ABSTRACT

The construction sector plays a key role in the goal of a 55 percent reduction in climate-changing gas emissions by 2030 (compared to 1990 levels), as well as full decarbonization by 2050. A careful analysis of previous literature and studies shows that the overall reduction of the environmental impacts of building materials goes through the establishment of a sustainable continuity between the end-of-life phase of the building product and the production phase of individual building components, according to the concept of "closing the circle" production. In particular, in Italy, with reference to the end-of-life phase of the building (BS EN 15978: 2011), the Minimum Environmental Criteria (Minimum Environmental Criteria for the procurement of design services for building interventions, for the procurement of works for building interventions and for the joint procurement of design and works for building interventions - DECREE June 23, 2022, in OJ General Series no. 183 of 06-08-2022) provide, among the Basic Criteria, the verification of criteria 2.4.14 Disassembly and End of Life and 2.6.2 Selective Demolition, Recovery and Recycling.

So, at this level of CAM adoption, this research work proposes two additional criteria namely the assessment of the Level of Disassembly of the building system and the estimation of CO2eq emissions to the atmosphere during selective demolition activities of the building system.

Through the application of a phased methodology, from the technological characterization of the work to the verification of the fulfillment of the basic criteria art. 2.4.14 and 2.6. 2 and material input and output resources, developing an assessment of the level of disassemblability and an estimate of CO2eq emissions, it is intended to provide both technological and environmental information, essential tools in the design and management phase that can be basic principles for the drafting of Guidelines for DfD (Design for Deconstruction) but also for the elaboration of Methodologies for Optimization of Design Solutions for Sustainability (LCA and LCC) as provided in Art. 2.7.2 and implemented in specific calculation software as advocated by Art. 2.7.3 Design in BIM.

This phased methodology was applied to four case studies representative of the most widely used construction techniques of 'dry' steel and wood assembled systems.