

# Life cycle assessment of biofuels: Ongoing extension of the ecoinvent database

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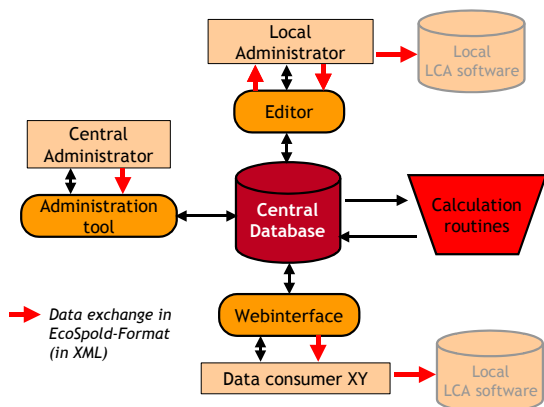


## Introduction

The ecoinvent database provides more than 2700 LCI datasets covering the areas energy supply, transportation, waste management, construction, chemicals, detergents, papers and agriculture with reference to Europe and Switzerland [1]. Several projects are ongoing for updating and extending the database. One of which deals with the investigation of bioenergy.

## Central Database

The central ecoinvent database has been developed building on past experiences with a large network-based LCI database developed at ETH Zurich [2].



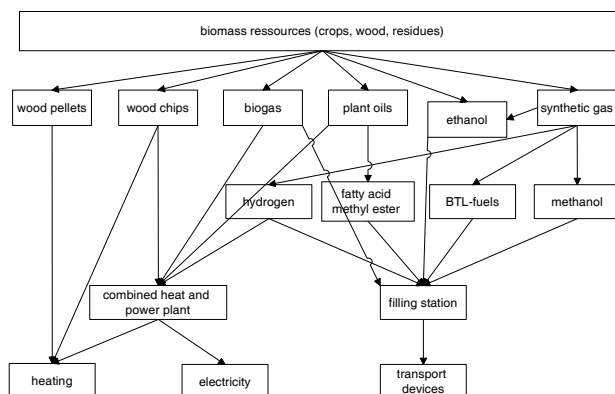
## Project LCI bioenergy

The aim of this project is to investigate data for biomass production, conversion to biofuels and its use e.g. for transport services. In general four stages of production can be distinguished (provision of the biomass, conversion to a fuel, distribution and use).

Within this project, the production and use of ethanol, biogas, BTL-fuels (biomass to liquid) and plant oils are investigated. The production of some agricultural products (grass, straw, rape seeds) is included in the analysis. Also important imported biofuel products are considered. The use of such fuels in different transport devices is investigated as well. LCI data of some biomass products are already available in ecoinvent data v1.2, e.g.:

- Forestry
- Agricultural products
- Wood fuels
- Use of wood for heating and CHP

The content shall be made publicly available via the web page [www.ecoinvent.ch](http://www.ecoinvent.ch). Further information on this project is available from [www.esu-services.ch/bioenergy.htm](http://www.esu-services.ch/bioenergy.htm).



## Work packages

The following work packages are investigated by a group of Swiss partners. Three different Swiss federal authorities (BAFU, BFE, BLW) and private enterprises finance the project.

<ul style="list-style-type: none"> <li>• CH agricultural products               <ul style="list-style-type: none"> <li>• Grass</li> <li>• Rape seed</li> </ul> </li> <li>• Imported agricultural products               <ul style="list-style-type: none"> <li>• Sugar cane, BR</li> <li>• Corn, US</li> <li>• Rye conventional, RER</li> <li>• Palm kernels, MY</li> <li>• Rape seed, DE</li> <li>• Sweet sorghum, CN</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Biomass conversion to fuels               <ul style="list-style-type: none"> <li>• Biogas</li> <li>• BTL-fuels</li> <li>• Ethanol from biomass</li> <li>• ETBE production with ethanol from biomass (Ethyl Tert-butyl Ether)</li> <li>• Oil-based biofuels</li> <li>• Gaseous fuels at service station</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Road transport services               <ul style="list-style-type: none"> <li>• Biofuels and alternative fuels</li> <li>• Individual recent emission standards</li> <li>• Waste management services</li> <li>• Sewage sludge incineration in cement kilns</li> <li>• Basic chemicals</li> </ul> </li> </ul>
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## Quality Guidelines

Quality guidelines have been developed in the project group in order to facilitate and harmonise the data acquisition process and to ensure a consistent and homogeneous life cycle inventory data compilation. Common rules are defined for issues such as carbon balances, pollutants reporting, land use, allocation procedures, fuel supply, uncertainties description, etc. These guidelines are compatible with the ecoinvent quality guidelines.

## Outlook

The consistent and coherent LCI datasets of basic processes make it easier to perform LCA studies, and increase the credibility and acceptance of their results and conclusions. The life cycle inventory data of bioenergy will be fully compatible to ecoinvent data v1.2. Thus, the next version of the ecoinvent database will provide a useful basis also for the evaluation of bio-fuels. The data shall be published in 2007 together with ecoinvent data v2.0. In a second part of the project different options of the use of bioenergy are compared and analysed in a full life cycle assessment.

## References

1. ecoinvent Centre, *ecoinvent data v1.2, Final reports ecoinvent 2000 No. 1-16*. 2005, CD-ROM, ISBN 3-905594-38-2, Swiss Centre for Life Cycle Inventories: Dübendorf, CH. [www.ecoinvent.ch](http://www.ecoinvent.ch).
2. Frischknecht R, Jungbluth N, Althaus H-J, Doka G, et al., *The ecoinvent Database: Overview and Methodological Framework*. Int J LCA, 2004. 10(1): p. 3-9. <http://dx.doi.org/10.1065/lca2004.10.181.1>.