Programme, abstracts and list of participants

Market Opportunities in Life Cycle Thinking

First symposium of the

Nordic Life Cycle Association, NorLCA

October 9-10, 2006

Lund, Sweden

Preface

Welcome to the first of what we hope will become a long sequel of annual symposia for the Nordic Life Cycle Association, NorLCA.

What you have in your hands is the collection of abstracts or short papers from the participants who will present their experience with working with the environmental aspects of products in a life cycle perspective through

- design for environment
- integrated product policies
- life cycle-based environmental management
- exchange of environmental information in the product chain
- life cycle assessment as a decision support tool in companies and society

Nordic Life Cycle Association, NorLCA, has been founded to create a platform of exchange of information and experience on life cycle approaches among actors within this field in the Nordic Countries, and the purpose of this first annual symposium is therefore to support contact and networking among the participants and to bring them useful information on practical use of life cycle approaches among companies and authorities in the Nordic region.

In addition to the traditional platform sessions you will find sessions of a more interactive workshop character as well as a Life Cycle Market Place during the prolonged breaks, where you can stroll around among the stands and check the offers to see if there is something of interest to you. The Market Place also has a Life Cycle Project Bank, where you can deposit a project idea and hopefully see it give proceeds in the form of a collaboration with qualified students and supervisors at Nordic Universities.

We wish you all a fruitful and inspiring symposium and hope that many new contacts will be established between life cycle actors in the Nordic countries.

On behalf of founding board

Michael Hauschild
Chair of the Nordic Life Cycle Association, NorLCA, founding board

Content

Programme NorLCA Symposium in Lund, October 9-10, 2006

Get-together Sunday evening 20.00, 8th of October at symposium venue, International Institute for Industrial Environmental Economics, Tegnérsplatsen 4, Lund.

Time	Monday morning			Session room
09.00 – 09.15	**Welcome and introduction**			Main Hall
09.00	Welcome and presentation of NorLCA and the symposium, *Michael Hauschild, Chairman of the NorLCA founding board*			
09.15 –10.30	**Keynotes** (Chair: Göran Finnveden)			Main Hall
09.15 09.50	Integrated Product Policy and its Role for Nokia, *Olli-Pekka Mäkirintala, Director, Environmental Management, Nokia Mobile Phones* Presentation from HÅG *Frank Hugo Storelv, Environmental manager, HÅG*			
10.30 - 11.30	**Life Cycle Tool Café and Life Cycle Market Place** (coffee/tea will be served during this session)			Room 133
10.30 10.30	Life Cycle Tool Café A range of tools including KCL-ECO, SimaPro, ECODESIGN PILOT, GaBi and A designer's guide to Eco-Conscious design of Electrical and Electronic Equipment are present for demonstration and questions Life Cycle Market Place Several stands presenting the Nordic and European ecolabels, Public Green procurement guidelines in Denmark, Environmental Product Declarations and the Life Cycle Project bank			
11.30 – 13.00	**Application of LCA Methodologies** (Chair: Jyri Seppälä)	Main Hall	**Guided Tour on Life Cycle Management** (Chair: Michael Søgaard Jørgensen)	Room 201
11.30 11.50 12.10 12.30 12.50	Newspaper waste management – a combined assessment of ecological and economic aspects *Helena Dahlbo* Life Cycle Assessment of Wood Based Heating in Norway *Marte Reenaas* LCI as a tool in the environmentally oriented product development of paper products *Catharina Hohenthal-Juutsimo* Life cycle assessment for an ICT network product based on accounting data *Mikko Nousianen* Applying Leontief 's price model to construct life cycle inventories under imperfect information *Anders Hammer Strømman*		Life Cycle Management in product chains – concepts and experiences *Michael Søgaard Jørgensen* Case study experiences with LCM *ABB (Lennart Swanström)* *Tetra Pak (Cathrin Besch)* Dialogue around other cases from participants	
13.10 – 14.00	**Lunch** In the Academic Society building just opposite IIIEE			See p. 32

Programme NorLCA Symposium in Lund, October 9-10, 2006

Time	Monday afternoon			Session room
14.00 – 16.00	**Life Cycle information and Communication** (Chair: Raul Carlson)	Room 201	**Application of Life Cycle thinking in Society and regulation** (Chair: Per Christensen)	Main Hall
14.00	Use of LC information in design and development of products within the ABB group *Lennart Swanström*		Life Cycle thinking in Ecolabelling *Bjørn-Erik Lønn*	
14.20	General method for integration of industrial environmental information systems *Johan Tivander*		Going for Green Domino Effects - will European Eco-labelling Contribute to Sustainable Consumption? *Henrik Riisgaard*	
14.40	VIEWS - The Visualization of Integrated Environmental Work Spaces *Sandra Häggström*		Environmental impacts of material flows caused by the Finnish economy *Jyri Seppälä*	
15.00	Creating a national system for environmental classification of buildings. A Swedish project *Göran Finnveden*		The significance of boundary conditions and assumptions in the environmental life cycle assessment of paper and cardboard waste management strategies. An analytical review of existing studies *Henrik Wenzel*	
15.20	Life Cycle Information and Communication - practical examples from hygiene products industry *Björn Spak*		Chemicals regulation, REACH, and innovation *Søren Løkke*	
15.40	Preconditions and Barriers for the Flow of Product Related Environmental Information *Johan Erlandsson*		'Eco-Benchmark' for consumer-oriented LCA-based environmental information on products, services and consumption patterns *Ari Nissinen*	
16.00 - 16.30	**16.00 – 16.30 Tool Café and Life Cycle Market Place opened again** Coffee/tea will be served at the café and market place			Room 133
16.30 – 17.30	**NorLCA General Assembly**			Main Hall
	Break			
19.30	**Monday evening** Symposium Dinner at Grand Hotel Lund			See p. 33

Programme NorLCA Symposium in Lund, October 9-10, 2006

Time and	Tuesday morning			
08.30 -10.00	**Eco-design Network Workshop** (chair: Tim McAloone)	Main Hall	**FLIPP Roundtable**	Room 201
08.30	Product developer and LCA specialists get together Case study		Furthering Life Cycle considerations in Integrated Product policy	
10.00 – 11.00	**Life Tool café and Life Cycle Market Place opened** Coffee/tea served at the tool café and market place			Room 133
11.00-13.00	**Company experiences with application of LCA** (Chair: Tomas Rydberg)			Main Hall
11.00	Eco-efficiency approach of Akzo Nobel *Sara Tollin*			
11.20	LCM activities at Grundfos A/S *Tine Herreborg Jørgensen*			
11.40	Life Cycle Thinking in action! How to use LCA and supply chain management to facilitate product development and environmental improvement of office chairs *Ingunn Saur Modahl*			
12.00	Environmental assessment of Novozymes' enzymatic solutions applied in industry and agriculture *Per H. Nielsen*			
12.20	Sustainability Initiative- Measuring Alcoa/Landsvirkjun Performance on the Karahnukar and Fjardaal Projects *Ragnheidur Olafsdottir*			
12.40	Break			
13.00 – 14.00	**Lunch** In the Academic Society building just opposite IIIEE			See p. 32
	Tuesday afternoon			
14.00 – 15.30	**Harmonisation and initiatives** (Chair: Michael Hauschild)			Main Hall
14.00	Nordic IPP initiatives *Stefan Gislason*			
14.20	European life cycle product policy *Bengt Davidsson,*			
14.40	Developments in ISO standards *Kim Christiansen*			
15.00	EPD Global principle and European application *Stig Hirsbak*			
15.20	The UNEP/SETAC Life Cycle Initiative – Bringing science-based life cycle approaches into practice *Allan Astrup Jensen*			
15.40 -16.00	**Break and coffee/tea**			
16.00 -16.30	**Summing up and Next years meeting**			

Keynotes – Monday 9.15-10.30, Main Hall

Integrated Product Policy and its role for Nokia

Olli-Pekka Mäkirintala
Director, Environmental Management
Nokia Mobile Phones, Denmark
Tel: +4533295530
Mobile: +4520713221
Email: olli-pekka.makirintala@nokia.com

The Integrated Product Policy (IPP) pilot project of Nokia was initiated as a part of European Commission's (EC) effort to work together with stakeholders to test the IPP approach in practice. The objective of the EC's IPP approach is to "reduce the environmental impacts from products throughout their life-cycle, harnessing, where possible, a market-driven approach, within which competitiveness concerns are integrated".

Nokia decided to join this project as the co-operation with different stakeholders including the Commission was seen as a new and interesting opportunity to proactively participate in discussions and defining improvement options.

The project is now in its follow-up phase. The actual tasks derived from the improvement analysis have been chosen and implementation on-going. Additionally, experiences from this new type of approach can be concluded. This presentation will give an insight into the process, experiences and recommendations. As a whole, IPP seems to form a very interesting new approach for steering environmental improvements. However, one key question in this key note speech will be a comparison between IPP and a traditional legislative toolbox - what kind of advantages does the IPP approach provide?

Presentation from HÅG

Frank Hugo Storelv
Environmental manager
HÅG, Norway

Abstract not available

Life Cycle Tool Café – Repetitive during the symposium, room 133

A Designer's Guide to Eco-Conscious Design of Electrical & Electronic Equipment

Ole Willum
Institute for Product Development – IPU, Denmark
Tel: 45 25 46 74
Email: willum@ipu.dk

"A Designer's Guide to Eco-Conscious Design of Electrical & Electronic Equipment" has been developed in cooperation with Danish companies in the electronics industry. The guide aims at covering all the needs in a company, which has decided to make improvements in the environmental aspects of its products, and to have this as an ongoing standard activity in the development process

A core functionality of this EcoDesign Guide is a module of "Environmental Calculators". The Environmental Calculators enables the designer to compare the environmental impacts from the entire life cycle of different design alternatives. This can be done already in the concept phase, with very few data available and before the design is finalised. There are three calculators in the tool:

- **Calculator I** is intended - with a minimum of effort - to give a very rough overview of the environmental aspects of the life cycle of a product.
- **Calculator II** can perform a more detailed assessment and material declarations based on generic LCI-data for electronic components.
- **Calculator III** can predict the consequences of different end-of-life scenarios based on the design of the electrical- and electronic product. Key-values for end-of-life can be calculated.

This EcoDesign Guide also gives inspiration on how metrics for evaluation and reduction of dangerous chemicals/substances can be set during the development of new products. A coarse method for overall hazard reduction is given. The guide is available free of charge from http://www.ecodesignguide.dk .

KCL-ECO 4.0 LCA software offers proven performance

Catharina Hohenthal-Joutsimo
KCL Science and Consulting, Finland
Tel: +358 20 7477273
Email: catharina.hohenthal@kcl.fi

Many problems, including life cycle assessment, can be described in terms of modules and flows. **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 e.g.:

ECOINVENT-DATABASE: Ability to import Ecoinvent-database into KCL-ECO

COMPARISON OF DIFFERENT CALCULATION RESULTS: Different calculation results can be compared in two different chart-windows. Useful for example when comparing different process conditions.

FILTERING OF MODULES: User can filter a certain amount (%) of a parameter. By filtering the user can cut the modules and flows that have small effect on the filtered parameter. A useful function when considering very large flowsheets.

KCL-ECO is flexible and powerful

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 processess), 1900 flows and 7200 linear equations describing the system. Due to KCL-ECOs transparent structure transports can be studied separately.

ALLOCATION. Both multi-output and open loop allocations are supported.

AGGLOMERATION FUNCTION. Modules can be agglomerated together in a suitable way.

UNCERTAINTY ANALYSIS enables you to make a fast check on the range of variation of your results

All of the above mentioned features and many more will be demonstrated depending on the requests of the listeners.

The ECODESIGN PILOT

Prof. Wolfgang Wimmer
Environmentally sound product design / ECODESIGN
Institut für Konstruktionswissenschaften, Austria
Tel: +43 / 1 / 588 01 - 307 44
Email: pilot@ecodesign.at

Niki Bey, IPU, Denmark is demonstrating the ecodesign pilot at the Lund symposium
e-mail nbe@ipu.dk

The ECODESIGN PILOT is a simple, practicable and easy to use software tool for identifying and applying ECODESIGN measures to your product.

PILOT signifies Product Innovation Learning and Optimization Tool.

The PILOT is mainly designed for the application in the topic of product development and improvement. It is also used as a general ECODESIGN knowledge base and for continuous staff training.

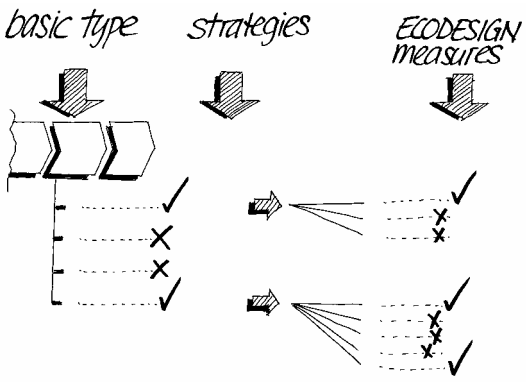
The ECODESIGN PILOT is:

a high quality tool that helps you to identify ECODESIGN measures to improve your product;
a systematic tool that helps you to take ECODESIGN into account when a new product is designed;
a knowledge tank that makes it possible to learn and understand ECODESIGN on the basis of examples in their specific context.

In three steps to a better product with the ECODESIGN PILOT.

When analysing your product you will identify which essential environmental impacts take place in which part of the product life cycle.
Each product type has specific ECODESIGN strategies and corresponding checklists.

By working with the ECODESIGN checklists you can then identify precise and easy to apply measures for the improvement of your product.



The strengths of the ECODESIGN PILOT are:

Fast and easy identification of product improvements with large environmental relevance.
The checklists are a reproducable documentation of the decisions made.
Concrete measures in the terms of product developers.
Comprehensive shaping of opinions and expansion of knowledge for environmentally sound product design.
Impulse for empowering creativity and innovation for new product concepts.

The ECODESIGN PILOT is available on CD-ROM and online:

The German and English CD-ROM is available with the book ECODESIGN PILOT (Wimmer, Züst). With the three access points product life cycle, product development and product improvement the CD-Rom is a comprehensive tool for environmentally sound product design and improvement.

Information and orders: http://www.ecodesign.at/pilot/ONLINE/ENGLISH/INFO/BUCH.HTM

The version 3 of the ECODESIGN PILOT is now available in five languages and comprises part of the content of the CD-ROM (part product improvement) and additional features as for example the auxiliary tool ECODESIGN Assistent. You can find the PILOT online at: www.ecodesign.at/pilot

GaBi

Demonstrated by Jan Poulsen
LCA Center, Denmark
Tel: +45 72157700
Email: jpo@force.dk

The software system GaBi is a tool for build up life-cycle-balances. GaBi supports you with handling a large amount of data within modeling of the product life cycle. GaBi calculates balances of different types and assists you in aggregating the results. Also the GaBi 4 analyst allows you to undergo different level of result analysis e.g. scenario analysis, parameter variation, sensitivity analysis and Monte Carlo analysis.
It is very helpful to know the characteristics of a system to enhance the significance of the balances and the limits of the GaBi tool. You should be familiar with the meaning of "integrated tool for decision support", "extensive database", "modular structure", transparent balance results" and know how to use these features for your own advantage.
The **GaBi 4** software is based on a modular concept. By this means, plans, processes and flows and their functionalities establish modular units. Within this structure, GaBi 4 gains a clearly arranged structure. That helps you by searching functionalities inside of GaBi.
Data of impact assessment, inventory and weighting models are accurately separated. So the single modules are easy manageable and then be connected, if the calculation of the Life Cycle Assessment is started.
Furthermore GaBi allows you to illustrate the single modules of a product life cycle. Several phases of the life cycle (production, utilization and disposal) can be captured into modules and can be modified separately.

Another characteristic of the modular structure is, that the software and the database are independent units. Within the database all information e.g. product models, ecoprofiles are saved. GaBi databases are always built up with a defined basic structure. The software itself provides the user interface to the database. Via the user interface the stored data can be red and modified.
Processes are arranged using a Sankey diagrams editor, allowing a quick overview of mass, energy or even cost flows shown as proportional to quantity. It is up to the user to determine which additional flow quantities one wishes to depict in this sophisticated manner.

SimaPro

Marcus Wendin
Miljögiraff, Sweden
Tel: +46 31 132115
Mobile: +46 (0)733-248185
Email: Marcus@miljogiraff.se
Homepage: www.miljogiraff.se

SimaPro	**Databases:**
Miljögiraff is the Swedish supplier of the LCA software **SimaPro**® which is developed by Pré Consultants in the Netherlands, with an international network of LCA specialists. **SimaPro**® can facilitate efficient, qualitative and longterm stability in your work with LCA. Companies, who want to develop their own work with LCA, can have courses and support. **SimaPro**® is available in differrent version depending on the needs of the user. It is also possible to buy a temporary and/or educational license to reduced price. An advantage with SimaPro is that it comes with extensive databases of LCI data and also all the common methods of LCIA. This allow for efficient and transparent LCA, with reliable data and methods. We experience that the most satisfied clients are those who uses the service contract which gives you all the updates and support.	ETH-ESU 96 BUWAL 250 Dutch Input-Output Database Industry data IDEMAT 2001 Franklin US LCI database Data archive Dutch Concrete database IVAM FEFCO Eco-invent
The SimaPro 7 family	**Methods**:
The SimaPro family allows you to implement Lifecycle Assessment in a flexible way. SimaPro can grow with the increasing importance of LCA in your organization. SimaPro comes in the following professional versions, that are available in a single user (stand alone) or multi user network version, which is ideal for project teams. With the SimaPro demo you can experience the different versions yourself. SimaPro Compact for quick results If ease of use, quick learning and an intelligent design are your main criteria, choose the Compact version. It is built for reliable results with limited effort. Powerful Wizards assist you managing complex tasks, while all results remain completely transparent. SimaPro Analyst for detailed LCA studies If advanced features, transparency and flexibility are your main criteria, choose the Analyst version. It is built for the LCA expert that wants to assess every detail of the LCA he/she is making. It comes with advanced analytical features including Monte Carlo analysis. SimaPro Developer to create dedicated LCA tools If you are a consultant, or for instance an industry association and want to develop simplified tools for your clients or members, choose the Developer. It has the same features as the SimaPro Analyst but is extended with Wizard writing options and COM interface.	Eco-indicator 99 Eco-indicator 95 CML 92 CML 2 (2001) EDIP/UMIP EPS 2000 Ecopoints 97 Cumulative Energy Demand IPCC Greenhouse gas emission

Guided tour on Life Cycle Management – Monday 11.30-13.00, room 201

Life Cycle Management in product chains – concepts and experiences

Michael Søgaard Jørgensen
Department of Manufacturing Engineering and Management, Technical University of Denmark, Denmark
Tel: +45 45 25 60 24
Email: msj@ipl.dtu.dk

The paper discusses different concepts for environmental management in product chains, like life cycle management, environmental supply chain management and responsible chain management. Furthermore it presents the results from some Danish studies of environmental management in product chains. Life cycle management in a product chain can be defined as environmental management in a product chain with focus on the environmental aspects throughout the life cycle of the product or service in focus. Compared with life cycle assessments the focus in life cycle management is on both the material and the organisational aspects of the product or service and compared with environmental management in product chains the focus in life cycle management is on the environmental aspects in a life cycle perspective.
The study of some Danish experiences with environmental management in product chains is based on an analysis of around 30 case studies. The type of activity in the cases differs. In some cases the focus has a life cycle dimension like the conduction of a life cycle assessment or the preparation of a license for an eco-label. In other cases the focus is on the environmental impact in a part of the product chain, but actors in a bigger part of the product chain is involved, because they influence the environmental impact in another part of the life cycle. The drivers of the organisation of environmental management are often related to governmental regulation, either directly affecting a company or mediated through customer demands. Another dimension is the type of activity. In some cases the aim is collection of information about environmental aspects, while other cases directly has a focus on reducing environmental impact, like green procurement or product development. A formalised environmental management system does not seem to be a prerequisite for organising environmental management in a product chain. The analysis identifies two types of impact from environmental management in product chains: reduction of environmental impact and changes in organisational practices within some of the involved companies. The type of relationships among the actors in the product chains is another dimension. In some cases the relationship has the character of co-operation, while in other cases one of the companies in the product has a dominating role in relation to deciding the focus of the environmental management or building up the competence for organising environmental management in a product chain. The paper summarises the studies into an approach for the analysis and initiating environmental management in a product chain. The approach includes dimensions like the organisational resources of the company, the existing product chain relations, and potential drivers and barriers for environmental management, including public discourses and governmental regulation.

Application of LCA methodologies – Monday 11.30-13.00, Main Hall

Newspaper waste management – a combined assessment of ecological and economic aspects

Helena Dahlbo[a]*, Markku Ollikainen[b], Sanna Peltola[c], Tuuli Myllymaa[a], Matti Melanen[a]
[a] Finnish Environment Institute, Finland
*Tel: +358-20-490 2318
Mobile: +358-400-148 700
Email: helena.dahlbo@ymparisto.fi
[b] University of Helsinki, Finland
Department of Economics and Management
[c] Paperinkeräys Oy, Finland

We combined life cycle impact assessment (LCIA) with economic analysis of social life cycle costs (SLCC) to investigate five alternatives for newspaper waste management. The alternatives consisted of various recovery and treatment methods applicable to newspaper in a separately collected paper fraction and to newspaper in mixed waste. The methods considered for the separately collected paper fraction were 1) material recycling, 2) gasification and co-combustion, and 3) incineration. The methods considered for newspaper in the mixed waste were 1) landfilling, 2) mechanical-biological pre-treatment followed by gasification and co-combustion, and 3) incineration. The boundaries of the commodity and its production process were defined within the LCA approach. The analysis of the recovery and other related costs followed closely these boundaries. We linked LCIA and SLCC to each other at three different stages. First, we used LCIA to rank our alternatives and asked how this ranking relates to the SLCC associated with each alternative. Second, we solved the cost minimizing problem and asked how this purely economic ranking relates to our LCIA ranking. Third, we solved the cost minimizing problem when external costs from the use of fossil fuels were included and then compared the solution to the LCIA results. Many useful features emerged. Tying economic analysis firmly to the steps of LCA helps to produce consistent SLCCs. Economic analysis can also be helpful in defining the boundaries of the product system and to facilitate decisions on avoided impacts. Finally, given that environmental policies usually involve trade-offs between environmental and economic factors, economic analysis conducted consistently with LCA complements LCA in a way that can be expected to make the results of the analysis more useful for policy making.

Life Cycle Assessment of Wood Based Heating in Norway.

Marte Reenaas, Christian Solli, Anders Hammer Strømman*
Norwegian University of Science and Technology, Norway
*Mobile: +47 99 58 14 41
Email: anders.hammer.stromman@ntnu.no

Household heating by wood stoves is significant in Norway, providing approximately 20% of the heat requirements in the households. The most important heat source is electricity from the grid. In light of the growing concerns about global warming, emissions of CO2 from energy production is getting increased attention. Biomass based energy can be one (of many) way(s) to mitigate global climate change, as long as it is seen as “carbon neutral". As marginal electricity in Norway is shifting towards more fossil fuel based electricity production, biomass can play an important role in limiting the electricity demand for heating in households. A comparative life cycle assessment of a wood based heating system with old and modern stove technology is conducted. A novel hybrid approach is applied, limiting the data intensity usually associated with the method.

LCI as a tool in the environmentally oriented product development of paper products

Anna Leinonen, Minna Forsell, Catharina Hohenthal-Joutsimo*, Eero Hiltunen and Helena Wessman
KCL Science and Consulting, Finland
*Tel: +358 20 7477273
Email: catharina.hohenthal@kcl.fi

This paper presents a new procedure developed for environmentally oriented product development, especially for paper and board products. The procedure aims to transform qualitative expert information

to an explicit form suitable for industrial decision-making. This goal is achieved by using LCI as a tool in the product design. The paper presents results from a case study and elaborates applicability of LCI in the product design procedure.

In the field of product development various approaches such as design for environment (DfE), ecodesign or environmentally oriented product design, include also life cycle thinking. These approaches aim usually at efficient material use; minimized energy consumption; improved recyclability; optimized product life time; and minimized use of environmentally harmful substances. From the paper industry's point of view, many of these approaches are unfeasible because they are developed for parceled goods. As paper and board are bulk products, which are used as raw materials for other goods, they cannot be developed without affecting the production process. Therefore, an objective of an ecodesign approach should be to define the effects of planned product development actions on the emissions from the production process. For this purpose a new procedure was developed. This paper presents the developed procedure and results from a case study on paperboard packaging, emphasizing the way LCI can be used as a tool.

The product development procedure consists of four stages as follows

a. Definition of customer requirements
b. Specification of product properties to be improved
c. Definition of development actions and their consequences, by LCI calculation
d. Assessment of the results in decision-making

The environmental burden caused by the planned development action was determined by using Life cycle inventory (balance) as the calculation method. The calculations were done with the KCL-ECO 4.0 software using data based on literature and KCL EcoData database.

Life cycle assessment for an ICT network product based on accounting data

Seppo Junnila[a]*, Mikko Nousiainen[a], Jyrki Louhi[b], Salla Ahonen[b]
[a]Helsinki University of Technology, Finland
*Tel: +358(50)5115816
Email: seppo.junnila@tkk.fi
[b]Nokia, Finland

Life cycle assessment (LCA) could significantly improve the quality of product design in companies, but there are still many practical problems, for example, the workload, intangible processes and availability of data, before the approach can be used in every day environmental management of companies. An interesting approach inside the LCA framework, which could overcome most of the challenges mentioned above, is the economic input-output life cycle assessment (EIO-LCA). This study tests the suitability of the EIO-LCA in screening the life cycle impacts of a sophisticated ICT network product by using readily available accounting data. The study found that the electricity in the use phase dominated the results contributing the most to life cycle impact, especially in climate change and acidification categories, but also other activities, such as, maintenance, traveling, transportation and electromechanical parts, were identified to be significant for the environmental performance of the manufacturing company. Based on the study, it seems that the EIO-LCA approach clearly offers a value-added to the environmental management in companies. The EIO-LCA could provide a very fast access to the key life cycle characteristics of the product while it produced results comparable with more detailed LCA studies.

Applying Leontief 's price model to construct life cycle inventories under imperfect information

Anders Hammer Strømman*, Christian Solli, Marte Reenaas
Norwegian University of Science and Technology, Norway
*Mobile:+47 99 58 14 41
Email: anders.hammer.stromman@ntnu.no

The combination of physical life cycle inventories with input-output data has gained interest within the LCA and eco-balance communities in the recent years. Several alternative approaches perform this combination has been developed. This paper presents an approach to combine input-output based data with physical life cycle data into a hybrid inventory utilizing Leontief's price model to tune and adapt data.

The motivation for the proposed method is provided based on experiences form case studies. In many cases, and for various reasons, LCA practitioners may often experience less than perfect availability of information. So, rather than starting from scratch we here present an approach that begins with, and then adapt, data from an input-output data set. This implies starting with an average data set rather than starting with blank sheets. We further show how the input-output based data is combined with original key data and adapted to represent the processes in question. The application of Leontief's price model is essential in adapting the input-output data under imperfect information of process inputs.

We present a formal approach to perform this adoption and presents results from an application. Through this it is shown how the method allows for a relatively fast approach to establish hybrid LCA inventories under imperfect access to data using Leontief's price model.

Life cycle information and communication – Monday 14.00-16.00, room 201

Use of LC information in design and development of products within the ABB group

Lennart Swanström
ABB Corporate Research, Sweden
Tel: +46 21 323072
Email: lennart.swanstrom@se.abb.com

Within ABB product development was early identified as a key application for the LCA methodology. Another common ABB application is for communication of the products environmental performance to customers and other stakeholders through LCA based Environmental Product Declarations.

During the year 2000 a management decision was taken to include environmental objectives in the ABB GATE Model - a mandatory project control tool in ABB for handling of all critical aspects of a product development project, as for example business aspects, economic and other risks, intellectual property issues and as discussed more in this presentation environmental considerations. LCA is one among other environmental tools used in this process. Example of another important tool, complementary to LCA is ABBs list of prohibited and restricted substances.

An easy to use LCALight tool has together with other environmental tools been made accessible for all ABB employees through ABBs Intranet portal. The quality of LCI data in the LCALight database is however critical and a major update of this LCI database have been conducted during 2006.

The focus for this presentation is put on practical experiences and outcomes of LCA use in product development and what demands this puts on the underlying LC information.

The conclusions from working with LCA in ABB is that LCA is a suitable and efficient tool to be used in the daily operations, presumed it is distributed in the organization as an easy to use and reliable tool. Additionally LCI data must be continually updated and last but not least LCA have to be combined with other tool to cover aspects were LCA have a low sensitivity, like for identification of toxic materials. Another critical factor is that the company have access to competence and resources to keep the LCA tool as well as the other tools updated and business relevant.

General method for integration of industrial environmental information systems

Johan Tivander*, Sandra Häggström, Raul Carlson
Industrial Environmental Informatics, Computer Science and Engineering,
Chalmers University of Technology, Sweden
*Tel: +46 31 772 4911
Email: johan.tivander@imi.chalmers.se

This article presents a general methodology for integration of industrial environmental information systems, developed in the IMPRESS project. IMPRESS (Implementation of Integrated Environmental Information Systems) ran between October 2004 and September 2006 and aimed at implementing method and tool integration with corporate business processes in a number of industrial companies. The research and development work was performed by the research group Industrial Environmental Informatics (IMI) at Chalmers University of Technology, and the industry was represented by seven companies, all members of the Swedish competence centre Center for environmental assessment of Product and Material systems (CPM) which also funded the project.

The purpose of the integration method is to make industrial environmental information systems more effective and efficient, i.e. decrease cost for developing, using and maintaining data, tools, and methods for industrial environmental management and to improve controllability of environmental performance. The scope of the method is industrial environmental management, and is independent of industrial sector, line of business, environmental tools and environmental data models.

The method is based on previous work with integration of environmental information systems within IMI and CPM. It has been developed and tested in case studies within three companies (ITT Flygt, SCA

Hygiene Products, and Akzo Nobel) and within IMI where an integrated concept tool Visualisation of Integrated Environmental Work Spaces (VIEWS) was implemented.

The method for integration of industrial environmental information systems consists of three main steps, *Analysis*, *Synthesis*, and *Implementation*. The method has been successfully used to identify ways to integrate information systems with different purpose and scope. The stakeholders in the case studies find the results from the synthesis useful as decision support for implementation. An integrated perspective of their information systems is established, which provides an understanding of possibilities to reduce costs of data management and increase controllability of environmental work.

[1] CPM, Center for Environmental Assessment of Product and Material Systems, viewed at http://www.cpm.chalmers.se/

Creating a national system for environmental classification of buildings. A Swedish project.

Göran Finnveden[a]*, Ola Eriksson[b], Mauritz Glaumann[b], Tove Malmqvist[c] Åsa Sundkvist[a] and Helene Wintzell[a,c]
[a]Division of Environmental Strategies Research, Royal Institute of Technology, Sweden
*Tel: +46 8 790 73 18
Email: goran.finnveden@infra.kth.se
[b]Division of Building Quality, University of Gävle, Sweden
[c]Helene Wintzell AB, Sweden

Buildings are responsible for approximately 40 % of the environmental impacts in Sweden. On our road towards a more sustainable society, the construction and real estate sectors thus have tremendous challenges. In a unique dialogue project, the Swedish government and a number of companies and organizations have made an agreement in which they have committed themselves to take action in a number of areas. One of the agreements concerns environmental classification of buildings. The agreement states that by the year 2009, all new buildings and 30 % of the existing buildings should be classified. There are a number of systems for assessing and classifying buildings available, both nationally and internationally. However, none has reached such a large market penetration. Thus there is a need to develop a system which can be widely accepted and used. In this paper we will present results from an ongoing project with the aim of developing a classification system that can be used within this dialogue but also in other contexts. We will present results from the first part of the project where we have made a number of inventories of:

- national and international methods already developed
- needs and expectations among different stakeholders
- the environmental policy context for the system.

Furthermore we will discuss different aspects of a classification system such as:

- Choice of aspects to include in the system.
- Choice of indicators
- Choice of criteria for classification.
- Weighting of different impacts or classes.
- Presentation of results

VIEWS - The Visualization of Integrated Environmental Work Spaces

Sandra Häggström*, Johan Tivander, Raul Carlson
Industrial Environmental Informatics, Computer Science and Engineering,
Chalmers University of Technology, Sweden
*Tel: +46 31 772 4916
Email: sandra.haggstrom@imi.chalmers.se,

This article presents a demonstration result from the IMPRESS project, running from October 2004 to September 2006. IMPRESS (Implementation of Integrated Environmental Information Systems) aimed at implementing method and tool integration with corporate business processes in a number of industrial companies. The research and development work was performed by the research group Industrial Environmental Informatics (IMI) at Chalmers University of Technology, and the industry was represented by seven companies, all members of the Swedish competence centre Center for environmental assessment of Product and Material systems (CPM) which also funded the project.

The demonstration result is called VIEWS (Visualization of Integrated Environmental Work Spaces). It is a visualization of what it may look like to work with environmental management tools that are integrated in reality. VIEWS is implemented as a web-based software platform combining previously separate environmental management databases and tools including Life Cycle Assessment (LCA), Environmental Management Systems (EMS), Design for Environment (DfE), Chemical Risk Management (CRM) and Emission Trading Scheme (ETS).

VIEWS is an integration in practice and was accomplished using a general methodology for integration of industrial environmental information systems, also developed within IMPRESS. In particular, the information reference model SPINE and the data and communication model PHASETS has been applied not only to analyse and synthesise a transparent integrated system but also as a conceptual visualization of the VIEWS platform. VIEWS is hence also a demonstration that the integration method is applicable in practice. In the integrated system, the common parts of different environmental management tools are shared in order to decrease costs, improve quality and increase availability of data.

[1] CPM, Center for Environmental Assessment of Product and Material Systems, viewed at http://www.cpm.chalmers.se/

Life Cycle Information and Communication- practical examples from hygiene products industry

Björn Spak* and Ellen Riise
SCA Personal Care, Sweden
*Tel: +46 31 7460433
Email: bjorn.spak@sca.com,

Within SCA's business division of hygiene products regular LCAs has been performed since the beginning of the 90's. Over the years a pragmatic approach has been adopted, at the same time a continuous work has been done to increase data quality, i.e. accessibility, relevance and reliability. Monitoring of the environmental performance of the products has been secured by a demand in the product development process to perform environmental evaluation on each product going to launch. This has meant a production of approx 10 to 15 LCA reports every year over the last ten years. The database structure of SPINE and the development of ISO 14048 – data documentation format, has been utmost importance for this quality work.
Systematic collection of supplier production data as well as the establishment of the business division's resource management system for production data from our own facilities has been vital for the development of high data quality LCAs.

Preconditions and Barriers for the Flow of Product Related Environmental Information

Johan Erlandsson
Environmental Systems Analysis,
Chalmers University of Technology, Sweden
Tel: +46 31 772 1962
Email: johan.erlandsson@chalmers.se

The generation, management and communication of relevant, accessible, comparable and understandable environmental information on company and product level is needed in companies both for business reasons and for different types of reporting requirements from stakeholders. However, there are several known problems to environmental information management in the industry. Ambiguous information, high time consumption, high costs, low organisational memory, low availability and a poor flow of product related environmental information are just a few.

The PhD project "Towards Integrated Environmental Information Systems" aims to contribute to increased knowledge about preconditions, barriers and possibilities for environmental information management in producing companies. Corporate/company/site related environmental information as well as product related information is included in the scope of the project. The main research method is qualitative field studies, primarily focussing on interviews with key employees and other stakeholders

within and outside the product chain, but also on documented material and IT systems. An analytical framework has been specifically developed within the project.

This paper presents some selected field study findings about preconditions and barriers for the flow of product related environmental information. The role of market demand, third-party intervention, organisational design and the understanding of life cycle thinking are some of the topics.

Application of life cycle thinking in society and regulation – Monday 14.00-16.00, Main Hall

Life Cycle Thinking in Ecolabeling

Bjørn-Erik Lønn
Stiftelsen Miljømerking, Norway

Abstract not available

Going for Green Domino Effects - will European Eco-labelling Contribute to Sustainable Consumption?

Henrik Riisgaard
Department of Development and Planning, Aalborg University, Denmark
Tel: (+45) 96 35 84 06
Email: henrik@plan.aau.dk

Consumption is a major challenge for sustainable development. To lead consumption in a more sustainable direction, consumers are guided by eco-labels. The EU developed its flower label back in 1992 but the flower is still threatened by extinction as market penetration remains very low. Various evaluations of eco-labels have given different explanations. The EU is now launching its own evaluation to revise the scheme. To understand the different evaluations and their applicability in the scheme revision, a meta-review is made and the current status of the flower eco-label is analysed. The meta-review and the updated status account provide a relevant overview on the current situation. These results are combined in recommendations on how to improve the dynamics of eco-labelling.

Environmental impacts of material flows caused by the Finnish economy

Jyri Seppälä[a], Ilmo Mäenpää[b], Sirkka Koskela[a], Matti Melanen[a], Juha-Matti Katajajuuri[c], Ari Nissinen[a], Yrjö Virtanen[c], Kirsi Usva[c], Tuuli Myllymaa[a], Tiina Härmä[b]
[a]Finnish Environment Institute, Finland
[b]Thule Institute, University of Oulu, Finland
[c]MTT Agrifood Research Finland, Finland

The processing of natural resources causes different impacts on the environment. For achieving sustainable development, it is important to recognize the material flows that stress the environment most or even exceed its environmental capacity. For this purpose, a team consisting of researchers from the Finnish Environment Institute (in charge), the Thule institute (University of Oulu), the MTT Agrifood Research Finland and the VTT Technical Research Centre of Finland, has started a project named ENVIMAT. The aim is to define the life cycle environmental impacts of the material flows used for production and consumption in the Finnish economy allocated to different activity sectors and product groups. In the project, the focus is not restricted to domestic environmental loads. Impacts on the environment caused by imported raw materials and goods are also taken into account. The final objective of the project is to create a hybrid model by which the relationships between environmental impacts and economic effects caused by the use of natural resources in Finland can be assessed. In the environmental assessment, life cycle methodology and databases are connected to the national material flow accounts and input-output analysis. Especially there is a need to develop impact assessment methodology concerning land use. The project is one of the projects funded by the Finnish Environmental Cluster Research Programme (4th phase: Ecoefficient Society). The ENVIMAT project has started in June 2006 and it will be finished by the end of 2008.

The significance of boundary conditions and assumptions in the environmental life cycle assessment of paper and cardboard waste management strategies. An analytical review of existing studies

Henrik Wenzel[a]* and Alejandro Villanueva[b]
[a]Technical University of Denmark, Department of Manufacturing Engineering and Management, Innovation and Sustainability, Denmark.

*Email: wenzel@ipl.dtu.dk
[b]Danish Topic Centre on Waste, Denmark

A review of existing LCAs on paper and cardboard waste has been undertaken. The objectives of the review were threefold. Firstly, to see whether a consistent message comes out of published LCA literature on optimum disposal or recycling solutions for this waste type. Such message has implications for current policy formulation on material recycling and disposal in the EU. Secondly, to identify key methodological issues of paper waste management LCAs, and enlighten the influence of such issues on the conclusions of the LCA studies. Thirdly, in light of the analysis made, to discuss whether it is at all valid to use the LCA methodology in its current development state to guide policy decisions on paper waste.

A total of nine LCA studies containing altogether 73 scenarios were selected from a thorough, international literature search. The selected studies are LCAs including comparisons of different management options for waste paper.

Despite claims of inconsistency, the LCA review showed an overall environmental preference for recycling over incineration or landfill options, for paper and cardboard waste. A systematic exploration of the LCA studies showed, however, important methodological dependencies, pitfalls and sources of error, mainly concerning differences in the definition of the system boundaries. 15 key assumptions were identified that cover the three paper cycle system areas: raw materials and forestry, paper production, and disposal/recovery. It was found that the outcome of the individual LCA studies largely depended on the assumptions made on these areas, and any differences in results and conclusions can be unambiguously tracked back to differences in these assumptions.

Chemicals regulation, REACH, and innovation

Søren Løkke
Aalborg University, Department of Development and Planning, Section for Technology, Environment and Society, Denmark
Email: lokke@plan.aau.dk

In this paper we investigate implications of the new REACH regulation on innovation. REACH is not yet finally developed and implemented, and the present paper shall be seen as a contribution to the discussions of improving the regulation, its implementation, and of supplementary and complementary activities and initiatives. It is important to remember that the adaptation of the regulation, which is expected to happen April 2007, and the concurrent establishment of the new European Chemical Agency in Helsinki and new procedures for contact and interaction between, suppliers, users, and authorities, will not be the end of the process of improving the working of the European chemicals Regulation.

Innovation may take very different shape depending on where and how we look. In the paper we develop an approach to innovation that is sensitive to the different nature of innovations carried out at different sites of the production-chains, i.e. from producer of basic chemicals to end-user, and which we will test and discuss against a number of branches such as paints and lacquers, pharmaceuticals, plastics, textiles, etc.

'Eco-Benchmark' for consumer-oriented LCA-based environmental information on products, services and consumption patterns

Ari Nissinen[a]*, Juha Grönroos[a], Eva Heiskanen[b], Asmo Honkanen[c], Juha-Matti Katajajuuri[d], Sirpa Kurppa[d], Timo Mäkinen[c], Ilmo Mäenpää[e], Jyri Seppälä[a], Päivi Timonen[b], Kirsi Usva[d], Yrjö Virtanen[d], Pasi Voutilainen[d]
[a]Finnish Environment Institute, Finland
*Tel.: +358 20 490 2346
Mobile +358 400 148813
Email address: ari.nissinen@ymparisto.fi
[b]National Consumer Research Centre, Finland
[c]Finnish Game and Fisheries Research Institute, Finland
[d]MTT Agrifood Research Finland, Finland
[e]Thule Institute, University of Oulu, Finland

Science-based approaches like life cycle assessment (LCA) were proposed as a basis for consumer information tools in the 2002 World Summit on Sustainable Development. LCA has been recognized also e.g. in EU in the context of 'Integrated Product Policy' (IPP) as providing "the best framework for assessing the potential environmental impacts of products currently available." In this study, a consumer-oriented, illustrative benchmark was developed to enable consumers to see the role of various products and consumption patterns in the whole of their environmental impacts, using LCA as the method to determine the impacts. Environmental communicators, various experts as well as active and environmentally conscious consumers were identified as key target groups for this type of information. But it also offers a tool for manufacturers to present understandable information of their products. Surveying LCA studies of products and services and developing the presentation formats and figures yielded material for the preparation of a brochure, which can be seen as a 'backbone' of the development work. The brochure preparation was a participatory, iterative process involving discussion with consumer focus groups, communication in stakeholder workshops, and questionnaire-based feedback. In addition to learning what works and what does not, detailed suggestions on improved wording and figures were obtained, as well as a wealth of ideas for future applications. Here we present the development process and the final outcome, i.e., the 'Eco-Benchmark'. Country-specific eco-benchmarks could also be developed in other countries, and products like passenger cars offer a possibility to an international eco-benchmark.

See also www.environment.fi/eco-benchmark

Company experiences with application of LCA – Tuesday 11.00-13.00, Main Hall

Eco-efficiency approach of Akzo Nobel

Sara Tollin
Sustainable Development
Akzo Nobel Technology & Engineering
Tel: +46(0)303-85375
Email: sara.tollin@akzonobel.com

Corporate social responsibility is of strategic importance for Akzo Nobel and it is the company's way of contributing to a sustainable development in the society. Eco-efficiency covers two of the three pillars of the concept of sustainable development: environment and economy. The use of eco-efficiency as a basis for business decisions is viewed as one of the most important undertakings for Akzo Nobel to ensure the embedding of corporate social responsibility in all parts of the company.

Eco-efficiency is the strategic way to combine environment and economy in major business decisions. Eco-efficiency, as applied in Akzo Nobel, includes the environmental effects of a product or activity calculated in a Life Cycle Assessment, but also more of the risk and toxicological aspects since there is a strong focus on these aspects in chemical industry. The method used is the BASF's Eco-efficiency method adapted to Akzo Nobel's businesses.

During the coming years eco-efficiency will be implemented throughout the whole company in the areas of investment decisions, marketing and innovation processes. To achieve a successful implementation, tailor made eco-efficiency implementation plans will be set up for each Business Unit as well as on corporate level.

LCM activities at Grundfos A/S

Arne Remmen*, Tine Herreborg Jørgensen and Jette Egelund Holgaard
Aalborg University, Department of Development and Planning, Denmark.
*Tel: +45 96 35 83 18
Email: ar@plan.aau.dk

Life cycle Management (LCM) is based on life cycle thinking considering environmental, economic, technological and social aspects of products and business activities. LCM is a strategy which involves corporate social responsibility, pollution prevention as well as product and supply chain management. The scope of the paper is to present a theoretical conceptualisation of LCM and, on that foundation, exemplify how the company Grundfos A/S is practising LCM.

Grundfos A/S has not deliberately chosen a LCM-related strategy or vocabulary, but by taking the business excellence model as a point of departure and by emphasizing sustainable development in its company values, the company has implemented activities closely related to the conceptual framework of LCM. These activities have followed four tracks:

1. Management of the production in relation to environment and occupational health & safety.
   Related activities such as certification according to ISO 14001 and OHSAS 18001 have been handled at the production sites and coordinated by the department of central services.
2. Environmental product chain management.
   Activities down-stream, as for example a self-assessment system of suppliers, have been handled by purchasers guided by the department of central services; and up-stream, the department of research and development has played a central role in initiating an energy labelling system.
3. Life cycle assessment and eco design.
   Related activities, as for example principles of eco design based on LCA, have mainly been handled by the department of research and development.
4. orporate social responsibility.

Grundfos has achieved the Social Index developed and launched in 2000 by the Danish Ministry of Social Affairs. Related activities are anchored in a cross-organizational task force and the health and safety unit is placed at the department of central services.

Based on a case study of the company, these activities will be explained and analysed. Special attention will be drawn to the fact that Grundfos A/S has initiated a European energy label scheme and furthermore complies with criteria of the energy-labelling scheme of circulator pumps launched in 2004.

This paper will present experiences of bringing life cycle thinking into specific business practises and furthermore contribute to the discussion of different strategic approaches to LCM.

Life Cycle Thinking in action! How to use LCA and supply chain management to facilitate product development and environmental improvement of office chairs.

Ingunn Saur Modahl
STØ (Stiftelsen Østfoldforskning), Norway
Tel: +47 6935 1100 / +47 4112 3551
Email: ism@sto.no

HÅG has worked with environmental and resource aspects of their products for many years. As part of this work, HÅG has carried out life cycle assessments (LCA) and obtained environmental declarations (EPD, Type III) for 10 of their office chair products. This initial work has been further developed, with a supplier project for product development and environmental improvement of the chairs.

Carrying out the LCA's has been a relatively extensive project, since the office chairs have between 40 and 160 components each. STØ has gathered data from 41 suppliers and 89 different materials during this process.

Based on analyses of six environmental indicators, three suppliers where chosen for further collaboration and development work: an aluminium moulding company, a PUR producer and a producer of different PP and PA components.

This collaboration has lead to the generation of many practical ideas for changes that can improve the environmental profile of the office chairs. Some of the suggested improvements can be carried out for the suppliers' existing products, others involve HÅG working on design and product development, while some will require better systematic solutions (e.g. better recycling systems).

Three relevant, possible improvements are:

- To substitute PA with recycled PET;
- Re-use PUR foam, and
- Increase the amount of recycled aluminium used.

A theoretical analysis shows that if all three of these improvements were implemented, the global warming potential for all of the office chairs is improved, the reduction is as much as 71% for one of the cases analysed. HÅG and their suppliers are now performing further work, assessing and carrying out improvements.

This project shows that LCA and EPD are useful in providing the basis for collaboration with suppliers to facilitate product development and environmental improvement of products.

Environmental assessment of Novozymes' enzymatic solutions applied in industry and agriculture.

Per H. Nielsen* and Karen M Oxenbøll
Novozymes, Denmark
*Tel: +45 44 46 02 41'
Email: phgn@novozymes.com

Enzymes are biological catalysts with an enormous capacity to speed up biochemical reactions. They are developed during millions of years of evolution and are essential to any type of life. Human beings have taken advantage of enzymes since early days, for instance by using animal dungs for softening animal

hides in leather making. Today, enzymes are produced in industrial scale by fermentation and used in a broad range of industries because they reduce raw material, energy and water expenditures, processing time, and/or improve product quality.

Novozymes is a major producer of industrial enzymes and the company has used LCA systematically for some years now to analyse 1) the environmental impacts associated with enzyme production and 2) the environmental achievements when the enzymes are applied in agriculture and various industries.

So far, seven different fields of enzyme applications have been analysed (detergent additive, animal feed supplementation, vegetable oil production, leather production, bread production, fatty acid production and fuel ethanol production) and the results show that enzymatic solutions generally add to considerably the costumers' environmental profiles in terms of reduced energy consumption, contribution to global warming, acidification, nutrient enrichment, photochemical smog formation and sometimes also consumption of limited resources.

The explanation is the high reaction rate and specificity of the enzymes and that small amounts of enzyme do the same or a better job in industrial production than large amounts of chemicals and energy.

Enzymatic solutions are widely used today, but there is still a great potential for expansion into existing fields of application as well as into new, and the total potential savings of for instance greenhouse gasses by enzyme application are measured in millions of tonnes of CO_2 –equivalents. Such saving potentials are interesting even at a national scale and it is interesting to note that most of them are free of charge, because use of enzymes for the most is driven by cost saving and/or quality improvements in the applying industries.

All environmental assessments of Novozymes' enzymatic solution are based on market oriented LCA principles, and the results are backed up with sensitivity assessment of the most uncertain and variable assumptions to evaluate and document robustness of results.

The observed environmental performance of enzymes is used in Novozymes' marketing after external review of LCA documentation according to ISO standards.

Sustainability Initiative- Measuring Alcoa/Landsvirkjun Performance on the Karahnukar and Fjardaal Projects

Ragnheidur Olafsdottir

Abstract not available

Life cycle harmonisation and initiatives – Tuesday 14.00-15.30, Main Hall

Nordic IPP initiatives

Stefan Gislason
Telefon: +354 437 2311 / +354 862 0538
E-post: stefan@environice.is

The Nordic countries have co-operated on IPP-related issues since 1995. The first visible move in this direction was the first Nordic "POMS-conference" in Saltsjöbaden close to Stockholm in januari 1998. That same year a cross-sectoral Nordic working group was established with representatives from ministries and governmental institutions in the fields of environment, consumer and industry. This was the so-called POMS-group which in 2002 became the NMRIPP-group (Nordic IPP). Governmental officials from the 3 sectors have since then co-operated on IPP through this group. At present the group is mainly focusing on three areas, i.e. Green Public Purchasing, Environmental Information and Sustainable Lifestyles, and Environmental Technology. Life cycle considerations play a central role in all this work. During the presentation a short overview will be given over the different initiatives which the NMRIPPgroup has within the 3 areas. Links to European strategies, such as the IPP-communication and the Environmental Technology Action Plan (ETAP) will be mentioned, as well as a couple of national initiatives.

Stefán Gíslason has an MSc-degree in Environmental Management and Policy and is currently working as a secretary of the Nordic IPP-group. Apart from that he is the owner and director of Environice Consulting in Borgarnes, Iceland.

European life cycle product policy

Bengt Davidsson

Abstract not available

Developments in ISO standards

Kim Christiansen
2.-0 LCA consultants, Denmark
Tel: + 45 33 32 28 55
Mobile: + 45 22 77 69 87
Homepage: http://www.lca-net.com/

The development of the international standards for life cycle assessment (ISO 14040:1997, ISO 14041:1999, ISO 14042:2000, ISO 14043:2000) was an important step to consolidate procedures and methods of LCA. Their contribution to the general acceptance of LCA by all stakeholders and by the international community was crucial. With the publication of the two new standards, ISO 14040 and ISO 14044, the existing four standards ISO 14040-43 are technically revised, cancelled and replaced. According to the scope of the revision, the core part of the technical contents remained unchanged. However, despite the fact that the main technical content was confirmed to be still valid, some relevant formal and technical changes were made. On the technical side these include e.g. the addition of principles for LCA, the addition of an annex about applications, the addition of several definitions (e.g. product, process, etc.), clarifications concerning LCA intended to be used in comparative assertions intended to be disclosed to the public, clarifications concerning the critical review panel, clarifications concerning system boundary, etc. On the formal side, changes include the reduced number of standards, a reduced number of annexes, a reduced number of pages that contain requirements, alignment of definitions and clarification of compliance with the standards. For the sake of the international and stakeholder acceptance of LCA, it is recommended that the new standards serve as core reference documents for the users and practitioners of LCA.

EPD Global principle and European application

Stig Hirsbak
Hirsbak Consult, Denmark
Tel: + 45 4678 7467
Mobile: +45 2343 4961
Email: shirsbak@gmail.com

The first global standard on Environmental Product declaration ISO 14025:2006 has this summer been published after nearly eight years of discussion. It happened parallel to the publication of the revised/merged ISO standards on LCA, ISO14040:2006 and 14044:2006, because EPD in based on LCA. ISO 14025 is a generic standard, which rules out the principles and procedures on how to make an EPD. You cannot publish an EPD if you don't have a programme with transparent statues, developed a PCR (Product Category Rules) which is the detailed recipe on how you include your data from LCA; LCI and/or information modules for the pre-set parameters in the EPD as well as what additional environmental information you are allowed to include.

The introduction of information modules in 14025 will serve as a building block and enable all-sized businesses to construct EPD information modules providing life cycle information.
You have to let your PCR become third party reviewed by a competent Review Panel before you start producing the information to fill in your EPD. Before publishing your EPD it has to be become verified of an independent and competent verifier. A Business to Business (B2B) EPD can be internally verified, but a Business to Consumer (B2C) has to be third party verified.

One of the intended applications of 14025 is to frame sector specific EPD programmes. ISO TC 59 - building construction, has established a subcommittee SC 17-Sustainability in building construction. A working group WG 3 has in the last three years worked on a standard on EPD's for building product, ISO DIS 21930 (Draft International Standard). DIS 21930 is based on 14025 procedures, but the development of the standard has taken place in parallel with the development of 14025 which means the adoption has been delayed due to compliance with 14025 not has been fully clarified..

However DIS 21930 is one of the main inputs in a DG Enterprise initiative on sustainable buildings. CEN has been mandated to develop voluntary European standards for sustainability assessment of buildings. The components are EPDs, health and comfort impact categories and life cycle costs. Comparison of the results shall only take place at building level on the basis of the functional equivalency. It means one European PCR for building products, a huge challenge, and one format for communication of EPDs. The standards shall be ready in 2009.

It also between autumn 2007 and 2009 the Commission shall process the new action plan on SCP (Sustainable Consumption and Production), revise the Integrated Product Policy of EU including a position paper on EPD promised the EU Parliament in 2003, implement ETAP (Environmental Technology Programme) which include a building platform, clarify the role of LCA in the new waste framework directive and not least develop the EU LCA platform which hopefully will get its brake through as on open data source. I think in the next coming years LCA has its one and only chance to demonstrate its value as an important tool in SCP.

The UNEP/SETAC Life Cycle Initiative – Bringing science-based life cycle approaches into practice

Jensen, A.A.[a]*, Fava, J.[b], Sonnemann, G.[c], Valdivia, S.[c]
[a]FORCE Technology, Denmark,
Tel: +45 43 26 70 00
Email: aaj@force.dk
[b]Five Winds International, USA
[c]UNEP DTIE, France

Aware of the need to support a global dissemination and implementation of Life Cycle approaches, the Life Cycle Initiative was set-up in 2002 by UNEP and SETAC. In the first phase of the UNEP/SETAC Life Cycle Initiative a secretariat was set up in the UNEP DTIE office in Paris, and three programs were established:

(1) Life Cycle Management Program; application of LCA and life cycle thinking;
(2) Life Cycle Inventory Program; development and enhancement of sound LCI data and methods; and
(3) Life Cycle Impact Assessment Program; Development and enhancement of sound LCIA data and methods.

Thee activities were conducted in various Task Forces and workshops coordinated by the International Life Cycle Panel (ILCP). The first phase concludes this year with important achievements and the completion of a series of products, which will be presented.

Renewed goals and a strategy are being outlined for the second phase of the Life Cycle Initiative from 2006 to 2010 in line with the 10-year Framework of Programmes on Sustainable Consumption and Production (Marrakech Process). The Initiative aims at facilitating

(1) Promotion of life cycle thinking worldwide in order to bring science-based life cycle approaches into practice.
(2) Collection, dissemination and discussion of experiences among business, and
(3) Knowledge exchange of the 100 leading life cycle experts and associated regional networks (Africa, Eastern Europe, Latin America and Southeast Asia),

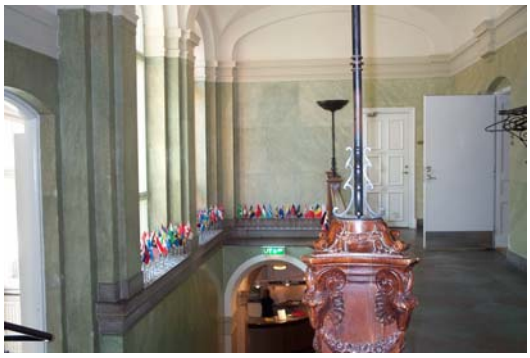
Preliminarily it is foreseen to structure the activities in the second phase in work areas such as:

(1) LCM applied to Consumption Clusters (structured in housing, mobility, food and consumer products),
(2) Industry roundtable
(3) Resource and Capacity Building and
(4) Life Cycle Approaches Methodology.

The final decision about activities will be taken in connection with the launch of the second phase in Montreal, Canada, November 2006.

Practical information

Overview of NorLCA session rooms



Hall way leading to first floor

Room 202, first floor, get-together

Room 203, first floor, get together

Room 201, first floor, session room

Room 133, ground floor, marked place and tool café

Main Hall (Aula), ground floor, session room

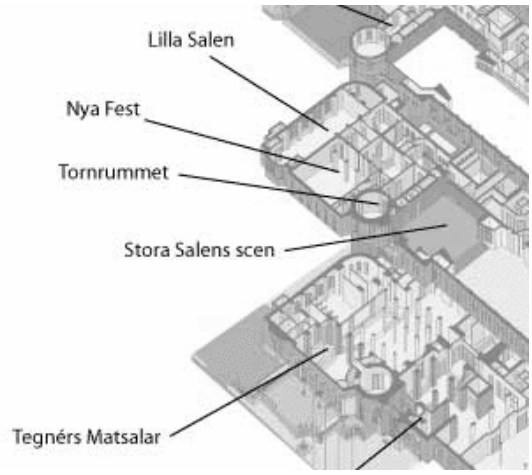
NorLCA registration, ground floor, entrance hall

Lunch is served in Academic Society building just opposite the IIIEE.

The Academic Society IIIEE

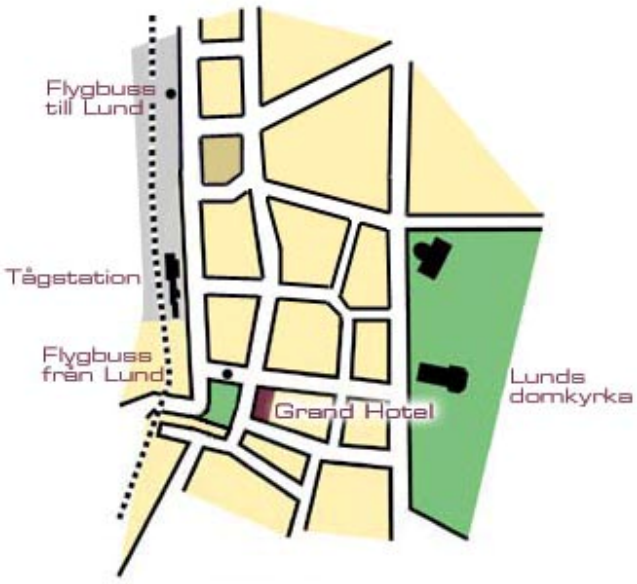
The lunch room reverved for the NorLCA group is called ”the small hall” or ”Lilla Salen” in Swedish. This hall is on the first floor.

Lilla Salen



Plan of the Academic Society Building

The symposium dinner is held in the Lukas dinning room and salon at the Grand Hotel Lund



Grand Hotel Lund

The Lukas dinning room

List of participants

Name	Affiliation	Country	Activity
Abbi Asur Hassan	Elsam	**DK**	speaker and/or participant
Allan Astrup Jensen	Force Technology	**DK**	speaker and/or participant
Andreas Jørensen	NorLCA, Technical University of Denmark	**DK**	session chair, organizer
Anne Rønning	NorLCA, Oestfold Research Foundation	**N**	board
Anne-Marie Tillmann	Chalmers University	**S**	FLIPP, host
Annette Hou Olsen	Vestforbrændingen	**DK**	speaker and/or participant
Ari Nissinen	Nordic Council of Ministers/SYKE	**F**	NorLCA-NMR
Beatrice Kogg	FLIPP, IIIEE		
Beng Davidson	DG environment	**EU**	invited speaker
Björn Spak	SCA	**S**	speaker and/or participant
Bjørn-Erik Lønn	Nordic Ecolabelling Board	**N**	speaker and/or participant
Bodil Gillsander	IIIEE	**S**	organizer
Carl Dalhammar	FLIPP, IIIEE	**S**	speaker and/or participant
Catarina Thormark	Lund Institute of Technology	**S**	speaker and/or participant
Catharina Hohenthal-Juutsimo	KCL	**F**	speaker and/or participant
Charlotte Leire	IIIEE	**S**	speaker and/or participant
Christine Molin	NorLCA, Technical University of Denmark	**DK**	NorLCA proj.coordinator, organizer
Chris van Rossem	FLIPP, IIIEE	**S**	speaker and/or participant
Erik Svanes	Oestfold Research Foundation	**N**	speaker and/or participant
Frank Hugo Storelv	HÅG	**N**	keynote
Göran Finnveden	NorLCA, Royal Institute of Technology	**S**	board
Helena Dahlbo	SYKE	**F**	speaker and/or participant
Helga Bjarnadottir	NorLCA	**I**	board
Henrik Riisaard	Aalborg University	**DK**	speaker and/or participant
Henrik Wenzel	Technical University of Denmark	**DK**	speaker and/or participant
Inguun Saur Modahl	Oestfold Research Foundation	**N**	speaker and/or participant
Jacob Juul	Öresund Environment Academy	**DK**	organizer
Jacob Nyborg	Consultant	**DK**	participant 1 day
Jan Poulsen	LCA-center	**DK**	session moderator, PC-tools
Jeppe Frydendal	Ecolabelling Denmark	**DK**	speaker and/or participant
John Stern Nielsen	Novo Nordisk	**DK**	speaker and/or participant
Juha-Matti Katajajuuri	MTT agrifood research	**F**	speaker and/or participant
Jyri Seppala	SYKE	**F**	board
Katrin Besch	Tetra Pak AB	**S**	speaker and/or participant
Kim Christiansen	2.-O LCA consultants	**DK**	invited speaker
Lars Hansson, IIIEE	FLIPP, IIIEE	**S**	speaker and/or participant

Name	Affiliation	Country	Activity
Lennart Swanström	ABB Corporate Research	**S**	speaker and/or participant
Luis Mundaca	FLIPP, IIIEE	**S**	speaker and/or participant
Marcus Wendin	Miljögiraff	**S**	speaker and/or participant
Markus Lindahl	SCA	**S**	speaker and/or participant
Michael Hauschild	NorLCA, Technical University of Denmark	**DK**	board, chair
Michael Søgaard Jørgensen	Technical University of Denmark	**DK**	session chair
Mikkel Thrane	Aalborg University	**DK**	speaker and/or participant
Mikko Nousianen	Helsinki University	**F**	speaker and/or participant
Morten Søes Hansen	Technical University of Denmark	**DK**	speaker and/or participant
Mårten Karlsson	FLIPP, IIIEE	**S**	speaker and/or participant
Niki Bey	IPU	**DK**	speaker and/or participant
Ole Willum	IPU	**DK**	speaker and/or participant
Olli-Pekka Mäkirintala	Nokia	**F**	keynote
Per Christensen	Aalborg University	**DK**	board
Per Nielsen	Novozymes	**DK**	speaker and/or participant
Ragnheidur Olafsdottir	Landsvirkjun	**I**	invited presentation- no reimbur
Raul Carlsson	NorLCA, Chalmers University	**S**	board, project group
Sara Tollin	Akzo Nobel	**S**	speaker and/or participant
Sigridur Thormodsdottir	Nordic Innovation	**N**	cancelled
Stefan Gislason	Nordic Council of Ministers,Environice Consulting	**I**	invited speaker
Stig Hirsbak	International Organization for Standardization	**DK**	invited speaker
Stig Irving Olsen	NorLCA, Technical University of Denmark	**DK**	NorLCA, program & organizer
Søren Løkke	Aalborg University	**DK**	speaker and/or participant
Thomas Lindhqvist	IIIEE	**S**	FLIPP, co-organizer
Thomas Rydberg	NorLCA, Swedish Environmental Research Institute	**S**	board, project group
Tim McAloone	Technical University of Denmark	**DK**	chair & organizer of Design workshop
Tine Herreborg Jørgensen	Aalborg University	**DK**	speaker and/or participant
Yrjö Virtanen	MTT agrifood research	**F**	speaker and/or participant
Jyri Seppälä	SYKE	**F**	board
Cathrin Besch	Tetra Pak AB	**S**	speaker and/or participant
Johan Tivander	Chalmers University	**S**	speaker and/or participant
Sandra Häggström	Chalmers University	**S**	speaker and/or participant
Marte Reenaas	Norwegian University of Science and Technology	**N**	speaker and/or participant
Christian Solli	Norwegian University of Science and Technology	**N**	speaker and/or participant
Anders Hammer Strømman	Norwegian University of Science and Technology	**N**	speaker and/or participant

Own notes