

Enriched set of KPIs in Next-generation Dynamic Digital EPCs for enhanced quality and user awareness (D²EPC) project

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Presentation Structure

1. The D²EPC project
2. The set of D²EPC indicators
3. Q+A

1. The D²EPC project

Project short description

D²EPC aspires to deliver the next-generation of dynamic EPCs for the operational and regular assessment of buildings energy performance through a set of cutting-edge digital design and monitoring tools and services. D²EPC relies upon and adjusts accordingly to the smart-readiness level of the buildings and the corresponding data collection infrastructure and management systems. It subsequently builds upon actual data and the 'digital twin' concept to calculate energy, environmental, financial and human comfort indicators and through them the EPC classification of the building

1. The D²EPC project

Project short description

in question. In this context, D²EPC will be based on Level 3 6D-BIM literacy, integrating smart meters, actual performance-related data and activities profiling into the buildings' digital twins. The proposed scheme will provide sufficient background for the redefinition of EPC related policies, through regular benchmarking and upgrade of the reference buildings, as well as with the integration of geolocation and "polluter pay" practices into the EPC rationale. The implementation of the proposed project is also anticipated to foster the energy saving consciousness of buildings' users, through their regular information on the actual energy performance of their buildings and suitable incentivization.

1. The D²EPC project

Project Partners

Partners

- Centre for Research and Technology Hellas, Information Technologies Institute, Greece
- Kaunas University of Technology, Lithuania
- Geosystems Hellas A.E., Greece
- Cleopa GmbH, Germany
- SEnerCon GmbH, Germany
- Asociacion Espanola de Normalizacion, Spain
- DEMO Consultants BV, Netherlands
- SGS Tecnos SA, Spain
- HYPERTECH Energy Labs, Greece
- Austrian Standards International, Austria
- Frederick Research Center, Cyprus
- Austrian Energy Agency, Austria
- IsZEB - Intelligent Solutions For Zero And Positive Energy Buildings, Greece, as linked 3rd party



1. The D²EPC project

Project objectives



D²EPC objectives



- Introduction and establishment of the concept of the dynamic EPC
- Definition of the drawbacks and discrepancies of the current EPC scheme
- A novel set of environmental, financial, human comfort and technical aspects indicators
- Integration of actual operational data from buildings into the EPCs
- Integration of smart readiness rationale into the building's EPC
- Implementation of intelligent operational digital platform for EPCs

1. The D²EPC project

Project impact

D²EPC impact

- Recalculation of the operational EPC
- Enriched BIM and building digital twin
- LCA, LCC indicators, real-time performance data
- Building smart readiness & human comfort
- GIS environment visualization
- Novel financial schemes – “polluter pays” concept
- Added value services suite for improved energy performance
- Extended dynamic EPCs applications

2. Development of the Operational Framework for dEPC Schemes

Development of the Operational Framework for dEPC Schemes

❖ Objectives

- Analyse and define a set of indicators to be included in the next generation EPCs, including **SRI, LCA and economic indicators** and taking into account **user driven models (thermal/vision comfort, occupancy)**
- Deliver the system's information model to optimally support information flow among the various components.
- Deliver the necessary requirements and steps for ensuring a common way for auditing and implementation

2. Development of the Operational Framework for dEPC Schemes

SRI Indicators

This Task will include the following activities:

✓ **Sub-Task 1: Current Status of SRI – Detailed Overview**

- Identification of the level of development, methodology, related procedures needed for the issuance of SRI certification

✓ **Sub-Task 2: Identification of SRI KPIs for D²EPC**

- Definition of a set of SRIs KPIs which can be extracted based on the BACS related BIM input data

✓ **Sub- Task 3: Framework analysis of SRIs integration in the D²EPC**

- Analysis of the calculation methodology for the definition of SRI based on BACS related BIM data



✓ **Sub-Task 4: Guidelines and procedures for SRI-EPC dynamic integration**

- Development of the required procedures which will define guidelines for the realization of SRI certification based on the linkage of BACS related BIM data.

2. Development of the Operational Framework for dEPC Schemes

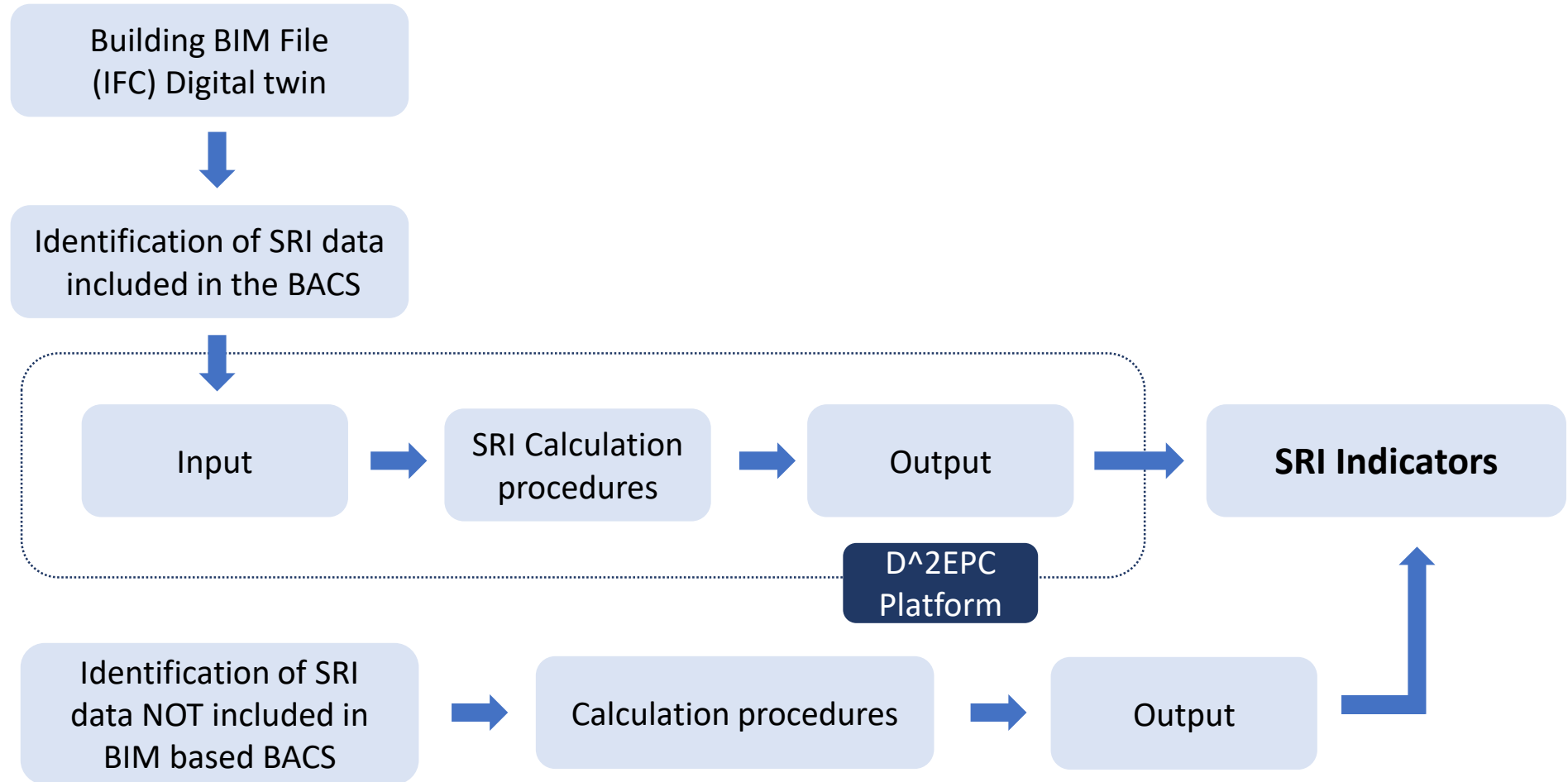
SRI Indicators

- ✓ Lighting – 2 services
- ✓ Electricity – 7 services
- ✓ EV Charging – 3 services
- ✓ Monitoring and Control – 8 services
- ✓ Dynamic Envelope – 3 services
- ✓ Ventilation – 6 services
- ✓ Cooling – 10 services
- ✓ Heating – 10 services
- ✓ Domestic Hot water (DHW) – 5 services



2. Development of the Operational Framework for dEPC Schemes

Employment of SRIs in next generation BIM based EPCs



2. Development of the Operational Framework for dEPC Schemes

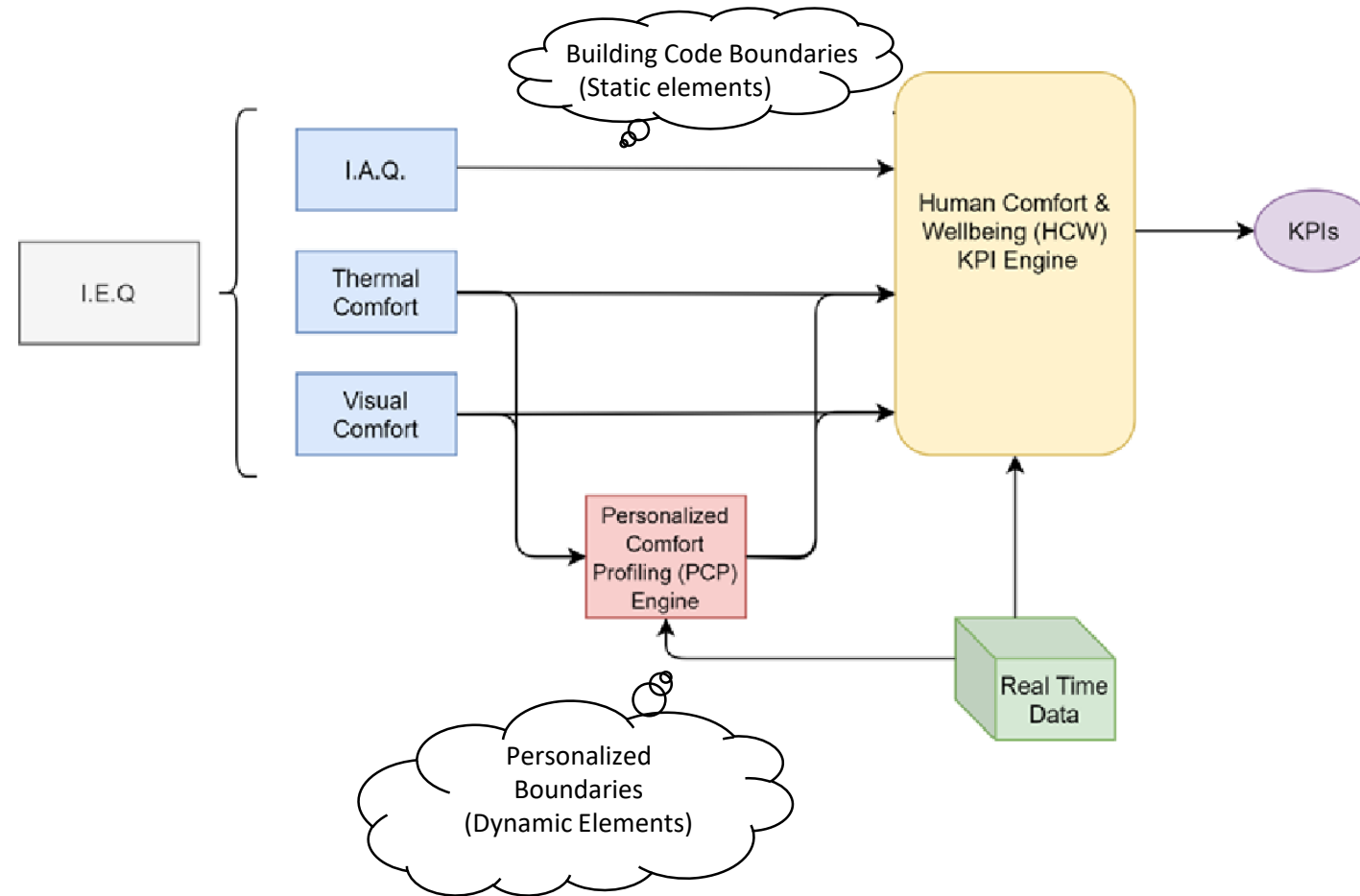
Human Comfort and Wellbeing

Indoor Environmental Quality (I.E.Q.):

- **Thermal Comfort** is the condition of mind that expresses the level of satisfaction with the thermal environment and is assessed by subjective evaluation
- **Visual Comfort** is the subjective reaction to the quantity and quality of light within any given space at a given time
- **Indoor Air Quality (I.A.Q.)** makes reference to the right amount of fresh air provided according to occupation rate and type of activity

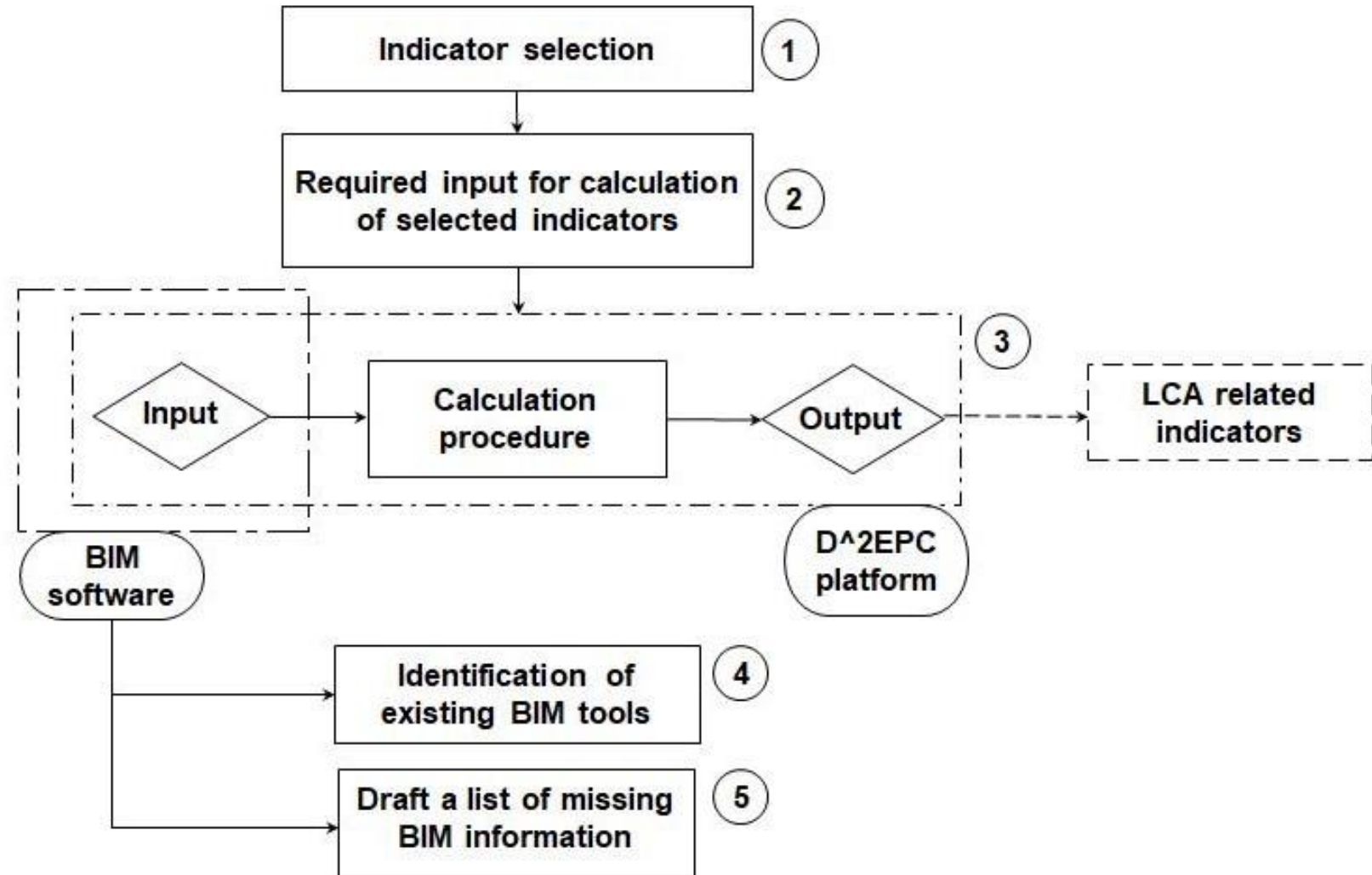
2. Development of the Operational Framework for dEPC Schemes

Human Comfort and Wellbeing KPI Engine



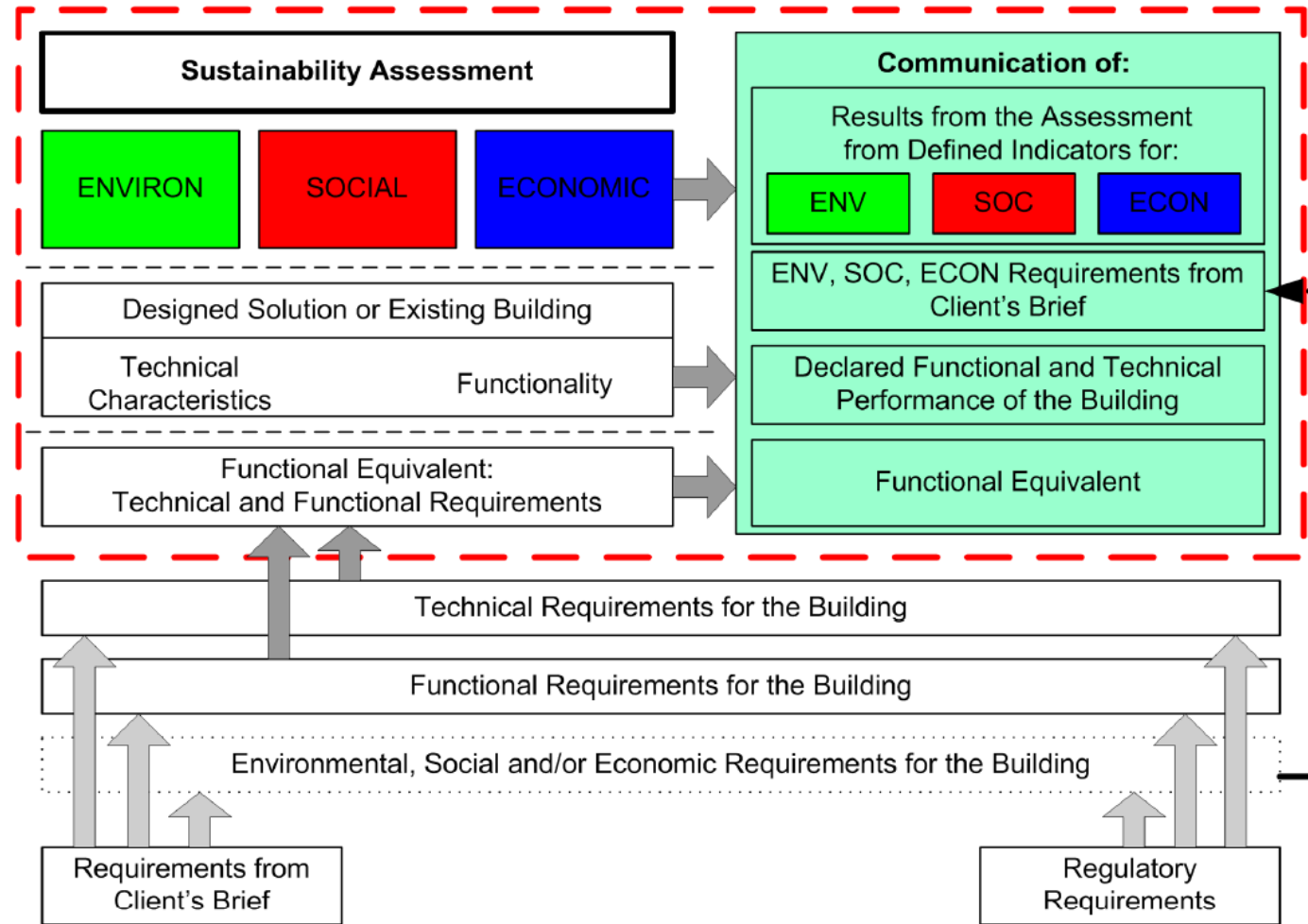
2. Development of the Operational Framework for dEPC Schemes

Life Cycle Assessment Indicators



2. Development of the Operational Framework for dEPC Schemes

Set of Sustainability Indicators (EN 15978)



2. Development of the Operational Framework for dEPC Schemes

LCA Indicators

Climate change (global warming potential)

Ozone depletion potential

Acidification potential

Eutrophication aquatic freshwater

Eutrophication aquatic marine

Eutrophication terrestrial

Photochemical ozone formation

Depletion of abiotic resources - minerals and metals

Depletion of abiotic resources – fossil fuel

Water use

Use stage energy performance

Life cycle Global

Warming Potential

Bill of quantities, materials and lifespans

Construction & demolition waste and materials

Design for adaptability and renovation

Design for deconstruction, reuse and recycling

Use stage water consumption

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