

Uncertainty in Life Cycle Impact Inventory Estimates from Economic Input Output Models

Chris Hendrickson

Carnegie Mellon University, cth@cmu.edu

Francis C. McMichael

Carnegie Mellon University, fm2a@cmu.edu

Economic input output models have been used as an alternative approach to process based life cycle assessment models. A United States input-output model for this purpose is maintained by Carnegie Mellon's Green Design Institute and is available at the website <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 of the US economy, as released by the US Department of Commerce Bureau of Economic Analysis.

Any model that relies on underlying data to estimate effects will be subject to uncertainty. For LCA, few studies have considered or estimated the uncertainty that exists. In this paper, the major sources of uncertainty in input-output models, specifically the [eiolca.net](http://www.eiolca.net) web model are identified and quantified. Various types of uncertainty exist, including underlying data uncertainty that results from the firm-level survey of economic and environmental data used to create the model. In addition, the effects of correlations among impacts for comparison of alternative designs is evaluated.

The resulting uncertainty is discussed and shown via several cases of using the model for analytical purposes.