

## Life Cycle Initiative: A Joint UNEP/SETAC Partnership to Advance the Life-Cycle Economy

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This paper presents a summary of the presentation given in a plenary session entitled 'Promoting a life-cycle approach' as part of the UNEP's 7th International High-Level Seminar on Cleaner Production (CP7) in Prague, Czech Republic on April 28–30, 2002.

### 1 Who are SETAC and UNEP?

SETAC was the first international organisation to fully recognise LCA's potential value and the need for developing a sound scientific basis and appropriate procedures for conducting LCA-studies. SETAC's first LCA workshop, conducted in August 1990, resulted in the workshop proceedings entitled 'A Technical Framework for Life-Cycle Assessments' which focused on defining concepts and developing a framework for the inventory component of an LCA; however, it also identified the need to conduct other workshops to evaluate other LCA components. Subsequent to that first workshop, SETAC sponsored many other workshops, case study symposiums, and technical sessions at their annual meetings (see [www.setac.org](http://www.setac.org) for a complete listing of SETAC-LCA publications).

#### SETAC brings over 10 years experience in life cycle ([www.setac.org](http://www.setac.org))

- Society of Environmental Toxicology and Chemistry founded in 1979
- Over 5000 members worldwide – members from government, industry, academic and NGO sectors
- Recognized leader in scientific development and application of life-cycle assessment – will continue that role in Initiative
- Published over 10 books and reports on state-of-the-practice in field of life-cycle assessment
- Regularly holds life cycle symposiums and workshops
- Brings proven procedures for holding workshops & engaging shareholders

In the meantime, the United Nations Environmental Programme (UNEP) began its involvement in the LCA community in the mid 1990s. UNEP's publication entitled 'Life Cycle Assessment: What it is and how do it'

in 1996 provided background information and examples on LCA. In June of 1998, a UNEP workshop in San Francisco focused on global use of LCA. Subsequent efforts have reiterated the global emphasis including applications in developing countries, promotion and further standardization of databases and LCA methodology in order to stimulate sound use of LCA. A UNEP report on the level of acceptance and adoption of LCA worldwide, 'Towards a Global Use of LCA', was published in October 1999, supported by the US EPA, and the Dutch and Swiss governments.

In May 2000, over 100 Ministers of Environment released the Malmö Declaration at the First Ministerial Environment Forum. The declaration reads,

We have at our disposal the human and material resources to achieve sustainable development, not as an abstract concept, but as a concrete reality. Our efforts must be linked to the development of cleaner and more resource efficient technologies for a Life-Cycle Economy.

UNEP's Executive Director Dr. Klaus Toepfer re-emphasized the importance of life-cycle aspects of the Malmö Declaration by stating,

Consumers are increasingly interested in the world behind the product they buy. Life-cycle thinking implies that everyone in the whole chain of a product's life cycle, from cradle to grave, has a responsibility and a role to play, taking into account all the relevant external effects.

While much has been accomplished, UNEP and SETAC recognise that additional coordination, enhancement, and dissemination of the value of life-cycle thinking and LCA is needed. In 2000, UNEP and SETAC established a joint effort to cooperate for the enhancement of the application of LCA and life-cycle thinking, or, in other words, to bring life-cycle thinking and LCA into practice.

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**UNEP has been a leader within UN for Life-Cycle Thinking & Economy** (<http://www.uneptie.org>)

- Division of Technology, Industry and Economics (DTIE)
- DTIE's Mission:
  - encourage decision makers to adopt strategies and practices that are cleaner safer,
  - use natural resources more efficiently,
  - reduce pollution risks to humans and environmental, and
  - enable implementation of conventions
- DTIE's Major programs:
  - International Environmental Technology Centre
  - Production and Consumption unit
  - Chemical unit
  - Energy and OzonAction unit
  - Economics and trade unit
- Accomplishments (examples): GRI Guidelines & LCA reports

## 2 UNEP/SETAC Life Cycle Initiative

The goal of the UNEP/SETAC Life Cycle Initiative is to *develop and disseminate practical tools for evaluating the opportunities, risks, and trade-offs, associated with products and services over their whole life cycle*. See <http://www.uneptie.org/sustain/lca/lca.htm> for additional information on the Initiative.

The Life Cycle Initiative aims to foster life-cycle thinking around the world through the development of an international life-cycle management (LCM) framework, project-specific activities and databases of best available life-cycle assessment (LCA) methods and data. Life-cycle based tools are vital for ecological sustainable development and are increasingly applied by industry and government to estimate the impacts of products throughout their life cycle. LCM is a broader approach and focuses on the application of and education on LCA and LC Thinking in management practice. The Initiative builds on the TC-207 ISO 14040 series, previous work of SETAC ([www.setac.org](http://www.setac.org)) and UNEP ([www.uneptie.org](http://www.uneptie.org)). The Initiative has established an International Life-Cycle Panel (ILCP) as the core advisory body. Jacqueline Aloisi de Larderel, Executive Director for the Division of Technology, Industry and Economics (DTIE) within UNEP is the Chair of the ILCP, with Atsushi Inaba from Japan and James Fava as Vice-Chairs. Helias A. Udo de Haes is the Executive Director for the Initiative. Moreover, a secretariat and an executive committee are being finalized along with working groups for each of the three programs – life-cycle database, life-cycle impact assessment, and LCM.

The specific aims are:

Aim 1: Exchange of information on the conditions for successful application of LCA and LC Thinking

Aim 2: Exchange of information about the interface between LCA and other tools

Aim 3: Implementation of educational activities related to the application of LCA and LC Thinking

Aim 4: Enhancement of the availability of sound LCA data and methods

Aim 5: Provision of guidance on the use of LCA data and methods

Within the Initiative three programs are planned:

Program 1: the enhancement of sound LCI data and methods (LCI program) (aim 4 and 5) – Greg Norris, Program manager

Program 2: the enhancement of sound LCIA data and methods (LCIA program) (aim 4 and 5) – Olivier Jolliet, Program manager

Program 3: the application of and education on LCA and LC Thinking (LCM program) (aim 1, 2 and 3) – Konrad Saur, Program manager

In 2002, each of these programs will conduct users needs assessments and will prepare a work plan on projects and deliverables to meet those needs. These three definitional reports will provide the foundation for the Initiative's work efforts in 2003 and beyond.

The UNEP/SETAC Life Cycle Initiative already has a number of sponsors including ACE (the Alliance for Beverage Cartons and the Environment), ICMM (the International Council on Metals and Mining), AIST (National Japanese LCA research Centre), and the governments of Netherlands, Switzerland, and Quebec. Additional industry sectors and governments have expressed interest. Anyone who would like to become a sponsor, is interested in participation, or would like to provide input into the users needs assessments, please contact the UNEP/SETAC Initiative secretariat at [sc@unep.fr](mailto:sc@unep.fr).

## 3 Illustrating Value of a Life-Cycle Perspective

As in the past, approaches to environmental protection continue to be based on 'end-of-pipe' solutions, focused on single media (e.g., air, water, soil) or on single stage in the life-cycle stage of a product (e.g., production, use, disposal). These do not always lead to an overall reduction in environmental impacts. Pollution control resources are spent on activities that are required by laws and regulations, and that do not always provide the most efficient use of those resources in terms of reducing impacts.

This has often allowed unexpected environmental 'impacts' to occur, by, for example, allowing one environmental problem to be solved while generating other, often unexpected, problems elsewhere (e.g., in another environmental medium or location). Because they are not designed to address a full understanding of the trade-offs and their implications in a systematic fashion, end-of-pipe approaches often diminish opportunities for achieving net environmental improvements.

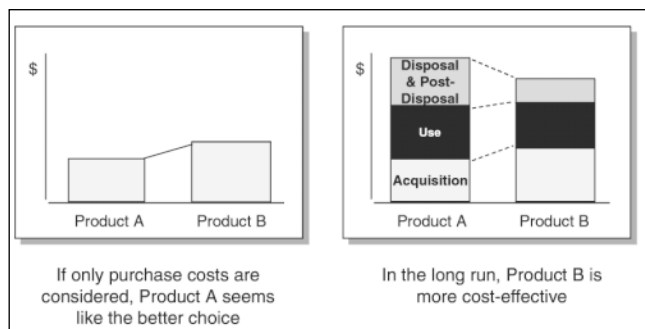


Fig. 1: The best choice is not always obvious (adopted from a presentation by Tom Tramm, ComEd)

This same approach has had the additional effect of promoting the view that environmental protection is a cost. Thus, the person in charge of environmental affairs in an organization may be seen as an obstacle or hurdle to getting things done, rather than a partner in innovation. Over the last few decades, experience has clearly demonstrated the multiple benefits and value of approaches that integrate environmental considerations into core decision-making processes and that take a 'systems' perspective. Life-cycle thinking provides a framework for supporting this paradigm change: towards thinking in terms of whole systems; integrating life-cycle environmental aspects into core business practice – e.g., purchasing, product design and development, policy making, strategic planning, etc.

While progress has been made since the early 1990s in developing, implementing, and integrating environmental and social aspects into decision-making, many, if not most, decisions are still made with little consideration of the full range of impacts and benefits they may generate. By way of example, it is easy to see how the decision to install a new pollutant control technology might be based on the local, site-specific benefits that it will yield, without considering the associated competing impacts that it may cause (for example, through greater energy consumption and the emissions that it generates off-site). It is not so easy to see how the boundaries of the decision could be expanded to include the competing impacts-emissions versus land use or societal impacts. What are the incentives or disincentives for doing so? What are the tools and skills needed?

As another example, purchasing agents who are given a budget to purchase a particular ingredient, product, or technology may only consider price in their decision to buy. Their budget is not affected by the costs associated with ownership and use of what they buy (Fig. 1). Such 'hidden' costs could include higher waste disposal and handling fees and the need to buy protective gear for workers, which, when taken together, may substantially raise the real cost

Life Cycle Management Process					
Life Cycle Stage / Impact	Material Acquisition	R&D Operations	Manufacturing Operations	Customer Needs	
				Use	Disposal
Environment					
Energy / Resources					
Health					
Safety					

Fig. 2: 3M's LCM matrix

of the purchase. While the decision may be rational at the individual or site level, it is less rational when the system boundaries are expanded.

Companies like 3M ask their product development teams to use a Life-Cycle Management matrix to systematically address the environmental, health and safety opportunities and issues See Fig. 2 from a presentation by JP Fretiere; 3M at the Copenhagen LCM 2001 conference in August 2001.

In order to make decisions that lead to a net or overall improvement in the environmental impacts associated with consumption and production, it is necessary to have the framework and information needed for understanding relative impacts, trade-off and opportunities along the product system or life cycle.

#### 4 Conclusion

Building awareness of life-cycle thinking and its value will be an important first step towards creating more sustainable forms of consumption and production. We have come a long way – even though the public may not have heard of it as 'life-cycle thinking'. Articles in the popular press, which elude to life-cycle implications, are beginning to surface. For example, George F. Will (Newsweek, May 6, 2002) describes the 'most politically correct product' as being Ben & Jerry's ice cream. But he also goes on to mention that their ice cream is "made in a factory that depends on electricity-guzzling refrigeration, [and that] a gallon of ice cream requires eight gallons of milk. While making that much milk, a cow consumes a lot of water plus three pounds of grain and hay, which is produced with tractor fuel, chemical fertilizers, herbicides, and insecticides, and is transported with truck or train fuel."

Yes, we have made progress, yes, there is some application of life-cycle thinking today, and yes, there is much more to do. But if we all work together, we can move along the journey towards a life-cycle economy and a sustainable future.