Workshop on Life Cycle Inventory Databases

to be held at the InLCA/LCM Conference
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Background Document

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Until this time, much of the emphasis on life cycle inventory data quality has been placed on how completed data sets are presented (in an attempt to make databases more interchangeable). Early work, such as that of SPOLD, has led to the development of more uniform formats for reporting data (i.e. harmonization.). However, consistency in how the data are collected, calculated and modeled[1] has been given less attention. Data, therefore, used for LCA's continue to be inconsistent from study to study and not as transparent in how they were derived as many users would like them to be.

The LCA community has begun to discuss these issues in a more organized fashion. Such coordinated work will allow for LCI practice to reach agreement more quickly as well as avoid duplication of effort. Only with reliable and consistent inventory data will LCA be able to move forward and become adopted as a respected environmental management tool.

Having a national database can alleviate concerns about consistency, if all data needs are met by the database. However, the creation of national databases is a very costly undertaking (and still does not address the need for consistency between countries). As stated by the Life Cycle Inventory Work Group of the UNEP Life Cycle Initiative, "the real practice of LCA will continue to rely on a mixture of pooled existing data and newly developed data[1]."

[1] The terms calculated and modeled data are used here to differentiate between data that are arrived at by either manipulating existing data (such as dividing environmental releases from an industry reported under TRI and dividing it by a nationally reported production number to get a per unit result) or employing programs that produce theoretical outputs from industrial process or operations (such as using emission factors or programs such as ASPEN).

Purpose of the Seattle Workshop:

With or without the development of national databases, continued discussion to get us to a consistent approach for inventory data development is needed. To this end, efforts are being coordinated to provide a unified platform for building consensus around LCI. Under the leadership of the UNEP/SETAC Life Cycle Initiative, a workgroup on Life Cycle Inventory has been established with the goal of addressing inventory issues. An upcoming workshop will be held in Karlsruhe, Germany, as part of this Initiative. During the Karlsruhe workshop additional discussion will be included in one of the workshop's three themes. The discussions held in the Seattle workshop will be recorded and summarized. After review by the workshop attendees, a summary report will be presented at the Karlsruhe workshop.

The purpose of the Seattle workshop is to provide a venue for LCA experts to exchange ideas on current practice in life cycle inventory, focusing on data collection methodology.

Suggested Discussion Topics

For purposes of this work group, discussion will be limited to existing processes, and will not address design application in which conceptual products would be evaluated (and the manufacturing process does not yet exist).

As one collects, models, calculates and estimates inventory data, many decision points are encountered and many technical assumptions about the data must be made. To get to a level of consistent practice, these decision points need to be clearly identified, and possibly, categorized so that more uniform rules can be applied. The following sections describe the most common decision points.

<u>Decision Rules</u>:

Co-Product Allocation - the assignment of inventory data related to a production process that makes two or more products has presented a problem to LCI since the beginning. The traditional solution has been to partition the environmental inputs and outputs of the process across its multiple products, usually on a mass basis. A cost basis (selling price of the multiple products) has also been suggested. Others believe that system expansion is the way to solve the problem. But is system expansion always feasible?
[Does this category include recycling allocation issues or does recycling require a different approach?]

Exclusion of small amounts (inputs and outputs) – uniform methodology is needed when considering inputs and outputs to a system that are small and potentially insignificant to the overall inventory. These small amounts may then be excluded from the inventory. Conversely some outputs, because of toxicity or other considerations, need to be included at any level, no matter how small.

Exclusion of spills and losses – past practice in LCA has been to exclude non-routine spills and leaks. When is this assumption not appropriate? If spills are included in the inventory, what basis is used to determine how much of the spill allocated to the air versus the land/water?

Age-appropriateness of data – LCI data should be collected based on a reference year, but what data for that year are not always available. How does one decide when "old" data is too old?

Surrogate data – similarly, when data are not available, surrogate data can be used. But what are the parameters that determine when the use of a surrogate is permissible?

Inventory for Impact Assessment – often data are available for a category that covers many chemicals, such as reported VOC's. How should this be handled especially if the inventory is to be collected for use in impact assessment?

Others?

Matching the Goal to the Method:
How does the goal affect the rules? In a screening level LCA, when is it okay to use data that are "close enough?" Often, data from different sources are need in order to calculate necessary inventory data – is this acceptable practice? are there limits?

Collecting Primary Data:
If secondary data is not available, then an effort may be undertaken to collect data directly from source (i.e. primary data). This raises question about how to use the data to represent that particular industry. How does one determine if the data is representative of the industry? Should the aggregated represent the best available technology? the worst? the average?

Report Format:
After data are collected, calculated and modeled, the approach that was used should be transparent to other users of the data. Some of these details can become very specific and the amount of information grows, making total transparency difficult to maintain. What is an effective format for recording methodological decisions when inventory data are reported? How should missing data be noted? How does one ensure that zeroes mean 'no input/output" versus "Not Available" or "Unknown?"

Next Steps

This background document is being sent to everyone who was invited to the Seattle workshop. Your feedback on the issues raised here regarding decision points and technical assumptions is solicited (send them to Mary Ann at curran.maryann@epa.gov). Please add any thoughts you feel should be discussed but are not included here. All input will be compiled and presented at the Seattle workshop for further discussion.

By the end of the workshop, all participants should have a better understanding of the issues regarding data collection and how completed data sets can vary depending on the methodology that was applied. The final end product of the workshop will be an initial (as close to final as possible) list of areas in which decision points arise in inventory data collection along with possible approaches on how they are typically handled or alternative ways that they may be handled.

The ultimate goal of these discussions (going beyond the Seattle workshop) is the creation of guidance (i.e. a decision tree [2]) for others who undertake a life cycle inventory. This effort will be closely coordinated with the efforts of the LCI workgroup under the UNEP/SETAC Life Cycle Initiative. Further discussion on how to develop this guidance document and coordinate efforts will be held at the Seattle workshop.

References

1. UNEP/SETAC Life Cycle Initiative, "Draft Final Report of the LCI Definition Study," p 3, version 7a, March 2003.

2. UNEP/SETAC Life Cycle Initiative, "Final Draft Summary Terms of Reference For Life Cycle Inventory Task Forces," September 2003.