August 2003 • NREL/SR-550-34270

Subcontractor Report

Report on LCI Database Project Meeting of Interests

Period of Performance: May 7, 2001 – December 1, 2001

Athena™ Sustainable Materials Institute
Merrickville, Ontario, Canada

Franklin Associates, Ltd.
Prairie Village, Kansas

Sylvatica
North Berwick, Maine

National Renewable Energy Laboratory

1617 Cole Boulevard
Golden, Colorado 80401-3393

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NREL Technical Monitor: M. Deru

Prepared under Subcontract No. AAX-1-31445-01

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Printed on paper containing at least 50% wastepaper, including 20% postconsumer waste

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Report on LCI Database Project
Meeting of Interests

Ford Motor Company Research Center
Dearborn, Michigan, May 21, 2001

1 Report Introduction

The purpose of the Meeting of Interests for the Life-Cycle Inventory Database Project[1], hosted by Ford Motor Company, was to explain the database project, discuss related issues and concerns, and seek the support of a broad spectrum of relevant organizations.

In response to an invitation from Dr. John Sullivan (Attachment A), the meeting was attended by 37 representatives of industry, government, consulting organizations, universities and research institutes, in the following proportions.

Industry	15	(40.5%)
Government	9	(24%)
Consultants	7	(19%)
Universities and Research Institutes	6	(16%)

The complete attendee list is included as Attachment B. The agenda is included as Attachment C.

2 Meeting Introduction

Dr. G. Schmidt, Vice President of Ford Research Laboratories, opened the meeting and welcomed the participants on behalf of Ford.

Dr. Sullivan then outlined Ford's vision of the project. As he explained it, Ford is interested in the following:

- The development of benchmarks for its product systems, in the form of "cradle-to-gate" modules for a wide range of materials as well as modules for common transformation processes (e.g., molding, stamping, finishing);
- An improved ability to measure the environmental effects of decisions;
- Access to peer reviewed, publicly available databases;
- The eventual development of a North American (NAFTA) LCI database;
- An LCI database that would be used by the Sierra Club, Environmental Defense Fund and other non-governmental organizations (NGOs) because they perceive it to be accurate, useful, and reliable.

He especially noted that life-cycle inventory analysis is about the current state of product manufacture and use and not about future targets. Hence, LCI is not likely to be used directly for regulation, a concern that some manufacturers have raised, though it might be

[1] LCI Database Project information available at: http://www.nrel.gov/lci

used to define targets. But even if that occurs, at least they will be informed targets. There seemed to be no disagreement with these points on the part of other industry attendees.

The objectives of the meeting were to provide participants with a basis for deciding whether they want to participate in the project, including:
- A clear definition of the project; and
- An understanding of what would be required of them.

Dr. Sullivan stated that Ford considers this to be a necessary and important project in which it intends to participate. He also noted the importance others place on having publicly available, high-quality environmental data, as evidenced by participation in the meeting of people from Canada, Mexico, and Korea, as well as the United States.

Dru Crawley advised that the Department of Energy (DOE):
- Has supported Athena™ Sustainable Materials Institute, or Athena Institute, over the past 4 years, not just for its applicability to the U.S. built environment, but as an end in itself;
- Now wants to expand beyond the building environment; and
- Has committed to provide funding for this project.

Dr. Paul Torcellini of the National Renewable Energy Laboratory (NREL) then outlined the DOE roadmap process as it applies to high-performance buildings—the area of most immediate concern to his office.

Derry Allen presented the U.S. Environmental Protection Agency (EPA) perspective by briefly outlining the nature of environmental challenges to be faced over the next 30 years, challenges that can be met by building on the environmental progress of the last 30 years. He especially emphasized the need for new organizing concepts and a systems approach to foster the efficient use of resources and protect the environment in the face of population and economic growth. Industrial ecology was cited as an important concept that supplements current regulatory programs.

Within this context, Mr. Allen suggested that a North American LCI database can become a major building block for environmental protection, with the current project setting a new collaborative tone.

3 Project Overview

Wayne Trusty, President of Athena Sustainable Materials Institute, provided an overview of the project, with emphasis on Phase I. The full PowerPoint presentation has been provided individually to all participants and will be made available on the NREL project web site.

He described the project as a public and private research partnership, and set out the objectives, criteria, and scope as follows.

3.1 Objectives

The project is designed to:
- Produce publicly available LCI databases for commonly used materials, products and processes;
- Focus on user needs;
- Support the development of decision-support systems and tools; and
- Develop regional benchmarks.

3.2 Project Criteria

Key criteria include:
- Consistent guidelines that provide for
  - Transparency
  - Representative data, and
  - Peer review;
- Uniform and equal treatment of all materials;
- Regional data development as required to reflect important variability; and
- Full accessibility of data in formats to maximize use.

3.3 Scope

The scope will cover:
- Materials and products commonly used in manufacturing;
- Standard transformation processes – stamping, processing, painting, etc.; and
- Other common processes – electricity generation, transportation, industrial boilers, energy pre-combustion.

Within the cradle-to-gate life cycle, the LCI project will emphasize data development for:
- Materials acquisition, and
- Primary manufacturing.

3.4 Phasing

The project will be undertaken in three phases.

Phase I will involve the establishment of an advisory group, which, in a workshop environment, will discuss project details, identify issues, and develop the work program for Phase I. Smaller task groups will be set up, consistent with the interests and expertise of individual members of the advisory group, to undertake the following:
- The development of s;
- The establishment of research parameters, including products, processes, data categories, and data quality;
- An assessment of the availability of data and the identification of data gaps;
- A determination of which data, if any, needs to be regionalized;
- Defining transparency; and
- Developing a peer-review process.

Athena Institute and its associates will provide technical information and expertise to facilitate the advisory group's deliberations

Phase II (not yet funded) will involve the collection of data and will depend on the results of Phase I.

Phase III will involve long-term data dissemination and database maintenance.

4 **Moderated Discussion** (Afternoon Session)

Following a restatement of the meeting objectives, the meeting participants posed specific questions related to the process and its practicality and engaged in a wide-ranging discussion of concerns and issues. Without attempting to attribute or prioritize the points, the following were identified, with responses noted where relevant.

4.1 Database Maintenance

1. DOE / NREL assumed responsibility for long term maintenance and updating of the database.

2. It is likely that all components of the database will need to be reviewed at least every 5 years, with more frequent reviews necessary in some cases.

4.2 Database Scope

1. Regional data may be necessary for a variety of reasons including differing energy production and use profiles, manufacturing practices, codes and transportation factors from one region to another. It can also support regionalized impact assessment.

2. The study team should maintain a "watching brief" on international developments and activities, such as those under the recent SETAC/UNEP initiative. In fact, there is a direct connection with that initiative because Dr. Greg Norris (Sylvatica) is a vice-director of the SETAC/UNEP project.

3. DOE strongly supported a geographic scope beyond just the United States and the consensus was that this should be a North American (NAFTA) database to the extent possible.

4.3 Data Confidentiality and Accuracy

1. There was considerable discussion about the protection of confidential industry data, especially for industries, or products, dominated by a small number of companies. The argument was that, in such cases, the presentation of an industry average could still allow inferences about company-specific information.

It is therefore critical that the advisory group look at means of protecting proprietary industry data, while ensuring data transparency and relevance. One possible solution would be for the database to specify ranges on sensitive parameters rather than industry averages (the range mid-point would not necessarily be the average). Another possibility is that companies themselves report ranges of values to protect their confidentially. A third possibility could be reporting of industry average data for a "vertical" or sequentially aggregated system of processes.

2. With regard to the margin of error likely in the data, the point was made that maintaining relative values across competing product lines is probably more important than a high degree of accuracy in absolute numbers.

3. A concern was expressed that generalizations based on averages could be used to discriminate against companies that perform better than the benchmarks. Related to this concern is the point that true impact assessment has to be site specific, and that regional averages and ranges hide critical numbers.

   One response was that regional averages provide benchmarks for assessing or comparing individual company and site-specific data. Regional average data also provides information for high level decisions about material choices, while manufacturer selections must be made with more detailed information.

4.4 Access to Existing Databases

1. As part of the NREL contract, consultants will be required to make existing databases available to the project and fully transparent to the extent that they do not reveal proprietary third-party information.

2. Mary Ann Curran (EPA) advised that approximately 75 sources of LCI-related or LCI-relevant data have already been identified in a prior EPA project, and that information could be made available to this project.

4.5 Cost and Cost Sharing

1. Of the estimated $1 million required for Phase II, there will have to be a combination of public and private contributions. Some of those contributions may be 'in kind' in the form of existing databases, which will save the project time and money and therefore have a direct value.

   Ford advised that it expects to pay for what it needs. There may need to be a general contribution from participants.

4.6 Critical Review

1. Recognizing that the database has to not only be open, but also acknowledged as reliable, critical review was identified as another important subject for the Advisory Committee. This led to discussion about the true nature of any review process.

   While a so-called 'peer review' of the methodology and an ISO-style audit of process can be accomplished by an outside critical review panel, review of data must be accomplished by the industry supplying the information. One way to accomplish this is for industry to provide "raw data" to an LCI consultant, who will then process it and return the LCI profile to the industry for review before its release.

4.7 Generic and Common Process Data

1. There was strong consensus that developing data for various common processes like transportation, electricity generation and energy pre-combustion effects should be a high priority for Phase II. This was emphasized in the context of the general principle that it is better to get on with the task and put key elements properly in place than to let uncertainties or potential difficulties with other elements slow or even stop the process.

2. Related to the above point was the view that we should first fill the database with all the information possible and then perform sensitivity analysis to determine the areas that need closer attention. This accords with the idea that information is constantly changing anyway and the database must be dynamic.

3. Questions were raised about the value of generic (e.g., regional industry average) databases and their use by practitioners. One issue is the potential variability among manufacturers of some products (e.g., small versus large suppliers). Others felt that a generic database can be valuable at early planning or conceptual design stages and to provide building blocks for more detailed assessments.

4. A related concern was whether it would be premature to stop at primary manufacturing processes. The suggestion was that the database may have little value for doing life-cycle assessment on an assembly or consumer product with a large number of components. Again, others responded that a generic database covering primary materials and fabrication processes can help with the development of supplier-specific data or more detailed final product assessments. However, a key task will be determining the boundary between primary and secondary manufacturing on a sector-by-sector basis.

In general, the consensus was that this is an important project which offers the potential to provide a valuable data resource, and the possibility of data gaps in the initial round should not deter or stall the project.

5 Next Steps

The following are the next steps and actions required.

1. Each participant was asked to email Wayne Trusty (Athena Institute) regarding his or her interest in participating on the advisory group, with a copy to John Sullivan at Ford.

   For those who do not wish to participate on the committee but would like to be able to comment on progress, working papers, and reports, these papers will be posted to an NREL web site and will be available for review and comment.

2. One of the documents to be made available will be a brief description of the successful Athena Institute approach to database development, with an example.

3. Participants were also asked to provide Derry Allen with their thoughts on what EPA could provide to the project other than financial support.

4. Once the advisory group is formed, a workshop will be held as detailed in Section 3.4, above.

6 Summary

Based on the discussion, Dr. Sullivan summarized the challenges and issues as follows:

- The nature and scope of data to be included;
- The quality of the data obtainable;
- The meaning of "peer review";
- The form of the data model and how the data will be stored;
- The format of the database;
- Where the database will reside, and who will take responsibility for its maintenance; and
- How new modules are to be added.

Attachment A
Invitation Letter

Ford Motor Company

Ford Research Laboratory
Department of Chemistry and
Environmental Science
M/D 3083 SRL
2101 Village Road
Dearborn, MI 48124

Dear _____:

On Monday May 21, the Scientific Research Laboratories of the Ford Motor Company is hosting a "Meeting of Interest" pertaining to the development of a public North American Life Cycle Inventory Database. Ford advocates and supports the development of such a database to foster more informed, system-wide, product environmental improvement initiatives, as well as vehicle industrial ecological and sustainability determinations.

The first phase of a project to develop the life cycle inventories for a wide range of industrial materials has been sponsored and budgeted by the DOE, the GSA and the Navy. The Athena Sustainable Materials Institute, a Canadian not-for-profit research organization, started similar work about a decade ago and has generated a Canadian LCI database for a range of construction materials. This effort is serving as a starting point for the US project and the Athena Institute in association with two US companies, Sylvatica and Franklin Associates Limited, has been retained by the National Renewable Energy Laboratory (NREL) to serve as prime consultant for this first phase. The objectives of this phase are to establish all of the data category, quality, and research management parameters before proceeding with actual LCI data gathering.

With the scope properly expanded to include a full range of material production, transformation (stamping, extruding, etc.), and finishing (painting, plating, etc) operation unit process modules, we at Ford feel the time is right to join forces with others to support this critical initiative.

A number of other organizations, including NGOs (World Resources Institute/ World Business Council for Sustainable Development), the USEPA, other automakers, and manufacturing interests from Canada, USA, and Mexico, have also expressed interest in this project. All recognize that a high quality, public LCI database will be a valuable source of information, one that is needed for assessing future efforts to build a more

sustainable world and product systems. And life cycle assessment in general, with its system focus, is the tool of choice.

Attendance at this meeting is by invitation only. I hope you and your organization choose to attend to get a better sense of the scope of, and momentum behind, this effort.
I further hope that your organization decides to participate. To be successful, such an effort must be a multi-stakeholder one. Indeed, the greater the participation, the more likely a timely and productive project will result.

The meeting starts at 10:30 am in CR 1139 of the Scientific Research Laboratories. I hope to see you there. Please let me know if you plan to attend the meeting.

Regards,

Dr. John L. Sullivan
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Fax: 313-594-2923
e-mail: jsulliv8@ford.com

Attachment B
List of Attendees

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Attachment C
Meeting Agenda

Agenda

Time	Topic
10:30	Welcome to Ford, Dr. G. Schmidt, VP FRL
10:40	Ford's Vision of the Project; meeting objectives, Dr. John Sullivan
10:50	DOE's Perspective and Long-Term commitment, Dr. Drury Crawley, USDOE
11:00	EPA's Perspective on the LCI-Database, Derry Allen
11:10	Project Background and Overview, Mr. Wayne Trusty, Athena Institute - Broad objectives - Approach - Phase 1 process - Expected Phase 1 results
12:00	Lunch
12:45	Moderated discussion: questions, concerns, suggestions, Dr. Sullivan
2:30	Break
3:00	Summary of discussion points and further discussion, Dr. Sullivan
4:00	Wrap-up

REPORT DOCUMENTATION PAGE

Form Approved
OMB NO. 0704-0188

1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	August 2003	Subcontractor report

4. TITLE AND SUBTITLE
Report on LCI Database Project Meeting of Interests; Period of Performance: May 7, 2001 – December 1, 2001.

5. FUNDING NUMBERS
WF9V.5501

6. AUTHOR(S)
Athena Institute, Franklin Associates, Ltd., and Sylvatica

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Athena Sustainable Materials Institute
Merrickville, Ontario, Canada

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)
National Renewable Energy Laboratory
1617 Cole Blvd.
Golden, CO 80401-3393

10. SPONSORING/MONITORING AGENCY REPORT NUMBER
NREL/SR-550-34270

11. SUPPLEMENTARY NOTES
NREL Technical Monitor: Michael Deru, Ph.D.

12a. DISTRIBUTION/AVAILABILITY STATEMENT
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

12b. DISTRIBUTION CODE

13. ABSTRACT *(Maximum 200 words)* This is a report of the Meeting of Interests for the Life-cycle Inventory (LCI) Database Project hosted by the Ford Motor Company. The meeting was held to explain the project, discuss related issues and concerns, and to seek the support of a broad spectrum of relevant organizations. The ultimate goal of the project is to develop publicly available LCI Data modules for commonly used materials, products, and processes.

14. SUBJECT TERMS
LCI, LCI Database Project, Review panel, Athena Institute, life-cycle inventory.

15. NUMBER OF PAGES

16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL