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Sustainability in Building Construction – A Multilevel Approach

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Sustainability in Building Construction – A Multilevel Approach

T Lützkendorf

Karlsruhe Institute of Technology (KIT), Department of Economics, Centre for Real Estate, Chair for Sustainable Management of Housing and Real Estate, Kaiserstr. 12, 76131 Karlsruhe, Germany

thomas.luetzkendorf@kit.edu

Extended abstract. The implementation of sustainable development principles requires integrating general goals for maintaining a balance between the environment, society and the economy into the specific area of work and responsibility of the actors involved, as well as their work and decision-making processes. It also requires adapting them to the specific object of assessment. For the construction and real estate industry, this means, among other things, extending the already complex interrelationships of designing, constructing and operating real estate properties by considering sustainability aspects. This not only has consequences for the decision-making processes of individual actors, but also for the exchange of information along the value chain and across the individual levels of action. Typical levels of action are the manufacturing of construction products, the provision of services (transport, construction site processes), the building, the neighbourhood, the city, the region, the national building stock. Selected actors also deal with the management of municipal, commercial and institutional building stocks.

At all levels of action, developments are currently underway to support sustainable development. At the product level, the extension of the present scope of Environmental Product Declarations in the direction of additional requirements for environmental information is currently underway. This development will allow the reporting of additional indicators for the quantification of environmental impacts on the global environment, support a more sophisticated assessment of the GWP, and provide guidance on risks to health and the local environment as additional information. At the construction level, the results of a sustainability assessment in determining the value of the asset as well as determining the conditions for financing and insurance will be taken into account more than ever before.

Again, the consideration of additional indicators in the environmental performance assessment is discussed. BIM provides a tool to handle complex design and assessment tasks that affect data delivery requirements – EPDs must be designed to be BIMable among others. The aim is to combine life cycle costing (LCC) and life cycle assessment (LCA). The life cycle carbon footprint is becoming an important indicator. Almost all countries are currently working on the introduction of compulsory calculation and assessment rules as well as carbon footprint benchmarks. This is also integrated as a requirement in the green public procurement. It remains to be seen what impact the introduction of taxes or fees on CO₂ can have.

Urban neighborhoods are becoming an important level of action for sustainable development. In addition to sustainability rating systems, preferably for new neighborhoods, process-related strategies and recommendations for the further development of existing ones are establishing themselves. Of particular interest is the ability of residents to actively participate in the process of sustainable development. In general, sustainable urban development is currently in the public



interest – see also SDG11 – a goal for sustainable development dealing with the topic of sustainable development of cities and communities. The city is thereby the object of assessment, the level of action and, through its administrative institutions, also an actor. Many cities have already formulated their own goals in the direction of climate neutrality or sustainability and developed corresponding strategies. Here, too, it is important to involve individual stakeholder groups in a more effective and systematic way.

For national climate protection and sustainability strategies, it is advantageous to formulate sub goals for individual industries and sectors. In the construction and real estate industry, this approach encounters problems because it is a cross-cutting issue. Frequently, goals for the national building stock are therefore formulated, which have the character of a budget for greenhouse gas emissions.

Increasingly, there is also a link with sustainability reporting for company-owned building portfolios.

It becomes clear that the topics of climate protection and resource conservation are dealt with at all levels of action. This requires a multi-level provision and processing of appropriate indicators. It is recommended to pursue this approach also in the standardization activities of CEN TC 350 and ISO TC 59 17. Indicators such as GWP and primary energy consumption, non-renewable, are and can be used at all levels of action. The carbon footprint evolves as a key indicator. However, the handling of the issues of resource use and resource efficiency is still a problem. In addition to the use of the indicator ADP, new opportunities are arising. A differentiated description of the use of resources according to four different types of materials – i.e. fossil energy materials, non-metallic minerals, metals and biomass – enables a better support of the management of resources. This requires taking into account parts of the life cycle inventory in the EPD.

With new, additional indicators on the one hand, and involvement of other actors such as valuation professionals and banks on the other hand, new tasks are emerging. The requirements for transparency and traceability of data are growing. There is a need for approaches that can capture the quality of data and signal it to third parties. Furthermore, it has to be clarified who takes the responsibility for the accuracy and reliability of the data. As the number of indicators increases, the question arises as to how this information can be communicated to third parties. Third-party actors can be clients active in the construction market who want to select a construction product or valuation professionals who want to consider the results of the environmental performance assessment. From the author's point of view, partially aggregated results on the basis of “endpoints” can be useful to this end. A presentation of assessment results organised according to carbon footprint, other impacts on the global environment, use of material resources, impacts and risks to the local environment, as well as impacts and risks to health, can facilitate the interpretability of assessment results. In this respect, it is important to develop suitable communication formats with respect to the various levels of action, the exchange of information along the value chains and the various actors with specific interests and options for action. It is recommended to maintain information that preserves basic data and background information while allowing the transformation and aggregation of information to meet the specific information needs of respective actors. A modern information management process is thus a prerequisite for the provision and use of information to support decisions for sustainable development.

For further reading:

- [1] Lützkendorf T 2018 Assessing the environmental performance of buildings: trends, lessons and tensions *Build. Res. Inf.* **46(5)** 594–614 DOI: 10.1080/09613218.2017.1356126
- [2] Ströbele B and Lützkendorf T 2019 Communicating environmental information: rethinking options for construction products *Build. Res. Inf.* **47(6)** 681–96 DOI: 10.1080/09613218.2018.1521191
- [3] Lützkendorf T and Balouktsi M 2017 Assessing a sustainable urban development: Typology of indicators and sources of information *Procedia Environ. Sci.* **38** 546–53 DOI://www.sciencedirect.com/science/article/pii/S1878029617301263