

An Approach to Automate the Modeling of Life Cycle Inventory Data: Case Study on Electrical and Electronic Equipment Products

Authors : Axelle Bertrand, Tom Bauer, Carole Charbuillet, Martin Bonte, Marie Voyer, Nicolas Perry

Abstract : The complexity of Life Cycle Assessment (LCA) can be identified as the ultimate obstacle to massification. Due to these obstacles, the diffusion of eco-design and LCA methods in the manufacturing sectors could be impossible. This article addresses the research question: How to adapt the LCA method to generalize it massively and improve its performance? This paper aims to develop an approach for automating LCA in order to carry out assessments on a massive scale. To answer this, we proceeded in three steps: First, an analysis of the literature to identify existing automation methods. Given the constraints of large-scale manual processing, it was necessary to define a new approach, drawing inspiration from certain methods and combining them with new ideas and improvements. In a second part, our development of automated construction is presented (reconciliation and implementation of data). Finally, the LCA case study of a conduit is presented to demonstrate the feature-based approach offered by the developed tool. A computerized environment supports effective and efficient decision-making related to materials and processes, facilitating the process of data mapping and hence product modeling. This method is also able to complete the LCA process on its own within minutes. Thus, the calculations and the LCA report are automatically generated. The tool developed has shown that automation by code is a viable solution to meet LCA's massification objectives. It has major advantages over the traditional LCA method and overcomes the complexity of LCA. Indeed, the case study demonstrated the time savings associated with this methodology and, therefore, the opportunity to increase the number of LCA reports generated and, therefore, to meet regulatory requirements. Moreover, this approach also presents the potential of the proposed method for a wide range of applications.

Keywords : automation, EEE, life cycle assessment, life cycle inventory, massively

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