
Letter to the Editor

Hertwich, E. 1998. Letter to the editor responding to T. Boguski's letter regarding E. Hertwich's (Fall 1997) "Book Review of *Environmental Life Cycle Assessment*, edited by M. A. Curran," *Journal of Industrial Ecology* 1(4): 128–131.

I apologize if I have not made myself clear enough, but my discussion about feedback loops (Hertwich 1998) was prompted precisely by the statement of Boguski and colleagues that "iterative calculations are used to resolve circular links." Boguski and colleagues claim: "For example, fuels and electricity are needed to produce and refine fuel resources, such as coal, crude oil, natural gas, and uranium. This creates a 'chicken or egg' situation that can only be resolved through iteration." (Curran 1997, 2.5)

Let's take a simple example, the production of electricity in a coal fire power plant. One ton of coal yields A kWh. A fraction of this, g , however, is needed to run the coal mine that supplies the power plant. Hence we will need a little more coal, $1+g$ tons, to still produce A kWh of electricity. The g tons of coal also require electricity to be produced, $A * g^2$ kWh. Continuing this iterative calculation, Boguski and colleagues would note that the mine-power plant system requires $(1+g+g^2+g^3+...)$ tons of coal to produce A kWh of electricity. Any formula collection would show them that this power series is equal to $1/(1-g)$. This is the widely used solution for a feedback loop.

In the book review, I cited work by Heijungs (1994) and Lave and colleagues (1995) to indicate that even the complex, economy-wide feedbacks common in LCA can be addressed through calculations standard in economics -- without requiring an iterative approach.

The other issues raised by Terrie Boguski's letter are questions of taste that I would like to leave for the reader to judge.

References

Curran, M. A. 1997. *Environmental Life-Cycle Assessment*. New York, McGraw-Hill.

Heijungs, R. 1994. "A Generic Method for the Identification of Options for Cleaner Products." *Ecological Economics* 10(1): 69-81.

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Lave, L., E. C. Fores, C. Hendrickson and F. McMichael. 1995. "Generalizing Life-Cycle Analysis: Using Input-Output Analysis to Estimate the Economy-Wide Discharges." *Environmental Science & Technology* 29(9): A420-A426.

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