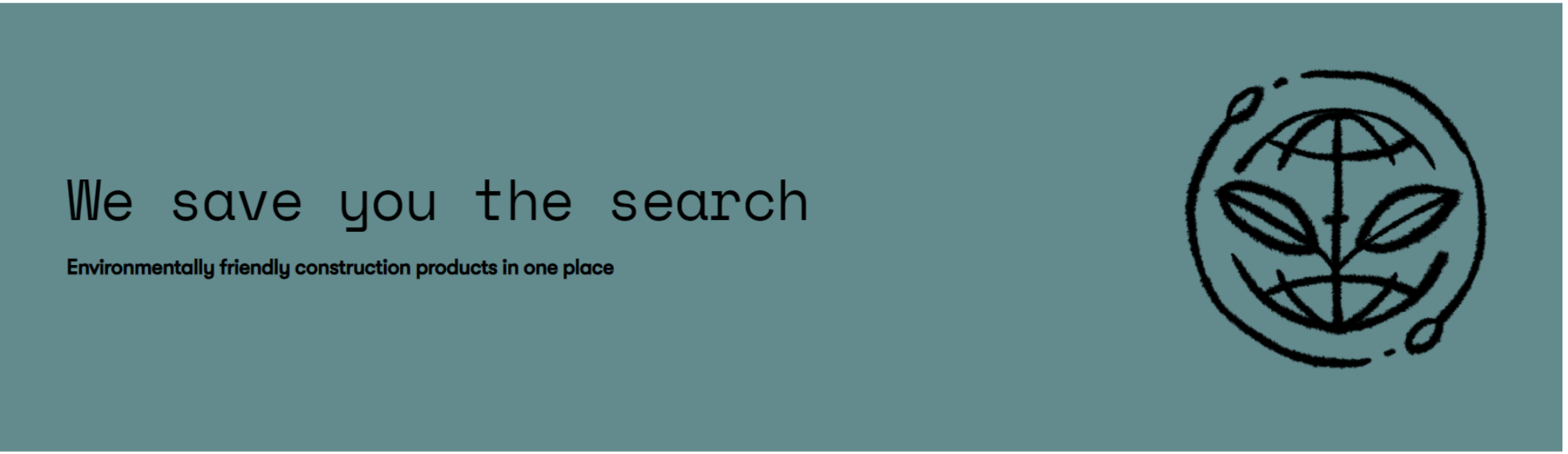
Contractors

https://www.iav.is/

https://javerk.is/

Other initiatives

vistbók_



BYKO

https://www.vistbok.is/

Other initiatives cont.

Magnús Arason, Alexandra Kjeld, EFLA

Thank you for the attention

kjag@graennibyggd.is

Photo: Einar H. Re

Closing words

Greetings

Anni Sinnemäki

Deputy Mayor

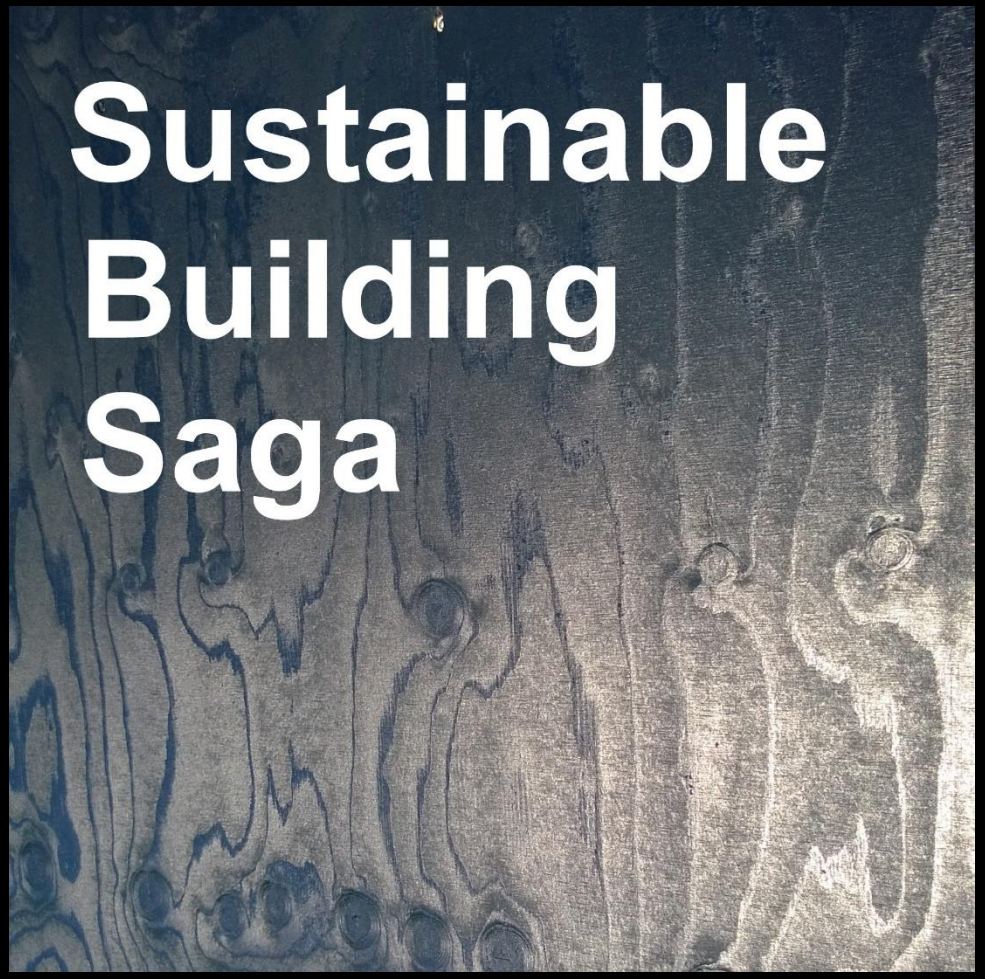
City of Helsinki

Closing Words

Dr. Matti Kuittinen / Aalto University

Maria Tiainen / Ministry of the Environment

Miisa Tähkänen / Green Building Council Finland



The official podcast of
the Nordic Bauhaus Programme

1. Designing for the climate emergency with Sofie Pelsmakers
2. Decarbonizing design with Alan Organschi
3. Balancing sustainability with Eeva Furman
4. Designed to be relocated – Jaakko Torvinen
5. Is this how architecture ends? Interview of John Schellnhuber
6. Carbon flows from forests to buildings with Mark Hughes
7. Do androids dream of carbon neutrality? Interview of Chat GPT
8. Mainstreaming wood construction with Anna Denell and Oskar Norelius
9. Inspired by resource scarcity with Karl Kvaran

https://on.soundcloud.com/KwnEp

Thank you All for participating!

GREEN BUILDING COUNCIL FINLAND

Ympäristöministeriö
Miljöministeriet
Ministry of the Environment

Aalto University