How to use LCA tools and results with more impact in infrastructure projects


Panu Pasanen, Bionova Ltd / One Click LCA
ONE CLICK LCA AND OUR EXPERIENCE

KEY DIFFERENCES BETWEEN BUILDING & INFRA LCA

HOW ARE LCA TOOLS USED MOST EFFICIENTLY

BEST PRACTISE CASE: HS2 OLD OAK STATION, UK
One Click LCA is easy, fast and powerful LCA, LCC and circular design software

Global #1 construction LCA software

- Used in 60+ countries
- Supporting 40+ certifications
- Includes 40+ LCA databases
- Plugs into 10+ design software
- Backed by 25 dedicated experts
A platform integrating with other tools, having all data & supporting all standards

LEADING CLIENTS
- STATSBYGG
- JRC
- bre
- ARUP
- INTEGRAL GROUP
- Thornton Tomasetti
- SWECO
- SKANSKA
- Tomasetti
- JACOBS
- Helsinki
- RAMBOLL

10+ INTEGRATIONS
- Autodesk Revit
- Microsoft Excel
- gbXML
- IES
- MRPl
- IDA ICE
- DesignBuilder
- SOLibri Model Checker
- simplebim.

ALL GLOBAL DATA
- EPD
- CEN
- ISO
- SCS Global
- BREEAM
- EPDplus
- ÖKOBAUDAT
- AENOR
- greenstar
- Level(s)
- PAS 2080

40+ STANDARDS

Details at https://www.oneclicklca.com/
We work with the entire construction sector – with specific tools for different businesses

LEADING MANUFACTURERS
- LafargeHolcim
- CEMEX
- Saint-Gobain
- Rudus
- SSAB
- CONSOLIS
- peikko
- Kingspan

LEADING BUILDERS
- SKANSKA
- STRABAG
- BOUTIQUES CONSTRUCTION
- NCC
- COSTAIN
- PEAB
- YIT
- VEIDEKKE
- Sir Robert McAlpine

LEADING DESIGNERS
- ARUP
- WSP
- HDR
- Gensler
- SWECO
- RAMBOLL
- Foster + Partners
- ARCADIS

LEADING INVESTORS
- STATSBYGG
- Grosvenor
- Liikenne Väestö
- Finnish Transport Agency
- VASAKRONAN
- IKEA
- Helsinki
- Dublin City Council
- hs2

INSTITUTIONS & GOVERNMENTS
- JRC
- CEN
- NAPE
- MARSHALL
- Ympäristöministeriö
- Ministry of the Environment
- Confederation of Finnish Construction Industries
- bre
- European Bank
- for Reconstruction and Development
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BEST PRACTISE CASE: HS2 OLD OAK STATION, UK
Embodied carbon covered in 105 regulations & certification systems globally, 15 for infra

Building level systems are yet more advanced

The more in green, the more sophisticated
There’s no standard design data format for exchanging infra-BIM or even quantities.

When different disciplines and firms use different tools, importing data requires a completely different approach.

Design tools and workflows:

- BENTLEY
- AUTODESK
- COSTING
- OTHERS
- DATA
- EXCEL
- REVIT
- IFC
- RESULTS

All integrations at: https://www.oneclicklca.com/support/faq-and-guidance/documentation/integrations/
On a positive side, IFC as used for buildings can be used for smaller projects like bridges.
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BEST PRACTISE CASE: HS2 OLD OAK STATION, UK
Acting early in a project is essential, as bigger changes are still possible - and inexpensive.
Cutting carbon is possible also later on, but decisions and details differ greatly.

**BRIEF & SET TARGETS**

*Best impact and cost efficiency*

- 1. PROGRAM
- 2. BRIEF

**DESIGN**

**CONSTRUCTION**

*Lower impact and cost efficiency*

- 3. CONCEPT DESIGN
- 4. TECHNICAL DESIGN
- 5. PROCURE
- 6. BUILD

Simulate, also covering transport

Optioneer early and leverage design tools

Use EPD data to compare products
How we support the different levels of decisions with One Click LCA

1. PLANNING
   - Site tool
   - Consider options

2. CONCEPT
   - Optimize design

3. DESIGN
   - Specify products

4. CONSTRUCTION
   - Validate result

5. AS BUILT

Global LCA database

- Other manufacturer specific data (41) - Use when buying specific products:
  - Air and water barrier system, fluid applied, 0.0225 lbs/ft², Tyvek (DuPont) - UL
  - Air and water barrier system, fluid applied, 0.0451 lbs/ft², Tyvek (DuPont) - UL
  - Air and water barrier system, mechanically fastened, 0.184 lbs/ft², Tyvek (DuPont)
  - KEE HP waterproofing roof membrane, single-ply, 50 mil, 0.33 lbs/ft², Sure-Fit
  - KEE HP waterproofing roof membrane, single-ply, 60 mil, 0.48 lbs/ft², Sure-Fit
  - KEE HP waterproofing roof membrane, single-ply, 80 mil, 0.51 lbs/ft², Sure-Fit

Example of carbon comparisons in a site impacts study

Carbon Designer
Carbon Designer – early phase module developed with Statsbygg – is essential client to be effective

MINIMUM DATA REQUIRED

Building type, size and number of floors
- Building type: Office buildings
- Gross floor area (GFA): 5000 m²
- Number of above ground floors: 5
- Calculation period: 60

EASY OPTIONEERING

CLIENT INDEPENDENCE

CO2 TARGETS

COST & CARBON FOR OPTIONS

MINIMUM DATA REQUIRED

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More options
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BEST PRACTISE CASE: HS2 OLD OAK STATION, UK
Old Oak is a HS2 station designed by WSP who also do carbon design with One Click LCA.

HS2 has a very specific, inhouse standard both for carbon and circular materials.

One Click LCA has a custom module for it.
Designing carbon out step by step

\[ ME_{\text{asset}} = \sum_{\text{material}} M_{\text{m}} + 0.7 M_{\text{rec}} + 0.35 M_{\text{reu}} + 0.245 M_{\text{rec+reu}} + 0.1 M_{\text{rec+reu}} + 0.035 M_{\text{rec+reu}} \]

*Design life achieved with material (years)*
Our recommendations to road authorities

WORK ON MATERIAL EFFICIENCY BEFORE MATERIALS SPECIFICATION

SET REQUIREMENTS AND IF POSSIBLE, TARGETS IN DESIGN BRIEFS

TO DO SO, DEVELOP AN EARLY PHASE CARBON OPTIONEERING CAPABILITY

If this is of interest, Bionova is ready to invest with you to develop a Carbon Designer for infrastructure to allow early phase carbon optioneering
Also, remember to make carbon accessible and easier to understand – including visually.
Decarbonizing the built environment

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