The data-free product model

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Third party critical review remains the bedrock of quality control in LCA. However, it has fundamental limitations. Studies are almost always confidential, meaning that cross-review of studies by different authors is essentially impossible. Even in the case of product category rules (PCRs), studies that are independently consistent with a PCR specification may not be directly comparable to one another. As LCA becomes increasingly important in public and private decision making, a gulf is widening between LCA practitioners and the downstream users of LCA results.

The data-free product model (DFM) is a concept that is meant to bridge the interpretive gap between practitioners, reviewers, and non-expert members of the public. The DFM is an "LCA machine" that facilitates the interactive review and dynamic re-use of LCA modeling expertise. Put simply, a DFM is a process-flow diagram with no numbers, yet one that can be used to generate study results and perform analysis interactively. Model details can be inspected while excluding or restricting access to confidential information. A DFM can be shared, reviewed, altered, and run, with information disclosure controlled by the model author. With cloud-based hosting of reference data to ensure consistency and an interactive model browser/viewer, the DFM offers a framework for independent parties to generate private results using a common model.

The DFM provides a software-independent mechanism for broad-based interpretive review of LCA studies. We discuss the design and capabilities of a preliminary DFM implementation and explain its potential applications for study communication, EPD generation, and privacy-preserving computation.