



Research Fund  
for Coal & Steel



# Large Valorisation on Sustainability of Steel Structures

## Smartphone & tablet app



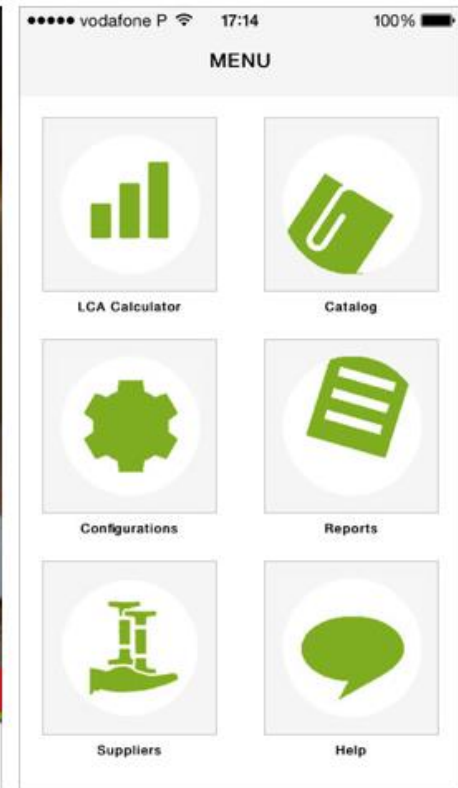
Σύνδεση με το  
Google ή  
Apple Store

Εφαρμογή:  
Buildings LCA



Buildings LCA  
CMM - Associacao...

+ FREE



## MENU



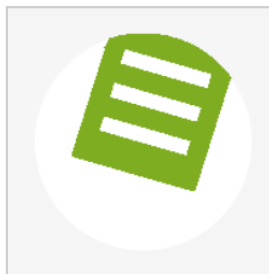
LCA Calculator



Catalog



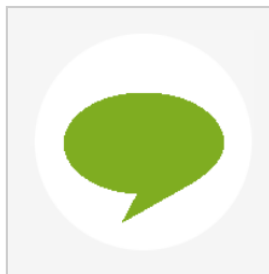
Configurations



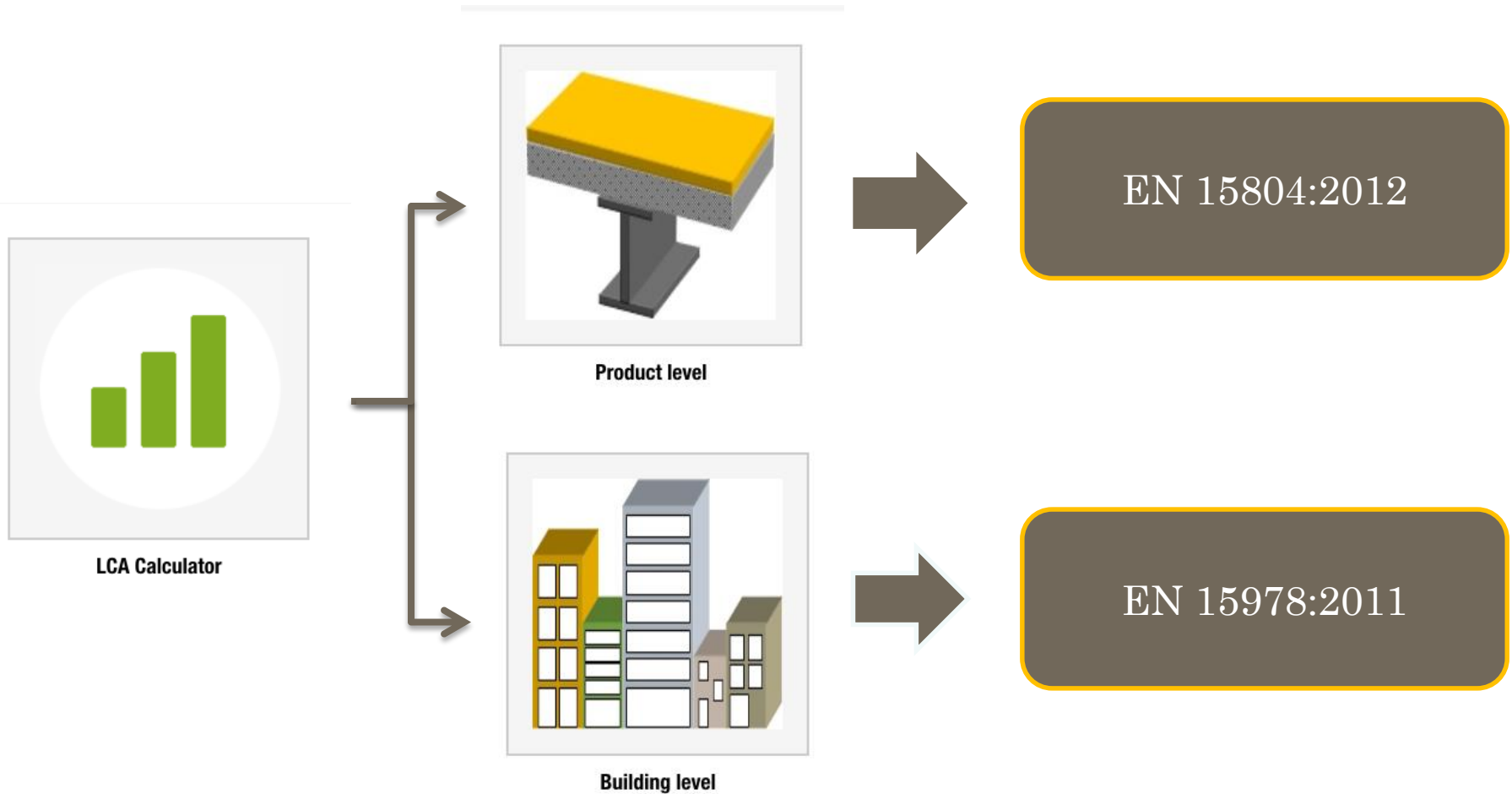
Reports

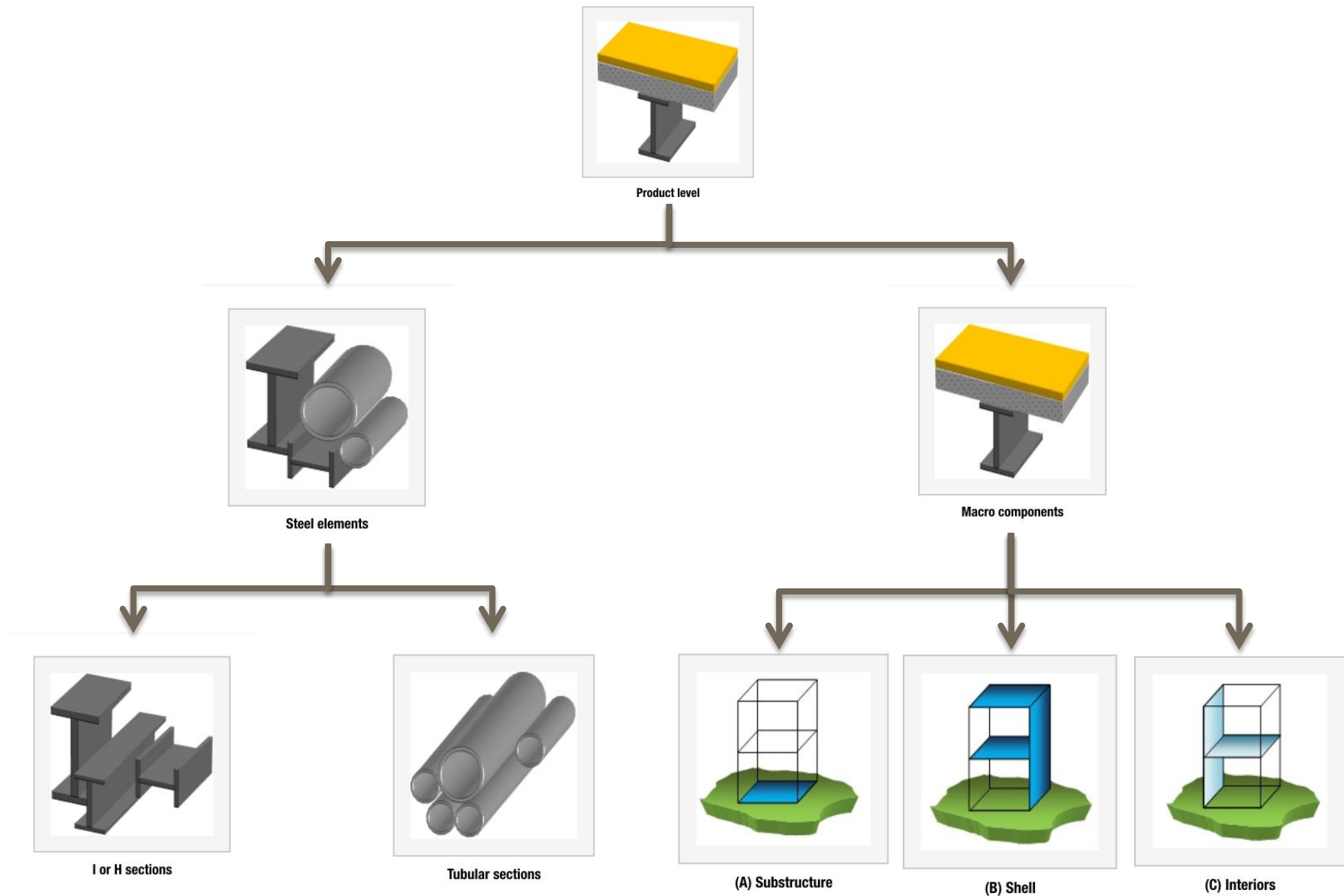


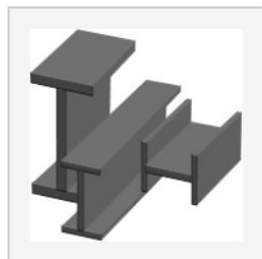
Suppliers



Help







I or H sections

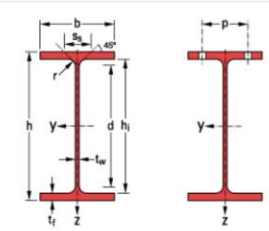
## Εισαγωγή στοιχείων για επιμέρους τμήματα



No SIM 16:59 69%

< I or H sections I or H sections CALCULATE

HE
HE 100 AA
HE 100 A
HE 100 B
HE 100 M
HE 120 AA
HE 120 A
HE 120 B
HE 120 M
HE 140 AA
HE 140 A
HE 140 B
HE 140 M

HE 100 AA



 add your company
 

Designation

G	12.24	[kg/m]
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Dimensions

h	91.00	[mm]
b	100.00	[mm]
t.w	4.20	[mm]
t.f	5.50	[mm]

Inputs parameters

Length [m] 0

Lifespan [years] 0

Steel Grade S235

Quality JR

Fabrication Procedure Hot Rolled

Scope of the Analysis

Cradle-to-gate

Coating System ✓

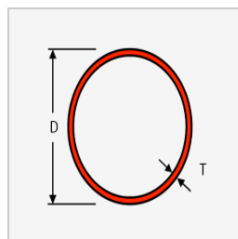
Transportation ✓

End-of-life recycling ✓

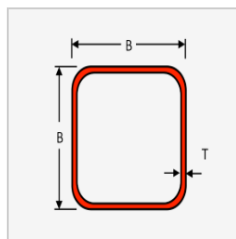


Tubular sections

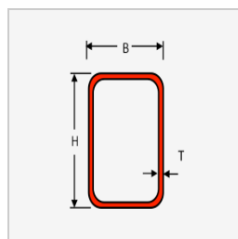
Εισαγωγή στοιχείων για  
επιμέρους τμήματα



CHS



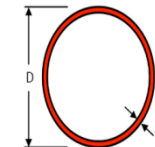
SHS



RHS

CALCULATOR	
CHS	
CHS 10 x 2	>
CHS 12 x 2	>
CHS 13 x 2	>
CHS 14 x 2	>
CHS 16 x 2	>
CHS 17.2 x 2	>
CHS 18 x 2	>
CHS 19 x 2	>
CHS 20 x 2	>

CHS 12 x 2



Add your  
company



## Designation

G 0.49 [kg/m]

## Dimensions

D 12.00 [mm]

T 2.00 [mm]

## Area

A 0.63 [cm<sup>2</sup>]

## Surface

AL 0.04 [m<sup>2</sup>/m]

## Section properties

I 0.08 [cm<sup>4</sup>]

Wel 0.14 [cm<sup>3</sup>]

Wpl 0.20 [cm<sup>3</sup>]

i 0.36 [cm]

## Other section properties

it 0.16 [cm<sup>4</sup>]

Wt 0.27 [cm<sup>3</sup>]

AmV 600.00 [m<sup>-1</sup>]

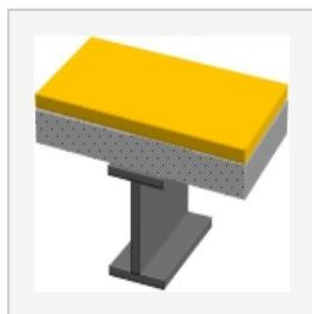


Macro components

## Επιλογή Macro-components από λίστα

(A) Substructure	(A40) Slabs-on-grade	(A4010) Standard slabs-on-grade	
(B) Shell	(B10) Superstructure	(B1010) Floor construction	(B1010.10) Floor structural frame
			(B1010.20) Floor decks, slabs and toppings
	(B1020) Roof construction	(B1020.10) Roof structural frame	(B1020.20) Roof decks, slabs and sheathing
			(B1020.20) Roof decks, slabs and sheathing
	(B20) Exterior vertical enclosures	(B2010) Exterior walls	(B2010.10) Ext. wall veneer
			(B2010.20) Ext. wall construction
	(B30) Exterior horizontal enclosures	(B2020) Exterior windows	
		(B2050) Exterior doors	
(C) Interiors	(C10) Interior construction	(B3010) Roofing	
		(B3060) Horizontal openings	
	(C20) Interior finishes	(C1010) Interior partitions	
		(C2010) Wall finishes	
		(C2030) Flooring	
		(C2050) Ceiling finishes	





## Macro components

# Υπολογισμός

**(B1010.10) Floor structural frame**

**B1010.10.1 – Light-weight steel slabs**

- B1010.10.1a
- B1010.10.1b
- B1010.10.1c
- B1010.10.1d
- B1010.10.1e

**B1010.10.1a**

+ add your company

**Rock wool**

Density	Thickness	Weight
150 [kg/m <sup>2</sup> ]	40 [mm]	

**Inputs parameters**

Rock wool [mm]

**Scope of the Analysis**

Cradle-to-grave + EOL

**ADPelements**

A1-A3	2.90e-5
A4	1.89e-9
B	0.00e+0
C2	1.65e-9

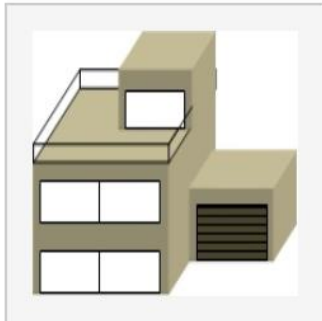
**Full Report**



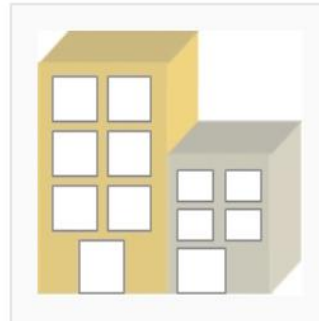
Building level



Επιλογή κτιρίου



Single & multi-family building



Apartment blocks



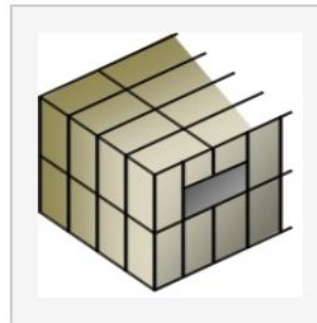
Office buildings



Commercial / Industrial buildings



Επιλογή κατασκευής  
κτιρίου



Category 1



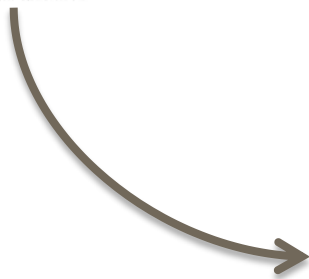
Category 2














Category 3



Building level



## Συνδυασμοί

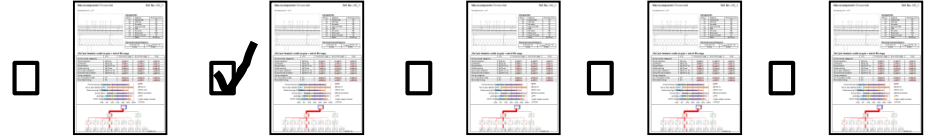
	Category 1	Category 2	Category 3
Single & multi-family building			
Apartment blocks			
Office buildings			
Commercial/Industrial buildings			



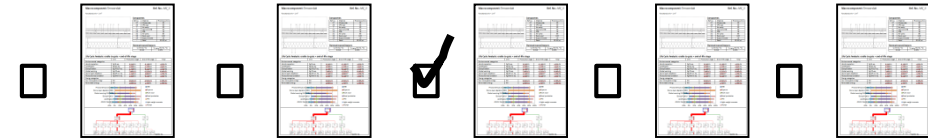
Building level

Επιλογή  
Macro-components

Floor construction



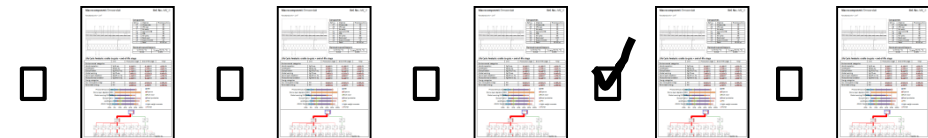
Roof construction



Exterior walls



Interior partitions





Building level

Υπολογισμός LCA

## LCA REPORT FOR STEEL BUILDINGS

### SUMMARY

**Scope:** Cradle-to-grave + EOL

**Lifespan:** 50 years

**Environmental Impacts**

**LCA index:** -1.42E-11

**Global Warming Potential (GWP):** 41 kg CO<sub>2</sub> eq


**Primary Energy Demand**

**Total Primary Energy Demand:** 679 MJ

### DETAILED RESULTS

#### LCA Input Data

#### B1010.10 Floor structural frame

	Materials	Thickness (mm)	End-of-life scenario	RR (%)
	Light weight steel (LWS)		Recycling	90
	OSB	18	Incineration	80
	Gypsum pasterboard	15	Recycling	80
	Rock wool	40	Recycling	80

#### LCA Results

#### LCA of 1m<sup>2</sup> of a Roof macro-component

#### Parameters describing enviromental impacts

Indicator	Unit	A1-A3	A4	B1-B5	C2	C4	D	TOTAL
ADP elements	[kg Sb Eq.]	2.90e-5	1.89e-9	0.00e+0	1.65e-9	3.67e-8	-1.97e-4	-1.68e-4
ADP fossil	[MJ]	5.88e+2	7.02e-1	0.00e+0	6.14e-1	1.43e+0	-3.36e+2	2.55e+2
AP	[kg SO <sub>2</sub> Eq.]	1.93e-1	2.27e-4	0.00e+0	1.97e-4	6.25e-4	-4.45e-2	1.50e-1
EP	[kg PO <sub>4</sub> - Eq.]	1.66e-2	5.22e-5	0.00e+0	4.51e-5	9.59e-5	-1.01e-3	1.58e-2
GWP	[kg CO <sub>2</sub> Eq.]	5.46e+1	5.06e-2	0.00e+0	4.41e-2	4.20e-1	-1.46e+1	4.05e+1
ODP	[kg CFC-11 Eq.]	7.66e-7	8.86e-13	0.00e+0	7.73e-13	7.85e-11	1.76e-7	9.42e-7
POCP	[kg C <sub>2</sub> H <sub>4</sub> Eq.]	2.70e-2	-7.40e-5	0.00e+0	-6.38e-5	1.62e-4	-1.07e-2	1.63e-2

*Ευχαριστώ για την προσοχή σας!*

*Μαριάννα Σταματιάδου  
PhD Μηχ.Μηχανικός*

**HMCS**



Εργαστήριο

Ετερογενών Μειγμάτων

&

Συστημάτων Καύσης

[hmcs.mech.ntua.gr](http://hmcs.mech.ntua.gr)

