**A comparative life cycle analysis of living walls**

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***Abstract.*** Urban population growth and changing people's lifestyles have led to the expansion of the construction sector, with environmental consequences such as increasing heat island effects, air pollution, storm runoff, and reduction of green spaces and biodiversity. A key strategy consists in the use sustainable solutions to improve the grey urban environment. Green infrastructures have a high potential of reduction of these environmental impacts: integrating green systems in the design of new buildings can turn the above-mentioned challenges into great opportunities, greening the building envelopes and providing more resilient urban spaces.The increasing interest on green wall systems and the advances made in recent years have led to the availability of various models with different designs and technical solutions. However, in their environmental assessment poor attention is usually paid to production and construction phases. By using the life cycle assessment (LCA) as a systematic and comprehensive approach, the sustainability of a product can be examined. LCA provides a quantification of product's potential burdens and environmental benefits.In this study, different components and materials used in the construction of vertical green systems are evaluated using LCA, with a cradle to gate approach. Both modular systems using soil as growing medium for plants and soilless living walls solutions are analysed, since the structural characteristics and related differences of the two systems can consistently affect their environmental performance. Both systems have been modeled in the OpenLCA software and analyzed using the CML-IA baseline impact assessment method. The results obtained from 11 different categories show that the processes involved in the production of plastic panels play a major role in terms of environmental burdens.The results emphasize the importance of the materials used in vertical green systems and confirm the need to design and create more sustainable products.

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