UNEP and SETAC – The Life Cycle Initiative

Life cycle based tools for low carbon and resource-efficient societies

Guido Sonnemann, PhD - Programme Officer for Innovation
Division of Technology, Industry and Economics
Sustainable Consumption and Production Branch
Overview

Towards low carbon and resource efficient societies

Introduction to the UNEP/SETAC Life Cycle Initiative

Global Guidance Principles for Life Cycle Inventory Databases

UNEP/SETAC Life Cycle Impact Assessment Framework

Promoting LC Management and Capability Development
United Nations Environment Programme

Thematic Priorities

- Climate Change
- Harmful Substances & Hazardous Waste
- Environmental Governance
- Ecosystem Management
- Resource Efficiency & SCP
- SCP = Sustainable Consumption & Production
- Disasters & Conflicts
SCP - What are we talking about?

Consuming and producing **more efficiently** and differently ...

... and **sharing resources** between the rich and the poor.
Efficiency at economic level

+ 

Environmental dimension

= 

Resource efficiency

(materials, energy, water, land & emissions)

Reducing the environmental impact

of consumption and production

of goods and services over their full life cycles

→ By producing more wellbeing with less material consumption, RE enhances the means to meet human needs while respecting the ecological carrying capacity of the Earth.
International Resource Panel

Key resources and environmental impact clusters

Drivers

Pressures

Impacts

Responses

Energy

Water

Biodiversity

Climate

Land

Supply security

Health

Materials

State
Assessing the Environmental Impacts of Consumption and Production:

Priority Products and Materials
What is a Green Economy?

A Green Economy is one that results in increased human well-being & social equity, while significantly reducing environmental risks & ecological scarcities.

In other words it is an economy whose growth of income and jobs is driven by investments that reduce carbon emissions and pollution, enhance efficiency and sustain biodiversity and ecosystem services.
The role of the UNEP/SETAC Life Cycle Initiative - Providing adequate assessment & management tools

Authoritative assessments of env’t impact and resource stress using life cycle approach

Identification of priority areas & articulation of programs based on the guiding principle of life cycle methodologies

Life cycle indicators (carbon, water footprints etc.) to evaluate cost-benefit of investment and clean tech applications

Life Cycle Initiative

10YP Marrakech Process

Resource Panel
Assessing and managing the life cycle of a product …
Overview

Towards low carbon and resource efficient societies

Introduction to the UNEP/SETAC Life Cycle Initiative

Global Guidance Principles for Life Cycle Inventory Databases

UNEP/SETAC Life Cycle Impact Assessment Framework

Promoting LC Management and Capability Development
UNEP/SETAC Life Cycle Initiative

Business, Academic, and Governments working in a partnership together since 2002 to:

• *Bring science-based life cycle approaches into practice worldwide*
• Over 2000 individuals collaborating globally
• SETAC brings the science
• UNEP brings access to governments and dissemination
Value-added roles of the Initiative

• The ability to access and mobilize a network of over 1000 global interested members

• With this global network also comes the ability to:
  – facilitate, manage and gather examples of best practices and achievements; and
  – disseminate the accomplishments of the Life Cycle Initiative, its experts and partners to all corners of the world.

→ One stop shop for life cycle approaches
Objectives

• Objective 1:  
  **Expanding capability** worldwide to apply life cycle approaches

• Objective 2:  
  Refine and facilitate **methodologies and data access** for life cycle assessment by international consensus

• Objective 3:  
  Facilitate the **use of life cycle based approaches** worldwide in business, government and the general public about natural resources, materials and products targeted at consumption clusters (food, housing and mobility)
Region of Origin of Applicants

- Europe: 46%
- Asia/Pacific: 16%
- Latin America: 12%
- Global: 2%
- Africa: 8%

Work Areas Chosen by Applicants

- LCAM: 21%
- LCACC: 19%
- LCACD: 17%
- LCARM: 20%
- LCMBI: 19%

Structure: Work Areas

- 150 Life cycle collaborators around the world
Overview

Towards low carbon and resource efficient societies

Introduction to the UNEP/SETAC Life Cycle Initiative

Global Guidance Principles for Life Cycle Inventory Databases

UNEP/SETAC Life Cycle Impact Assessment Framework

Promoting LC Management and Capability Development
Global Guidance Principles for Life Cycle Inventory Databases

Background and History

• Decision in 2007 to produce a manual on developing a countries’ LCI data for energy systems.

• However, the manual was not finalized due to the number of diverging comments, especially on development of databases.

• Process to address this issue more generally was launched in September 2009.

• More than 10 stakeholder consultations held in various regions for scoping purposes.

• Formed steering committee consisting of 12 members balanced across geographies and sectors.
Global Guidance Principles for Life Cycle Inventory Databases

Vision

• To provide global guidance on the establishment and maintenance of LCA databases, as the basis for improved dataset exchangeability and interlinkages of databases worldwide

• Increase the credibility of existing LCA data, the generation of more data and their overall accessibility.
  • provides a sound scientific basis for product stewardship in business & industry and life cycle based policies in governments, and ultimately, helps to advance the sustainability of products

• Complement other ongoing initiatives
Global Guidance Principles for Life Cycle Inventory Databases

Workshop - Methodology

• **Global** in geography with representation from developed and developing countries, final participants included 48 attendees from 23 countries

• **Balance of data and study providers** (primarily consultants and industry associations) with users, including IGOs, government, industry, NGOs, and academics

• Needed neutral and rigorous process with participants agreeing to **strict ground rules**

• SETAC-developed “Pellston Process’ used to create structure and agenda
Global Guidance Principles for Life Cycle Inventory Databases

Structure & Results on Current Practice

- Data sourcing and data collection critical elements in producing datasets that are consistent and exchangeable.
- Need to maximize transparency whenever possible and provide supplemental information and a review process when aggregation cannot be avoided.
- Strong support for the view that only complete and verifiable documentation makes a dataset.
• Clear and meaningful differentiation of what does or does not constitute an “LCI database”

• **Data managers are the primary target audience**, they manage data flow and actors in data supply chain
Overview

Towards low carbon and resource efficient societies

Introduction to the UNEP/SETAC Life Cycle Initiative

Global Guidance Principles for Life Cycle Inventory Databases

UNEP/SETAC Life Cycle Impact Assessment Framework

Promoting LC Management and Capability Development
LCIA Midpoint-Damage Framework of the UNEP/SETAC Life Cycle Initiative

- **Environmental interventions**
  - Raw Material extraction
  - Emissions (in air, water and soil)
  - Physical modification of natural area (e.g. land conversion)
  - Noise

- **Impact categories**
  - Climate change
  - Resource depletion
  - Land use
  - Water use
  - Human toxic effects
  - Ozone depletion
  - Photochemical
  - Ozone creation
  - Ecotoxic effects
  - Eutrophication
  - Acidification
  - Biodiversity

- **Damage categories**
  - Human Health
  - Resource Depletion
  - Ecosystem Quality

**Areas of Protection**
• **Why USEtox?** - Different factors in various models leading to different results, poor coverage of chemicals in LCA, LCIs often without chemical impacts, … Environmental LCA in practice often Energy LCA

• **USEtox is not a scientific state-of-the-art model, but a stable interface** between the most advanced science in the field and the day-to-day application in LCA practice.

• **Once** a modelling practice has reached scientific **consensus**, it will be **implemented in USEtox** (yearly update cycles for model and databases).
Carbon Footprint Project: Providing input to ensure compatible standards
Water Use in LCA (WULAC) Project Group

Inventory
- What?
- Where?
- How much?

Midpoint
- Is it a potential problem?
- Water stressed area?

Endpoint (Damage)
- Impact on humans, ecosystems and resources?

Reporting & Communication
- Single score in litres equivalent?
Main Direct Drivers of Change in Biodiversity

<table>
<thead>
<tr>
<th>MILLENIUM ECOSYSTEM ASSESSMENT (Mea)</th>
<th>Habitat Change</th>
<th>Climate Change</th>
<th>Invasive Species</th>
<th>Over-explication</th>
<th>Pollution (Nitrogen, Phosphorus)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Forest</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boreal</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Temperate</td>
<td></td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Tropical</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td><strong>Dryland</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temperate grassland</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Mediterranean</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Tropical grassland</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Desert</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
<tr>
<td>Inland water</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
<td>←</td>
</tr>
</tbody>
</table>
Overview

Towards low carbon and resource efficient societies

Introduction to the UNEP/SETAC Life Cycle Initiative

Global Guidance Principles for Life Cycle Inventory Databases

UNEP/SETAC Life Cycle Impact Assessment Framework

Promoting LC Management and Capability Development
Current and upcoming Publications on LCM

Life Cycle Management
A Business Guide to Sustainability

How business uses it to decrease footprint, create opportunities and make value chains more sustainable
LCM must involve all levels of the organization
Life Cycle Sustainability Assessment: Linking to Life Cycle Costing & Social LCA

To capture economic and social dimension of sustainability along life cycle is captured

Environmental Impacts (GWP, energy, Eco-indicator, etc.)

Life Cycle Costing:
Cost estimation for-
- product & process development,
- purchasing,
- sales & marketing,
- etc.
## Capability Life Cycle Maturity Model in a company

<table>
<thead>
<tr>
<th>Maturity Level</th>
<th>Description</th>
<th>Span of control</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Ad hoc</td>
<td>Chaotic, success depends on heroic effort of individual</td>
<td>Individual</td>
</tr>
<tr>
<td>2 Managed</td>
<td>Requirements managed, measured and repeatable results on a project basis</td>
<td>Project</td>
</tr>
<tr>
<td>3 Defined</td>
<td>Standard processes, consistent across organization, measures of process and work products</td>
<td>Organization</td>
</tr>
<tr>
<td>4 Quantified</td>
<td>Statistical process control, quantified objectives, special causes of variation corrected</td>
<td>Value chain</td>
</tr>
<tr>
<td>5 Optimising</td>
<td>Process improvement objectives continually revised to reflect changing business objectives: agile and innovative workforce</td>
<td>Society</td>
</tr>
</tbody>
</table>
Capability Activities on Life Cycle Assessment and Management worldwide

Legend:
- : No information available.
- : No LC experience or regulation.
- : Limited experience and no regulation.
- : Some research experience and foundations of LC based regulation.
- : Some good practices and limited regulation.
- : Advanced LC practices and developed regulation.

Coatzacoalcos Declaration
SPONSORS OF THE UNEP/SETAC LIFE CYCLE INITIATIVE

Workshop Host
Government Platinum Sponsors and Strategic Partners

Private Sector Platinum Sponsors

International Plastics Associations & Chemistry Company

Academic Private Partnerships as Platinum Sponsors

13 Corporate Sponsors: Advisory Members within CIRAIG
For more information:

Secretariat

• SCP Branch, UNEP DTIE, Paris

http://lcinitiative.unep.fr

• Email: guido.sonnemann@unep.fr