

Implications of New Economic Classification Systems On Input-Output Based LCA Models

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Economic input output models have been used as an alternative approach to process based life cycle assessment models. Input-output models depend on input-output tables created by governmental economic agencies to track purchases between the economic sectors of a country. This form of economic modeling was originally created by Leontief in the 1930s.

The classification of sectors is necessarily arbitrary; any disaggregation from the national level down to the sectoral level is possible. In the United States, the classification system used for many years has been based on Standard Industry Classification (SIC). In the past decade, the US, Mexico, and Canada agreed upon a new North American Industry Classification System (NAICS) that was intended to streamline economic analyses across these three key trading partners. Internationally, a new NAICS-like classification system is proposed.

Input-output models also rely on supplemental industry-level estimates of resource use, environmental emissions, and energy use to estimate effects of production across the supply chain for a particular good or service. In the US, the primary data sources are the Environmental Protection Agency (EPA) and the Department of Energy (DOE). However these agencies continue to release data in SIC basis. To continue to use the latest economic input-output data, intermediate reclassifications are needed to accommodate this discrepancy. This additional reclassification can lead to misleading and more uncertain results.

A United States input-output model for this purpose is maintained by Carnegie Mellon's Green Design Institute, EIO-LCA, and is available at <http://www.eiolca.net>. The model traces the supply chain requirements, energy use, and environmental impacts of purchases from any of up to 480 economic sectors. The current model uses the 1997 benchmark (NAICS-based) of the US economy, as released by the US Department of Commerce Bureau of Economic Analysis.

We show the implications of maintaining multiple classification systems via several case studies of input-output based LCA using EIO-LCA. A goal in this talk is to increase awareness of the uncertainties related to LCA as well as motivating changes in the data collection and reporting practices at government agencies.