Environmental Assessment of Construction Works and Products

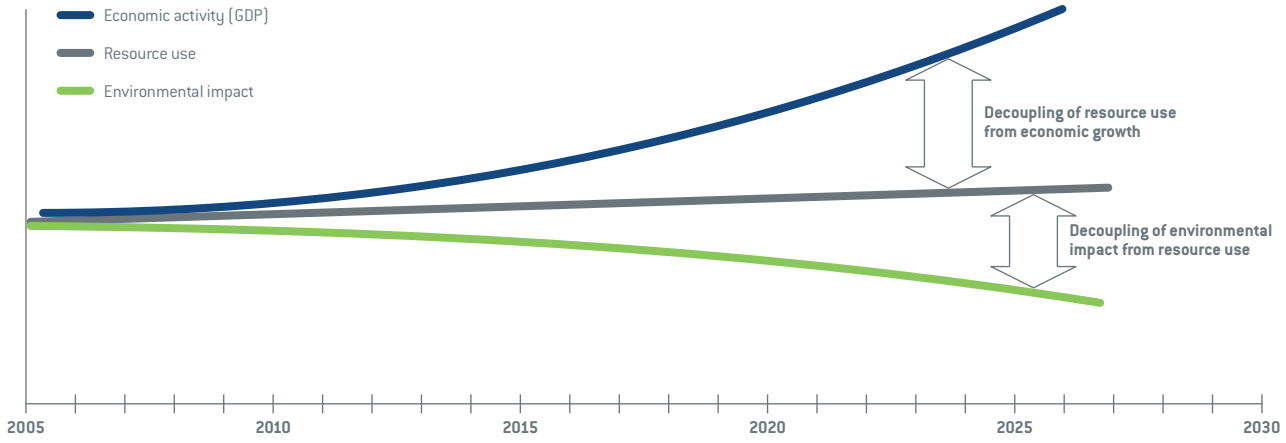
Alignment Required on CEN/TC 350 Standards

Position Paper

Context

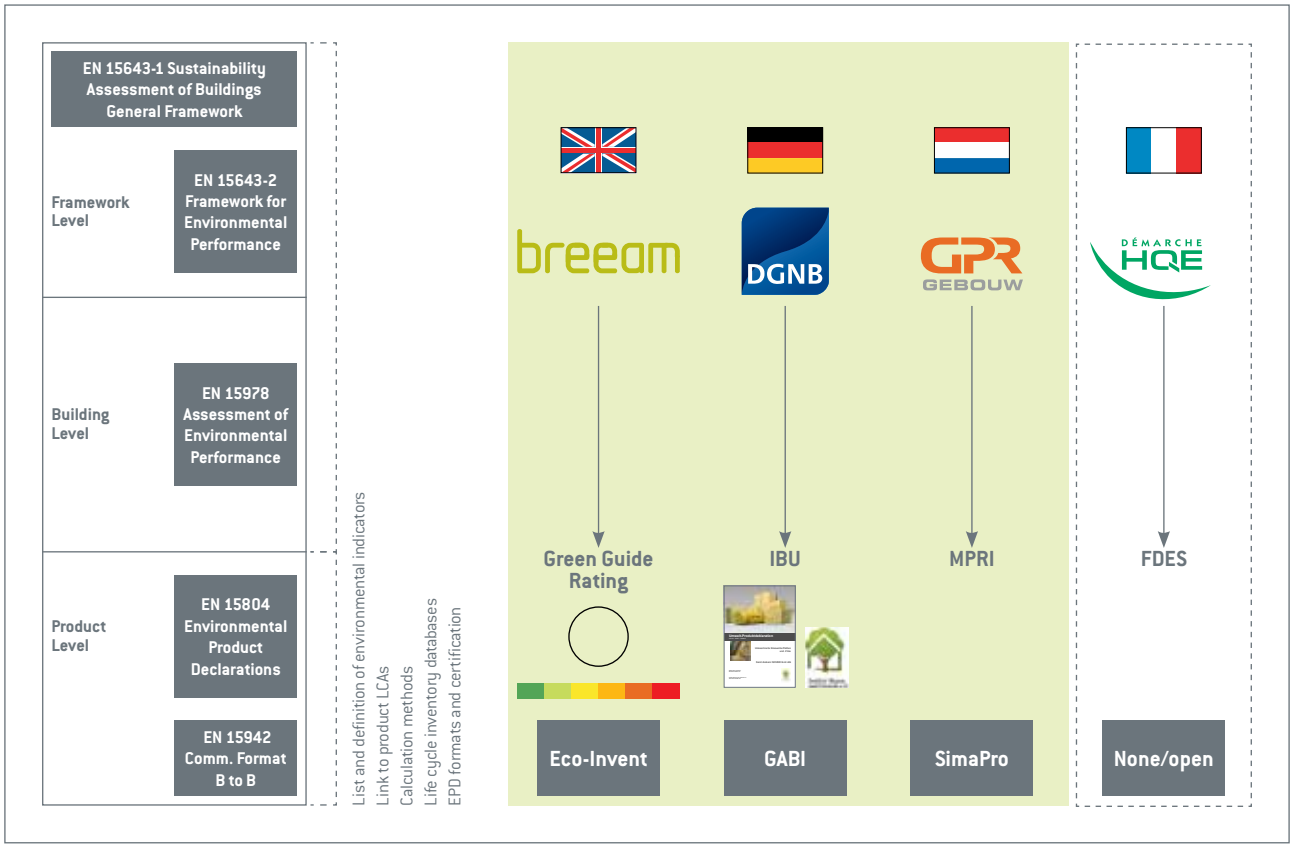
- In today's market, there is growing interest in assessing the environmental performance of construction works and construction products, and setting up minimum performance requirements to ensure reduced impacts on the natural environment.

- In addition, the EU has put Resource Efficiency at the core of its environmental policy aimed at achieving a greener and more competitive economy. Its Flagship Initiative on a Resource-efficient Europe and the Roadmap for a Resource Efficient Europe are essential milestones in this policy, with the clear objective of attaining absolute decoupling of overall resource use from pollution and economic activity. The contribution of the construction sector to these objectives is vital.



- With the development of low-energy buildings in Europe, i.e. 'nearly zero-energy buildings', the environmental impact of construction products relative to total environmental impact of the life cycle of buildings plays a much greater role than in the past. Whilst monitoring of and regulations on energy performance of buildings are well in place, monitoring of the environmental impact of construction products is yet to be established.

- Public policies (Green Public Procurement, Eco-design) are being increasingly implemented to encourage production and consumption of more sustainable goods, including those used in the construction sector.



- Environmental assessment and labelling schemes of different origins for buildings and/or construction products are currently being developed all over Europe. They are nevertheless difficult to compare, as they do not all refer to or use the same key indicators measured over the same stages of the life cycle.

- Some of these schemes are prescriptive (if you do this, you are 'good'), while others are more performance-oriented (if you achieve this performance level, you are 'efficient'). However, evaluation schemes do not always consider environmental impacts over the full life cycle of the construction work or product, thus delivering a biased or partial environmental profile.

- Evaluation schemes at product level do not necessarily allow consolidation at building level, while those at building level do not always refer to indicators that can be measured and aggregated at product level.

- Many evaluation schemes have been developed based on proprietary systems, for example: BREEAM, DGNB or GPR. Other schemes rely on open systems (e.g. HQE), with no imposed database, calculation tool or certification body.

- There is no best product as such, and only individual impact indicators calculated and expressed in a standardised form can provide an objective basis for comparison. One product may be good on one impact criterion, but not as good on another. Furthermore, a product needs to be assessed in the context of the application it is being used for in a building. Only factual data, quantified, reasoned and validated, can provide credible comparisons. There is no evidence that bio-sourced products (of animal or vegetable origin) necessarily have a better environmental profile than traditional mineral or organic products. Indeed, there may even be evidence to the contrary.

European Standardisation Process

- Harmonised European standards designed to assess the sustainability of construction works (CEN/TC 350) have been under development for seven years.

CEN/TC 350 – Sustainability of construction works

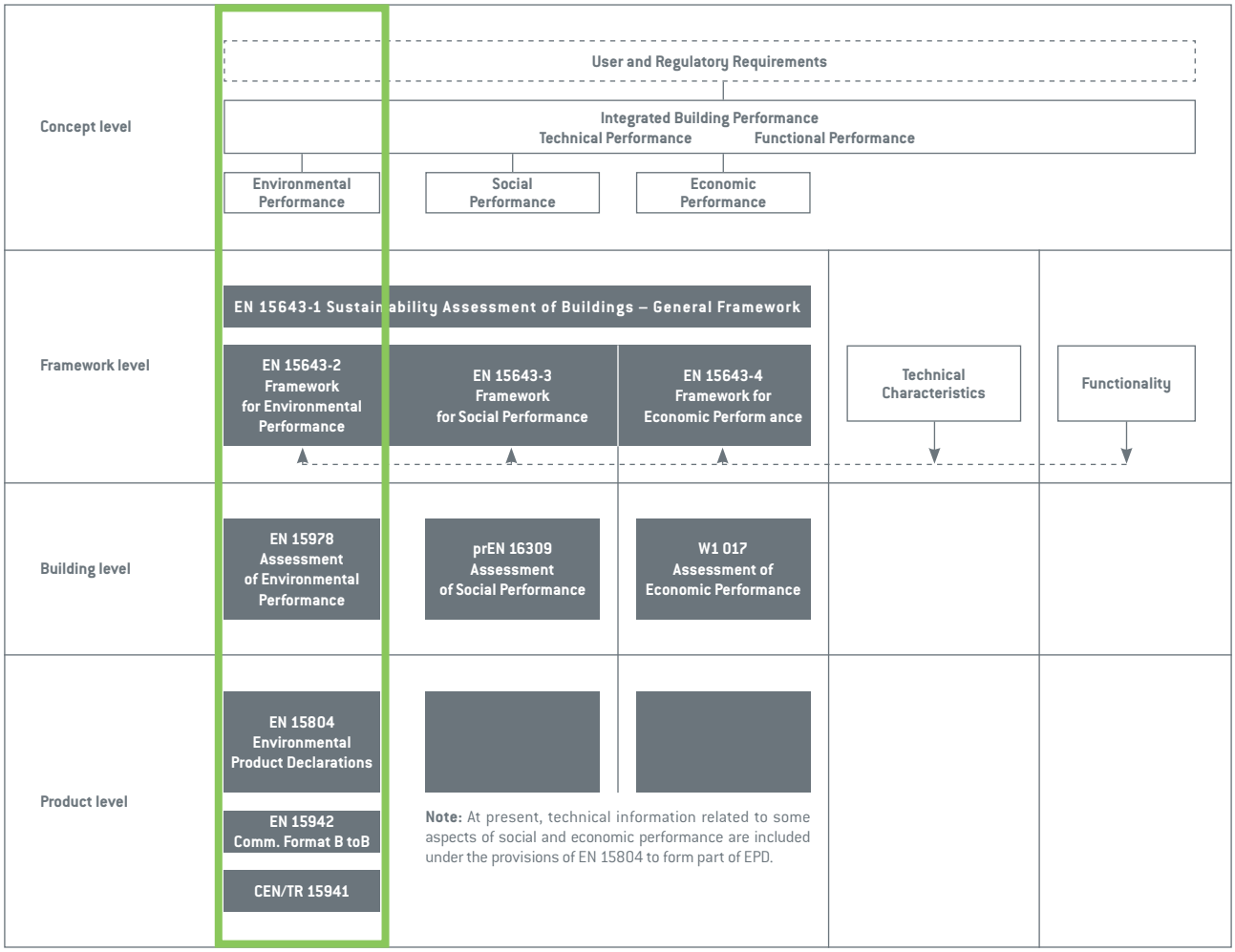
- EN 15643-1: 2010 – General framework

The environmental part relating to buildings and construction products is published.

- EN 15643-2: 2011 – Framework for assessment of environmental performance
- EN 15978: 2011 – Methodology for environmental assessment of buildings
- EN 15804: 2012 – Core product category rules for environmental product assessment
- EN 15942: 2011 – EPD Communication format business - to - business
- TR 15941: 2010 – EPD Methodology for selection and use of generic data

The social and economic framework standards are published, but the standards on building and product level are still on-going.

- EN 15643-3: 2012 – Framework for assessment of social performance
- EN 15643-4: 2012 – Framework for assessment of economic performance


Concept level
User and Regulatory Requirements
Integrated Building Performance
Technical Performance
Functional Performance
Environmental Performance
Social Performance
Economic Performance
Framework level
EN 15643-1 Sustainability Assessment of Buildings – General Framework
EN 15643-2 Framework for Environmental Performance
EN 15643-3 Framework for Social Performance
EN 15643-4 Framework for Economic Perform ance
Technical Characteristics
Functionality
Building level
EN 15978 Assessment of Environmental Performance
prEN 16309 Assessment of Social Performance
W1 017 Assessment of Economic Performance
Product level
EN 15804 Environmental Product Declarations
EN 15942 Comm. Format B toB
CEN/TR 15941
Note: At present, technical information related to some aspects of social and economic performance are included under the provisions of EN 15804 to form part of EPD.

Life Cycle Assessment (LCA) and Environmental Product Declaration (EPD)

- A Life Cycle Assessment (LCA) is the compiling and evaluation of inputs/outputs and potential environmental impacts of a product system during its lifetime. These impacts are evaluated within determined system boundaries: cradle-to-gate, cradle-to-grave[1] or cradle-to-gate with options. Results of LCA that identifies and appraises the amount and significance of the potential environmental impacts of a product system, are calculated according to a number of impact indicators, such as global warming potential, acidification, eutrophication, waste and consumption of resources.

- Any assessment based only on one stage of the life cycle could be biased, resulting in sub-optimisation. The assessment should always be integral over all life cycle stages and include all relevant indicators to avoid shifts of impacts from one stage or indicator to another.

- For example, while the production stage of a given product may well generate far-reaching impacts, the greatest optimisation might actually be achieved during the use stage. Similarly, some products may use little energy during the production process, but utilise additives with very high energy content.

- Environmental Product Declarations (EPDs) show, in a synthetic manner, quantified environmental impact data on products according to standardised indicators. They allow direct access to information and are a compact way of communicating LCA results. EPDs provide verified, consistent and comparable data based on LCAs, including information on relevant environmental aspects of products throughout their life cycle.

- The only way to correlate environmental impacts of products and environmental impacts of buildings is through LCA-based indicators. EPDs provide the input required to assess the environmental performance of buildings.

[1] i.e. from extraction of raw materials to product end-of-life after building demolition, including possible recycling

Recommended Approach

- As a significant proportion of environmental impacts of a building occur during its use stage, the environmental performance of a product should first be evaluated at building level over its full life cycle. Assessment of the building must be performance-oriented, not specification-based.
- Construction works should be the first stage to consider when setting environmental requirements and/or establishing environmental performance. Setting first-line requirements at building level ensures maximum contribution of products to the overall environmental performance of a building.
- Construction products require a specific approach in terms of assessment and certification, as they are intermediate products whose environmental contribution to the overall performance of a building must be declared. Only the building itself is the final product.
- LCAs and attached EPDs (according to EN 15804) provide input for the assessment of environmental performance of buildings and are the best science-based approach to supply information on products. All LCAs and EPDs should undergo third-party verification.
- From a product policy perspective, requirements can be matched to their environmental characteristics, taking the building context into account. In order to ensure a level playing field for the setting of criteria, it is necessary to use standardised assessment methods for harmonised environmental indicators, ideally reflecting the actual impact on nature. Use of only 'green' products is not enough to guarantee a 'green' building.
- It should be possible, according to EN 15804, to produce LCAs using different tools (e.g. GaBi, TEAM, SimaPro) and databases, and official validation of compliance of tools and databases with standards should be encouraged. Evaluation systems should remain open (no imposed use of proprietary systems or exclusive tools) in all EU countries. Mutual recognition of LCAs conducted in other countries should be common practice.
- A single harmonised EU format for EPDs based on EN 15804 should be developed.
- A specific European logotype should be designed to indicate that a product has a validated EPD. This logotype/brand could be endorsed by the European Commission.
- National or international public databases should be developed to make third-party-validated EPDs (including tools for consolidation at building level) universally available. An even better option could be to set up one centrally managed European database for all EPDs produced in the 27 EU Member States. Such database should be structured in such a way so that it can be easily updated, preferably by the manufacturer, who could retain ownership and responsibility for the updates.
- All private or semi-national schemes (e.g. HQE, DGNB, BREEAM) should align themselves with CEN/TC 350 standards (environmental part) and refer to indicators developed by this committee, making LCAs and EPDs produced according to EN 15804 a requirement for all products used in evaluated and certified buildings.

Comparison of environmental profiles of thermal insulation products

- Direct comparisons can only be made using two identical units of insulation products (e.g. 1m^2) with the same thermal resistance (R) value, installed in the same way in the same application, regardless of material they are made of. They need to be compared on the same basis in terms of life cycle duration (i.e. using the same system boundaries). Comparisons should also include other fit-for-use criteria (e.g. fire resistance, carrying capacity, acoustics), providing the required equal baseline for evaluation.
- While these two products may well save an equivalent amount of energy for heating and cooling over their lifetime, and produce identical reductions in associated CO_2 emissions, their environmental impacts will not be the same, having been produced according to different specifications in different sites using a different combination of resources.

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