SUSTAINABLE BUILT ENVIRONMENT D-A-CH CONFERENCE 2019– GRAZ, 11-13 SEPTEMBER 2019

IDENTIFICATION AND COMPARISON OF LCA-BIM INTEGRATION STRATEGIES

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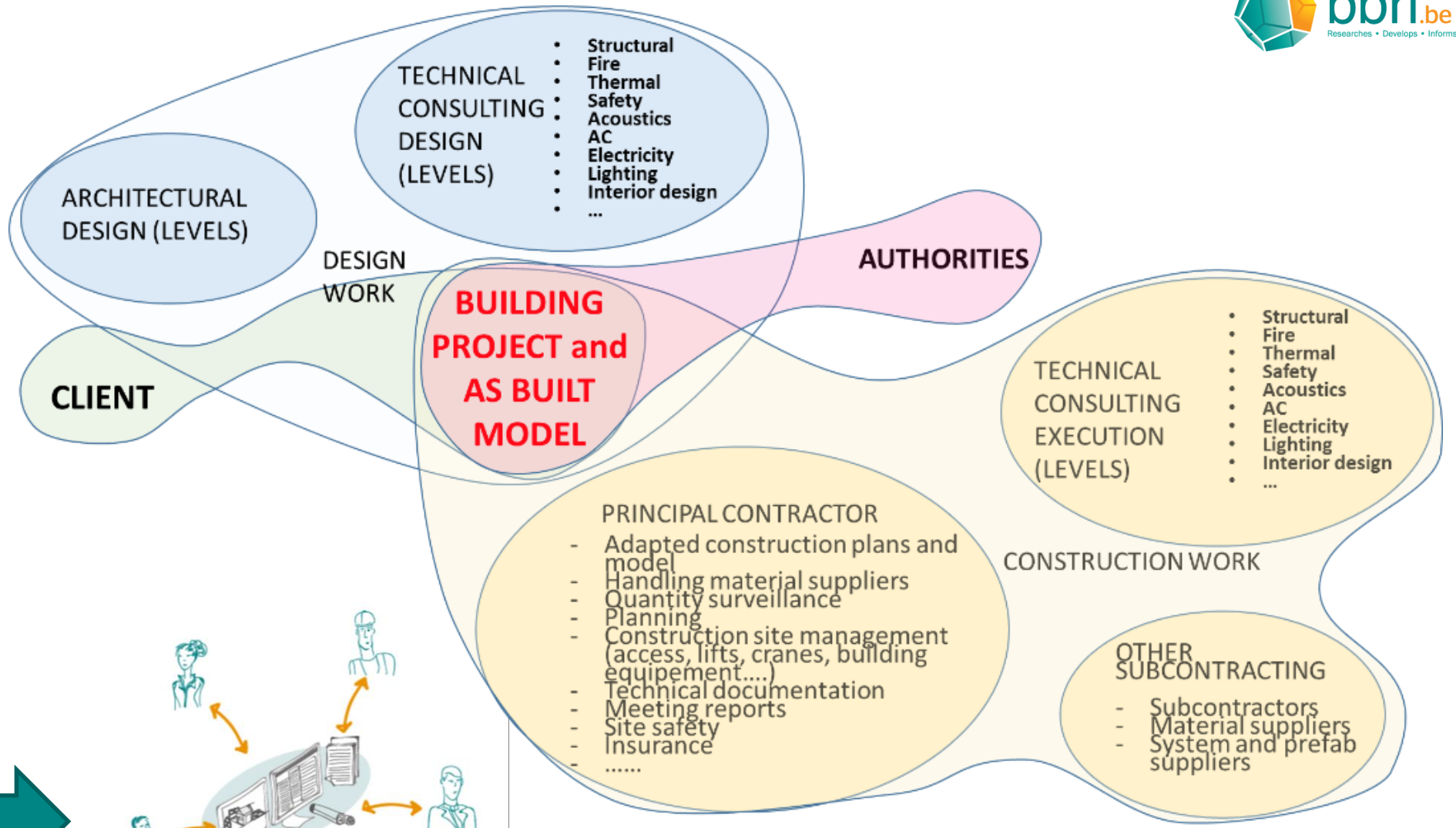
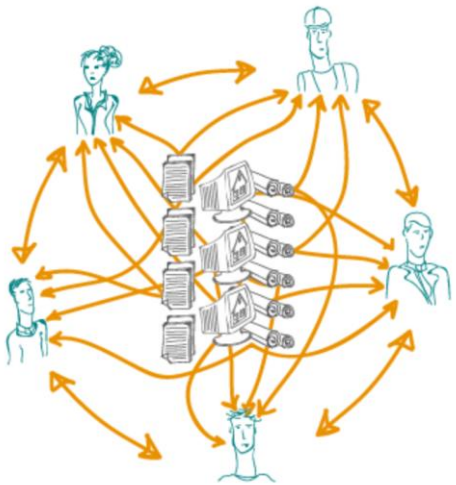
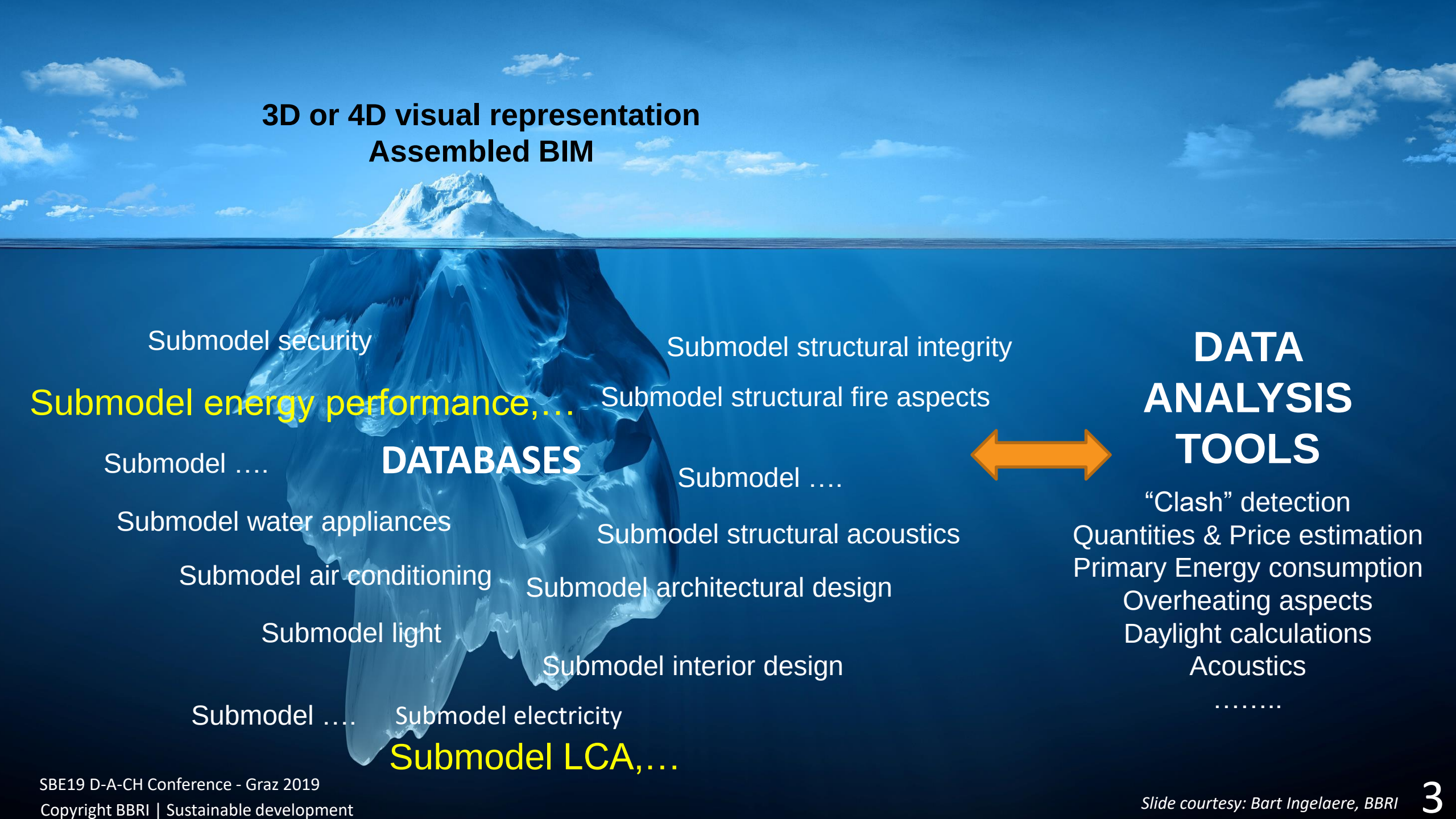
CONTEXT





BIM

Slide based on slide Bart Ingelaere, BBRI



Slide courtesy: Bart Ingelaere, BBRI

CONTEXT

Goal of research

- Identify feasible workflows for LCA analysis based on BIM models
- Provide guidelines for structuring LCA data for use in BIM workflows

Approach

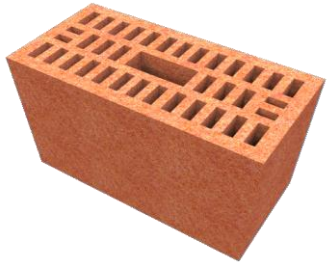
- Following up on normalisation work BIM and LCA
- Screening of existing tools and methods
- Focus group discussion with BIM and LCA experts from construction sector
- Cases

Concept LCA profile

=

LCA data for a certain *material* type or *combination of materials*

- represented through set of environmental indicators

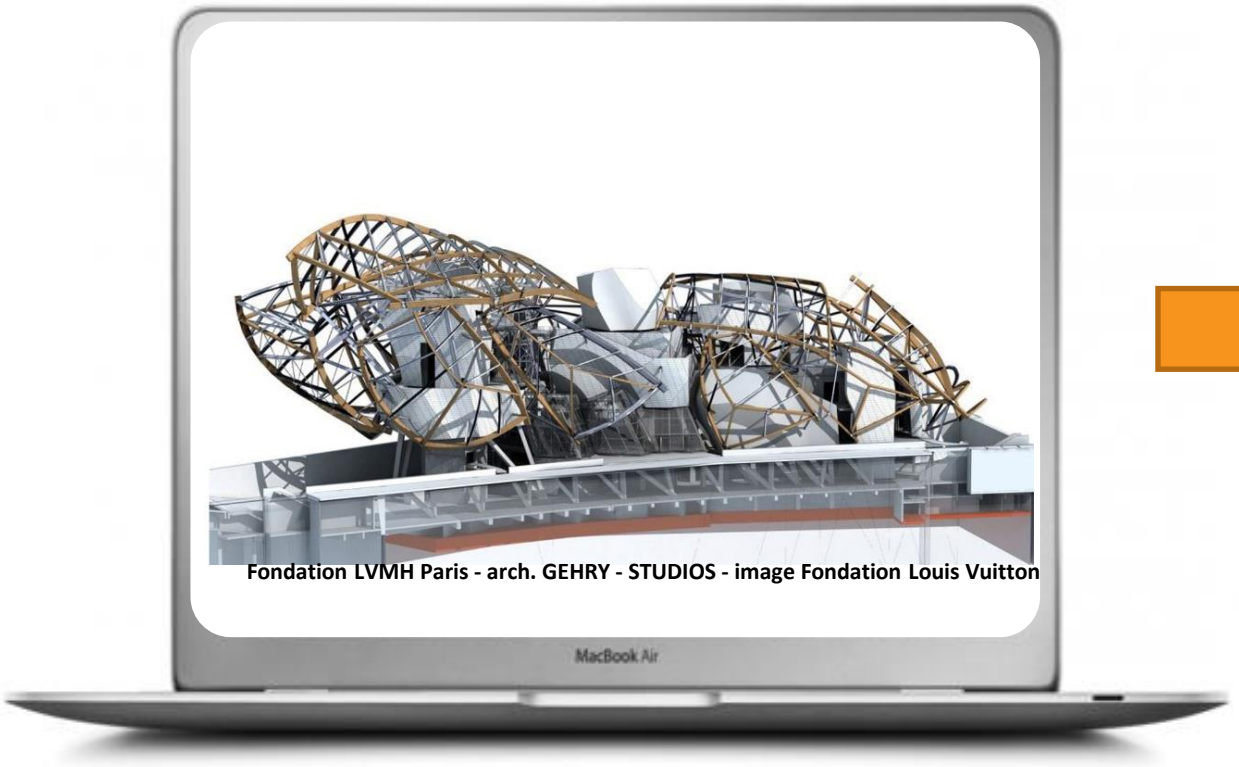


- Generic set
- EPD (Environmental Product Declaration)
- Combination of both

WORKFLOWS FOR INTEGRATION OF BIM AND LCA

Main strategies for integration

1. Geometrical and material information to specialized LCA

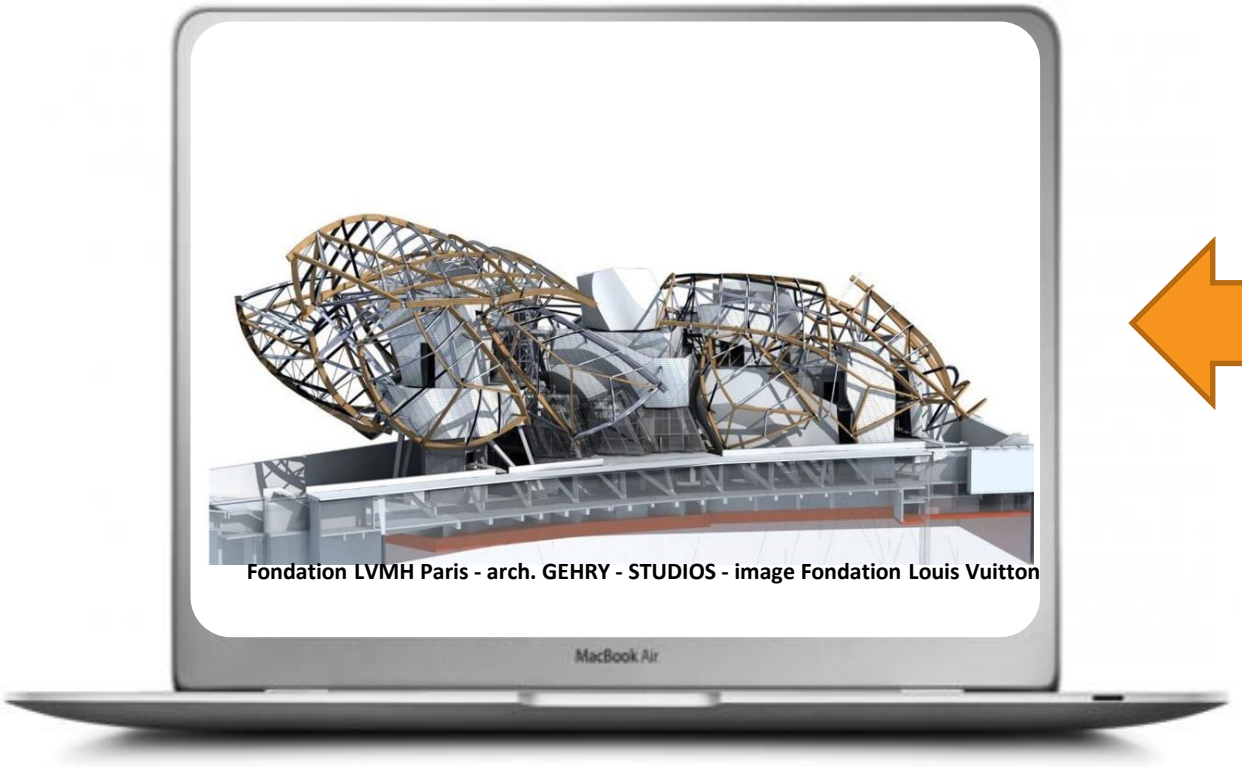


Fondation LVMH Paris - arch. GEHRY - STUDIOS - image Fondation Louis Vuitton

WORKFLOWS FOR INTEGRATION OF BIM AND LCA

Main strategies for integration

1. Geometrical and material information to specialized LCA
2. Adding LCA data to the BIM model



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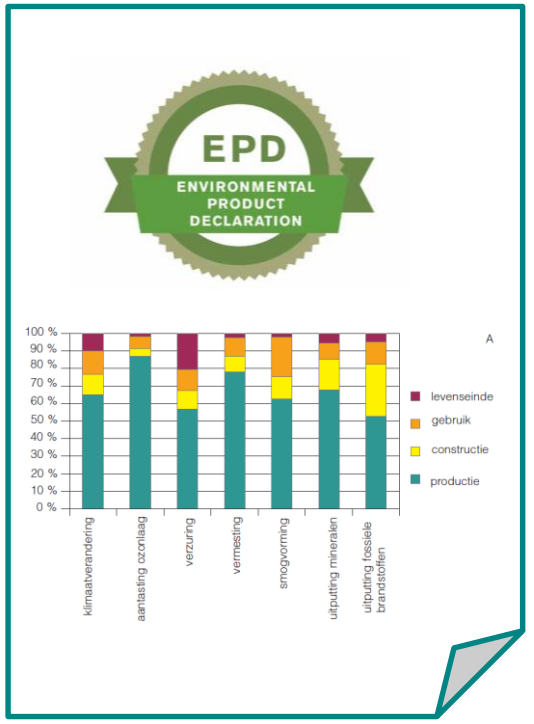
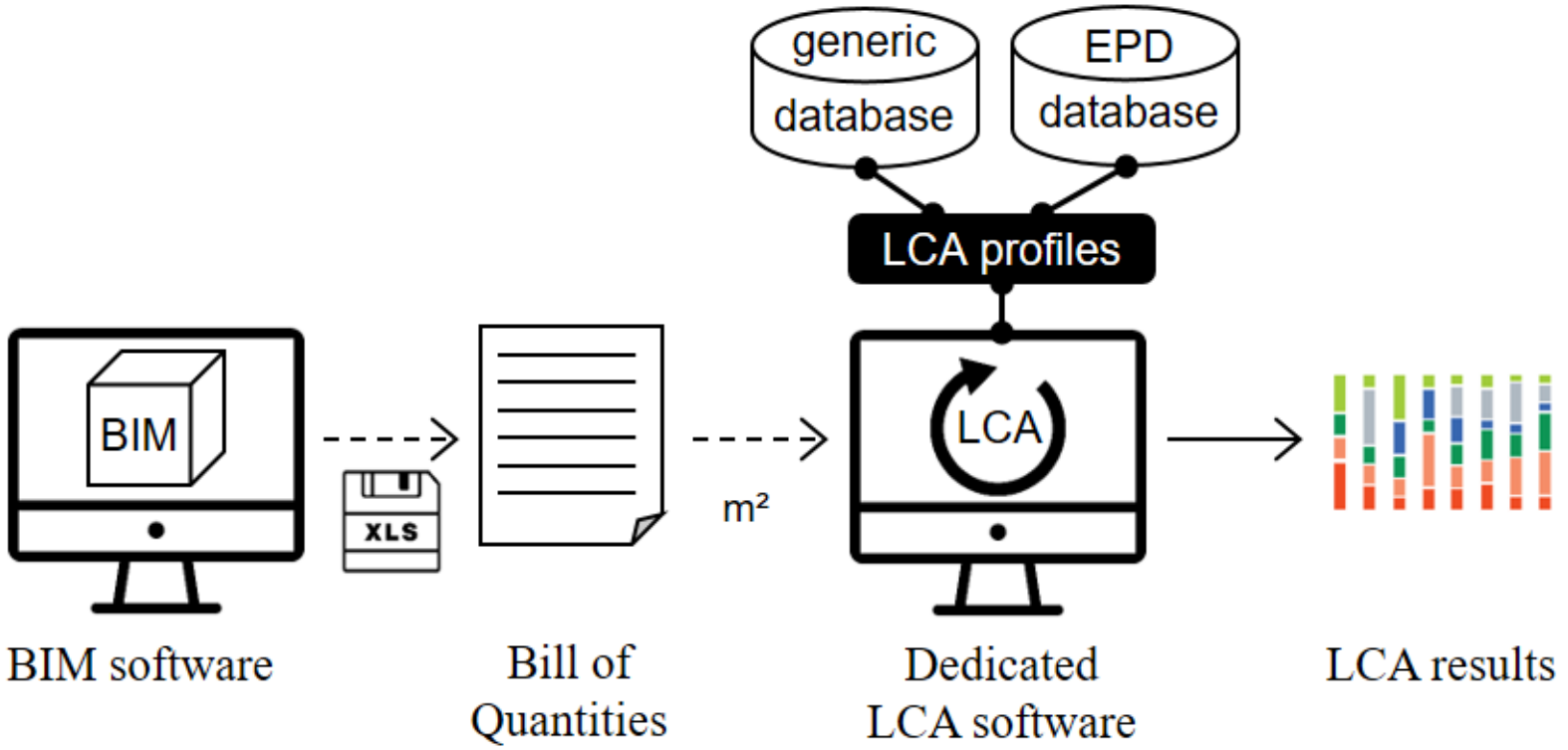


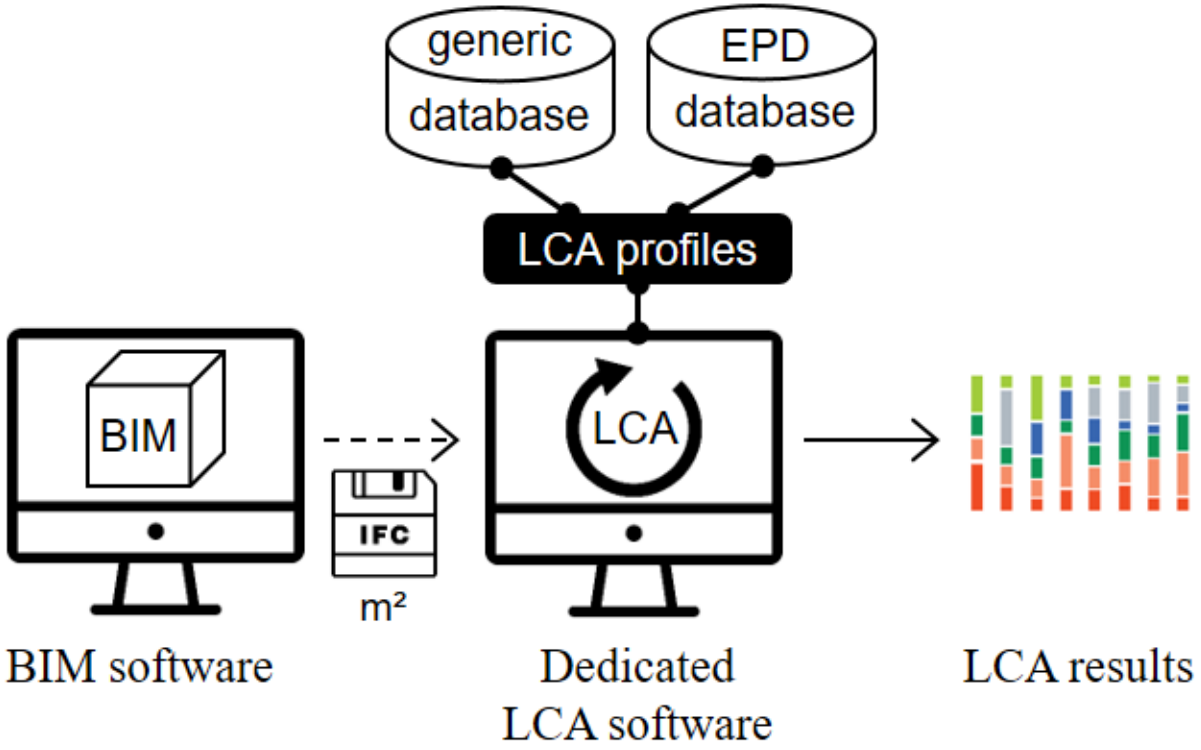
WORKFLOWS FOR INTEGRATION OF BIM AND LCA

Strategy 1: Bill of quantities export



WORKFLOWS FOR INTEGRATION OF BIM AND LCA

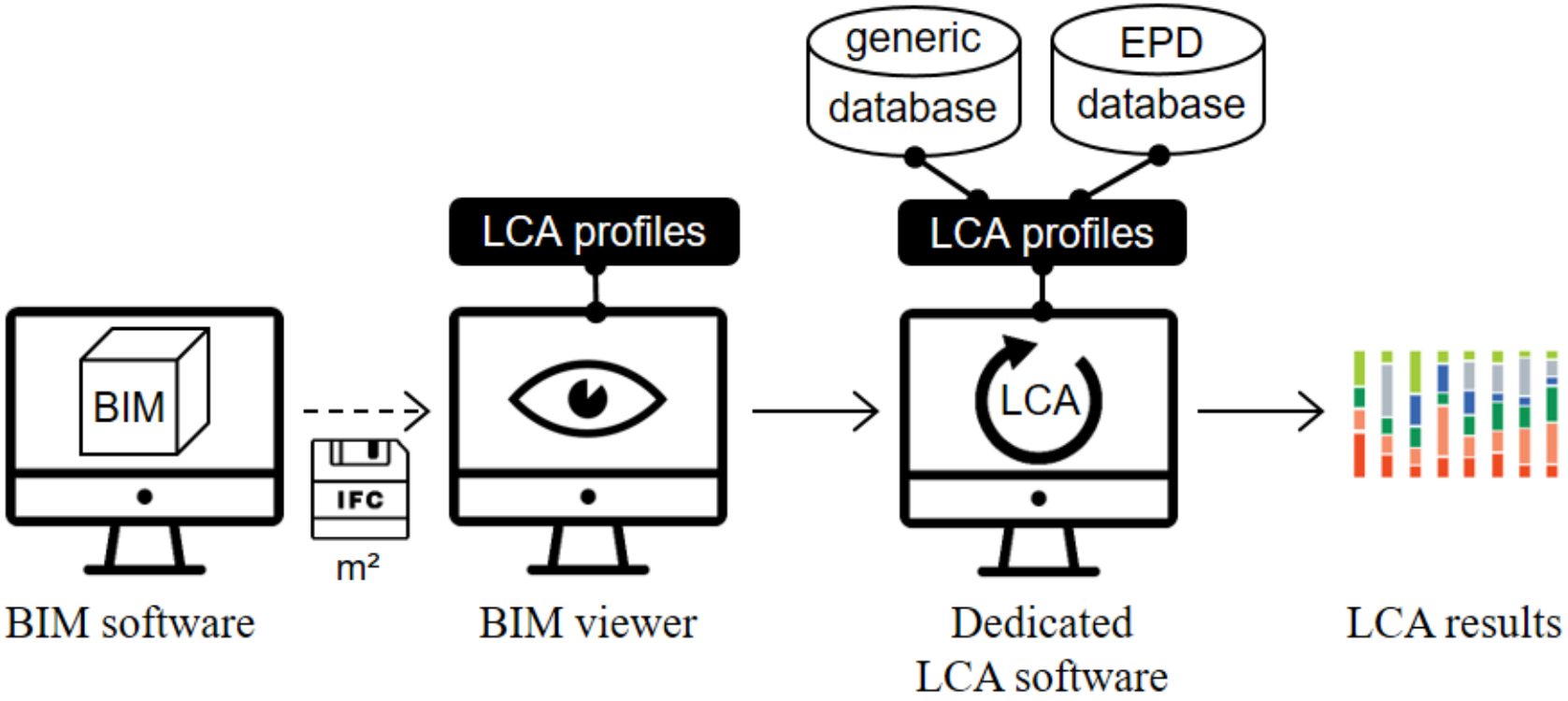
Strategy 2: IFC import of surfaces



e.g. totem CREATE | EVALUATE | INNOVATE

WORKFLOWS FOR INTEGRATION OF BIM AND LCA

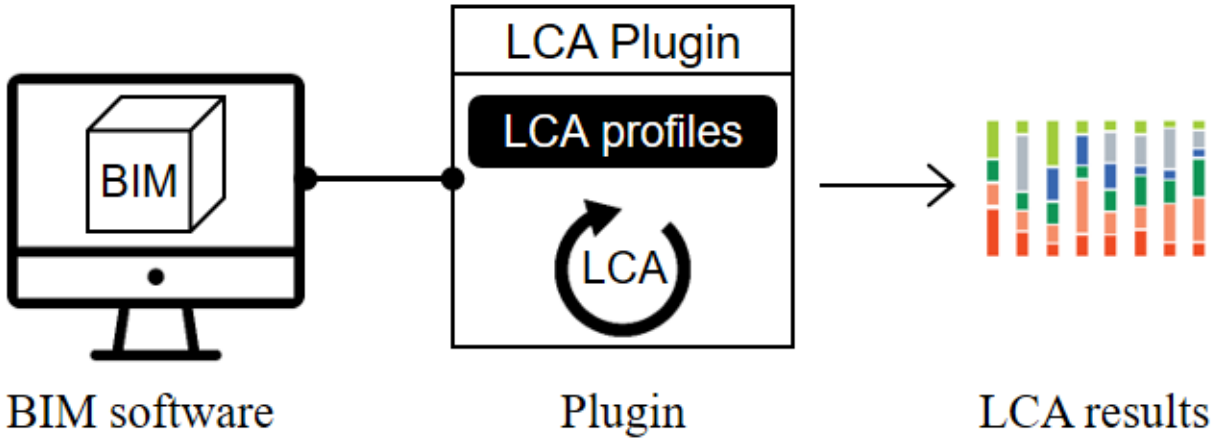
Strategy 3: BIM viewer for linking LCA profiles



e.g. eveBIM

WORKFLOWS FOR INTEGRATION OF BIM AND LCA

Strategy 4: LCA plugin for BIM software



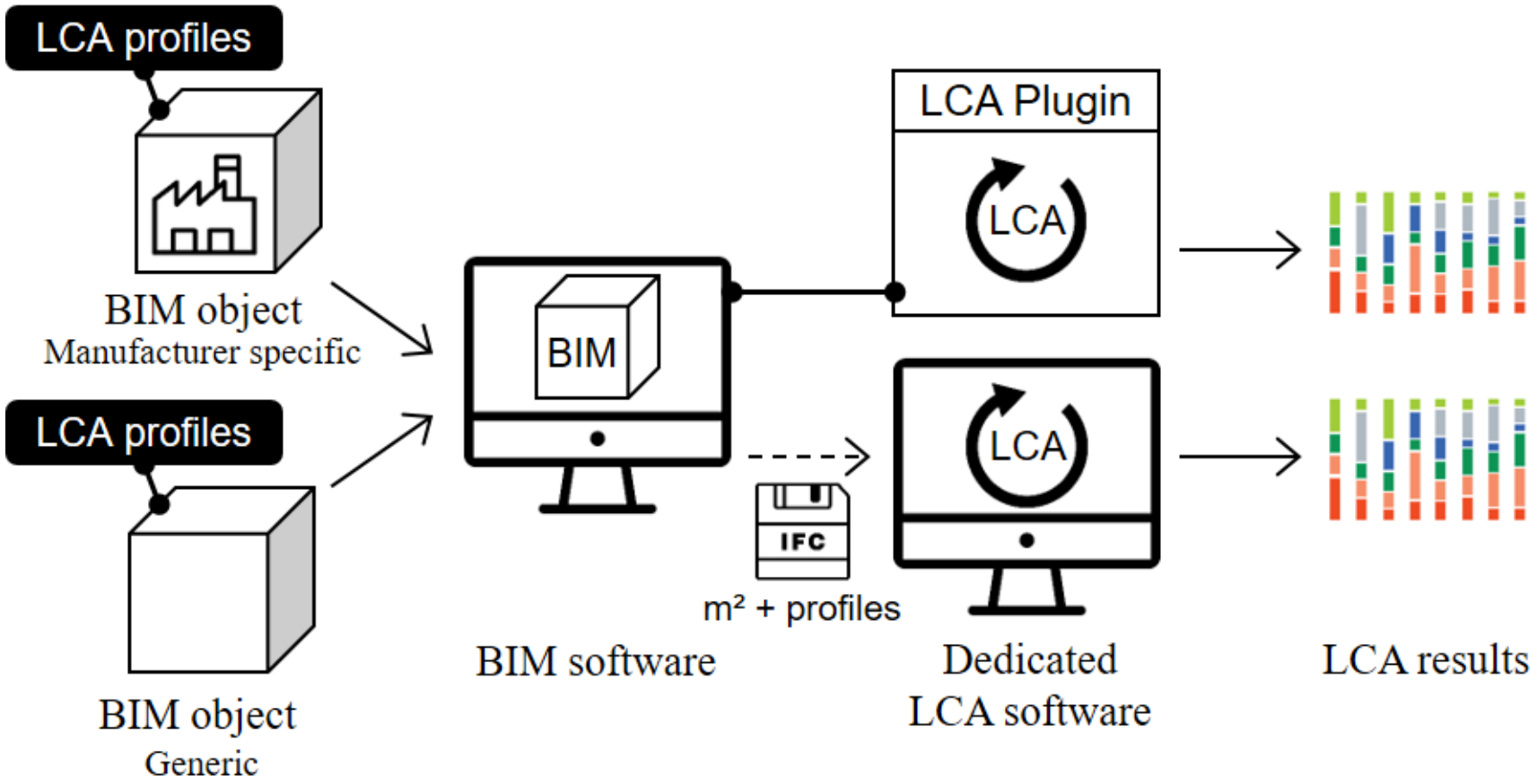
e.g.

One Click LCA

tally

WORKFLOWS FOR INTEGRATION OF BIM AND LCA

Strategy 5: LCA enriched BIM objects



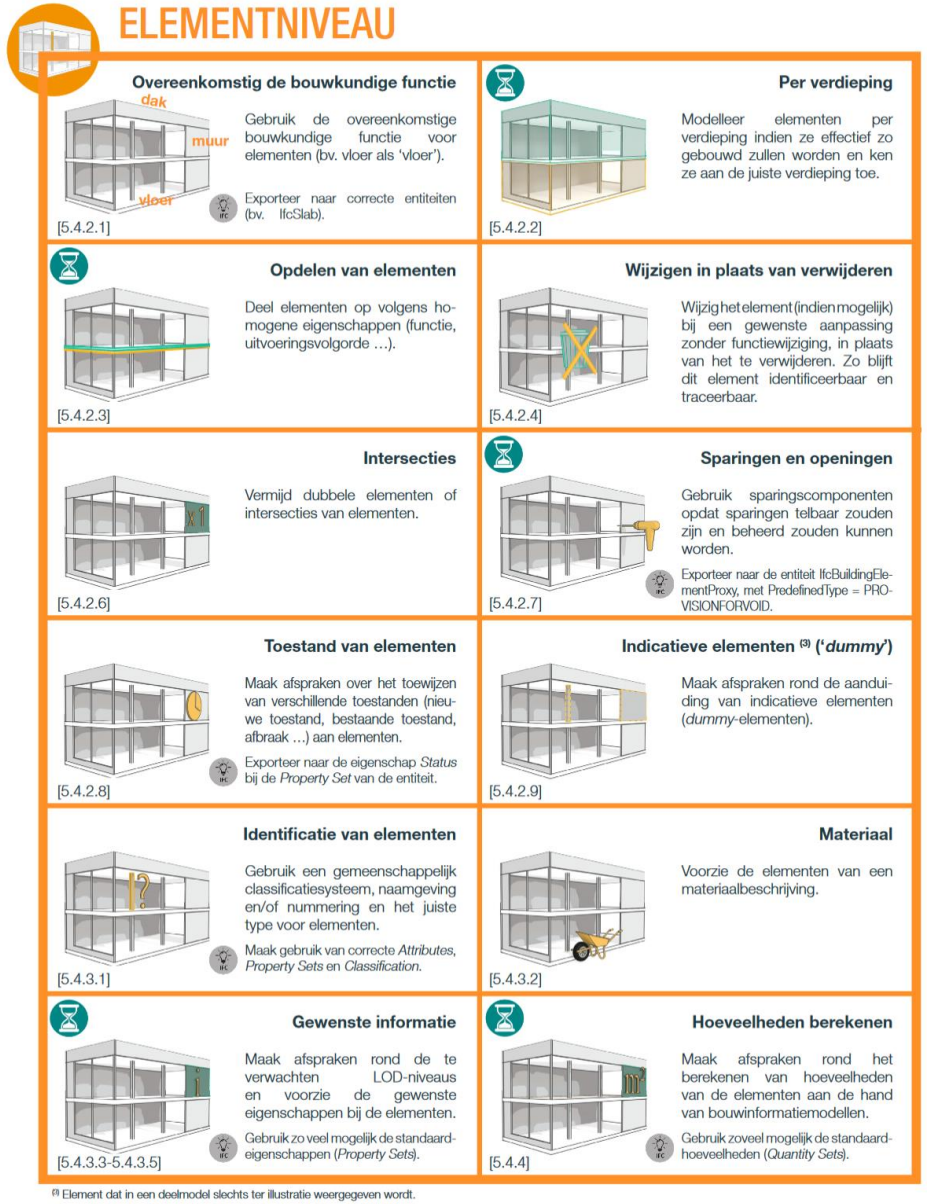
APPLICABILITY IN PRACTICE

Objective of the LCA study

- Structural works
  - LCA in early phases feasible, due to low variety in used materials
- Architecture / Early design
  - LCA on building element rather than building level
- Technical installations
  - Too complex?

→ Conflicting modelling conventions for different disciplines / phases

→ Different levels of detail for different disciplines / phase



http://www.bimportal.be

CRITICAL REFLECTION

State of play

- BIM is the new way of working and efficiently exchanging information in the construction industry
- Environmental performance (LCA) becomes part of “general” building assessment

→ Practioners want to use LCA, but integration and use must be “easy”

Types of integration in practice

- Notions of LCA → Gaining insights in environmental performance based on available data and models
  - OVERALL BUILDING ASSESSMENT: basic check in BIM environment (cfr. EPBD)
  - SPECIFIC MATERIAL CHOICES: basic comparisons within the BIM environment (cfr. BIM objects with manufacturer data)
- LCA expert assessment → Performing detailed assessment for environmental optimisation
  - Consider effects of different assumptions, compositions, …
  - Need for expert LCA environment but with easy tranfer of data on building composition

→ Different needs depending on goal of integration

→ Need for more insights on needs throughout the design and construction process

Identification and comparison of LCA-BIM integration strategies

L Wastiels and R Decuypere
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