MILJØMÅL FOR BYGG

SCANDIC LERKENDAL
2017-11-02

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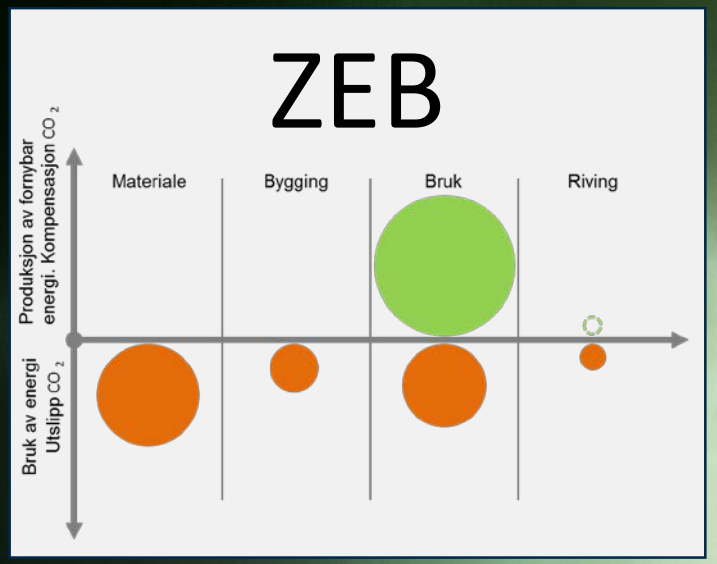
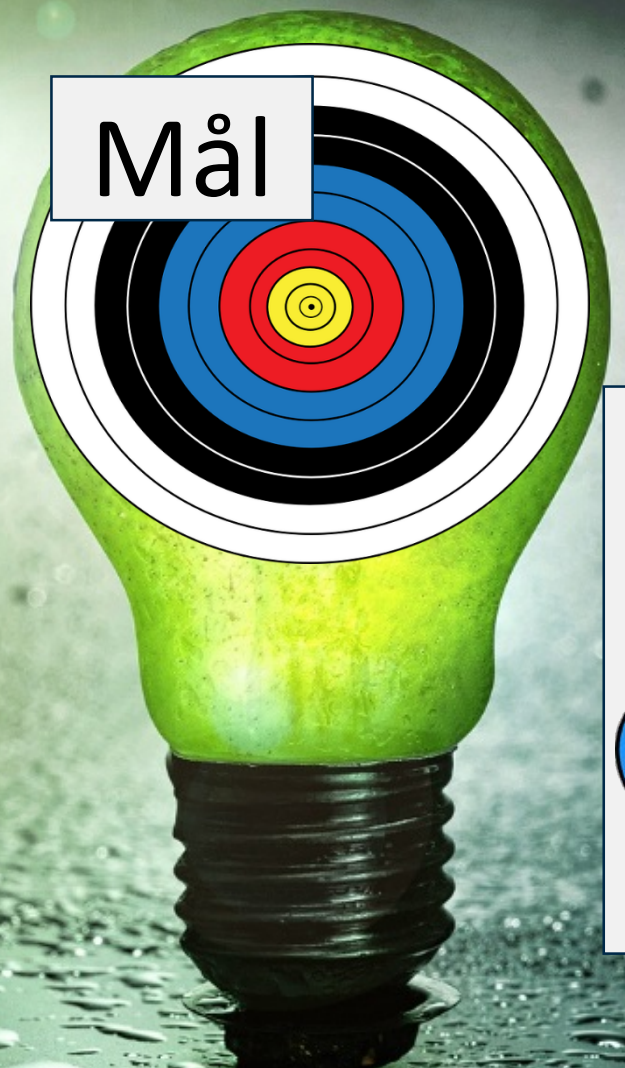
Bærekraft

SINTEF

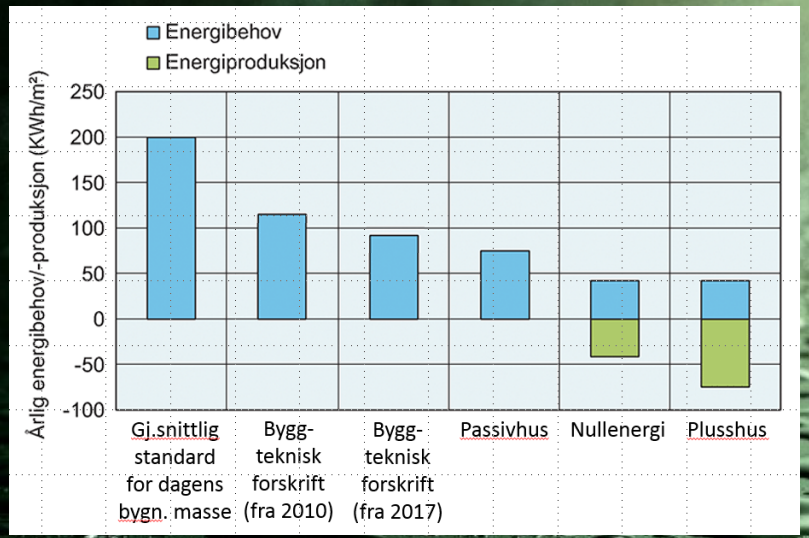
ZEB



BREEAM® NOR



Målemetode



Miljø

- Ambisjon
- Metode
  - System og systemgrenser
  - Funksjon
  - Livsløpsperspektiv
- Gjennomføring
  - Idé
  - Ferdig bygg
  - Drift
  - Avhending

Ambisjon: Klima

Systemgrense NS-EN 15978:2011					
A1-3 Produktfase	A4-5 Konstruksjons-fase	B1-7 Bruksfase		C1-4 Sluttfase	D Etter endt levetid

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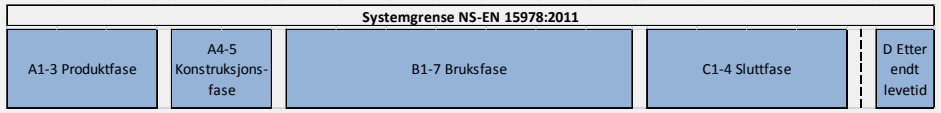
Ambisjon for systemgrenser



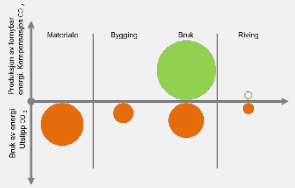
Hva skal telles med i klimaregnskapet?

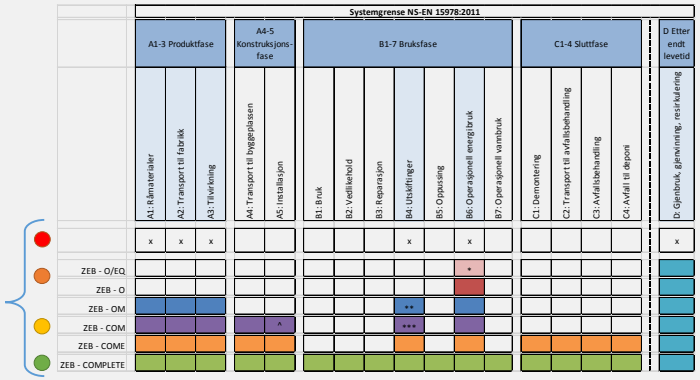
Anbefaling: Minst A1-A3, B4 og B6

Får da med bygget, utskiftinger og energibruk i drift

Ambisjon for prestasjon

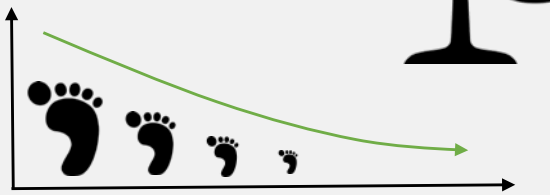
Hva er ambisjonen?





ZEB-ambisjon?

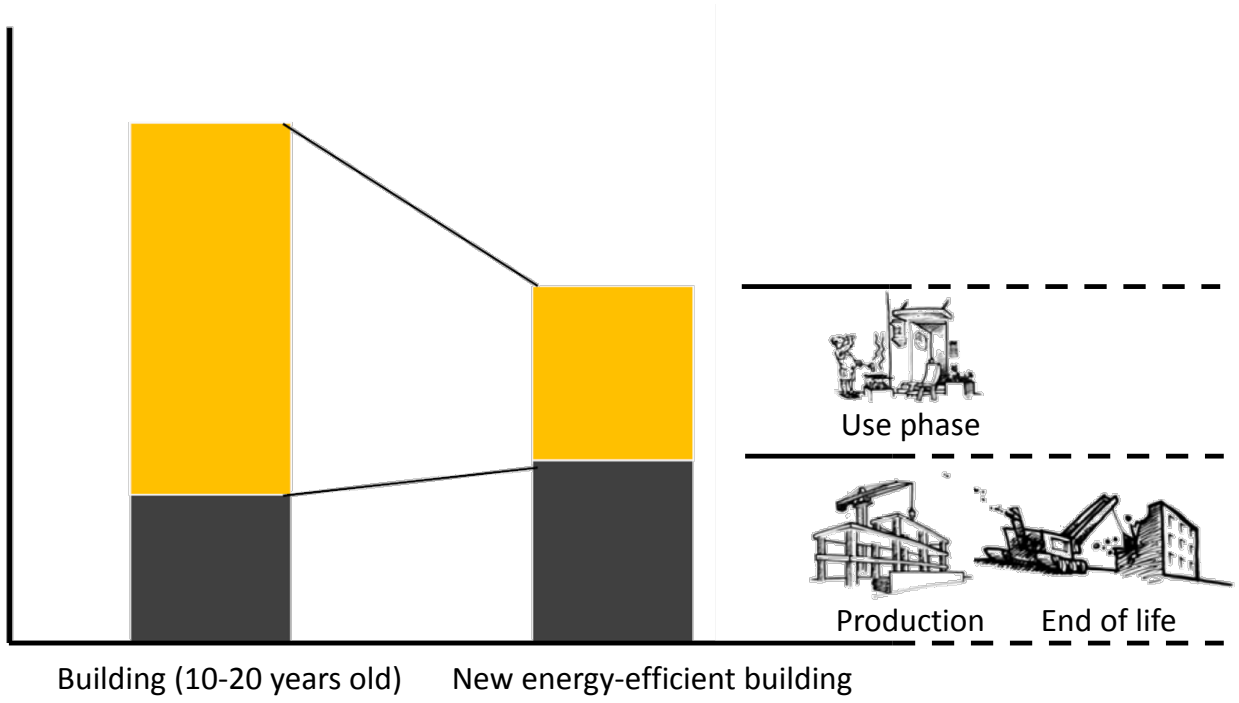
Reduksjon i forhold til et referansebygg?

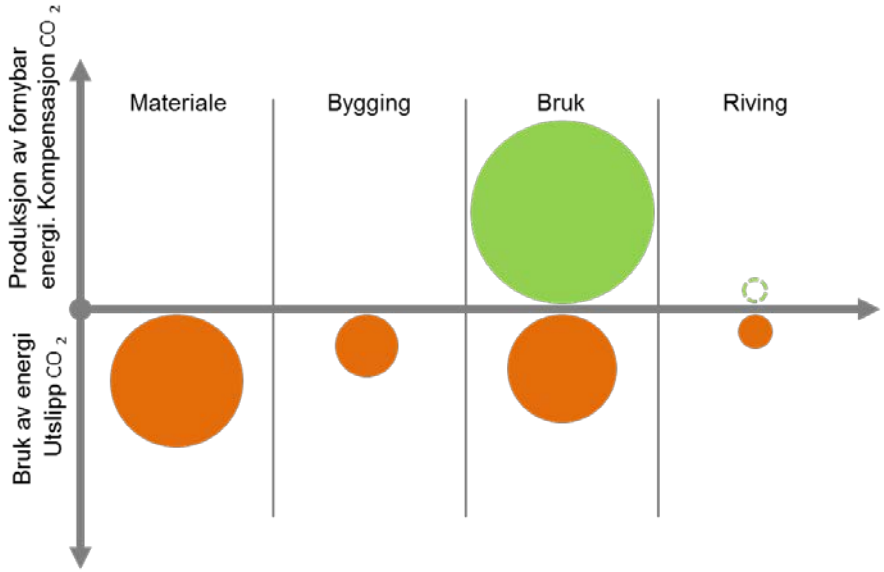


Klimafotspor

Denne sliden er lagt til i etterkant, for å få frem at vi snakker om to ambisjoner: Den er ambisjonen på hvor mye som skal dokumenteres (ambisjon klimaregnskap/systemgrenser) og den andre er ambisjonen for hvor lavt klimafotsporet skal være (klimaprestasjon).

Klima?





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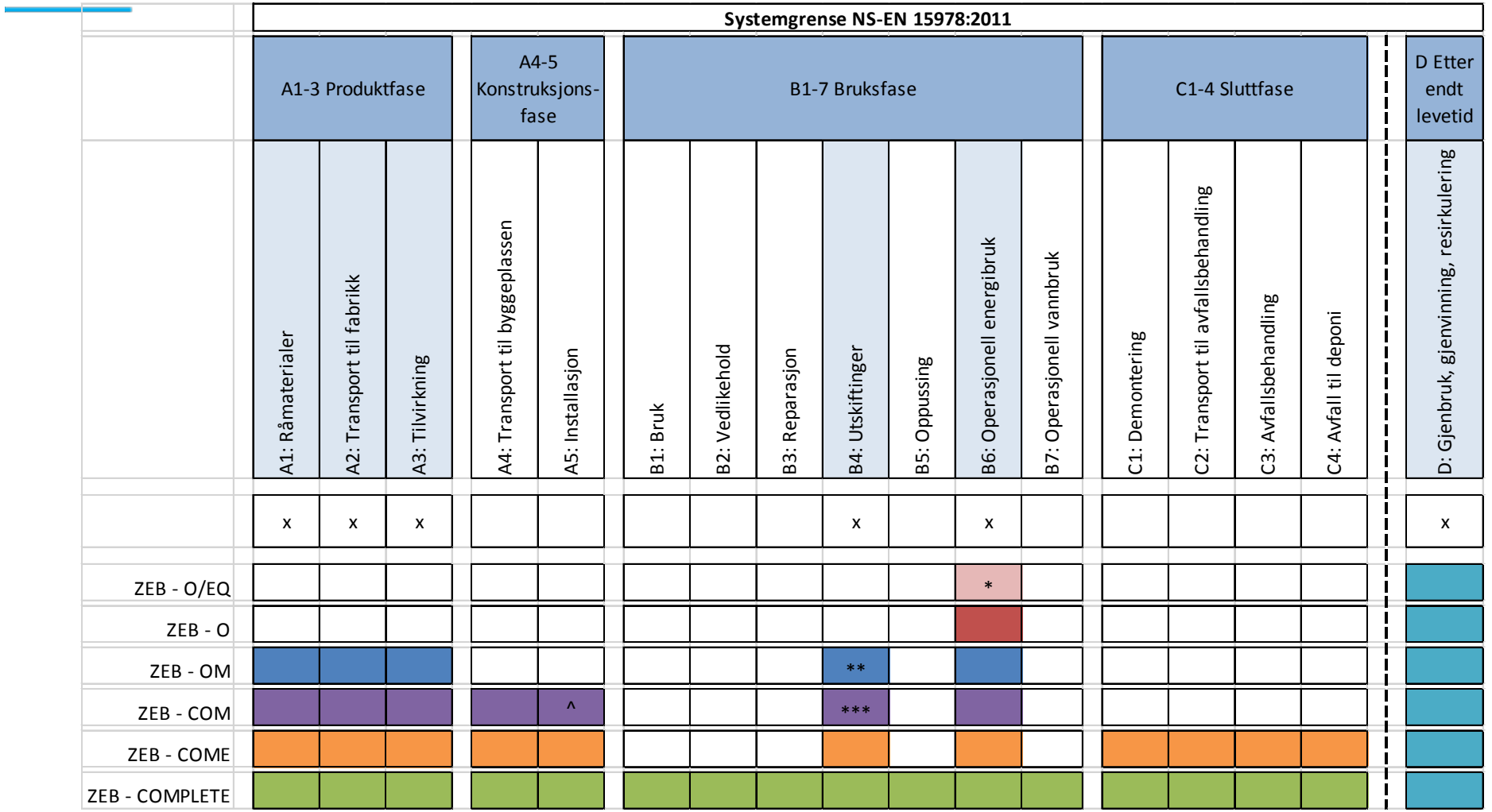
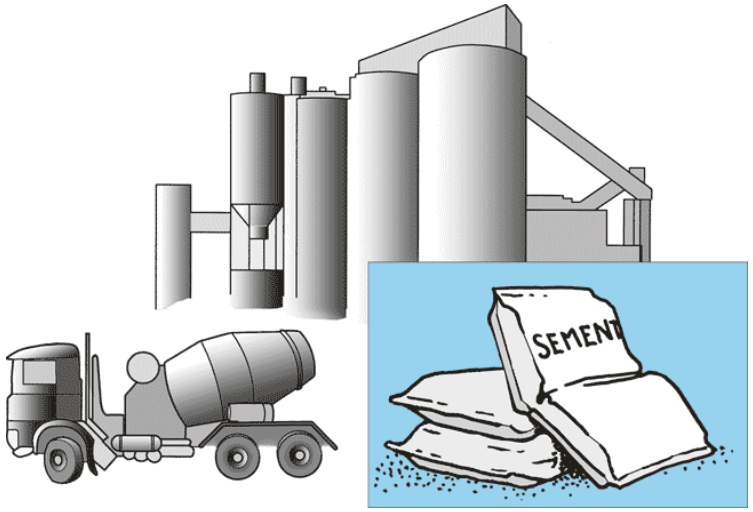
Eksempel

Ambisjon: ZEB / ZEN



Hva er klimagassutslipp fra materialer?

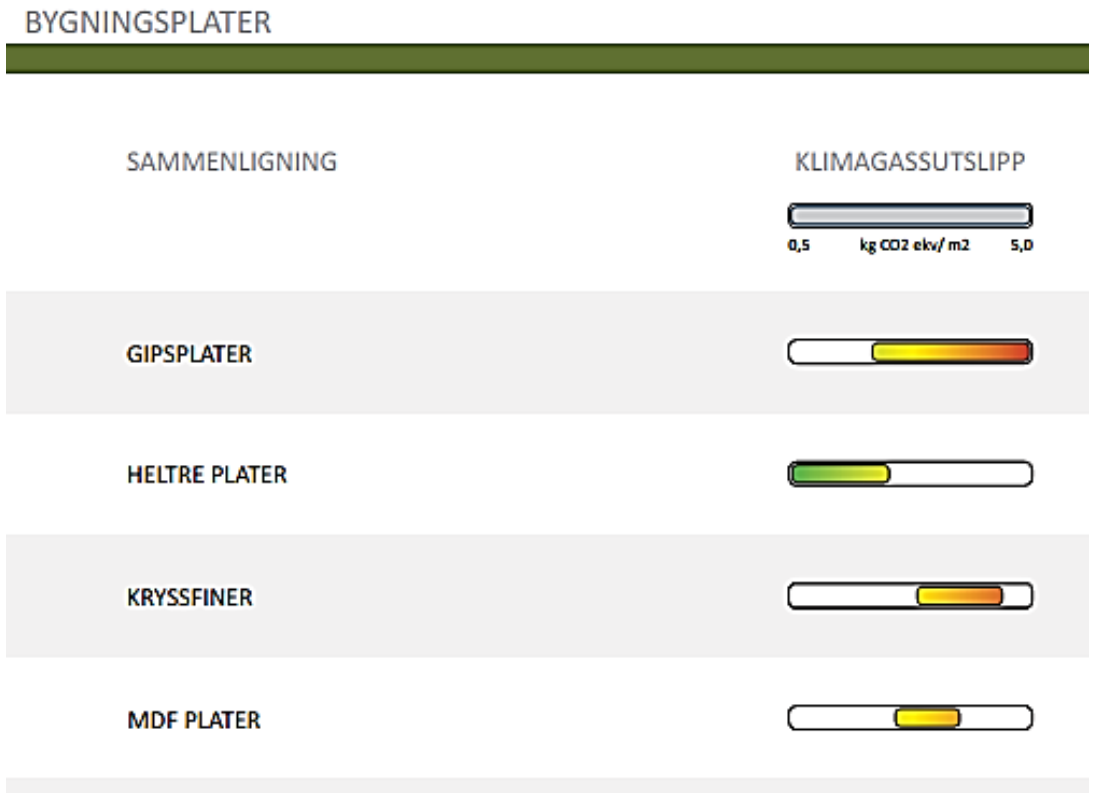
"Embodied energy is the sum of all the energy required to produce any goods or services, considered as if that energy was incorporated or 'embodied' in the product itself. " - Wikipedia



- "klimagassutslipp knyttet til materialer.."
- "materialutslipp"
- Engelsk: Embodied emissions → EE
- Bundet klimagassutslipp

Foto: SINTEF Byggforsk

Utslipp fra materialer i bygg



Klimagassutslipp fra produksjon av bygningsplater (A1-A3) varierer typisk omkring 5 kg CO_2 ekvivalenter per kvadratmeter plate.

Bygg og anlegg står for 1/3 av globalt energiforbruk

[Grønn Materialguide]

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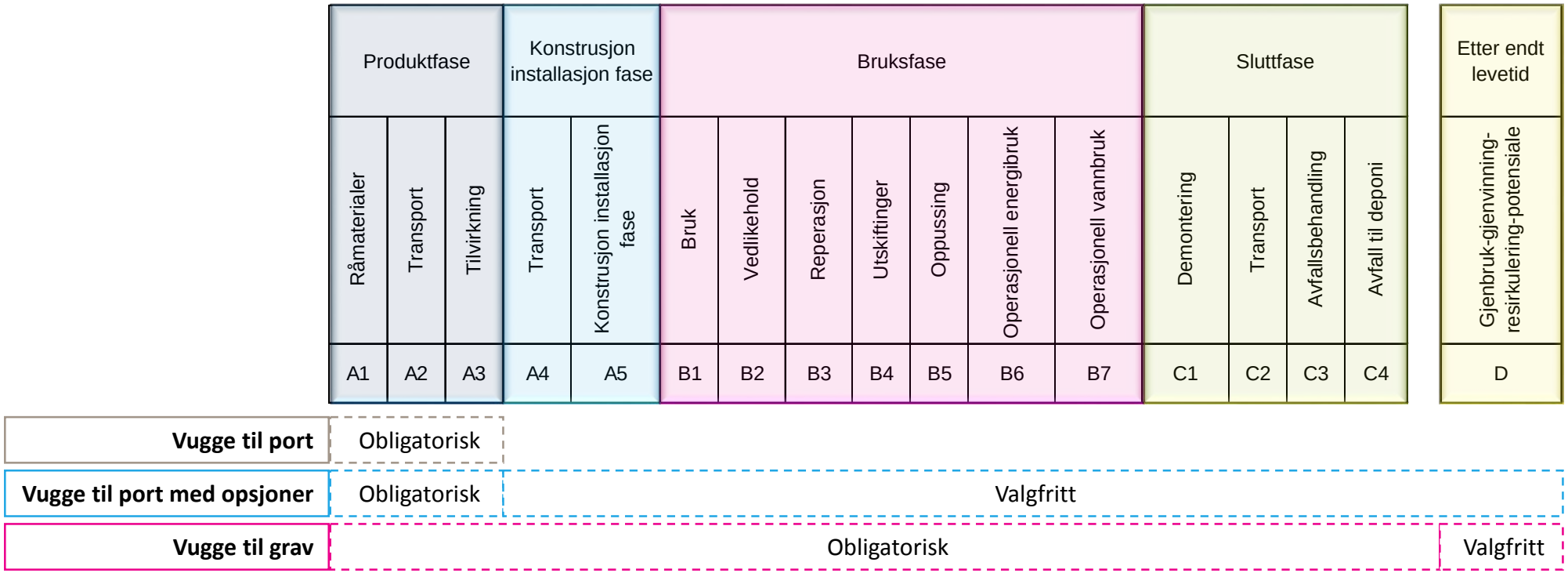
Materialer

- Må tenke funksjon, ikke produkt eller material
- Må ha en rettferdig sammenligning
  - Like systemgrenser
  - Bygningskontekst

Dokumentasjon: Miljødeklarasjon (EPD)



Eksempel, dekker

- Krav
  - Spenn på 7,2 meter
  - Lyd: 53 dB
  - Brann: REI 90

Fra:
Composite floors in urban buildings: Options for a low carbon building design
Skaar, C., Solem, B. og Rüther, P. (2017) presentert på Forum Wood Building Nordic 2017

Systemgrenser

Included

Not relevant

Not included

Product stage			Assembly stage		Use stage							End of life stage				Beyond the system boundaries
Raw materials	Transport	Manufacturing	Transport	Assembly	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D

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Systemgrenser

Included

Not relevant

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A1-A3

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Systemgrenser

Included

Not relevant

Not included

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Raw materials	Transport				Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling-potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D

A4

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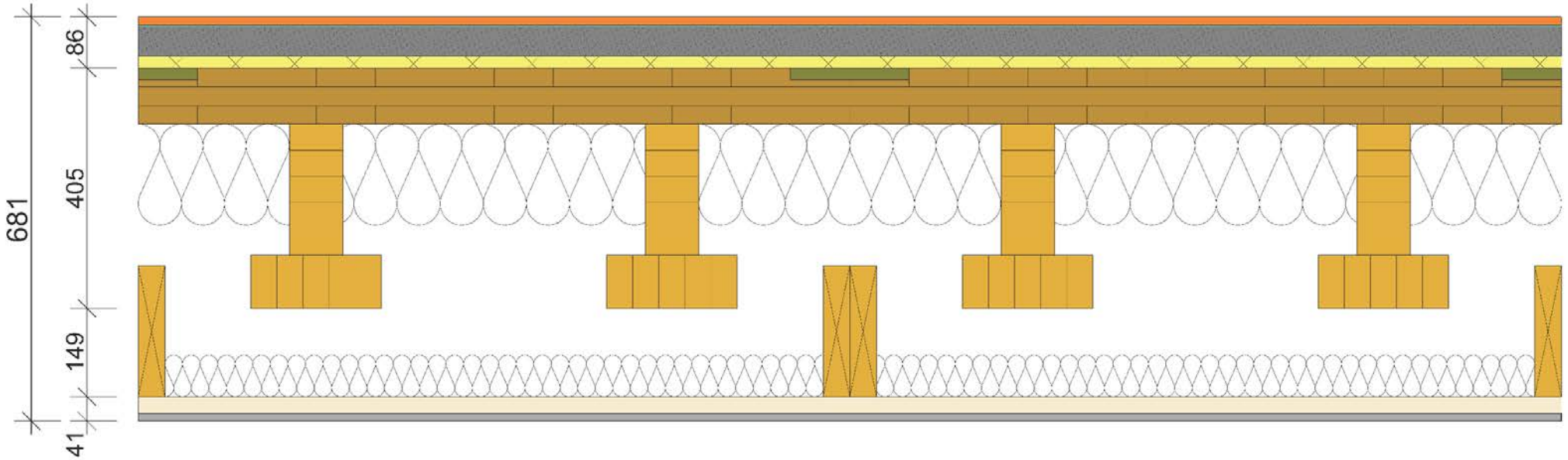
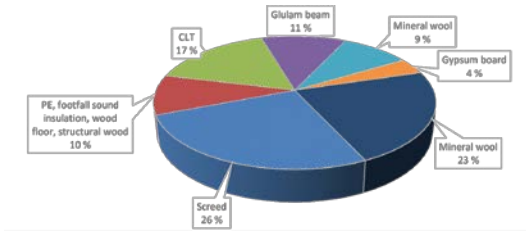
Construction 1: Cross-laminated timber (CLT)





SINTEF

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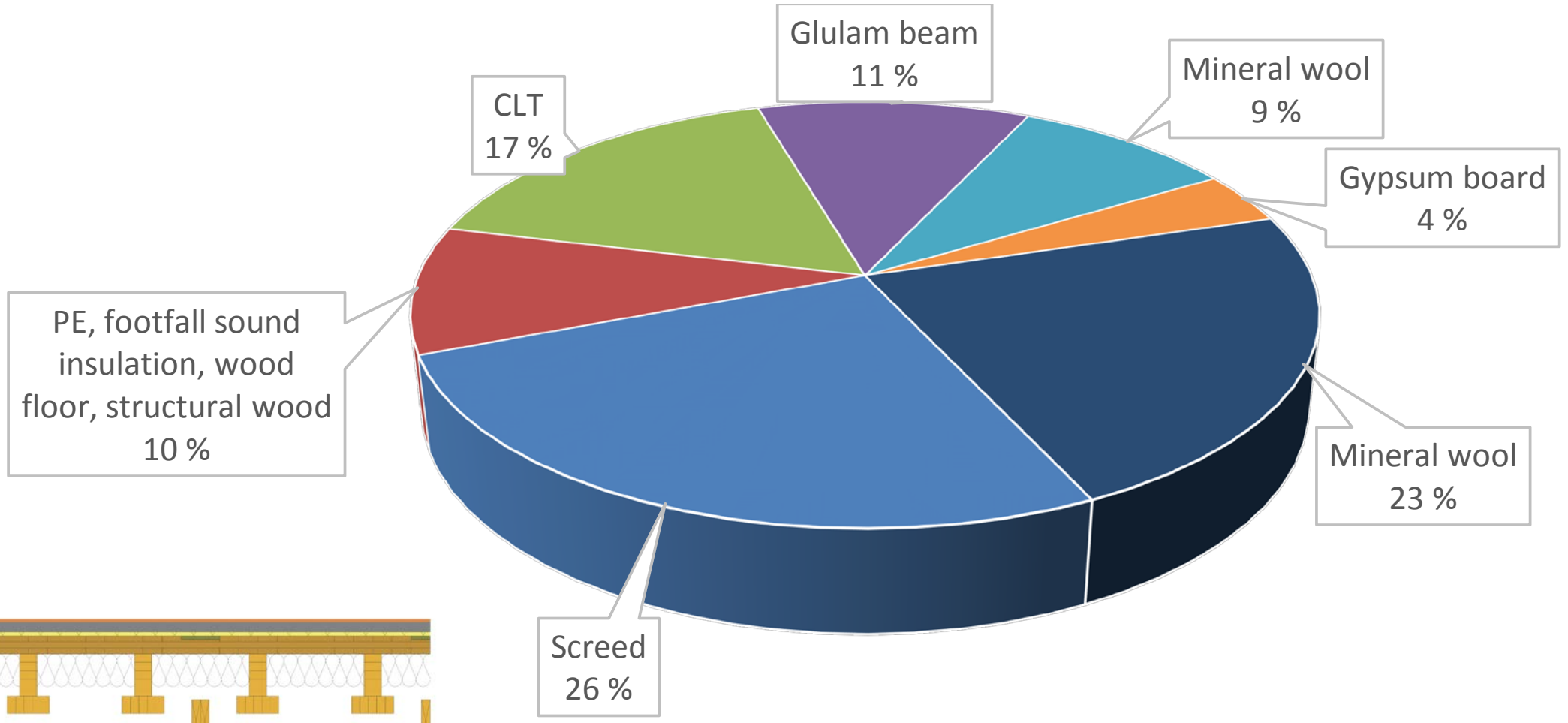
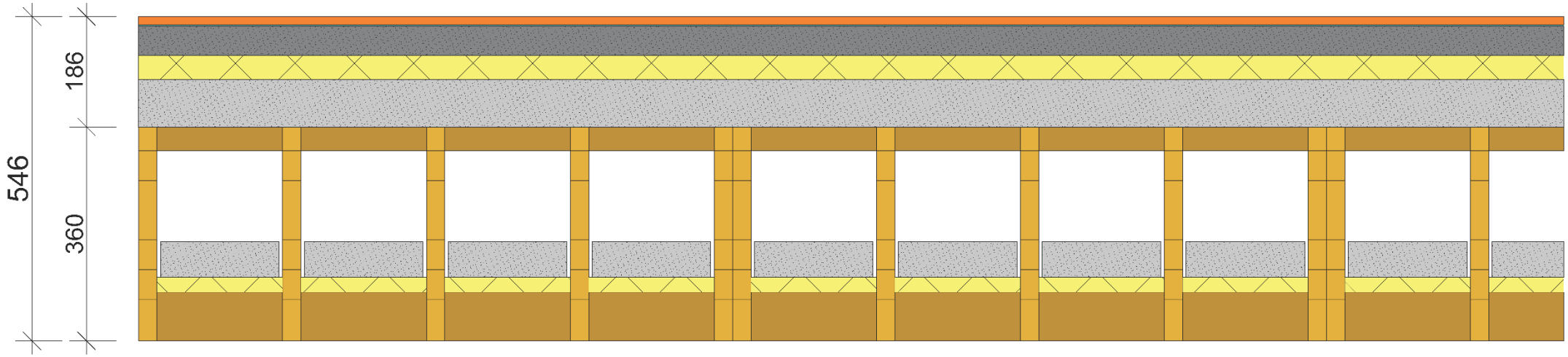
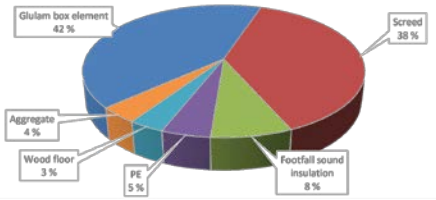


Construction 2: Timber box element





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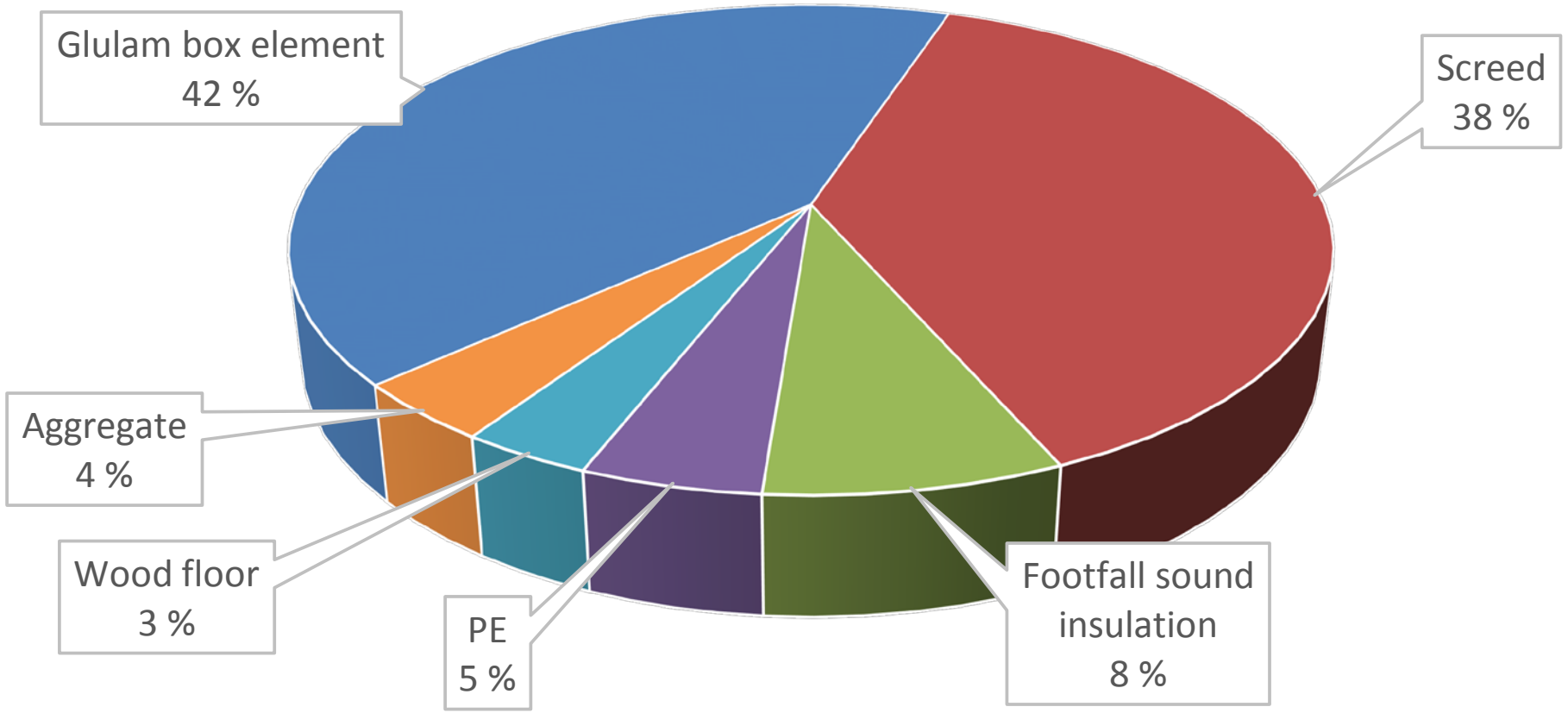
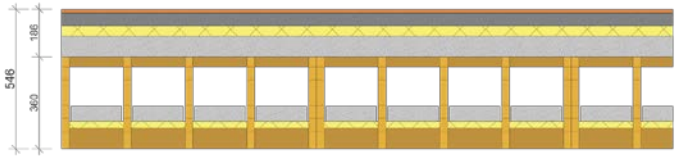
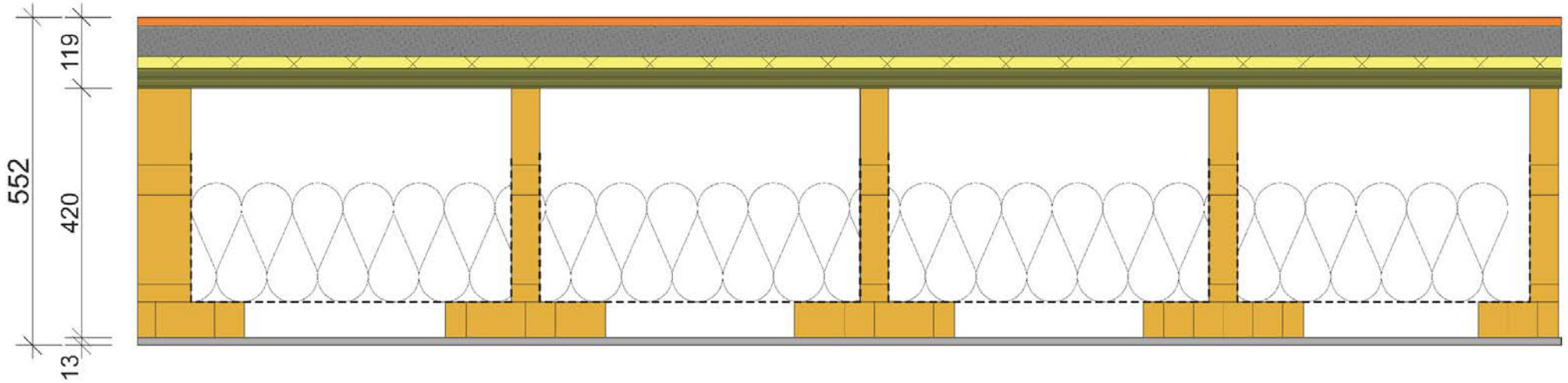
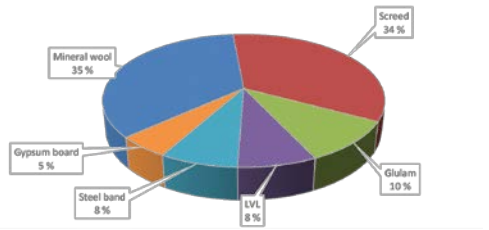




Construction 3: Laminated veneer lumber (LVL)





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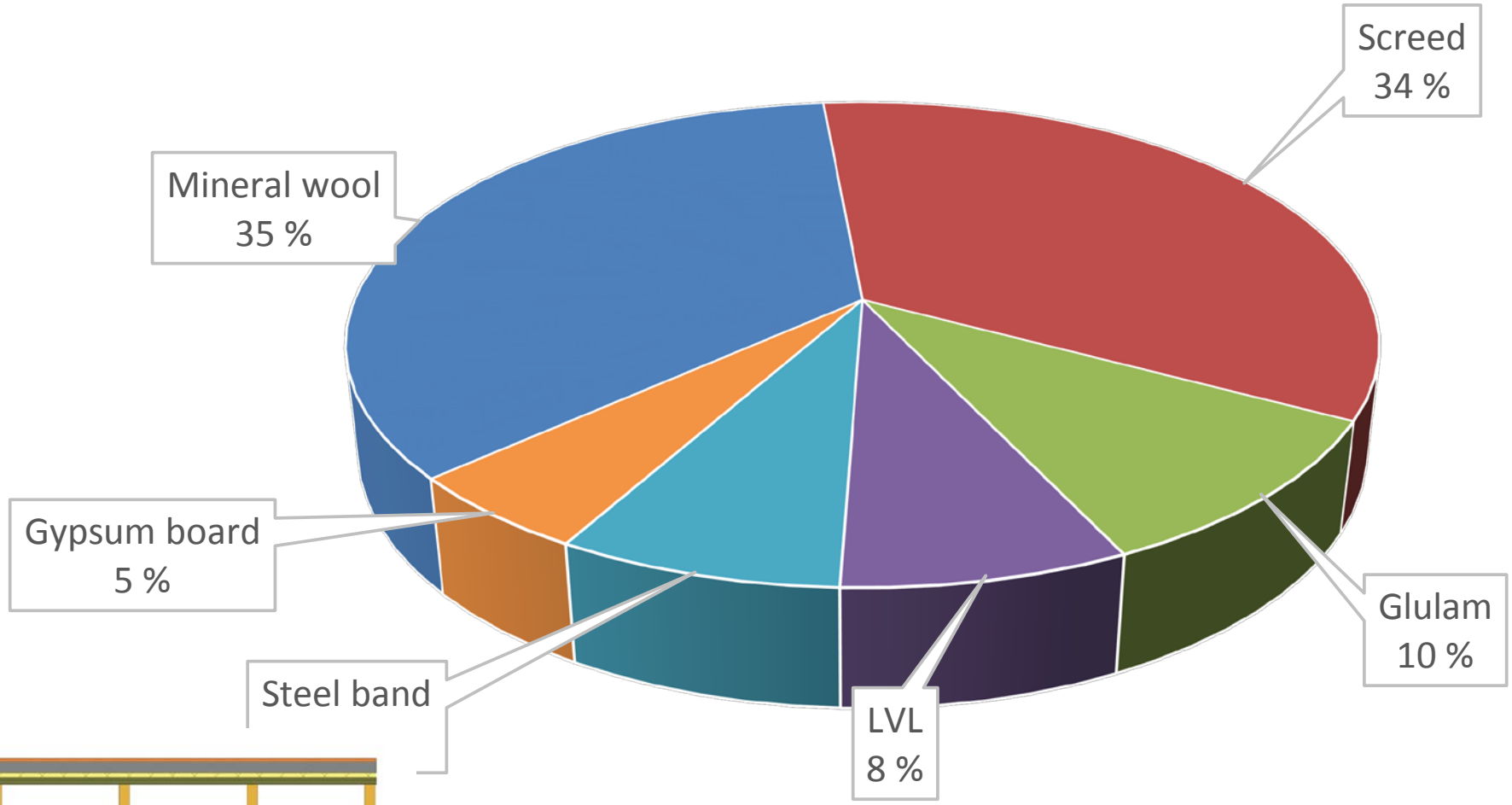

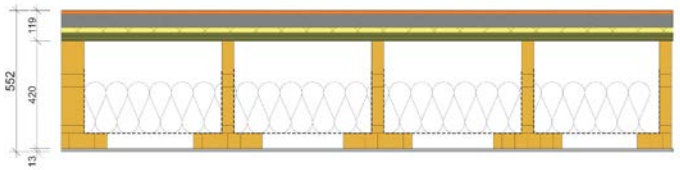

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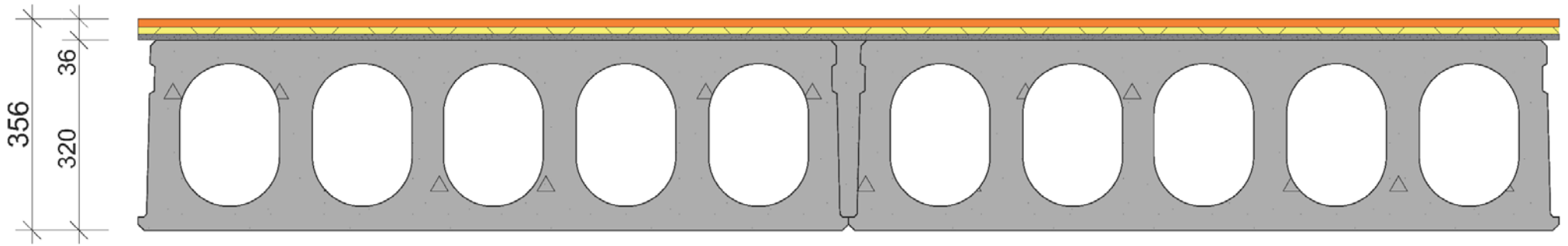
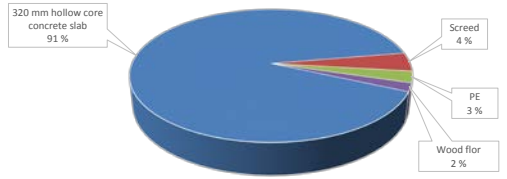
Construction 4: Hollow core concrete





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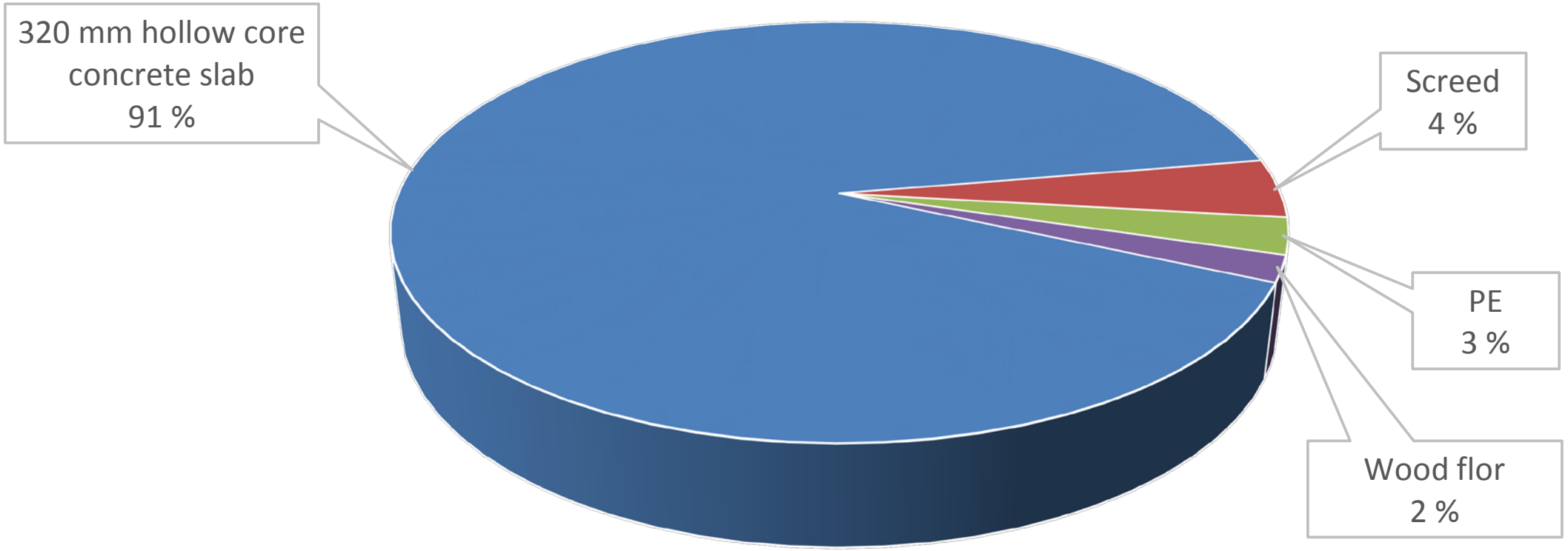
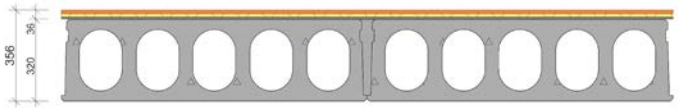
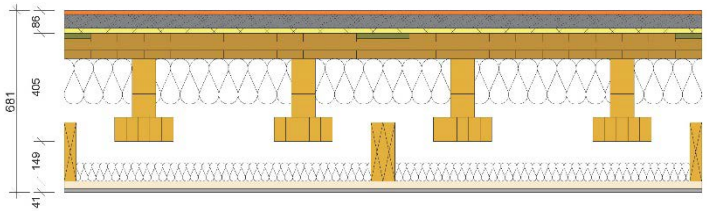




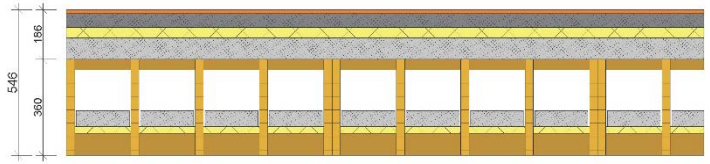
SINTEF

Results

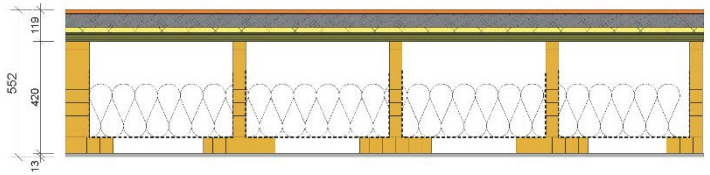
1: Cross-laminated timber (CLT)



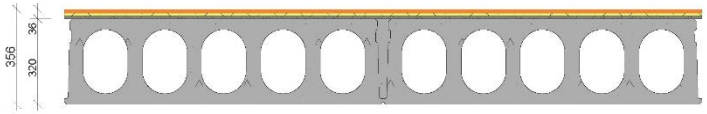
2: Timber box element

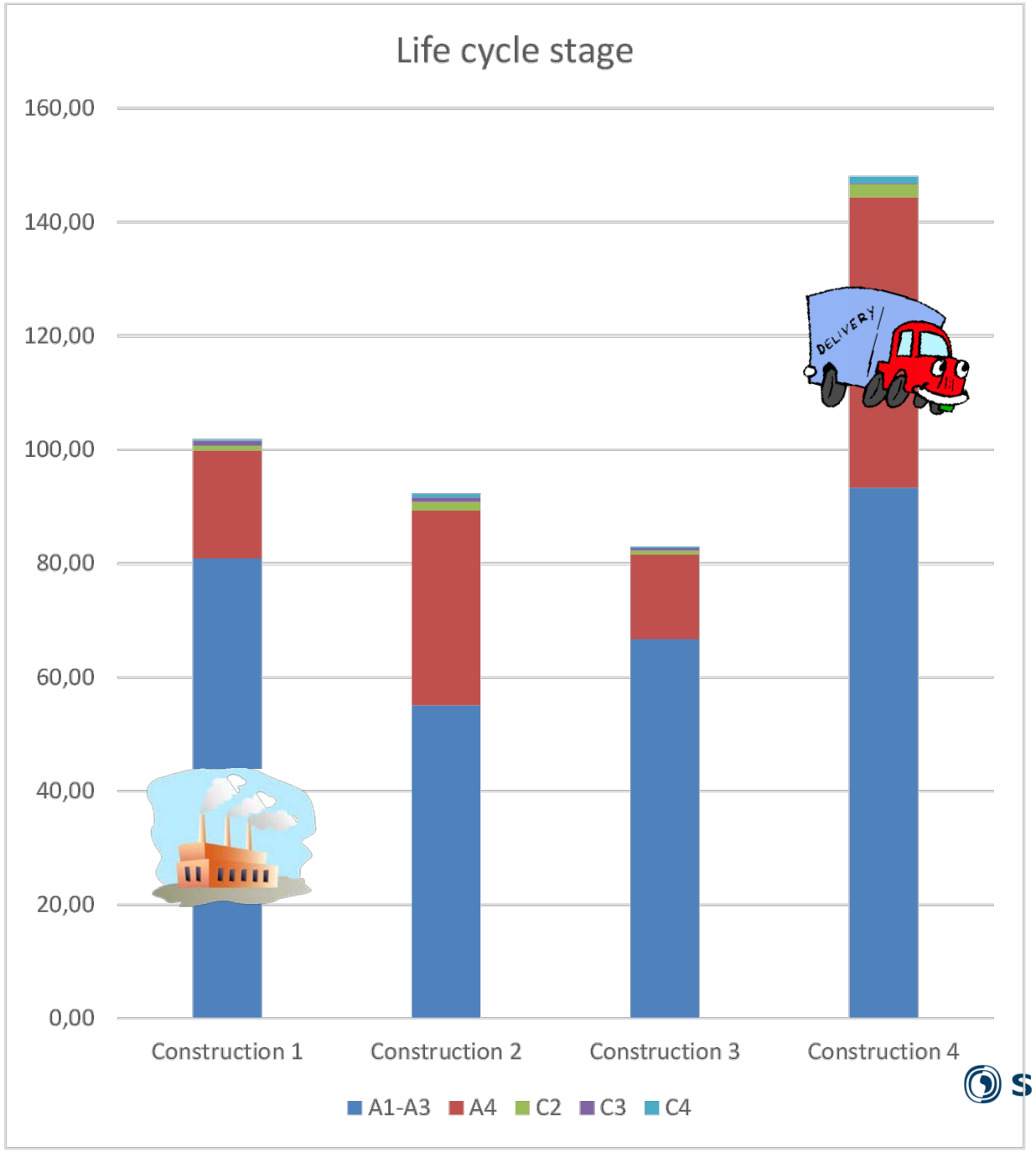


3: Laminated veneer lumber (LVL)



4: Hollow core concrete





SINTEF

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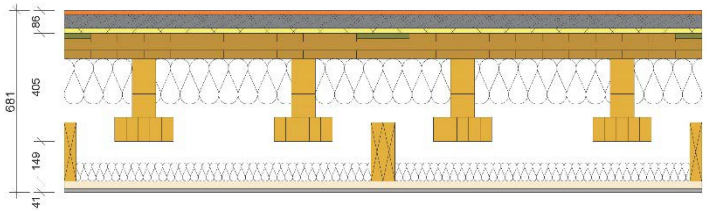

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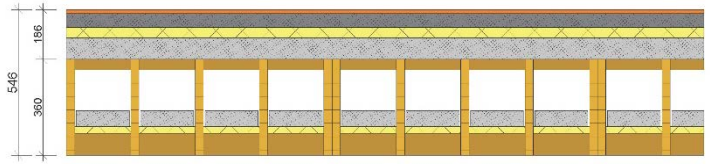

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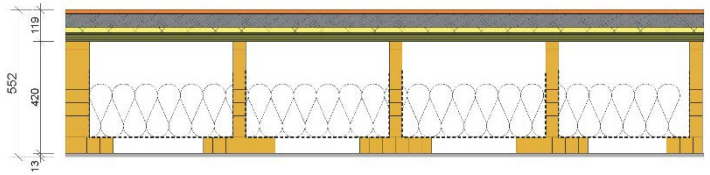

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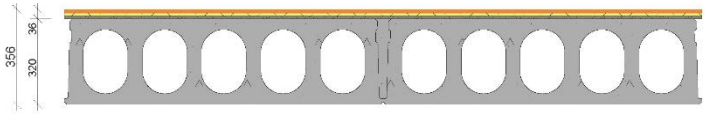

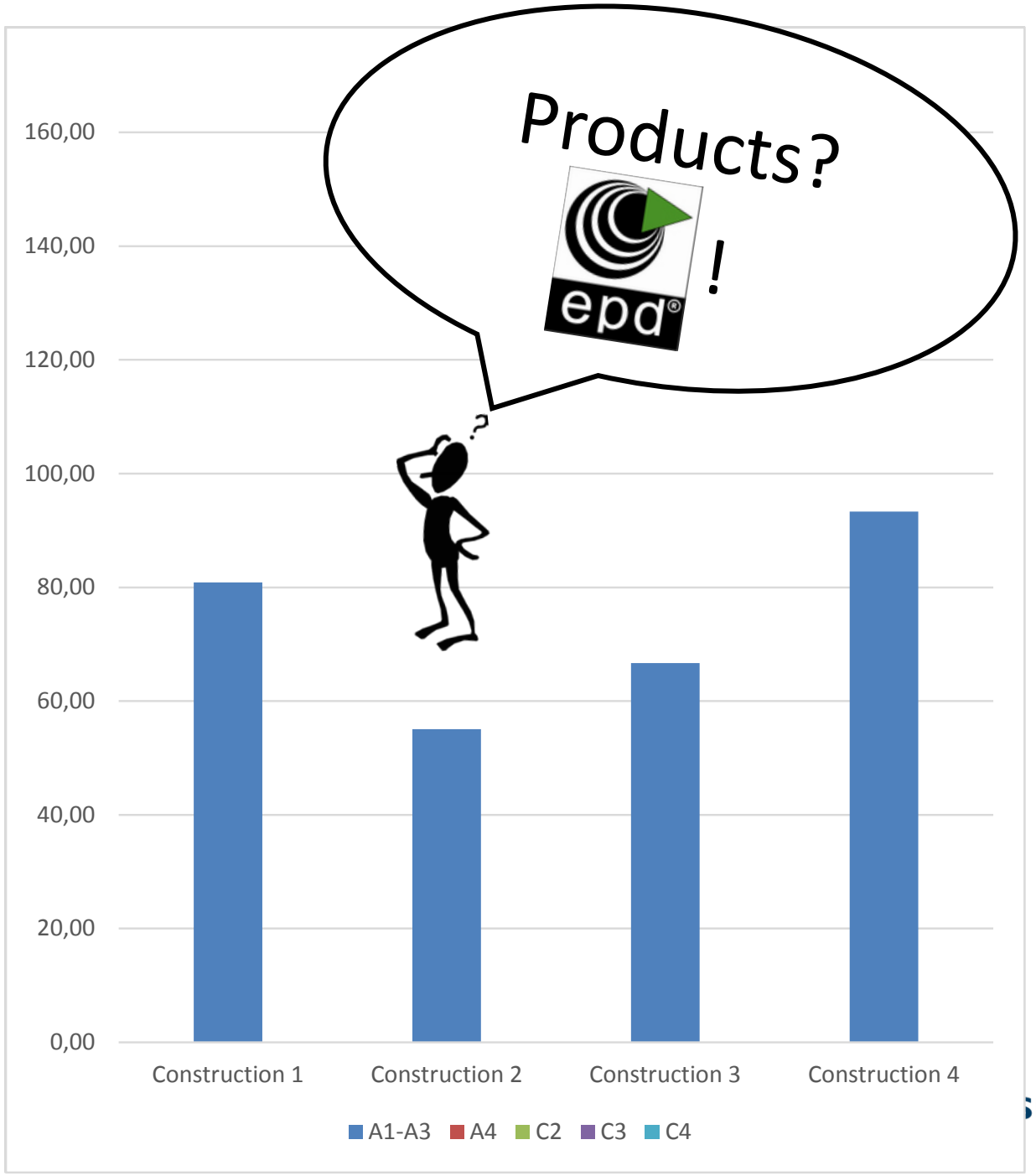

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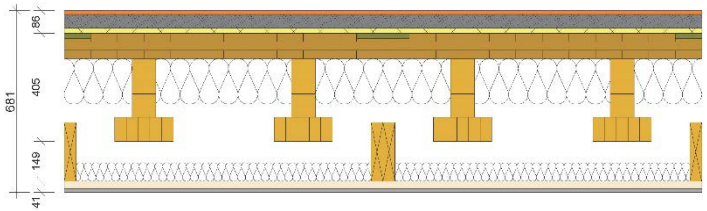
Resultater

1: Cross-laminated timber (CLT)



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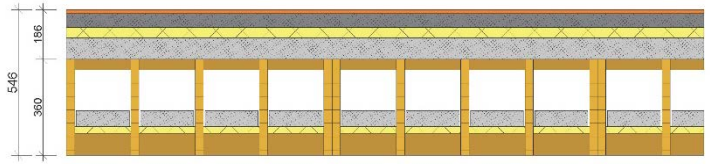

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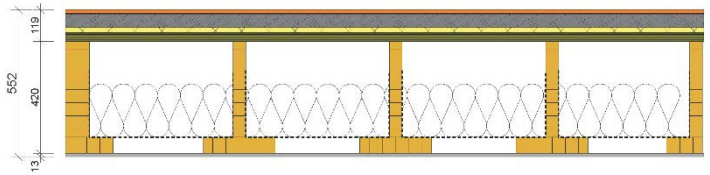

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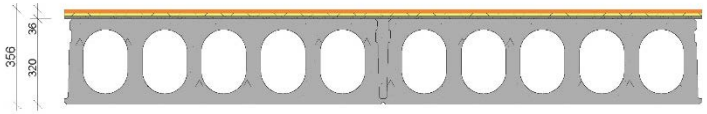
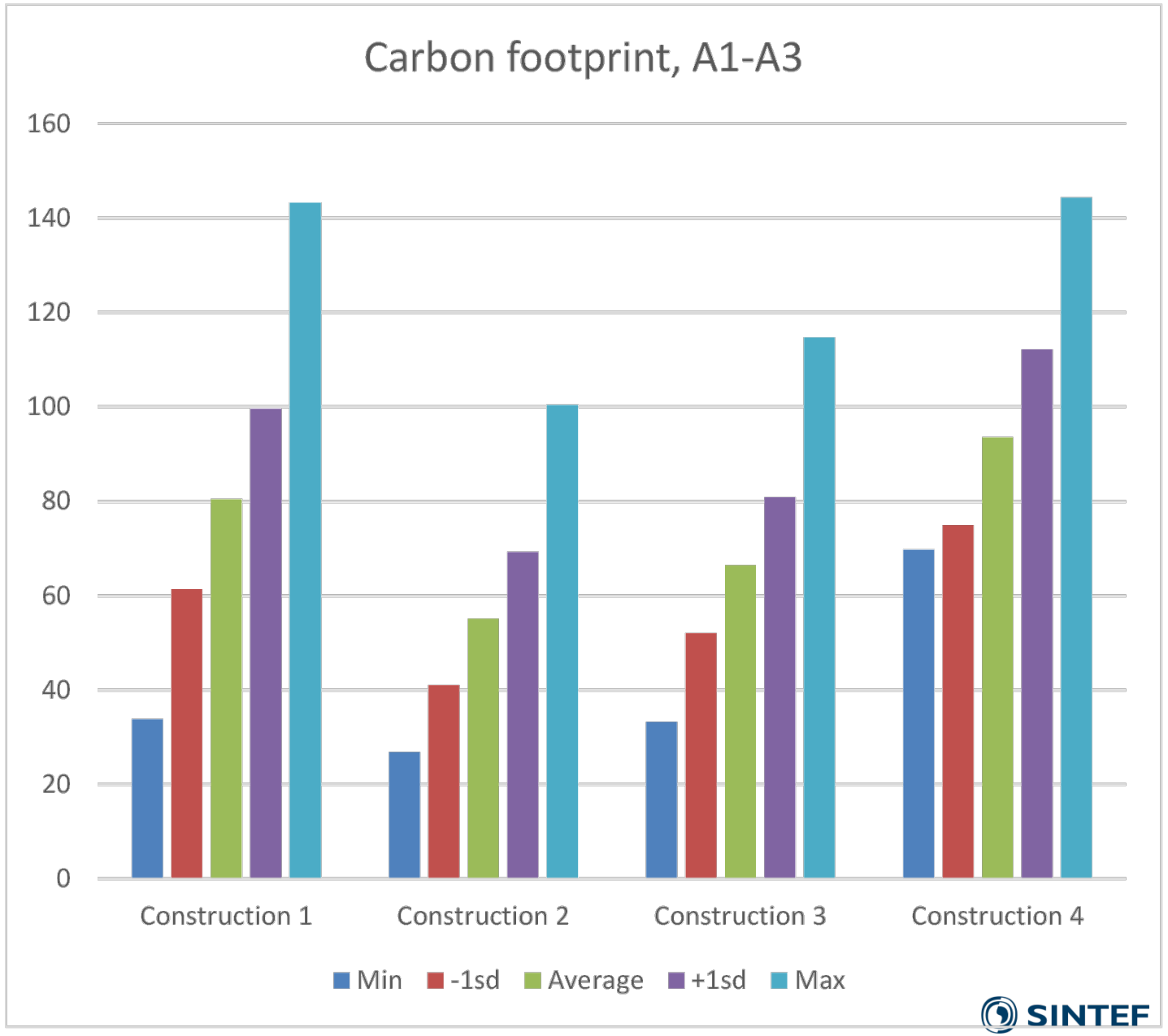




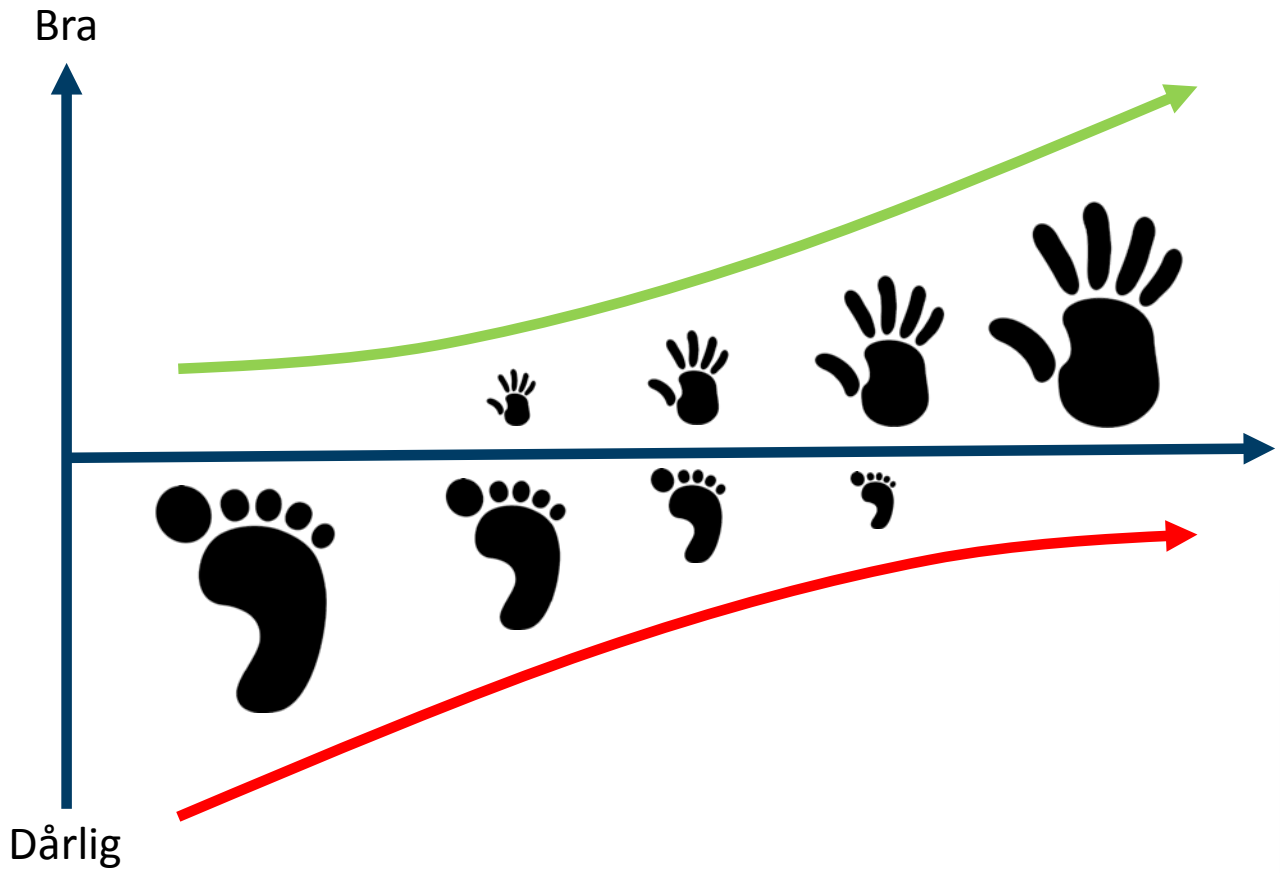
Praktiske utfordringer ved beregning av klimafotspor

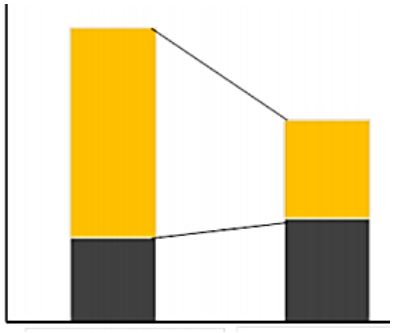
- Få inn data på materialer
- Se bygget som helhet
- Tenk på usikkerhet
- Holde data oppdatert fra idé til ferdig bygg (BIM?)

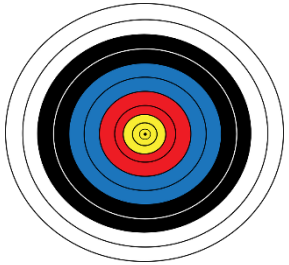
- Samsvar mellom teori og praksis
  - Byggeplass
  - FDV
  - Avhending

- Til sist…

Vi må både redusere klimafotsporet
og bygge gode, bærekraftige bygg!







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Teknologi for et bedre samfunn