

Monte Verità Declaration on a built environment within planetary boundaries

Outcome of IEA EBC Annex 72

0 Preamble

Buildings substantially contribute to and influence the quality of life. At the same time, they are one key element to help achieving several of the Sustainable Development Goals launched by UN Environment, in particular #11 Sustainable Cities and Communities, #12 Sustainable Consumption and Production and #13 Climate Action. A comprehensive assessment of buildings addresses the environmental, the social and the economic performance. The environmental dimension covers life cycle based impacts such as climate change caused by greenhouse gas emissions along the life cycle of buildings, impacts on the local environment and potential health risks e.g. due to indoor air quality.

The declaration and its recommendations focus on the life cycle based environmental impacts and resource consumption, the core topic of the experts and their research institutes co-operating in IEA EBC Annex 72. While this declaration has a special focus on greenhouse gas emissions, further environmental impacts including resource consumption are also addressed to avoid burden shifting.

The experts co-operating in the IEA EBC Annex 72 “Assessing Life Cycle Related Environmental Impacts Caused by Buildings” acknowledge that

- mankind is responsible for the rapidly increasing global temperature which is causing severe human suffering and irreparable damages on fragile ecosystems.
- CO₂ emissions need to be urgently and drastically reduced and globally reach net zero well before 2050 to stay within the remaining global budget which increases the likelihood that the global temperature increase stays below 1.5°C.¹
- the emissions of all other greenhouse gases (GHG) need to be reduced similarly.
- the planetary boundaries are exceeded with respect to pressure on biodiversity, nitrogen and phosphorous flows.
- freshwater is overused in several regions of the world.
- the concentration of aerosols (air quality) is far too high in many metropolitan areas and agglomerations of the world.
- Buildings put pressure on local and global natural resources
- buildings are causing about 40 % of global CO₂ emissions, either directly, or indirectly via the energy and the construction materials sectors.
- buildings, building related infrastructures and their supply chains are one driver for land use and land use change and landscape fragmentation and subsequent biodiversity losses.
- airborne pollutants emitted by the construction material industries are contributing substantially to the impairment of outdoor air quality.

¹ The emissions of other greenhouse gases need to be reduced to similarly low levels. That is why this Declaration addresses greenhouse gas emissions instead of CO₂ only.

Actions to reduce the carbon, environmental and resource footprints of the built environment are due in several domains and by different actors, namely:

1. Government and administration;
2. Investors, banks and financial institutions;
3. Research organisations (universities, research institutes);
4. Designers, Architects and Engineers;
5. Operators of EPD programs, sector specific LCA databases, certification schemes and labels;
6. Construction material and building technology manufacturers;
7. Construction companies;
8. Real estate agents;
9. Users and tenants.

The IEA EBC Annex 72 experts working in the field of environmental life cycle assessment of buildings² and further domain experts who signed this declaration agreed on the following recommendations.

1 Government and administration

- 1.1 Introduce legally binding maximum target values for GHG-emissions of new constructions and of refurbishments by 2025 latest with a roadmap to net zero by 2035.
- 1.2 Consider introducing a legally binding minimum benchmark for biogenic carbon stored in buildings (biogenic carbon content) taking local availability, building tradition and suitability into consideration. Define the benchmark in a way that it helps to maintain, preferably increase the amount of biogenic carbon stored in buildings and in the built environment in general.
- 1.3 Facilitate the development, introduction and operation of a national and regional life cycle assessment database for the construction sector, covering construction materials, building technology, energy supply, transport and waste management services.
- 1.4 Specify the contents of international and national standards to ensure consistency among the life cycle assessments of construction materials, building technologies and buildings in your country.
- 1.5 Facilitate the development of bill of materials, material passports, digital logbooks, digital twins and digital permits to document the material and environmental characteristics and to enable the future use of material resources embodied in buildings.
- 1.6 Consider launching research programs on sustainable construction and on construction materials and building technology (e.g. HVAC) with low environmental, resource and GHG footprints.
- 1.7 Launch a research program on negative emission technologies, either in a joint effort involving several countries or co-ordinated with other countries' research activities.
- 1.8 Enhance the education in environmental sustainability and feasible solutions to address environmental challenges in the general population.

2 Investors, banks and financial institutions

- 2.1 Consider sufficiency ("build less") and to refurbish existing buildings and urban areas as a relevant alternative to new construction following deconstruction.

² Visit <https://annex72.iea-ebc.org/> for further information about the experts involved and for guidelines and recommendations (expected to be published in late 2022).

- 2.2 Reconsider the construction and real estate sectors including upgrade and adaptation strategies as an economically attractive sector for financial investments.
- 2.3 Demand the quantification of GHG emissions, environmental impacts and resource consumption as a basis for risk assessment and economic valuation which is a precondition to invest in building projects.
- 2.4 Invest in building projects with low GHG emissions, environmental impacts and resource consumption and promote and support measures to reduce GHG emissions, environmental impacts and resource consumption of building projects.
- 2.5 Demand the integration of an assessment of GHG emissions, environmental impacts and resource consumption in the building design stages as relevant decision criteria and demand their improvements and reduction, respectively.
- 2.6 Keep yourself informed about existing and new targets, regulations and target values for buildings with regard to GHG emissions, environmental impacts and resource consumption, including the EU taxonomy for sustainable activities.

3 Research organisations (universities, research institutes)

- 3.1 Establish a knowledge/information centre on sustainable construction.
- 3.2 Foster research on the assessment and reduction of life cycle based environmental impacts of buildings and of construction materials manufacture, on budget based environmental benchmarks for buildings and on negative emission technologies by establishing chairs on sustainable construction, sustainable manufacturing and climate mitigation.
- 3.3 Offer mandatory/obligatory courses on environmental life cycle assessment and its application in the construction sector and its suppliers within the curricula of designers and architects and of civil and process engineers, business administration and facility management. The courses should also address the awareness and the environmental concern of employees in the building and construction sector.
- 3.4 Train engineers and architect to design with low carbon building materials and to design buildings with low GHG emissions, environmental impacts and resource consumption.
- 3.5 Offer courses on negative emission technologies in process engineering and forest management.
- 3.6 Embed courses on environmental sustainability in all curricula of the university.

4 Designers, Architects and Engineers

- 4.1 Discuss the overall design targets and actively address the sufficiency question: Challenge the clients brief in view of size and level of comfort of the building project and support the client in target setting.
- 4.2 Identify options to reduce the environmental impacts of the building project by changing the design, the static and/or materialisation of the building.
- 4.3 Consider the refurbishment of an existing building as a relevant alternative of demolition following new construction.
- 4.4 Assess the different design options with environmental life cycle assessment (LCA) and discuss the results with the client.
- 4.5 Identify and realise solutions to increase the adaptability and the longevity of the building.
- 4.6 Apply circularity principles using locally sourced materials, recycled materials and materials with low environmental impacts, and design building elements for easy disassembly and easy reuse. Use LCA to ensure lower life cycle based environmental impacts of such solutions.

- 4.7 Strive for lowering operational energy demand and cover the remaining demand with energy from renewable sources.
- 4.8 Introduce GHG emissions, environmental impacts and resource consumption of construction materials, building technology and energy supply during use as an important decision criterion when selecting (construction material and building technology) suppliers and energy systems.
- 4.9 Use advanced and reliable tools to quantify the GHG emissions, environmental impacts and resource consumption of the building project from early design stage to hand over and ensure continuity along the design process.
- 4.10 In the early design stage, consider to apply safety factors on the environmental impacts of building elements to cope with the uncertainties and to avoid unwelcome surprises later-on.
- 4.11 Structure the LCA model of the building and its life cycle according to well accepted schemes.
- 4.12 Consider to systematically document the characteristics and materialisation of your buildings and to use digital options such as bill of materials, material passports, digital logbooks/building passports, and digital permits to document the material and environmental characteristics and facilitate the future use of material resources of buildings.
- 4.13 Periodically attend further education courses on sustainable construction.

5 Operators of EPD programs, sector specific LCA database, certification schemes and labels

- 5.1 Follow international standards on environmental life cycle assessment to the extent possible.
- 5.2 Close the room for manoeuvre offered by international and national standards to ensure consistency among the life cycle assessments of construction materials and building technologies in your country.
- 5.3 Ensure to include product, use and end of life stages and consider to also include transport to construction site and construction.
- 5.4 Assign and require one single life cycle inventory database to be used to establish the LCA of all products and systems embedded in a construction work and of buildings. Allow to use life cycle inventory data from other databases in exceptional cases.
- 5.5 Be cautious in dealing with environmental credits attributed to the building, in particular if borrowed from future generations and other third parties. Check for and eliminate any possible double counting of these environmental credits.
- 5.6 Apply the core list of environmental and resource indicators requested by international standards and complement those by indicators that are used or required in your national context to quantify the life cycle based environmental impacts and resource consumption of buildings.
- 5.7 Consider method, data, tools and environmental benchmarks and targets as interdependent elements needed for a consistent, reliable and relevant assessment and evaluation of environmental impacts and resource consumption of buildings.
- 5.8 Consider keeping benchmarks and target values for environmental impacts of the building and for potential benefits beyond the building's perimeter separate.
- 5.9 Introduce a binding and demanding target value for life cycle based GHG emissions of buildings (carbon footprint) including a road map to net zero by 2035. Introduce a second, other than GHG-related footprint target value for life cycle based environmental impacts and resource consumption of buildings to avoid burden shifting.

- 5.10 Prefer absolute target values to relative ones (defined against a virtual reference building)
- 5.11 Consider introducing a minimum benchmark for biogenic carbon stored in buildings (biogenic carbon content) taking local availability, building tradition and suitability into consideration. It may help to maintain or even increase the amount of biogenic carbon stored in the built environment.

6 Construction material and building technology manufacturers

- 6.1 Establish a roadmap to net zero GHG-emissions of construction material and building technology manufacture and their end of life treatment to be reached by 2035.
- 6.2 Establish and publish environmental life cycle assessments of your products and your organisation. Use Environmental Product Declarations (EPD) or other suitable and established ways to document and supply the information and data.
- 6.3 Optimise your manufacturing process incl. your supply chains by introducing take back systems, increase the share of recycled raw materials, increase the material and energy efficiency, and generally foster circularity, and further reduce the environmental, resource and GHG footprints of your organisation and your products.
- 6.4 Purchase electricity products based on renewable energy, for which production and quality (guarantee of origin, GO or renewable energy certificate, RECS) of the electricity stem from the same power plants or ask the electricity provider for such an electricity product.
- 6.5 Invest in negative emission technologies rather than purchasing CO₂ emission certificates to neutralise remaining fossil CO₂ emissions.
- 6.6 Engage with suppliers and ask them to reduce their GHG emissions to net zero or change to suppliers with lower GHG emissions and more ambitious reduction targets. Give preference to suppliers, which additionally cause low environmental impacts and low resource consumption.
- 6.7 Adhere to international standards, use an acknowledged and transparent LCA database when performing the LCA and report according to a “true and fair view”.

7 Construction companies

- 7.1 Reduce GHG emissions, environmental impacts and resource consumption caused by construction processes for construction and deconstruction.
- 7.2 Choose or recommend suppliers of construction materials with low GHG emissions, low environmental impacts and low resource consumption.
- 7.3 Rely on supply transport logistics with low GHG emissions, low environmental Impacts and low resource consumption.
- 7.4 Reduce the amount of waste, and sort and recycle material wasted during construction and deconstruction.

8 Real estate agents

- 8.1 Encourage the owners of buildings for sale to inform about the buildings’ life cycle based GHG emissions, environmental impacts and resource consumption.
- 8.2 Encourage potential buyers and tenants to ask for life cycle based GHG emissions, environmental impacts and resource consumption caused by the buildings under examination.
- 8.3 Report on life cycle based GHG emissions, environmental impacts and resource consumption caused by the buildings you are offering.

9 Users and tenants

- 9.1 Question your demand for a rental object in terms of size, level of comfort and equipment.
- 9.2 Use life cycle based GHG emissions, environmental impacts and resource consumption as key criteria when selecting your rental object.
- 9.3 Use energy and water economically and use the rental object and its equipment mindfully by e.g. following cleaning and maintenance instructions.
- 9.4 Choose energy carriers and products with low GHG emissions, low environmental impacts and low resource consumption.

Monte Verità, Ticino, Switzerland, October 2021

[Signed by more than 40 scientists from 20 countries](#)

Disclaimer:

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