

일본 전과정평가 국가 과제의 현황

National Project on Life Cycle Assessment in Japan: Status Quo¹⁾

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I. Introduction

As one of the leading countries in Asia in the area of Life Cycle Assessment (LCA), Japan has developed many cases and given efforts to popularise its concept, even though it is much later than western industrialised countries. This paper is for the description of national LCA projects which is progressing in Japan. Japan launched the national project in the late of 1998, at the similar time, and it is worthwhile to describe it with the viewpoint of start. This paper reviews the former LCA activities and current national project in Japan, and describes the starting strategies and conditions.

II. LCA Activities in Japan

1. Former experiences

LCA in Japan is known as to be born in early 1990s in the plastic product and packaging industry, when LCA started to be recognised as an important tool for assessing total environmental impact of products and services comprehensively. However it is argued that the trend for adopting life cycle concept had progressed from 1970s.

The start of life cycle approach was the research on making input/output inventory table for pollution materials in 10 major industrial sectors, which was funded by Ministry of International Trade and Industry (MITI). The first study regarded SOx only, the second one was performed for general air pollutant. When the problem of energy depletion rose because of the oil crisis, a report titled "Life cycle energy for cloths, food and residence" was made out by Agency of Industrial Science and Technology (AIST). From then on, lots of case studies have cumulated by government, academia, and industry under the recognition that it is a good quantitative tool for decision making. MITI suggested to adopt LCA as the basic tool for evaluating major industries of Japan,

1) It is the latest as of February 1999.

when ISO/TC207 was established and standardisation issue was discussed in 1993. Some faculties of universities promote using the concepts such as EcoMaterials and EcoDesign. Most of all, the biennial EcoBalance and EcoMaterial conferences seem to have very important role for promoting and integrating LCA activities in Japan. Even though the conferences are international, the best beneficiary is Japanese.

With much discussion and motivation including these ways, vigorous activities have begun and finished with significantly valuable results. However they are still dependent on the information from overseas nevertheless there have been quite lots of practical examples of LCA in Japan. It is one of the reason why they want to develop their own LCA infrastructure.

2. Associations

Life-Cycle Assessment Society of Japan (JLCA) was established by MITI on October 1995. In addition to pursuing the exchange of information through communication among individuals who research LCA, this forum strives to examine a wide scope of matters including how to make LCA data common in the future, through the co-operation of the industrial and governmental sectors. The Society has received the support and participation of thirty industrial groups from research organisations of the industrial sector including national and public research centres [Morimoto, 1997]. Now about 250 national, industrial and academic organisations are participated.

The Society is categorised into three subgroups that examine LCA:

- Technical Committee I: Examination of LCA methods
- Technical Committee II: Examination of database construction
- Technical Committee III: Application of LCA

Between 70 and 100 people voiced their intention to participate in the respective subgroups. Meetings of the steering committee are held once a month. In addition, a symposium workshop is installed to transfer the debates and discussions from the steering committee to the members. The Society has prepared a report of their examination results to establish the direction of LCA in Japan.

3. Activities with foreign institutes

A couple of co-operations between foreign and Japanese institutes have performed. Mainly the foreign institutes come from Europe. Ecobilan participated in the project funded by the Association of Steel Industry, and Product Engineering GmbH worked together for pump product. Now EMPA, IKP, Pré, and CML are participated in another governmental project. There are some domestic consulting firms who perform LCA, but their portion in terms of the number of project is not so significant. Even though the number of co-operation is more than that in Korea, it is still not so much.

III. Description of Japanese Project²⁾

Many national projects and programmes related to LCA researches have been performed in Japan and Korea. It seems that the general and integrative study on LCA is now needed. Two national projects for LCA are launched at the late of 1998 in both countries. In this chapter they are compared with certain criteria. Unfortunately many of the information are under the security and confidentiality, so it is restricted to describe them in detail.

1. Objectives of the project

The project is titled as "Development of Assessment Technology of Life Cycle Environment Impact of Products." The objectives of the project are as followings:

- Establishment of LCA tools for the whole of Japan
- Construction of a Japanese public database
- Establishment of LCA application rules
- Establishment of education and popularisation systems for both the public and industries.

Basically the project focuses on making public database. It also aims on establishing certain methodology for practical applications. It is interested in management system for facilitating access from users. It explicitly expresses the function of education, and the provision of networking or management system to public.

No special plan for practical application about this aspect is shown in Japanese project. It would be omitted because Japan already has lot of experience in practising LCA and has studied foreign cases, so investigation for foreign experience is not necessarily needed in the project.

2. Period and schedule

Proposal for LCA national project submitted on June 1996. Even though the proposal was accepted implicitly on August 1996 by MITI, planning committee of the project had meetings 4 times till February 1998. Actually the research started on April 1998 and the report for the first year was published on April 1999. It took almost two and half years from the submission of proposal to the official start of the project. It was due to the bureaucratic process among governmental institutes. However the decision was already informally established and there had been lot of activities during two and half years, including the meetings of planning committee.

A LCA project for copying machine has been progressed and it will be continued till 2000. It will become one of the bases of this national project.

2) It refers JEMAI [1999]

The project will be continued for 5 years. Even though the draft schedule is set like that, basically it is assumed that the overall work will be finished in 3 years and the schedule is not subdivided more in detail. So it is not so meaningful to give much attention to the schedule.

At the fourth year, cases will be investigated comprehensively. The results from inventory and database study are used for evaluation of the case studies, and the result of evaluation is used for refinement and enrichment of data, via improvement of the systems. Report format for LCA results is also set at the fourth year. Finally the project is summarised at the end of fifth year.

3. Organisational structure and strategies

A number of experts and institutes are involved in this project and they are categorised by their function. Figure 1 depicts the organisational structure. 56 persons are mainly involved for this project.

Basically it is funded by governmental institute, MITI, and supervised by New Energy Development Organisation (NEDO). JEMAI has a role of secretariat, including control of the schedule and organisation of meetings. The Project Administration Committee is organised for this project. It manages three subcommittees. The Advisory Committee is organised for acquiring theoretical information from academia and professional expertise from industry. LCA Japan Forum is also participated as an advisor. Even though these committees are independent from the Forum, they have deep relation via the activities of advisory committee. They have the official meeting once a year and the unofficial meeting as frequent as possible. Japanese project has clarified way of communication with academic society and industrial association.

Despite that Japanese project consists of several committees and working groups, the organisational structure is not very strict and rather quite basic, which is simply composed with methodology development, database construction, and system development.

Inventory Study Committee. It is organised to construct transparent and reliable data. It has two working groups (WG) and the function of each group is as followings:

(1) WG-1. Creation of Inventory Data

- Inventory data collection manual
- Data collection
- Check of data quality
- Data disclosing and maintenance system

(2) WG-2. Treatment of recycled and wasted materials

- LCI methodology for inverse manufacturing
- Surveying material flow of recycled and wasted materials
- Environmental load model of the final disposal

22 industry associations are planned to co-operate. Participation of Industry Associations is organised as Figure 2. Investigation companies are not members of the association.

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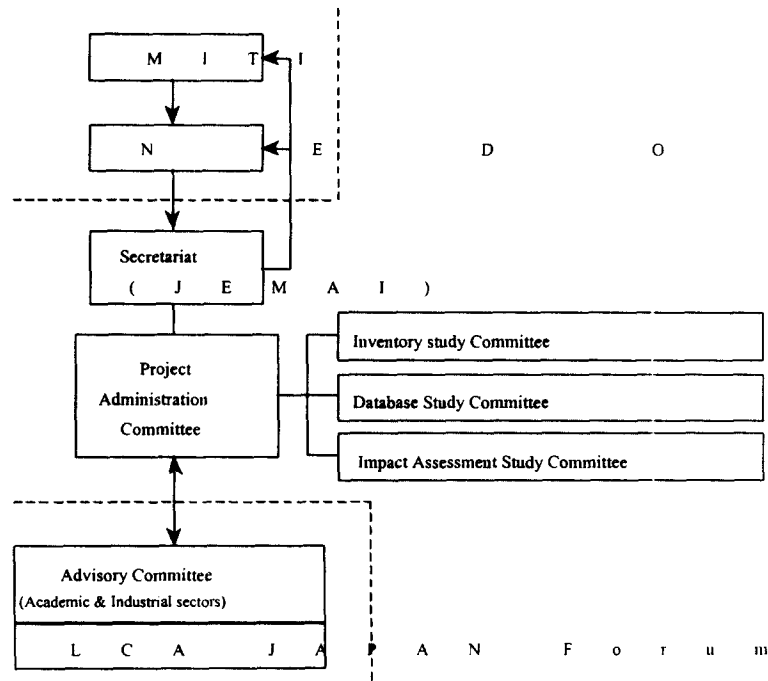


Figure 1. Organisational structure of Japanese national LCA project

Database Study Committee. It is organised to develop the easily operable database system. The structure of the committee is like Figure 3, and it has the roles like followings:

- LCA data package structure
- Database system (management, searching etc.)
- Interface for accessing LCA data
- Specification of data conversion filter

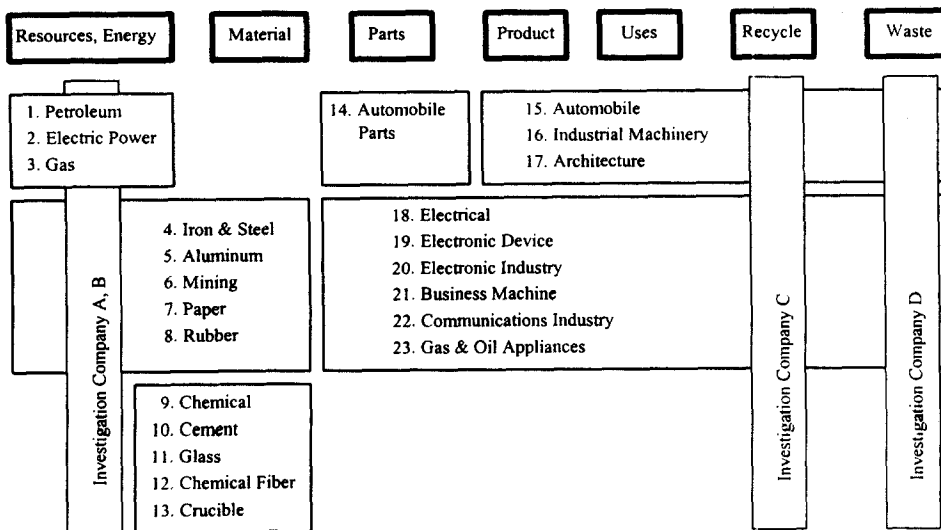


Figure 2. Participation of Industry Associations

The project is funded by national government, and MITI has the ownership of final data. Making data convert interface is not performed in this project, and commercial software is used for data access interface.

The basic structure of public inventory data integrates conventional statistical data and newly acquired data. The process model can be investigated while measuring data. The newly acquired data has the priority to the conventional statistical data if there are any overlaps between them. The database will be updated every year.

Impact assessment study committee. It is organised to establish the persuasive methodology. It has two working group like Inventory Study Committee, and the functions of each group are as followings:

(1) WG-1. Development of Japanese version impact assessment

- Assessment methodology
- Classification of the environmental load substances
- Characterisation of the environmental load substances

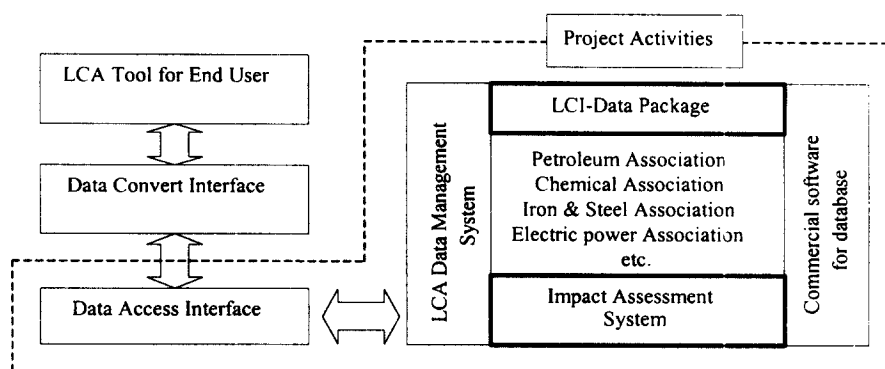


Figure 3. Structure of database study committee

(2) WG-2. Study of appropriate assessment methodology

- Valuation methods including damage estimation and aggregation
- Interpretation
- LCA case-study
- Report format for LCA result

It is also considered to include some foreign institutes to the advisory board.

4. Applicability of the result

The aspects which this project considers to apply are categorised into industrial, business, governmental, and educational one. Application to *industrial production activities* includes the popularisation of ecodesign and the construction of environmentally sound process. Application to *marketing* includes the persuasive approval of environmental labelling and establishment of environmental specification. It is also reflected in *governmental environmental administration*, including green purchasing.

Finally *educational aspect* tries to accelerate LCA popularisation, through the distribution of reliable LCA software, the enrichment of textbooks for education, and the training of LCA experts.

The projects will not give the software as a final product. Data convert interface will not be performed in the project, and commercial software is used for data access interface.

5. Evaluation criteria

It is difficult to know the formal assessment criteria for the external result and process of national project. Interestingly there are no known criteria which are written for evaluating the contents of this project, even though the project managers or organisers already have well-designed criteria in their mind.

IV. Suggestions and Conclusions

This paper will be revised with some more possible information. If the monitoring for the project is continued, than it would be also possible to revise this report periodically. There have been the assertions for need of collaboration between Japan and Korea in this aspect of LCA because of several reasons such as geographical adjacency. In addition, much of raw materials are imported and significant portion of final products are exported in both countries, so there is a need of much data about raw material of foreign countries from which it is imported, and data about usage and disposal of foreign countries to which the product is exported. Actual progress, results, and way of thinking of Japanese project will be revised or improved more or less. It can be a good model for LCA applications in Korea.

References

- [1] JEMAI (1999), Activities of the LCA-National Project in Japan
- [2] Morimoto, Mamoru (1997), "Activities of the Life-Cycle Assessment Society of Japan (JLCA)," *International Journal of Life Cycle Assessment*, Vol. 2, No. 2, p. 90