

Integration of simple LCA into complex systems: the CaSIE² project

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Recent scientific, technical and normative works insist on the relevance of life cycle assessment (LCA) as a methodology to evaluate the environmental performance of materials, systems and buildings. Though, those systems are complex by nature, evolving numerous subsystems, elements and materials and, particularly at building scale, a long service life. They interlock and overlap with one another, making any evaluation a fastidious task.

In order to allow a better diffusion of the LCA practices, the building sector have to adapt and to acquire operational decision-making LCA tools that can be used by all actors while reducing the complexity and amount of work required. In order to achieve this goal, some issues need to be solved. One of the main issues is related to the heating, ventilating and air conditioning (HVAC), and the electric and electronic equipment (EEE). The integration of their environmental evaluations within building systems is confronted to multiple issues: lack of reliable and compatible data on some equipment, characterisation methods and perimeter compatibility issues, and a reduced accessibility to information about system dimensioning (quantity and type of installed equipment within a complex system).

The CaSIE² project aims at answering this need. This study will be supported by the ELODIE (building LCA) and EIME (equipment and product LCA) software. It will provide a simplified environmental impact calculator for equipment systems based on automatic dimensioning. This automation will help assessing the environmental impact whatever the project state of progress. This tool will be used by the building sector to facilitate conception, calculate, decide and communicate on the environmental aspects of their products, building-integrated equipment. Ultimately, it will lead to global environmental optimization of building systems (energy and environment) and could provide a decision-aid to define coherent environmental policies towards the definition of energy-plus building French regulations.

This presentation will focus on the first step of the project and aim at identifying and describing the main issues faced when dealing with the integration of HVAC and EEE within building complex systems. This work will lead to the definition of the CaSIE² tool methodological and technical requirements. A description of the adopted methodology will be proposed to highlight how different scales (products, systems, building) could complete one another.

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