



Sustainability aspects of SESBE products

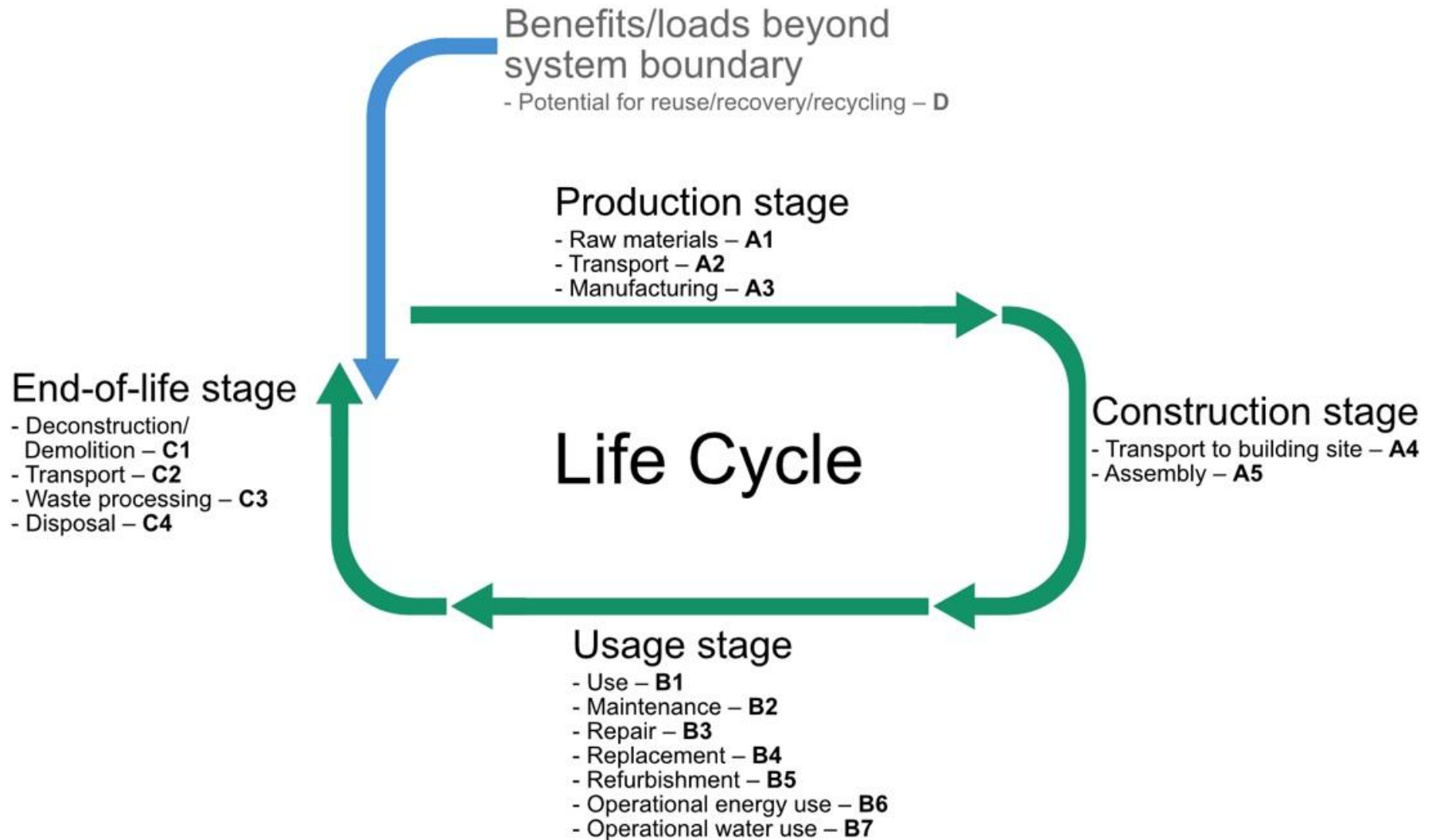
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Life cycle assessment (LCA) and life cycle cost analysis (LCC)

Goals

- Link development of the panels with sustainability
- Identify strong/weak links in the material and supply chain over the entire life cycle
- Benchmark SESBE materials and products with other solutions and identify potential for improvements
- Calculate costs of SESBE products based on sustainability aspects

Life cycle assessment (LCA)



The impact categories

	Impact Category	Unit
GWP	Global Warming Potential (100a)	kg CO ₂ -eq.
ODP	Ozone Depletion Potential	kg CFC 11-eq.
AP	Acidification Potential	kg SO ₂ -eq.
EP	Eutrophication Potential	kg (PO ₄) ³⁻ -eq.
POCP	Photochemical Ozone Creation Potential	kg C ₂ H ₄ -eq.
ADP-elements	Abiotic resource depletion potential	kg Sb-eq.
TRPE	Total renewable primary energy	MJ
TNRPE	Total non-renewable primary energy	MJ

Functional unit

Full panel

1 m² of concrete façade element with a U-value of 0,15 W/m²K and a service life of 80 years

Half panel

1 m² of concrete half panel with a R-value of 2,9 m²K/W

Other information

- The factory is **located in Eksjö, Sweden**
- The energy at factory is assumed to be the same for all elements
- The building site is assumed to be 200 km from the production plant

Full panel

Properties and references

	SESBE	Sandwich EPS	Sandwich RW	Sandwich EPS NLB
Insulation	Foam concrete with aerogel	EPS	Rock wool	EPS
Insulation thickness	190 mm	240 mm	240 mm	240 mm
Insulation density	120 kg/m ³	30 kg/ m ³	60 kg/ m ³	30 kg/ m ³
λ insulation	0,030 W/mK	0,037 W/mK	0,037 W/mK	0,037 W/mK
U-value	0,15 W/m ² K	0,15 W/ m ² K	0,15 W/ m ² K	0,15 W/ m ² K
Wall thickness	240 mm	475 mm	475 mm	410 mm
Weight per 1 m² wall	142 kg/ m ²	567 kg/ m ²	574 kg/ m ²	411 kg/ m ²

Maintenance and replacement

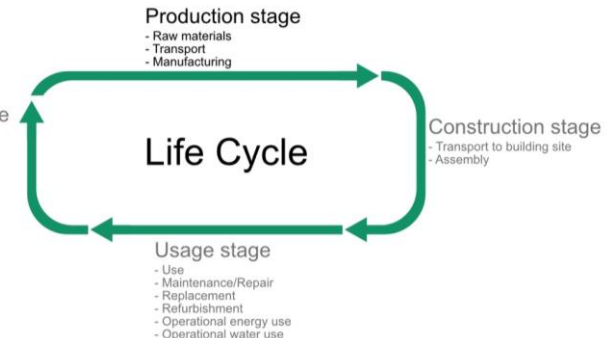
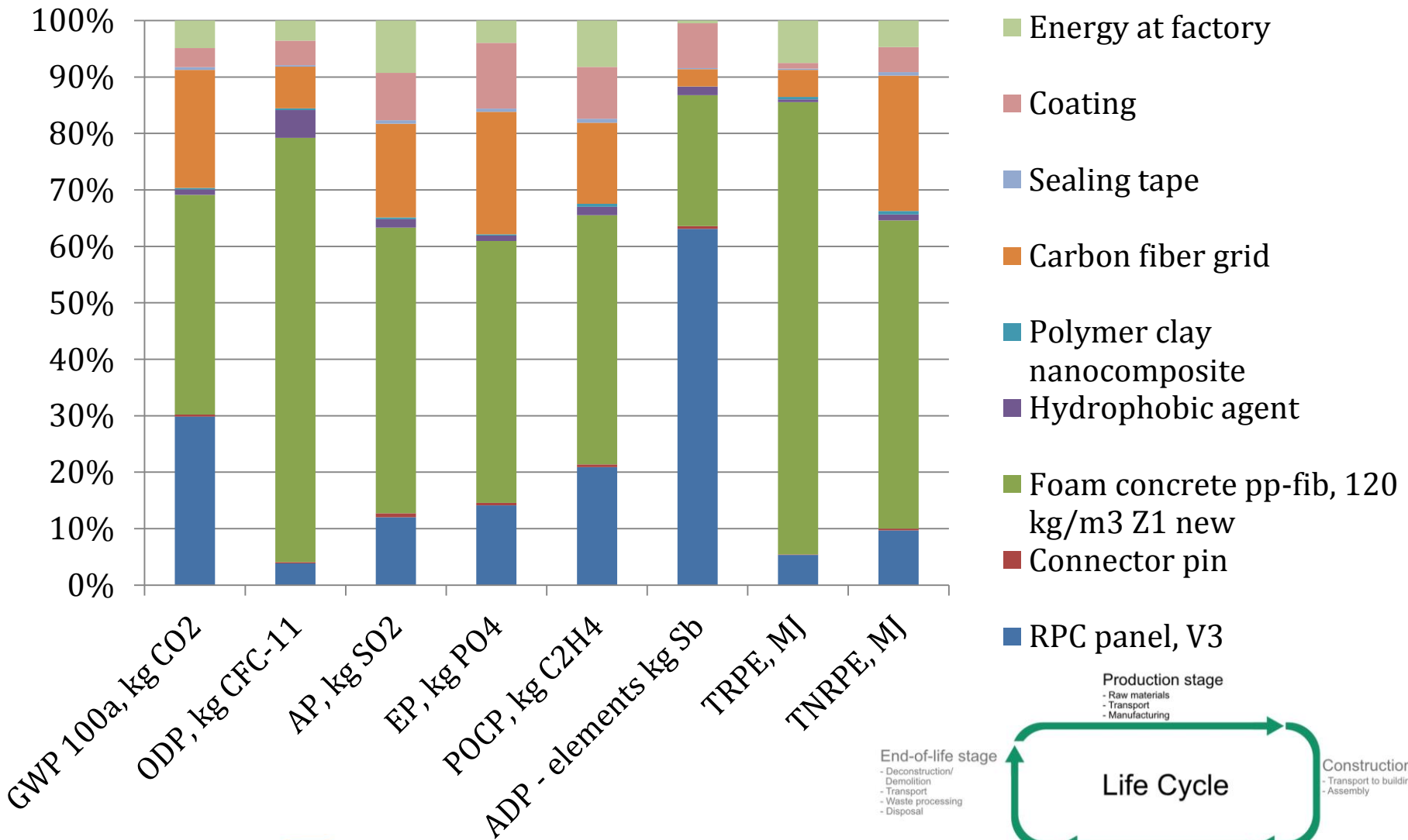
Reference walls: 10 % of the façade is rendered every 25 years (maintenance) and 100% every 45 years (replacement)

SESBE: no maintenance

Full panel – End-of-life

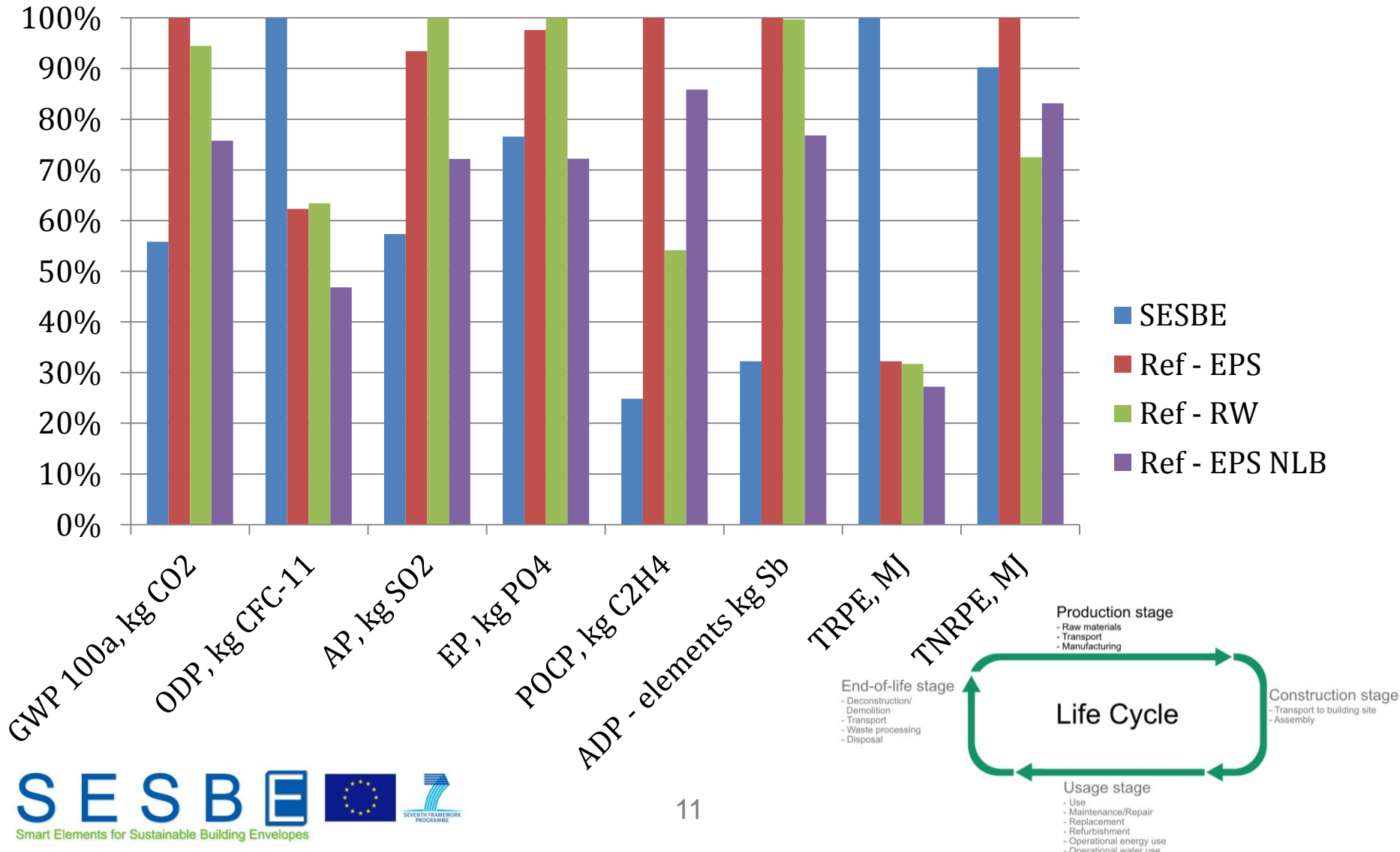
Component	Recycle	Landfill	Incineration
SESBE			
FRRPC concrete	X		
Foam concrete	X		
Sealing tape			X
Sandwich EPS and NLB			
Concrete	X		
EPS			X
Reinforcement	X		
Sealing tape			X
Render	X		
Sandwich RW			
Concrete	X		
Rock wool		X	
Reinforcement	X		
Sealing tape			X
Render	X		

Full panel – Detailed analysis of SESBE

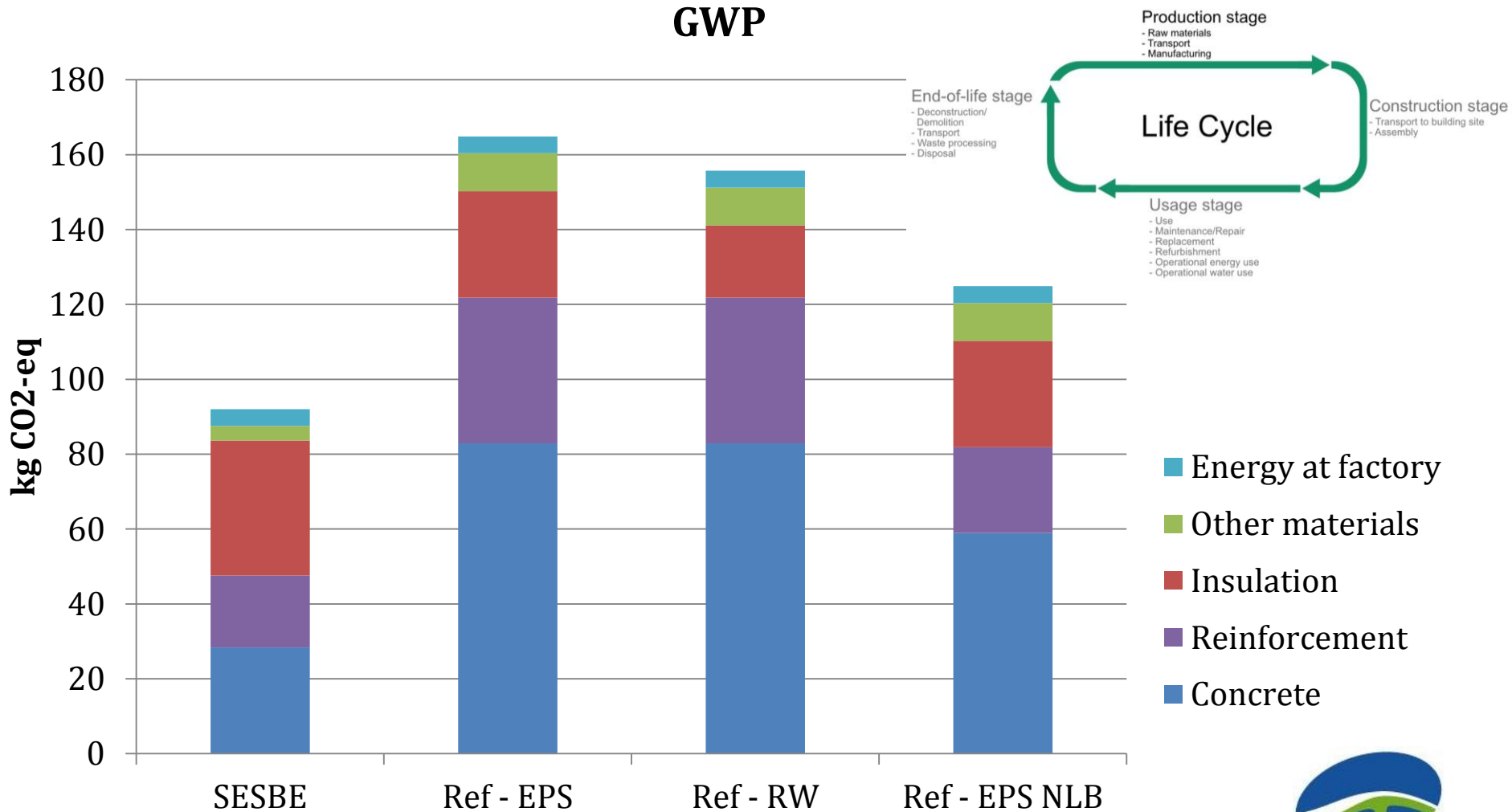


Full panel – Production of elements

Production stage

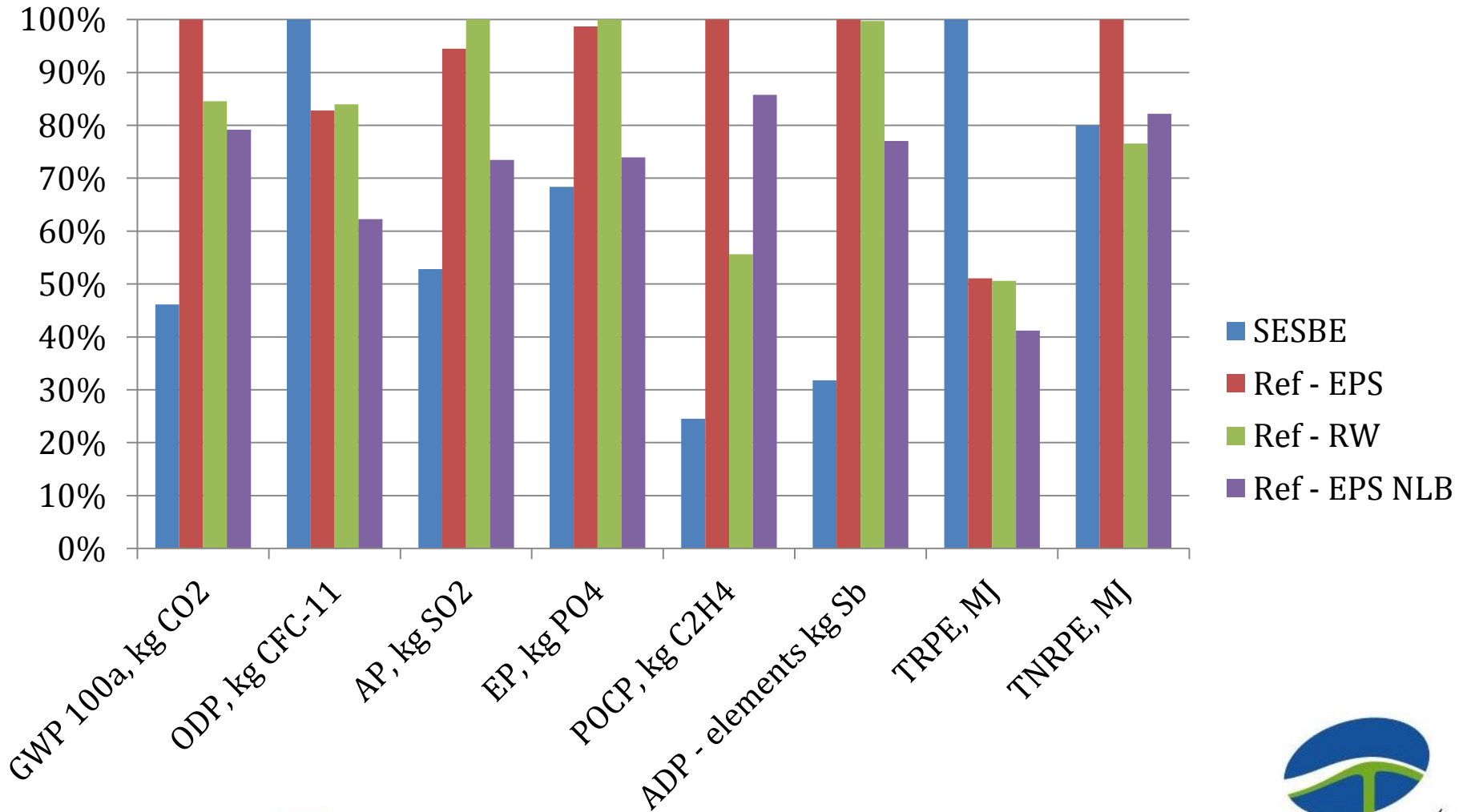


Full panel – Hot-spot analysis



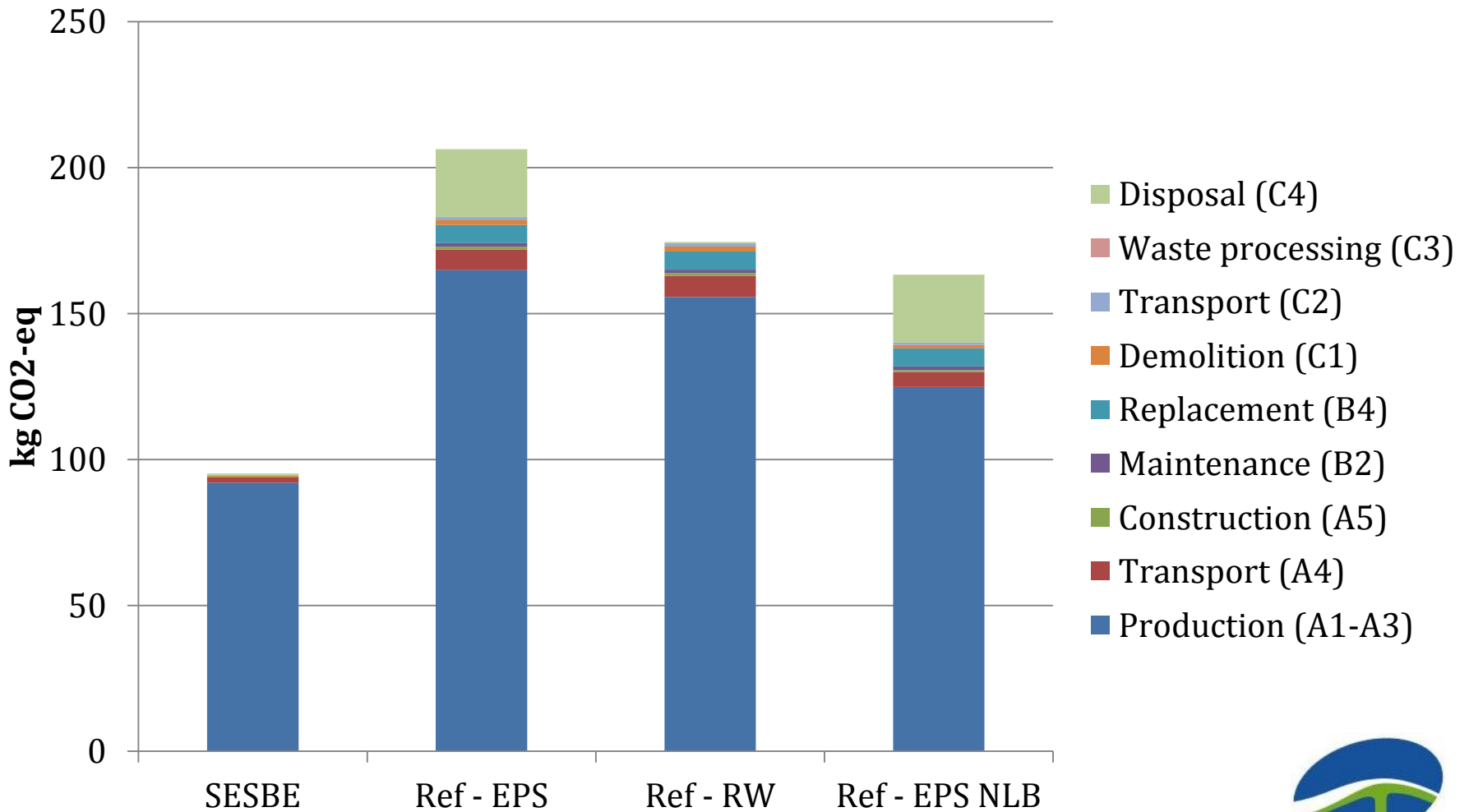
Full panel – Whole life-cycle

Whole life-cycle



Full panels – Material impact

GWP



Conclusions

Weak links

- CLC due to aerogel
- Carbon fiber grid
- → clear potential for improvement

Benchmarking with other panels

- Except for ADP SESBE sandwich elements are better between 20 and 70 % with comparable other elements
- GWP is better between 30 and 50 % for production and entire life cycle (excluding use and repair)

Improvements to be made

- One carbon grid instead of two as reinforcement layers
- Monitor aerogel development → less environmental impact



Thank you for your attention!