Spread of Innovative Solution for SUStainable CONstruction (IS-SusCon)

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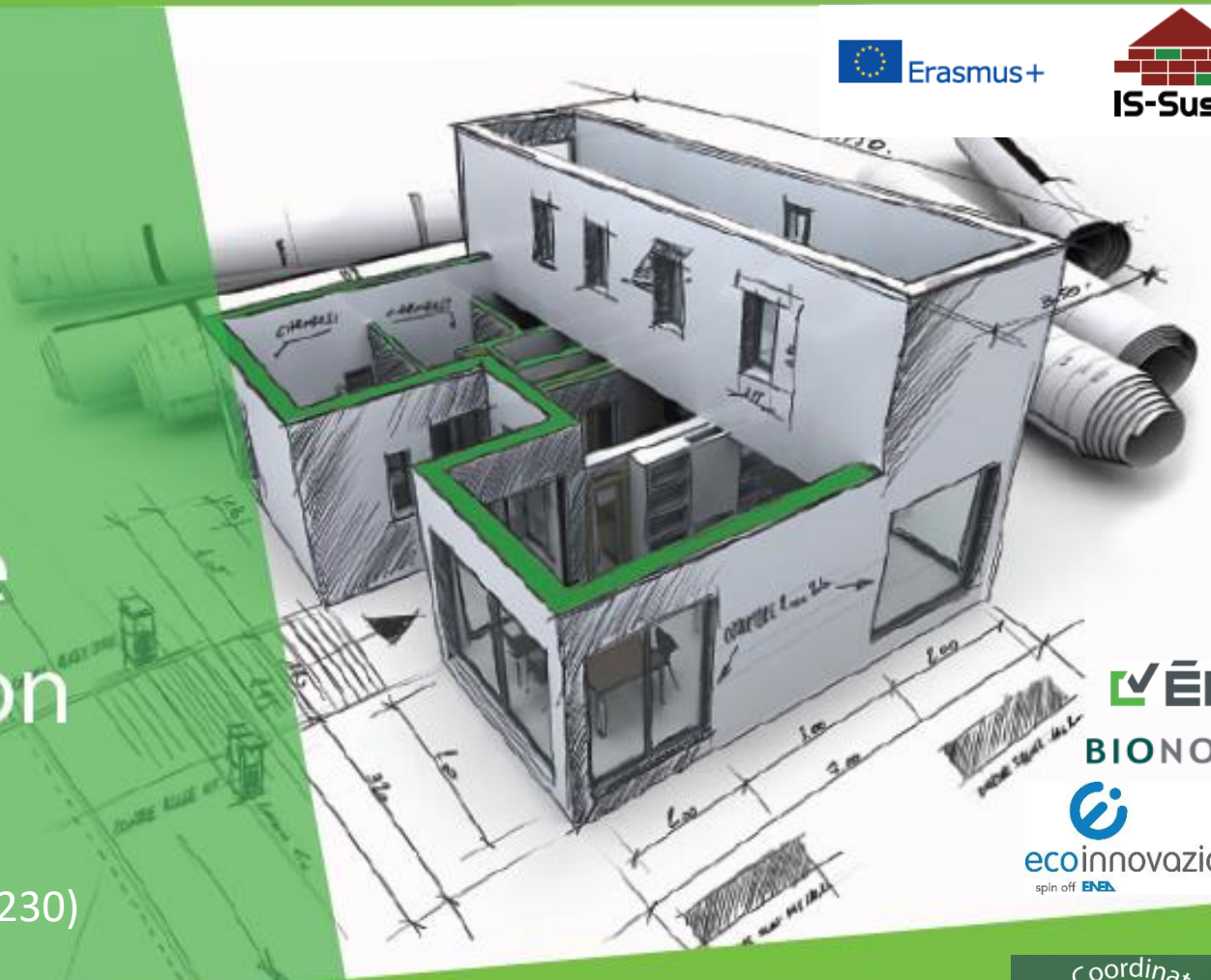

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ÉMI

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ecoinnovazione

spin off ENEA

Project Coordinator:

LCA CENTER

LCA Center Hungary Association

LCA of building materials and structures

Source: https://areeweb.polito.it/ricerca/LCA

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Content

- Definition of constructions
- Selection of data for LCA
- LCA case studies
- Use of results
  - Handbook
  - WebApp

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LCA of building materials and structures

Definition of constructions

Construction category	Nr
External walls	12
Cladding	5
Load bearing internal walls	2
Internal partition walls	7
Underground wall	2
Foundation	1
Cleanliness layer	2
Floor slab	5
Floor finish	8
Roof slab (flat and unheated pitched)	12
Roof (heated pitched)	7
Ground slab	2
Columns	2
Beams	1
Balcony	1
Staircase	1
Windows	7
Doors	1

- Hollow ceramic block (25NF) wall with EPS insulation
- Hollow ceramic block (30NF) wall with EPS insulation
- Hollow ceramic block (30NF) wall with grey EPS insulation
- Hollow ceramic block (30NF) wall with mineral wool insulation
- Hollow ceramic block (30NF) wall with wood wool insulation
- Hollow ceramic block wall (38 cm)
- Aerated concrete wall (37.5 cm)
- Aerated concrete wall (25 cm) with EPS insulation
- Sand lime brick (30 cm) with EPS insulation
- Sand lime brick (30 cm) with calcium silicate insulation
- Wood stud wall with mineral wool insulation
- Adobe wall with straw insulation

List of building materials

http://howtobuildgreen.eu/images/case-method.pdf

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Selection of data for LCA

Data sources:

A1-A3: Generic (or specific) EPDs from Ökobaudat, IBU, Inies, other EPD programs – search for the most representative data

A4: European transport scenarios defined by One Click LCA

B4-B5: service life has been defined for each material according to One Click LCA and IS-SusCon project experts

C1-C4: One Click LCA default waste management scenarios

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LCA case studies

Goals:

- to show examples of life cycle thinking
- to show examples of LCA and LCC for building construction alternatives

Cases:

- External walls
- Internal walls
- Cladding
- Floor finish
- Floor slab
- Roof slab
- Roofs

Functional unit:

- 1 m^2 construction surface
- 50 yr building life

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System boundaries

Product stage			Construction process stage		Use stage							End-of-life stage				Resource recovery stage
Raw materials	Transport	Manufacturing	Transport	Construction installation	Use stage	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
X	X	X	X					X	X			X	X	X	X	

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Results

- Global Warming Potential (GWP): as usually the most relevant indicator in the building industry,
- Acidification, Eutrophication and Photochemical Ozone Creation Potentials (AP, EP, POCP): to identify other potential environmental “hot spots”

NOTE!!!

- results of these case studies cannot be generalized.
- they are not meant to be a final judgment about what is better and what is worse from an environmental point of view
- they offer a first understanding of main environmental issues related to building constructions and materials.

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EXAMPLES

http://howtobuildgreen.eu/en/case-studies

External walls – Hungary
Floor finishes - Hungary

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Use of results

WebApp

- For the users all Hungarian constructions are available to create models of buildings.
- In constructions where concrete and steel are present, it is possible to select different concrete/steel alternatives depending on their recycled material content.
- Thickness of certain construction materials can be adapted based on the expert judgment of One Click LCA.
- Case studies are also available

Material datasheets

- Datasheets as an Annex of the Handbook.
- To describe environmental performance of the building materials, the results and conclusions of the Case studies have been considered.

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Thank you for your attention

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