European Platform on Life Cycle Assessment

Supporting business and policy making in Europe with reference data and recommended methods for better LCA practice

- Status and first achievements -

Marc-Andree Wolf, Raffaella Bersani, David Pennington

European Commission
Directorate-General Joint Research Centre (DG JRC)
Institute for Environment and Sustainability (IES)
Structure

• Introduction of DG JRC, Institute for Environment and Sustainability (IES)

• European Platform on Life Cycle Assessment
  • Overview
  • First achievements
DG JRC Mission Statement

... to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of EU policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.
IES Large-scale Research Infrastructures

- Emission reference laboratories (VELA, WIND)
- European Reference Laboratory for Air Pollution (ERLAP)
- European Solar Test Installation (ESTI), accredited ISO 17025
- Super EMEP Station and Greenhouse Gas flux towers

IES Key Information Systems and Databases

- Technical Secretariat of INSPIRE / European Geoportal
- Water Information System for Europe (WISE)
- European Forest Fire Information System (EFFIS)
- European Flood Alert System (EFAS)
- European Reference System for Renewable Energies
- WMO World Data Centre for Aerosols
- Radioactivity Environmental Monitoring Database (REM)
- Global Land Cover 2000 Database
- European Soil Database
- European Reference Life Cycle Data System (ELCD)
Life Cycle Thinking and general EU Policy

• Thematic Strategy for Waste Prevention and Recycling
• Thematic Strategy for the Sustainable Use of Natural Resources
• Communication on Integrated Product Policy (cross-cutting support, voluntary)
• Framework Directive on Waste (proposed revisions)
• Directive on Ecodesign for Energy-using products "EuP"
• Strategic Environmental Assessment Directive "SEA" (plans / programs)
Needs for coherent life cycle based policy making …

The European Platform on Life Cycle Assessment - status and outlook

Marc-Andree Wolf, Raffaella Bersani, David W. Pennington

Three dimensions: economic, social, environmental - and product quality!

Life cycle inventory (LCI)
Costs (LCC)
Social effects (LCWE)
Accidents / Risks (LCAA)
Technology scenarios
Consumption scenarios

Product performance indicators
Technology performance indicators
Object performance indicators

GPP ETAP Ecolabel EuP ELV SEA

Real world
Society needs; companies; plants and processes; products; interest groups; governments; environment; ...

Life cycle inventory data
Cost data
Social effects data
Accidents data
Technology data
Consumption data

Process emission data
Production data
Trade data
Cost data
Work. env. data
Technol. data
Accident data
Population data

Boundary conditions: competetiveness, other legislation, existing realities, ...
Needs for coherent life cycle based policy making …

... means first the need for coherent data and indicators, i.e. consistent methods for data collection, calculation, documentation, and review

Real world
Society needs; companies; plants and processes; products; interest groups; governments; environment; …

(* Not shown: national emission inventories, stock building of materials in society, etc.)
Life cycle illustration: Plastic parts in a car

European Platform on LCA - overview

Plastics manufacturing

Further constituents and auxiliaries

Crude oil extraction

Process heat

Electricity

Transport

Retail and use

Recycling to recyclate (of lower quality)

Incineration, electricity generation

Landfill

Waste collection

Crude oil processing

Plastics processing

Fuel consumption!

Product-specific recycling quota and routes!
European Platform on LCA: Summary

Project of the European Commission

Coordination: DG JRC, IES in close collaboration with DG Environment

Initial phase: September 2005 to August 2008

Key purpose: Improve credibility and acceptance of Life Cycle Assessment (LCA)

Key customers: European Business - EC services - Member states

Key deliverables:

• European Reference Life Cycle Data System (ELCD) with Life Cycle Inventory (LCI) data and recommended Life Cycle Impact Assessment (LCIA) factors
• Handbook of recommended LCA methods, guidance and review process
• LCA IPP information hub and communication platform
• (Training course on "life cycle thinking in policy making")
• (Guidance for life cycle based Ecodesign tools and link to EPDs)
Target groups and applications

Applications: all life cycle related activities

- **LCA studies** for product improvement and advance development, consultation with governments, strategic decision support, marketing, etc.
- **Ecodesign / Design-for-environment (DfE)** databases, tools, and studies
- **Communication** (B2B, B2C, B2G) incl. Ecolabels / EPDs, sustainability reporting etc.
- **Policy making and implementation** of policies TS Resources, TS Waste, IPP, ETAP, EuP, GPP, EMAS II and ISO 14001, SEAs, etc.

Target groups: business and policy makers

- European business
- European Commission services
- MS, CC, AC services
- Input into standardisation processes (CEN, CENELEC, ISO)
- Consultants in LCA, Ecodesign, DfE, EMAS II, etc.
- LCA database and tool developers, LCIA methods developers
- Developers of life cycle based Ecodesign tools
Five guiding principles

• Best attainable stakeholder consensus
• Starting from existing LCA standards, practice and knowledge
• Scientifically robust
• Practical and affordable
• Long-term support
Project work towards the deliverables of the Platform project

• In-house work at DG JRC-IES and DG Env, G4

• External service contracts via AMI list (published 18 May 2006)

• Stakeholder involvement
  • Advisory Groups (see next slide)
  • Formal stakeholder consultations
Achievements
Advisory groups

Purpose: "Improve quality and harmonisation status of deliverables before they go to public stakeholder consultation; support dissemination"

- "EC-internal Steering Group" and

Three advisory groups:

- "European Business Advisory Group" of data providing European-level industry associations
- "LCIA Method Developers Advisory Group" of developers providing their impact factors documented in the ELCD format
- "LCA Tool and Database Developers Advisory Group" of tool and database developers, that implement an import/export interface to the ELCD data format into their systems
Coordination of national life cycle activities

Few national database activities in the EU:

- German Network Life Cycle Data (ca. 30 organisations; research ministry funded)
- Danish LCA Centre (3 organisations; Danish EPA funded)
- NorLCA (Danish/Swedish network, managed by Danish LCA centre)
- (Italian national DB was stopped a few years ago; plans for bask database were recently announced; other maintained database activities (e.g. SPINE@CPM database))

Repeated coordination meetings with coordinators of German and Danish networks took place. Future cooperation:

- close coordination of tasks and time frames
- collection and processing of national data to be done on national level
- harmonisation of methods and data format, development of review process etc. coordinated on EU level, but with major participation and input from national activities
- coordination with non-EU activities (e.g. UNEP/SETAC LC Initiative, Swiss ecoinvent centre) mainly done on EU level
ELCD core database: LCI data supply for first (non-reference) version

European industry associations and further sources:

- European Aluminium Association (EAA)
- European Copper Institute (ECI)
- European Confederation of Iron and Steel Industries (EUROFER)
- Fédération Européene des Fabricants de Carton Ondulé (FEFCO)
- Association of Plastics Manufacturers (PlasticsEurope)
- Bundesanstalt für Forst und Holzwirtschaft (BFH), Germany
- Handbook emission factors for road transport (HBEFA) by EPA's of Germany, Austria and Switzerland
- PE Europe GmbH and IKP, University of Stuttgart, Germany
• (Example) data set in ELCD Format

Electricity mix example data set (mandatory fields only)

Electricity mix example data set (all fields)
LCA information hub; on-line from end of June 2006

Web-Site functionality

Directory

Information pages about tools, services, databases and providers
Search
Tool, data specific search
Usage driven search
Navigation
Navigation Hierarchy: lists of tools, databases, etc.
Terminology explanation (i.e. glossary)
Restricted area
Forms for maintenance

Data set area

Download of data sets
Search for data sets
Display of a data set and its metadata
Index or content listing
Download page for a metadata description / extraction tools

Form for metadata description of external LCI data sets and their data items
Functionality to automatically extract metadata from XML metadata descriptions
Restricted maintenance area

Static pages
LCA introduction
Links to organizations
Links page to EU LCA framework sites
Contact information
Full text search of EUROPA site
About this site
Impressum

Standard navigation elements
LCA information hub; on-line from end of June 2006

**List of Services**

This page lists LCA services categorized by their service category. If you click on a service name, a description of the service will be displayed and a list of provider of this is shown.

**General issues**

- Developing LCA impact assessment methods
- Review of environmental reports
- Review of LCA reports

**Life cycle costing, social life cycle working environment and joined analysis**

- (Social) life cycle working environment analysis (LCWE)
- Eco-efficiency studies
- Life cycle costing (LCC)
- Life cycle engineering (LCE)
- Life cycle risk analysis
- Life cycle sustainability
- Total cost of ownership (TCO)

**Policy making and monitoring**

- Environmental technologies action plan (ETAP)
- Life cycle thinking in policy making
- Material flow analysis (MFA)
- Monitoring the effects of environmental policy
- Waste management strategies

**Production sites and organisations**

- Benchmarking sites
- Clean development mechanism (CDM)
- EMAS / ISO 14001
- Emission trading (general)
## LCA information hub; on-line from end of June 2006

### LCA Tools, Services and Data

#### Service Emission trading (general)

<table>
<thead>
<tr>
<th>Name of provider</th>
<th>Category</th>
<th>References (Service provided for:)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GHGm.com</td>
<td>Consultant</td>
<td>Food and Agricultural Organisation of the United Nations (FAO), International Tropic Timber Organisation (ITTO)</td>
</tr>
<tr>
<td>ENSPA</td>
<td>Science and education</td>
<td>Several projects on energy system analysis models for CO2 emission trading, climate change mitigation and clean air strategies on national and European level (EU, national ministries, energy utilities).</td>
</tr>
<tr>
<td>BASF Aktiengesellschaft</td>
<td>Industrial Business organisation</td>
<td></td>
</tr>
<tr>
<td>Prof. Dr. Otto Rentz</td>
<td>Consultant, Science and education</td>
<td></td>
</tr>
<tr>
<td>2-0 LCA consultants</td>
<td>Consultant</td>
<td></td>
</tr>
<tr>
<td>Escola Superior de Comerc Internacional</td>
<td>Governmental organisation, Science and education</td>
<td></td>
</tr>
<tr>
<td>VTT Technical Research Centre</td>
<td>Governmental organisation</td>
<td></td>
</tr>
<tr>
<td>Studio Ingegneri Associati Life Cycle Engineering</td>
<td>Consultant, Science and education</td>
<td></td>
</tr>
<tr>
<td>Ambiente Italia - Istituto di Ricerche s.r.i.</td>
<td>Turin 2006 Winter Olympic Games Organizing Committee - TOROC; Ascels, AMA (waste); Trambus (public transports), Comune di Roma (local adm), Coldiretti (agriculture), COBAT (consortium-lead batteries)</td>
<td></td>
</tr>
</tbody>
</table>
### List of providers

This page lists providers for your search or chosen category. Click on the name of the provider to see the description of the provider. Via the left-hand menu entries “Services”, “Tools” and “Databases” you get access to lists of the respective offers.

<table>
<thead>
<tr>
<th>Name of provider (Categories)</th>
<th>Provided services</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>FFK Ltd</strong> <em>(Service provider, Software tool provider)</em></td>
<td>Review of LCA reports, Benchmarking products, Eco-efficiency studies, Developing LCA impact assessment methods, Benchmarking sites, Sustainability/environmental reporting, Environmental product declarations (EPD), Analysing products (LCA studies), Other service (please give short description (max. 500 characters), Environmental performance evaluation, Life cycle risk analysis, Supply chain management, Eco-efficiency studies, Developing LCA impact assessment methods, Training courses, Design for environment (DfE), Analysing products (LCA studies), Environmental performance evaluation, Review of LCA reports, EMAS / ISO 14001, Benchmarking products, Life cycle thinking in policy making, Material flow analysis (MFA), Environmental labels (European flower, Nordic Swan, Blue Angel etc.), Environmental product declarations (EPD), Environmental technologies action plan (ETAP), Green (public) procurement (GPP), Waste management strategies, Other service (please give short description (max. 500 characters))</td>
</tr>
<tr>
<td><strong>Finnish Environment Institute</strong> <em>(Service provider)</em></td>
<td>Supply chain management, Developing LCA impact assessment methods, Training courses, Design for environment (DfE), Life cycle based environmental risk analysis, Analysing products (LCA studies), Capacity building, Environmental performance evaluation, Development of cleaner products, Environmental communication, Review of LCA reports, EMAS / ISO 14001, Life cycle thinking in policy making, Material flow analysis (MFA), Sustainability/environmental reporting, Joint implementation (JI), Environmental labels (European flower, Nordic Swan, Blue Angel etc.), Social life cycle working environment analysis (LCWE), Environmental product declarations (EPD), Green (public) procurement (GPP), Workshops, conferences etc., Academic education</td>
</tr>
<tr>
<td><strong>FORCE Technology</strong> <em>(Dataset provider, Dataset developer, Service provider, Database provider, Software tool provider)</em></td>
<td>Supply chain management, Developing LCA impact assessment methods, Training courses, Design for environment (DfE), Life cycle based environmental risk analysis, Analysing products (LCA studies), Capacity building, Environmental performance evaluation, Development of cleaner products, Environmental communication, Review of LCA reports, EMAS / ISO 14001, Life cycle thinking in policy making, Material flow analysis (MFA), Sustainability/environmental reporting, Joint implementation (JI), Environmental labels (European flower, Nordic Swan, Blue Angel etc.), Social life cycle working environment analysis (LCWE), Environmental product declarations (EPD), Green (public) procurement (GPP), Workshops, conferences etc., Academic education</td>
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<tr>
<td><strong>Fraunhofer IZM</strong> <em>(Service provider)</em></td>
<td>Supply chain management, Developing LCA impact assessment methods, Training courses, Design for environment (DfE), Life cycle based environmental risk analysis, Training courses, Analysing products (LCA studies), Capacity building, Environmental performance evaluation, Benchmarking products, Life cycle thinking in policy making, Benchmarking sites, Life cycle costing (LCC), Life cycle engineering (LCE), Academic education</td>
</tr>
<tr>
<td><strong>FUTUREtec - Gesellschaft für angewandte Informatik mbH</strong> <em>(Dataset provider, Dataset developer)</em></td>
<td>Total cost of ownership (TCO), Review of environmental reports, Design for environment (DfE), Life cycle based environmental risk analysis, Training courses, Analysing products (LCA studies), Capacity building, Environmental performance evaluation, EMAS / ISO 14001, Life cycle thinking in policy making, Benchmarking sites, Life cycle costing (LCC), Life cycle engineering (LCE), Academic education</td>
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</tbody>
</table>
European Platform on LCA - achievements

LCA information hub; on-line from end of June 2006 -IV-

Provider name: FORCE Technology

Organisation type: Consultant
Type of service: Dataset provider
Dataset developer
Service provider
Database provider
Software tool provider
Languages spoken: English, French, Norwegian, Danish, Swedish, German

Description

FORCE Technology is an “Approved Technological Service Institute”. As such it is an independent, self-owned institution, transforming highly specialised engineering knowledge into practical and cost-effective solutions for a broad range of business sectors and industries. We have more than 15 years of experience with LCA/LCM for Danish and international industry as well as for national regulatory bodies and the EU Commission. Being a frontrunner, FORCE Technology covers the whole range of services in the LCA/LCM area, from LCA at all levels of detail over development of science-based methodologies to all types of sustainability and environmental reporting.

Services offered

Service offered: Supply chain management

Service provided for:
Development and implementation of a commercially available web-based system for information exchange and evaluation of suppliers (Supplier-evaluation); Project leadership: Centre for efficient environmental communication in product chains; Service to the Danish EPA: Environmental dialogue with suppliers (Environmental News No. 48, 2000)

Service offered: Developing LCA impact assessment methods

Service provided to the Danish EPA: LCA and the working environment (Environmental Project No. 907, 2004); LCA of landfilled waste (Environmental Project No. 971, 2004); Impact categories, normalisation and weighting in LCA (Environmental News No. 59, 2005); LCA and chemicals (pilot project, Environmental project No. 801, 2003).

Service offered: Training courses

Service provided to Technological Information Centres in Denmark (TIC); Calculating LCA...
**European Platform on LCA - achievements**

**LCA information hub; on-line from end of June 2006**

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**Tool KCL-ECO 4.0**

<table>
<thead>
<tr>
<th>Name of tool, version</th>
<th>Software website</th>
<th>Screenshot(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCL-ECO 4.0 (Released: Aug-04)</td>
<td><a href="http://www.kcl.fl/eco">www.kcl.fl/eco</a></td>
<td>screenshot 1; screenshot 2; screenshot 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Name of provider</th>
<th>Available languages (interface)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oy Keskkulaboratorio-Centraalaboratorium Ab, KCL</td>
<td>English</td>
</tr>
</tbody>
</table>

**Description of the tool**

The KCL-ECO Program is developed to carry out module calculations in general. The previous versions of the software have successfully been used in different branches of industry and for educational purposes since 1994. The newest version 4.0 is even more powerful and has plenty of new features. KCL-ECO has a fully graphical user interface. The whole system under study can be chosen to be completely transparent. KCL-ECO includes normal copy/paste, replace and short-cut menu functions as well as many advanced features. With KCL-ECO you can easily handle very large systems. For example, it has been used to build a model for wood fibre flows in paper and board production in Western Europe; a system comprising 660 modules (unit processes), 1900 flows and 7200 linear equations describing the system. Due to KCL-ECOs transparent structure transports can be studied separately. Some of the special features are: Closed loop function - Allocation. Both multi-output and open loop allocations are supported. - Agglomeration function. Modules can be agglomerated together in a suitable way - Hiding of modules. User can hide certain modules for example in a case if the flowsheet is sent to a user, who is not wanted to have access to all of the modules.

**Link to demo version**

- Demo Version: www.kcl.fl/eco

**KCL-ECO 4.0: Normal Licence**

- Focus on main economic sectors all categories
- Reference users
  - Stora Enso, M-real, UPM, Myllykoski, Fazer, Specialty Minerals, Dainisco A/S Finland, EDF, Franco, Astra Tech AB Sweden, Alco Nobel
  - The Netherlands, Ciba-Geigy Ab Germany, YL Sweden, Samsung Electronics Co. Ltd Korea, Sapp SA Technology Center South Afric

**Instruments functionally supported by the tool**

- Product stewardship, supply chain management, Substance/material flow analysis (SFA/MFA), Life cycle impact assessment (LCIA), Life cycle inventory (LCI), Life cycle management (LCM), Life cycle engineering (LCE), Design for environment (DIE, DIR), Life cycle assessment (LCA),

**Functionality**

**Inventory Modelling**

The graphical user interface is easy to interpret. KCL-ECO can handle very large systems and closed loops. The software provides...
**Database: The Boustead Model 5.0.12**

<table>
<thead>
<tr>
<th>Name</th>
<th>Website of database</th>
<th>Database developer</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Boustead Model 5.0.12</td>
<td><a href="http://www.boustead-consulting.co.uk">http://www.boustead-consulting.co.uk</a></td>
<td>Boustead Consulting Limited</td>
</tr>
</tbody>
</table>

**Release dates**
- Last update: Mz-06
- First release: Version 5.0 released 01/2004, version 1 released 06/1992

**Description**
The database is split into two parts. The first of these, called the Core, contains data for 33300 unit operations, which include fuel production and processing operations for almost every country (27000 operations in total), as well as over 6000 materials processing operations. All of the materials processing data is industry derived. In fact much of it has been determined using the Boustead Model! The second part of the database, called the Top, has space for a further 6000 unit operations and is available to construct user operations. This can be further extended if required (subject to hard disc space). This elegant yet tested structure enables complex structures like networks and open- and closed-loop recycling operations to be easily modelled. A list of included operations can be downloaded from the website.

**Reference users**
PlasticsEurope could be regarded as a reference user of the current version, although we use the Boustead Model to produce the ecoprofile reports in a consultancy capacity.

**Price and access conditions**
- Single or multiple terminal, commercial or educational.
- Educational licences are for users who do not use the Boustead Model to generate income; we provide either a single terminal licence or class licence (unlimited number of terminals at a single site) for educational users. Commercial users pay for one or more terminals.

**Add-on databases**
There are no add-ons. The Boustead Model is supplied complete to all users.

**Main economic sectors covered in the database**
- Sorry, this information is not available

**Languages of database**
- English
Summary of Platform project

• Initially 3 years project of the Commission
• Co-ordinated by DG JRC-IES in close collaboration with DG Env, G4
• Policy commitment
• Goal: Support life cycle thinking and assessment in policy making and product development with data, methods, and guidance as well as an information hub
• Approach: Stakeholder steered, quality focus, practical and affordable, long-term oriented

First achievements

• Established communication networks and Advisory Groups
• First versions of ELCD database and LCA Info Hub.
Thank you very much for your interest and time!

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Platform project: WWW-Adress: http://lca.jrc.it
LCA information hub: also http://lca.jrc.it; from end of June 2006