

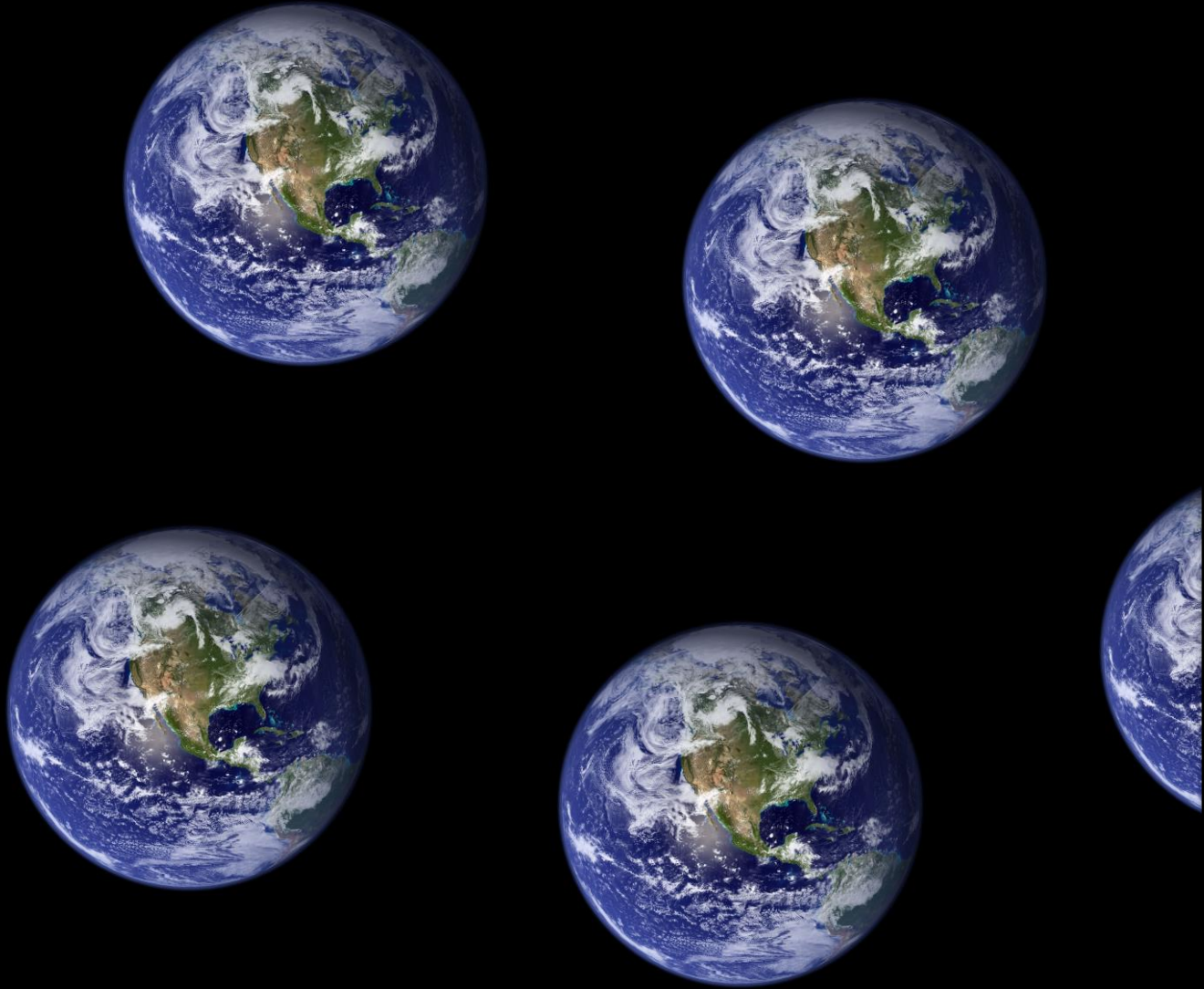
**”There’s no business
on a dead planet!”**

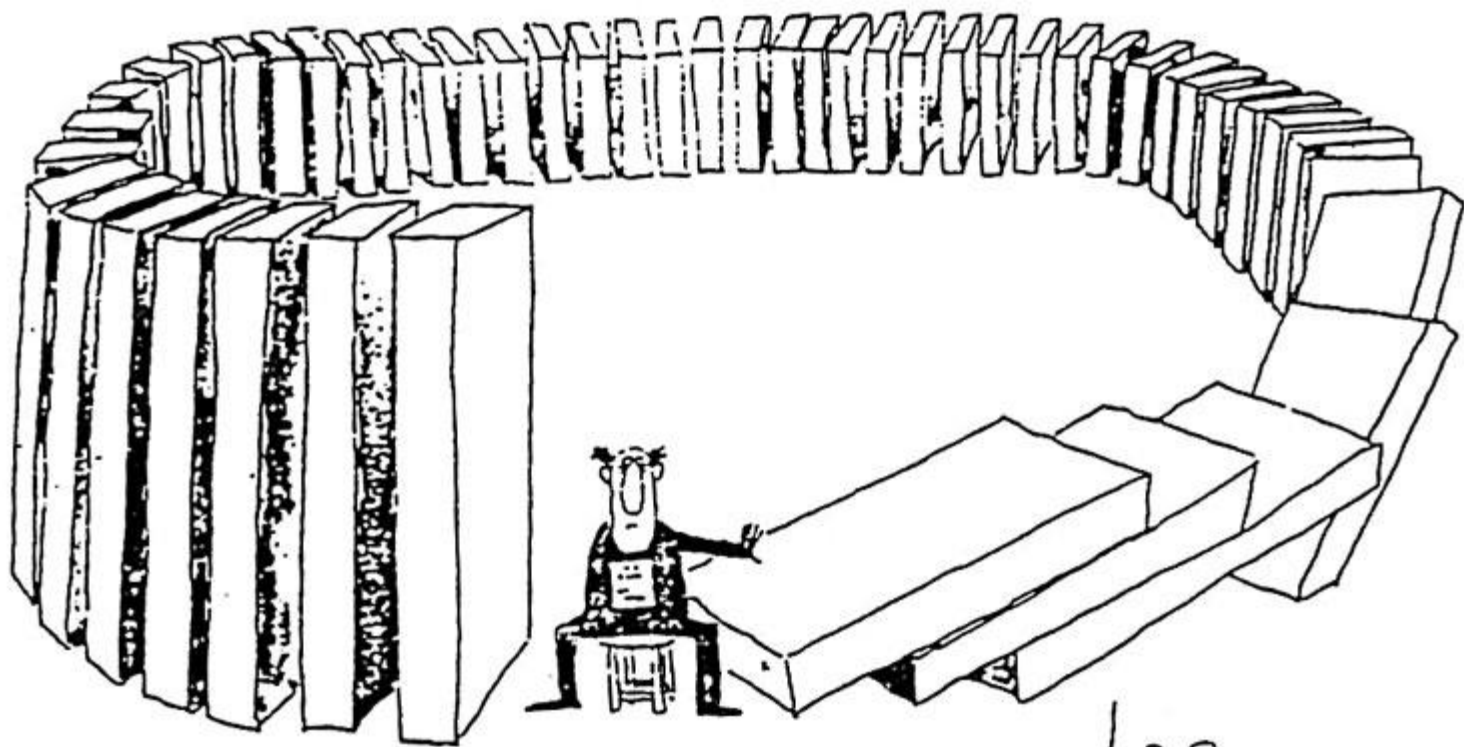


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Drawing by Levin; © 1976 The New Yorker Magazine, Inc.

BAN KI-MOON

”Vi är den första generationen med potential att utrota fattigdom och den sista generationen som kan påverka klimatförändringarnas värsta effekter.”



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**Tänk globalt,
agera lokalt!**



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DETTA ÄR FRIBO

- ✓ 610 lägenheter, 40 000 kvm BOA
- ✓ 14 anställda
- ✓ Stiftelse bildad 1955, ombildat till AB 1995
- ✓ 37,5 milj. omsättning 2017
- ✓ Certifierade enl. ISO 14 001 sedan 2001
- ✓ Helägt av Borås Stad



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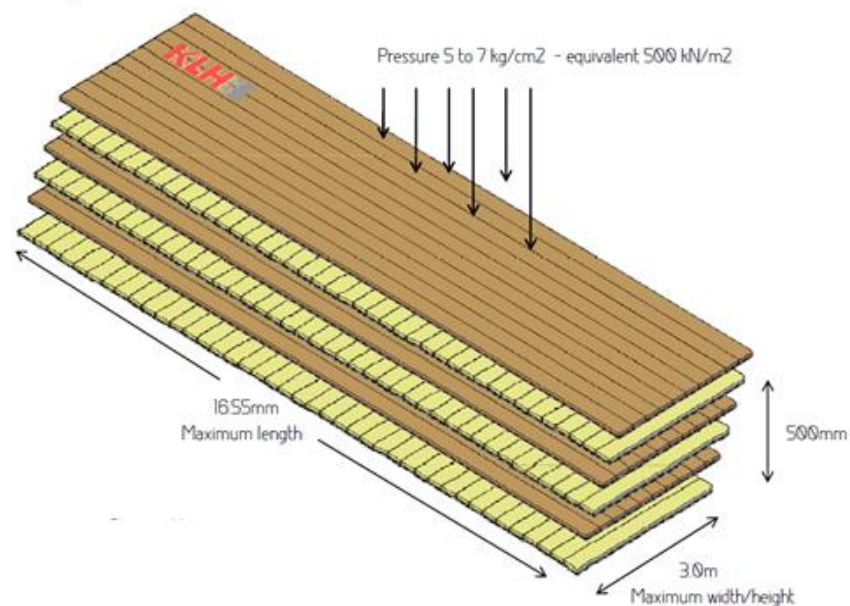


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KLH – MASSIVTRÄPANEL

- Panelformat 2,95 x 16,5m
- Min 2,4 x 8,25m
- 3, 5, 7, 9 skikt
- Paneltjocklek 57-500 mm
- DQ / DL - 2 riktningar





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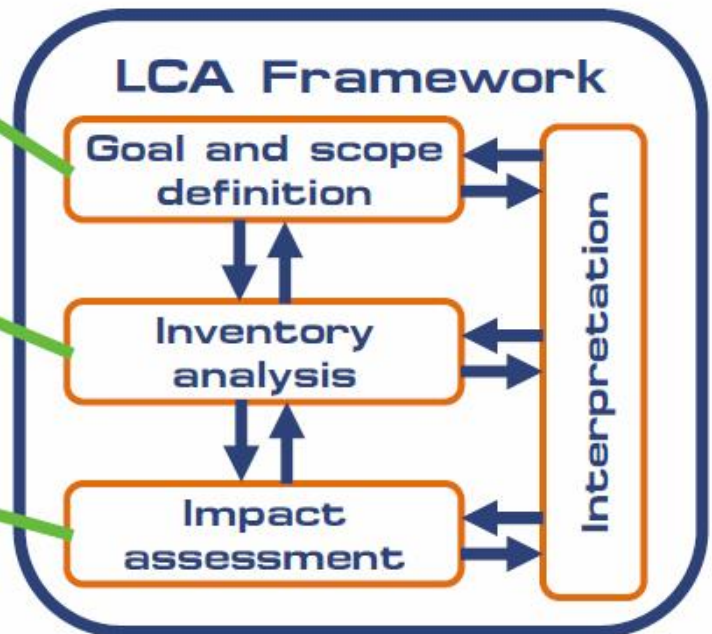
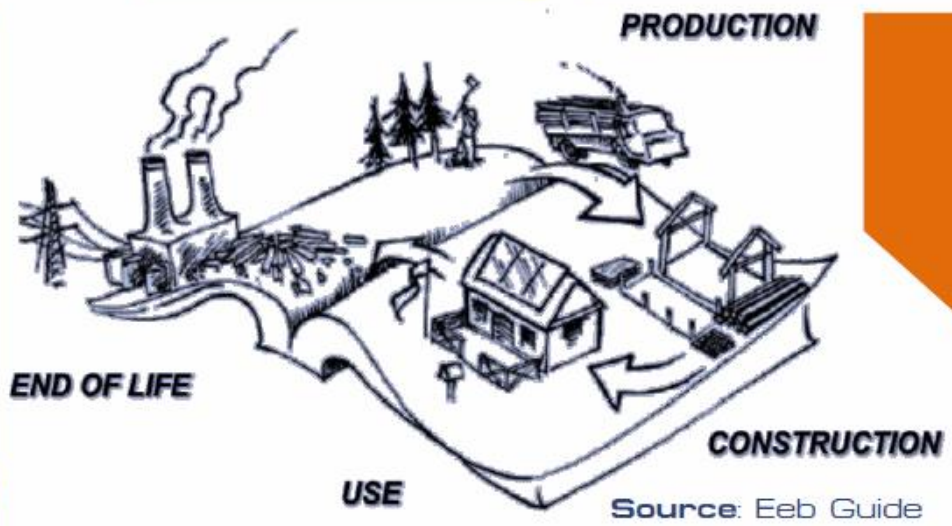
BASIC PRINCIPLES

-Cradle-to-grave approach

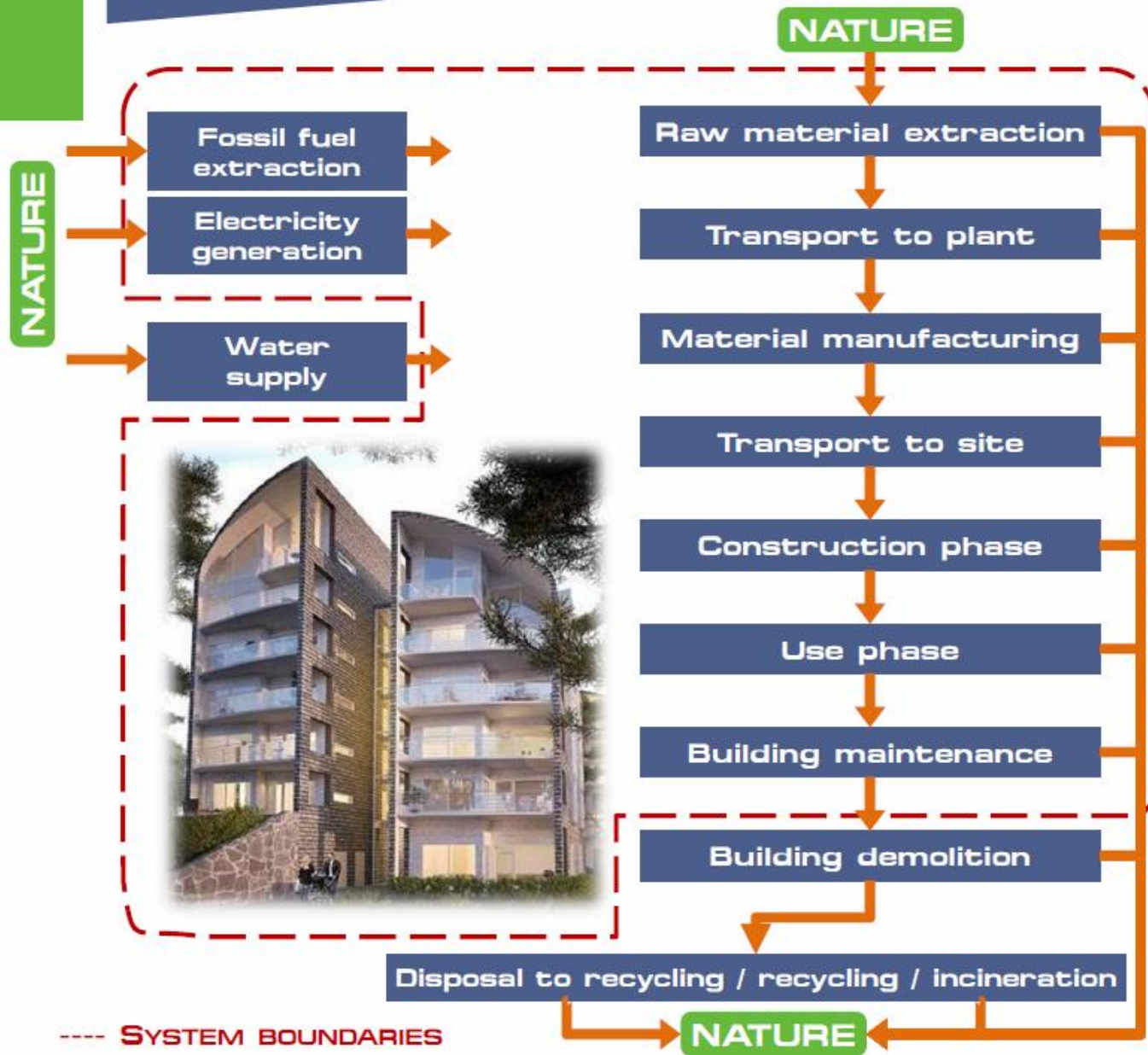
-What do we want to know?
-How do we want to use the results?

-Which energy & material inputs and environmental releases do we take into account?

-What potential impacts are associated to our activity?



WHAT IS INCLUDED?



LIFE-CYCLE INVENTORY

Material supply

Product	Quantity	Unit	Supplier	Product	Quantity	Unit	Supplier
Concrete	151	m3		Spånskiva	3074	m2	Moelven
Plastic Sheet	734	m2	T-Emballage	Metallic profiles	4487	kg	Lindab
Reinforcement steel	52,6	ton		Steel structure	17380	kg	
EPS	648	m3	Sundolit	OSB	3087	m2	Moelven
Prefab concrete walls	606	m2	Heda	Wooden battens	15	m3	Moelven
Concrete	312	m3		Cedar shingles	1886	m2	CedarBureau
EPS	74	m3		Insulation ground floor	264	m2	Isodrän
Reinforcement steel	48,4	ton		Asphalt sheet	264	m2	Icopal
Plaster Boards	15686	m2	Knauf -Danogips	Roof gutters	151	m2	Plannja
Fermacell	794	m2	Fermacell	Roof guards	1408	kg	Weland
KLH Elements	12820	m2	KLH	Windows	1049	m2	Velfac
Ballast	438	ton	Fristads Express	Doors	443	m2	Swedoor
Glue-lam timber	100	m3	Moelven	Acoustic elastomer	1510	kg	Getzner
Insulation: Rock wool	1335	m3	Rockwool	Wooden cladding	1051	m2	Moelven
Air-blowned	521	m3					
45mm	205	m2					
145mm	685,4	m2					
Facade 300mm	2351	m2					

7,5 % are added on SimaPro to account on-site wastes during construction phase

Blasting	
Machine	Diesel (L)
Excavator	3500
Drilling machine	1600
Dumper	1500
Trucks	10000
Stone Crusher	2000

Construction phase	Consumption	Duration	Total
Machines and heating	6500 kWh/month	14 months	91000 kWh
Consumption of the crane	35 kW	360 hours	12600 kWh
Electricity supply	Borås Elhandel mix		
Workers	17 workers FB /day	19 kms/day/person	215460 kms
journeys	10 workers subc / day	1,6 people/car	35% diesel, 65% petrol

Earthworks	
Machine	Diesel (L)
Excavator	4500
Wheel loader	1500
Trucks	10000
Compactor	100

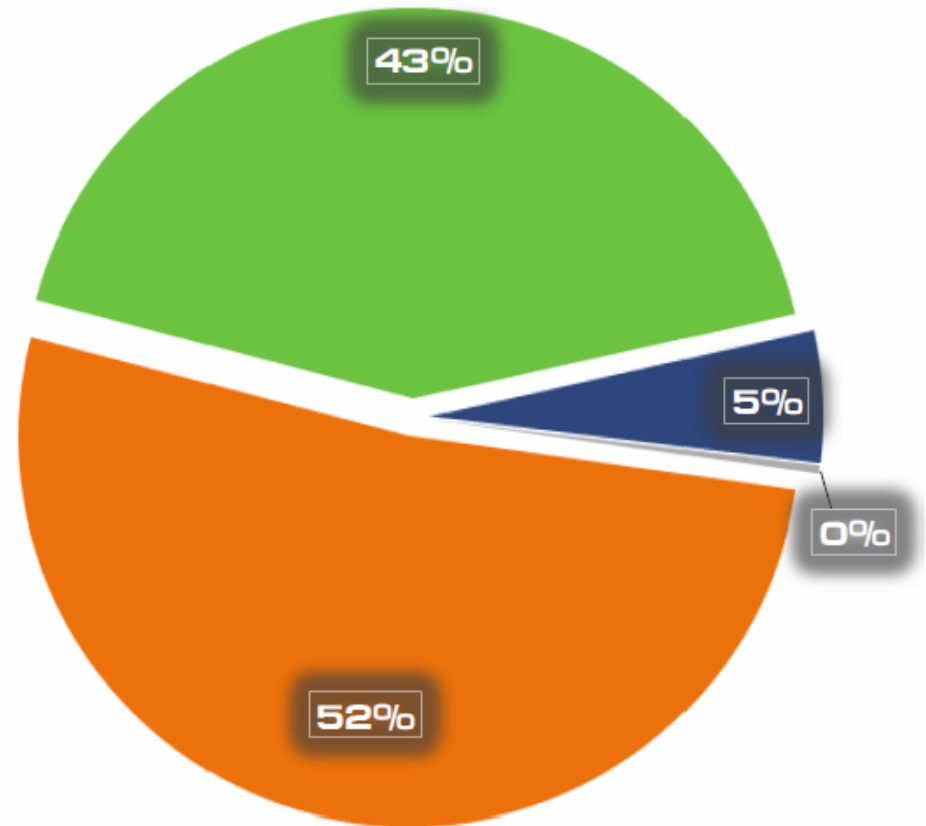
Use phase	Consumption	Supplier
Heating	51 kWh/m ² /year	Fristad district heating
Consumptions from households	30 kWh/m ² /year	Swedish electricity mix
Consumptions from Fribo	9 kWh/m ² /year	Bra Miljöval - 100% hydro
Maintenance	Frequency	Quantity
Asphalt sheet recovering	25 years	264 m ²



DISTRIBUTION OF CO₂ EMISSIONS PER PHASE

CO₂ emissions

- USE
- MATERIAL SUPPLY
- CONSTRUCTION
- MAINTENANCE



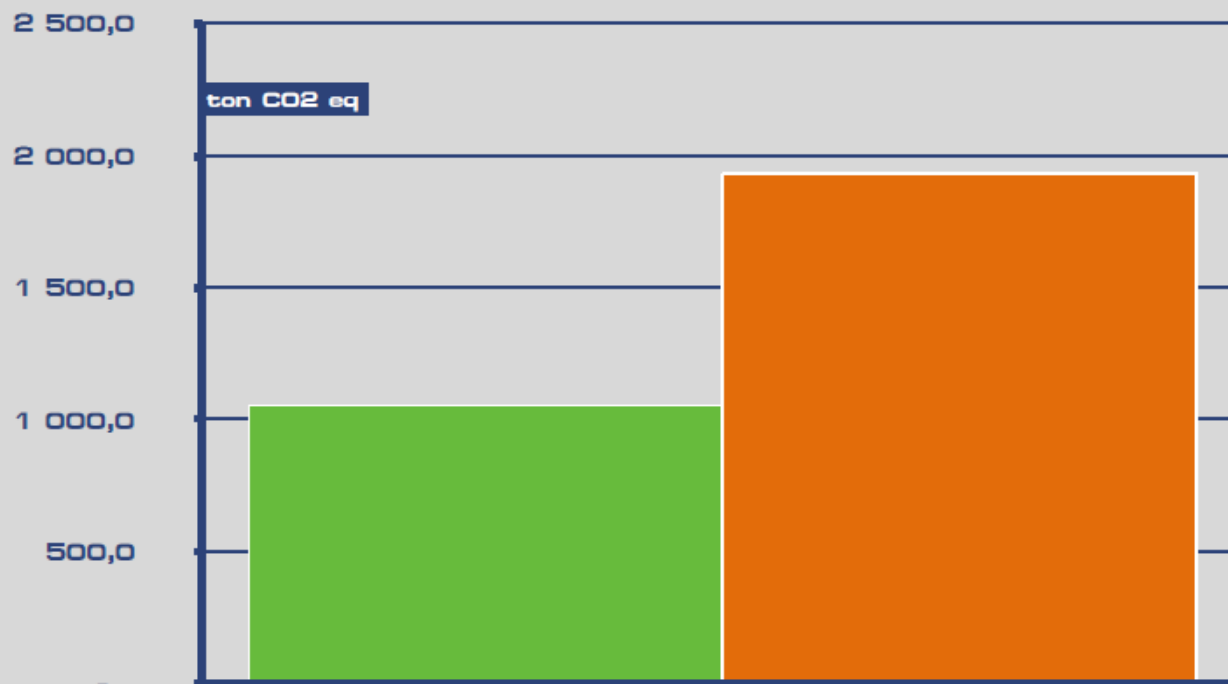
MATERIAL SUPPLY
CONSTRUCTION
USE
MAINTENANCE



CO₂ emissions

Global Warming Potential (ton CO₂eq)

Design solution comparison



Global warming (GWP100)

■ KLH

1 051,9

■ Concrete

1 931,3

MATERIAL SUPPLY
CONSTRUCTION
USE
MAINTENANCE

CEDAR SHINGLES



QUESTION

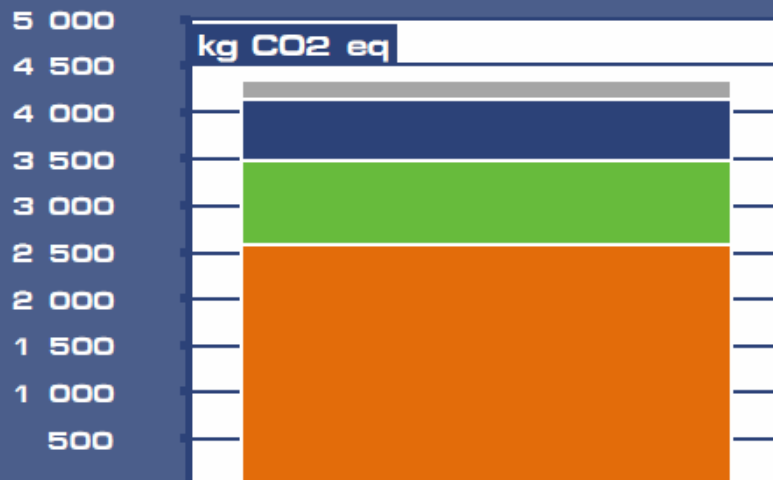
ARE THEY **REALLY** AN
"ENVIRONMENTALLY FRIENDLY"
PRODUCT?





CEDAR SHINGLES

CO2 emissions during Supply of Cedar Shingles



kg CO2 eq
Global warming
(GWP100)

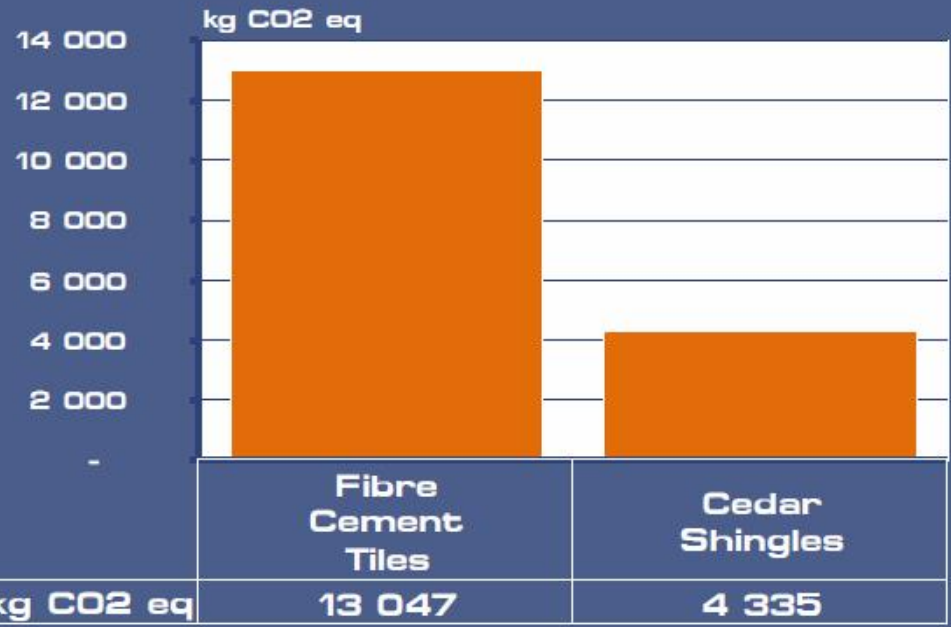
Transport, Road	206
Transport, Ocean	662
Cedar Shingle Manufacturing	895
Transport, Rail	2 573

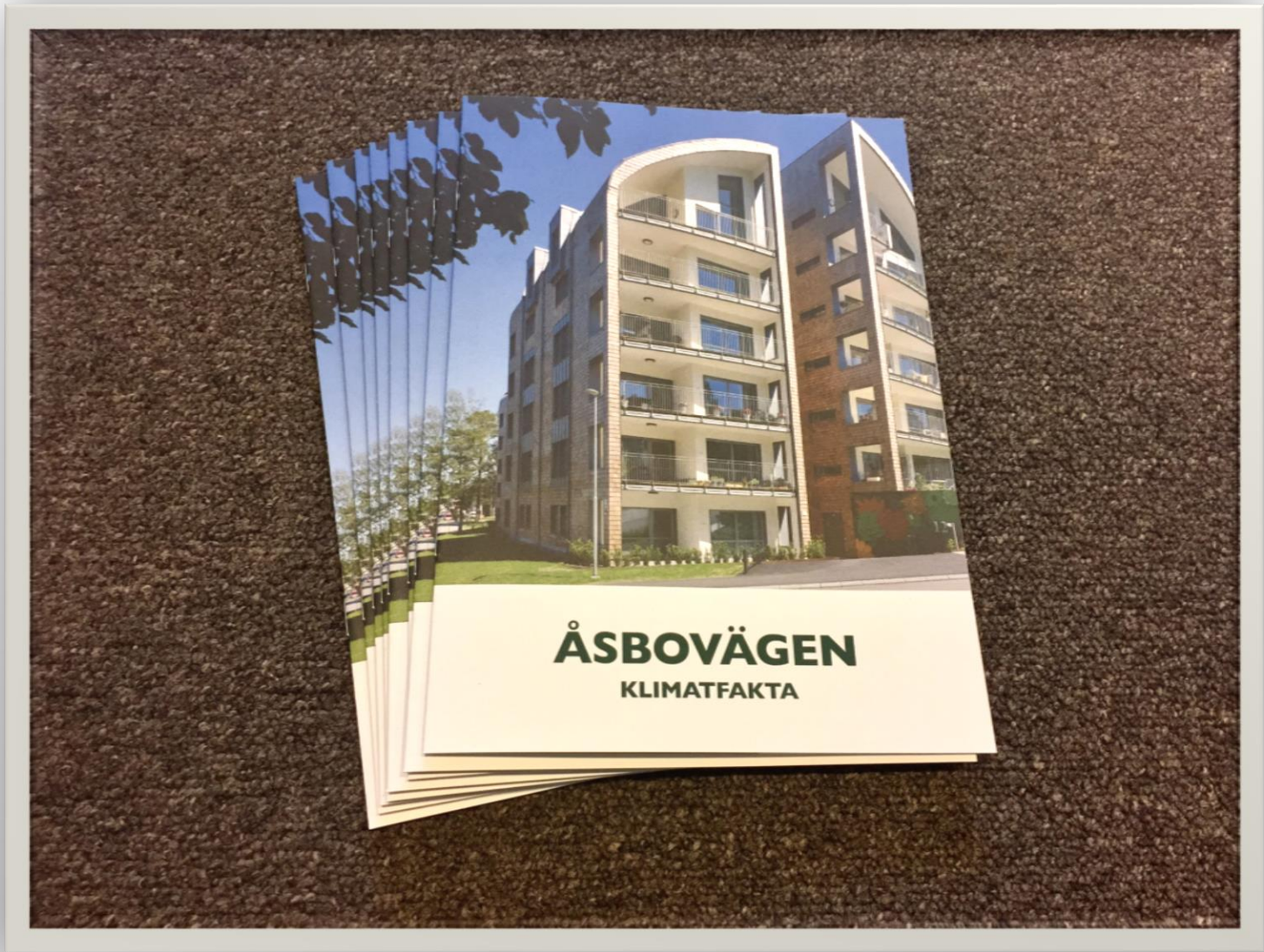




CEDAR SHINGLES

CO2 emissions from the supply of two facade materials





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Kjell-Ove Sethson

kjell-ove.sethson@fribo.nu

+46 (0)33-22 25 52

fribo.nu



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