**STRONG EXPERIENCE IN APPLYING LCA TO CUSTOMER CASES AND THE R&D CONTEXT**

The VTT has been among the pioneers of the development and implementation of the LCA approach. LCA is currently widely used at the VTT in research projects and customer work in many industrial branches. The VTT’s strength is the ability to combine strong competence in the LCA method with specific technological knowledge and expertise covering several industrial sectors. The VTT’s experts participate actively in the development of the LCA method and its applications both in Finland and internationally. The development work is often conducted based on sectoral approaches. New applications and areas of expertise include the carbon footprint and the water footprint.

**KCL-ECO: the VTT’s LCA software for professional and educational use**

KCL-ECO is a calculation software product that has been developed for the purposes of LCA. The commercially available software has been under development since 1992. The software includes the life cycle inventory and impact assessment phases and has a graphical interface. Transportation can be included in each flow and studied separately. KCL-ECO is applicable to all industries and for educational purposes.

For more information on the KCL-ECO software and licences, please contact: Minna Nors or Catharina Hohenthal.

**The VTT LIPASTO database provides information on transport emissions**

LIPASTO is a calculation system for traffic exhaust emissions and energy consumption in Finland (inventory tool). The LIPASTO website introduces the calculation system and its sub-models as well as current results. Information about the inventory of traffic emissions in Finland and unit emissions of traffic is publicly available and can be cited with reference to the source. Unit emission data are needed in, for example, LCA calculations of emissions for single vehicles, vehicle fleets and total emissions from the transport of products by a production plant.

For more information, see: [http://lipasto.vtt.fi/indexe.htm](http://lipasto.vtt.fi/indexe.htm)

**Additional information**

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Life cycle assessment supports green product and technology development

All products and services have environmental impacts during their production, use, and disposal. Life cycle assessment (LCA) provides several possibilities for analyzing the environmental impacts of industrial production.

The VTT has applied LCA to various industries including:
- pulp, paper and board
- printing
- packaging
- biomaterials
- forest management
- bioenergy
- wood
- mineral and metal
- construction
- design and engineering
- transport and logistics
- discrete production
- shipping and boats
- electronics

LIFE CYCLE THINKING IN THE CORE OF EUROPEAN ENVIRONMENTAL POLICY

The notion of LCA has been generally accepted within the environmental research community as the only legitimate basis on which to compare alternative products and services. Today, the life-cycle approach is adopted not only by researchers but also by strategies and policies of the European Union. It will become increasingly important for European industry to understand the meaning of the life-cycle approach and the need to adopt it.

DETAILED INFORMATION ABOUT THE ENVIRONMENTAL PERFORMANCE OF PRODUCTS

LCA addresses the environmental aspects and potential environmental impacts (e.g. use of resources and environmental consequences of releases) throughout a product’s life cycle from raw material acquisition through production, use, end-of-life treatment, recycling and final disposal (ISO14044).

SUPPORT FOR DECISION-MAKING

Existing standards provide a general framework and principles for the environmental management of products and processes. According to ISO 14040, LCA can assist in:
- identifying opportunities to improve the environmental aspects of products at various points in their life cycle;
- decision-making in industry, governmental and non-governmental organisations;
- the selection of relevant indicators of environmental performance, including measurement techniques; and
- marketing (e.g. environmental claim and eco-labelling schemes, including environmental product declarations).

Information about inputs and outputs and overall environmental performance is especially important in the context of new technology and product development. At the VTT, LCA is often applied in research projects to support the R&D activities towards environmentally sustainable solutions.

In addition to environmental performance evaluation, LCA studies can be complemented with economic and social evaluations. Life cycle costing, social LCA and qualitative evaluation methods.

POSSIBILITIES TO IMPROVE MATERIAL AND ENERGY EFFICIENCY AND OPTIMIZE LOGISTICS

A life cycle inventory consists of input-output analysis in which information of all inputs (raw materials, energy) and outputs (products, by products, emissions, waste) are defined. Life cycle inventory is a useful tool in analyzing material and energy efficiency over the life cycle of products.

An analysis of the inventory results reveals the critical life cycle phases with most reduction potential. Sensitivity analyses and different scenarios can also be applied to, for example, evaluating the impacts of different transport options, energy sources and raw materials.

IN-DEPTH CARBON FOOTPRINT ANALYSIS

The carbon footprint has rapidly become one of the most important sustainability indicators in business-to-business as well as customer communication. The carbon footprint is the amount of greenhouse gases produced during a product’s life cycle.

LCA is generally accepted as a reliable and consistent method for product-based carbon footprint calculations. The coming ISO 14067 standard for the carbon footprint of products is also based on the principles of LCA. The VTT is actively involved in the development of the standard and the carbon footprint calculation method.

WATER FOOTPRINT, A NEW CHALLENGE

The availability of fresh water resources is likely to be the biggest environmental and social concern of the coming decades. The water footprint is a new tool to understand and guide the development of water-saving products and processes. The product-based water footprint is a new indicator, and the definition of the concept and the methodology is still at the research phase.

Preparations for ISO 14046 – ‘Water footprint: Requirements and guidelines’ have started, and the development of the standard is expected to begin in 2011. The VTT is participating in the development process and is studying the possibilities of conducting water footprint calculations as a part of LCA studies.