



# ECOINVENT 2000

## the Swiss National Life Cycle Inventory Database

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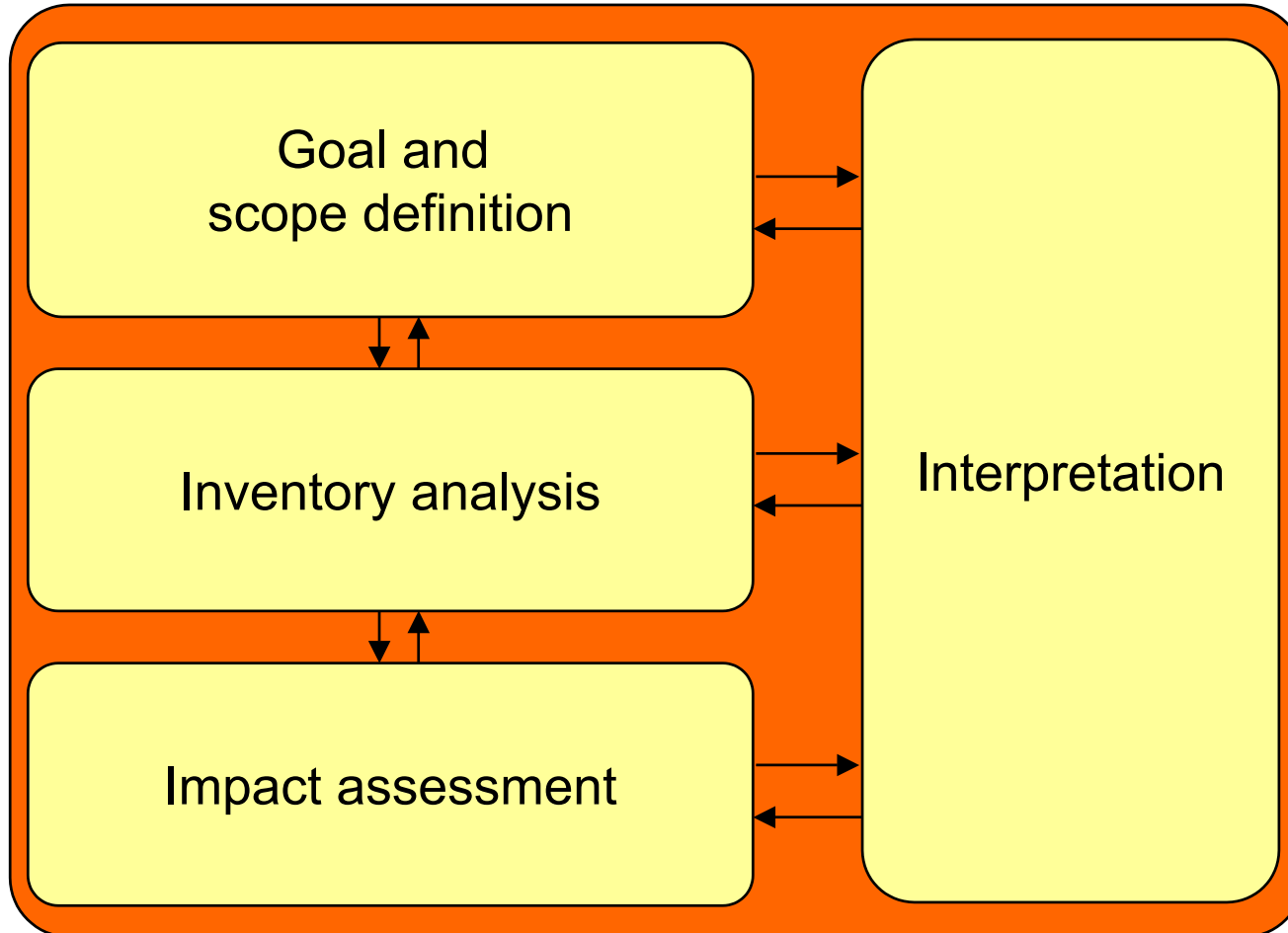
# Content

- Introduction
- Database Content
- Technical Aspects
- Fields of Application
- Outlook





# Life Cycle Assessment





## Problem Setting

- Various LCI databases in Switzerland
- Diversity in approaches
- Database maintenance beyond expertise
- Incompatibility between various LCI datasets
- No linkage between LCI data, e.g. energy <-> agriculture





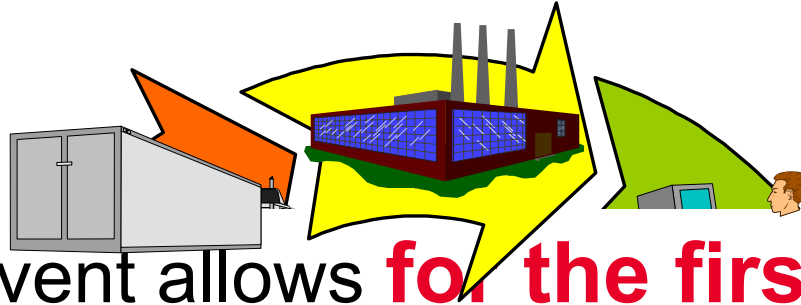
## Aims of Ecoinvent 2000

- Centralised, web-based LCI database
- Up-to-date harmonised LCI and LCIA data for Swiss / European LCA applications
- New benchmark setting in area of LCI database

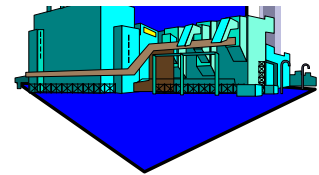
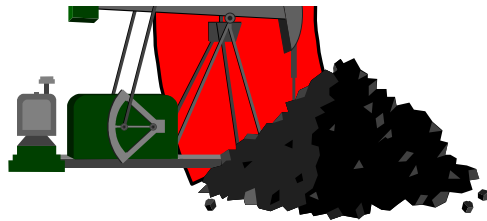




# Your Benefit

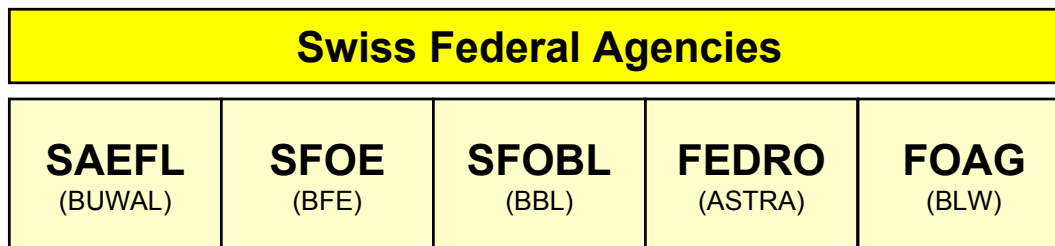


Ecoinvent allows **for the first time**  
 to calculate **complete value added chains**  
 from Cradle to Grave !



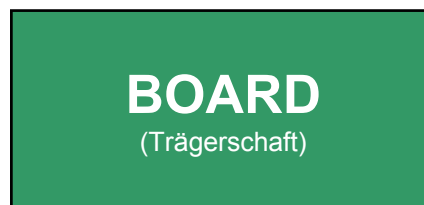


# Project Partners



Central Administrator :

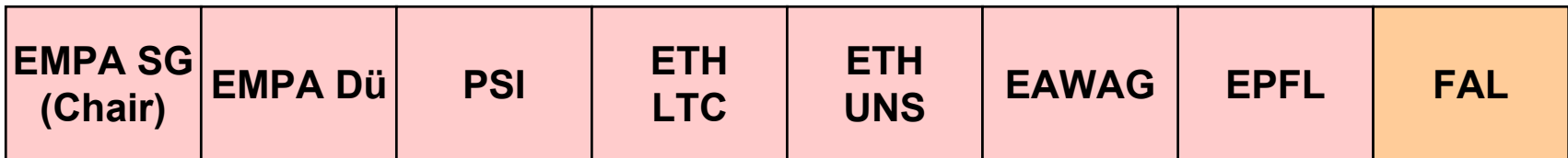
**R. Frischknecht**



Technical part :

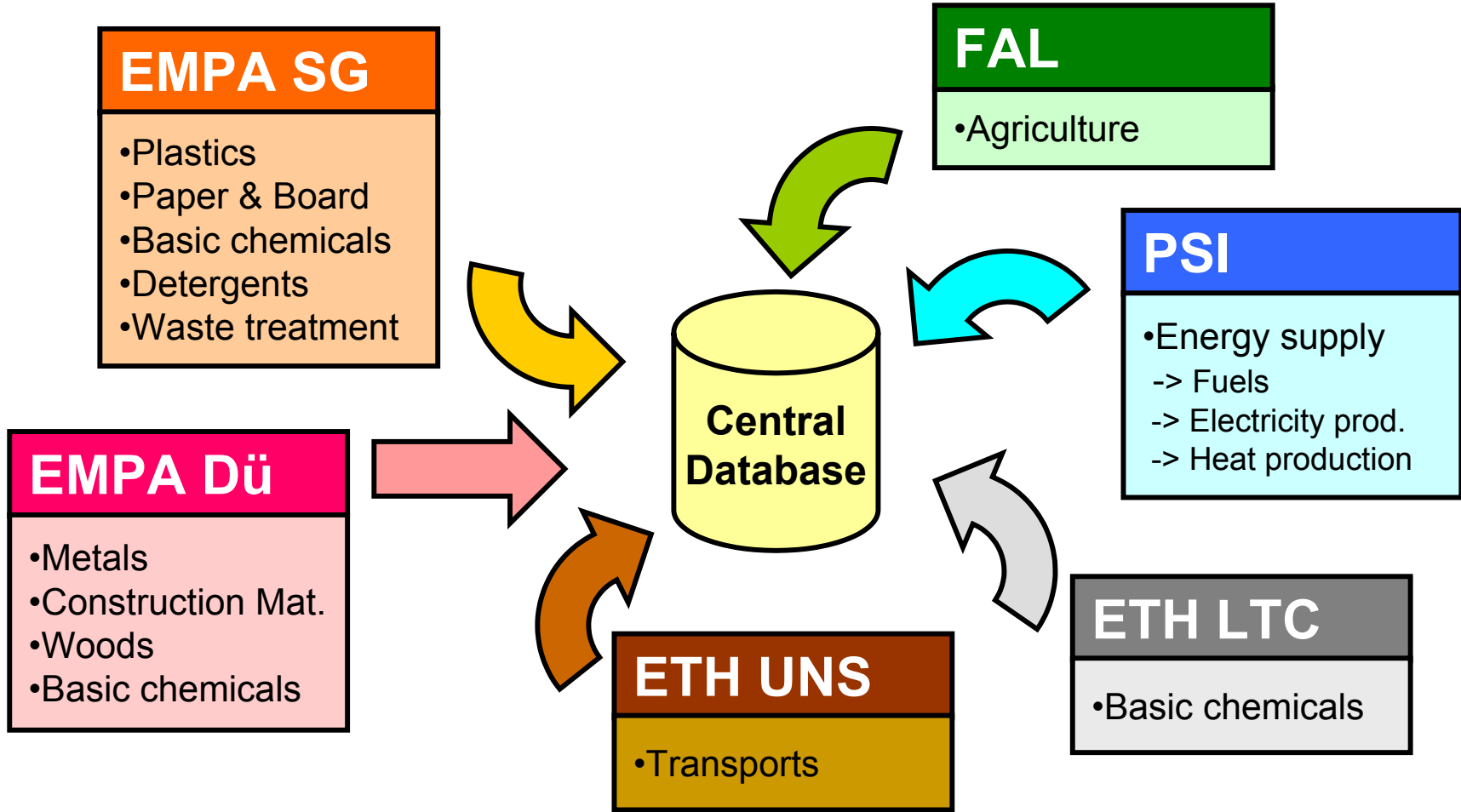
**IFU** (Hamburg)

## Center for Life-Cycle Inventories in the ETH Domain





# Database Content





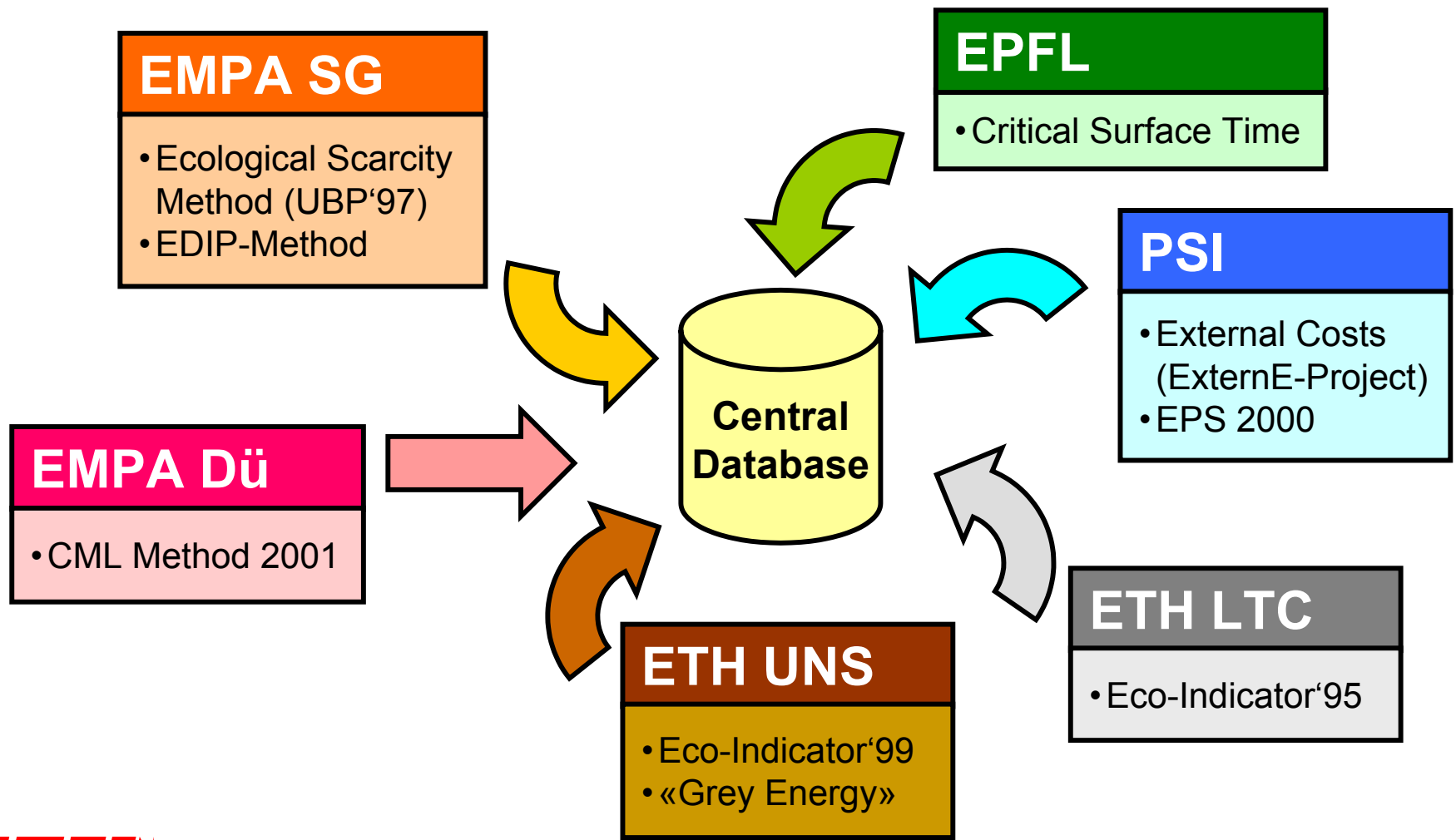
# Database Content (II)

<b>Energy</b>	oil	<b>Materials</b>
	natural gas	
	lignite	
	hard coal	
	wood energy	
	nuclear power	
	hydro power	
	wind power	
	photovoltaic	
	solar collector	
electricity	construction materials	
heat pumps	insulation materials	
district heating	construction processes	
cooling	metals	
transport systems	wooden materials	
waste management	biomass	<b>Agriculture</b>
water supply	agricultural production	
	agricultural means of production	
	food industry	<b>Cons.</b>
	private consumption	
	others	



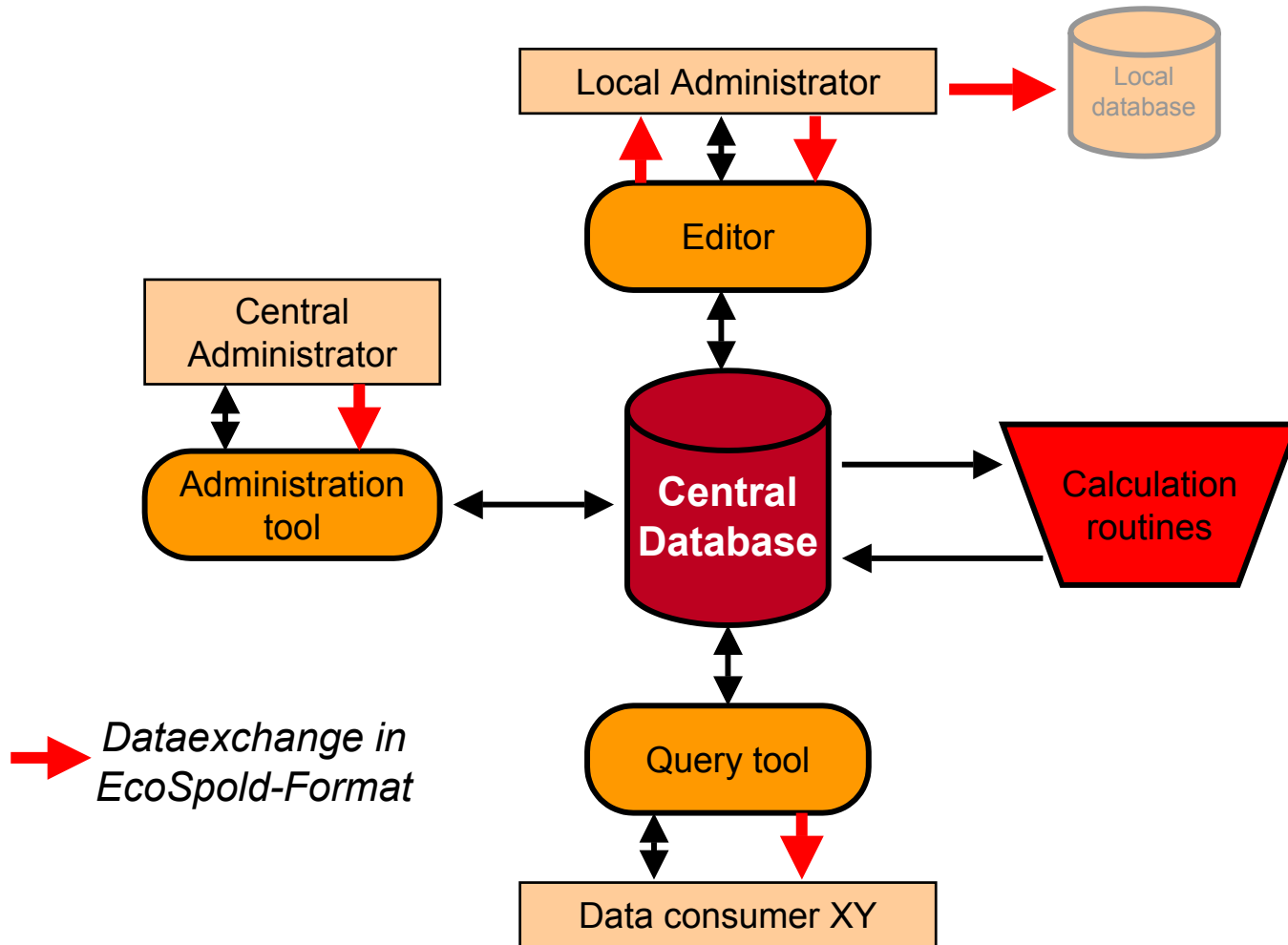


# Database Content (III)





# Architecture of Ecoinvent 2000





# Data (Exchange) Format: EcoSpold Format

- Based on Spold'99 format
- XML (Extended Markup Language):
  - adjustable to different requirements
  - downward compatibility
  - using XML schemes instead of Document Type Definitions (DTD)





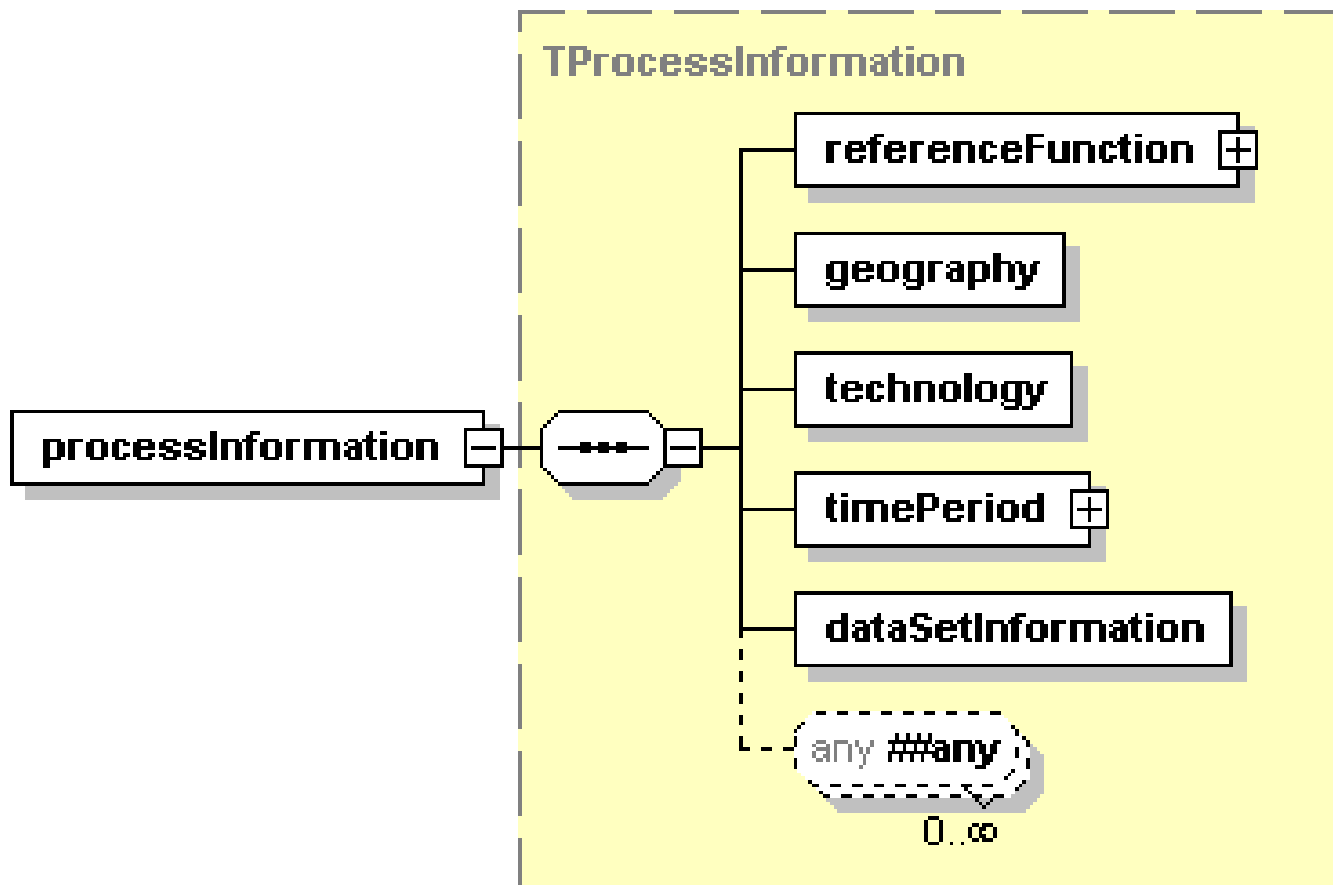
# Data (Exchange) Format: Content

- Meta information
  - process information
  - modelling and validation
  - administrative information
- Flow data:
  - Exchanges (emissions / resource extraction)
  - Allocation





# Data (Exchange) Format: Details for Process Information





hardwood, to forest road - Microsoft Internet Explorer

Adresse: C:\ecoinvent\ecospcold\EcoSpold\_Examples\EcoSpold\_Examples\_0.3.3\Laubrundholz\_0.3 Version Hir210102.html

Dataset	Flow Data
hardwood, to forest road	...
power sawing, with catalytic converter	...
power saw, with catalytic converter	...
construction, forest road	...

**hardwood, to forest road (#1)**

Indexnumber: 1  
 Generator: EcoInvent Excel2EcoSpold 0.6  
 Timestamp: 2002-01-13T23:12:33  
 Valid company codes: CompanyCodes.xml  
 Valid regional codes: RegionalCodes.xml  
 Valid eco categories: EcoCategories.xml  
 Valid units: Units.xml

Table of Content

Meta information	hardwood, to forest road
<i>Process information</i>	hardwood, to forest road
Reference function	hardwood, to forest road
datasetRelatesToProduct	no
name	hardwood, to forest road
localName	Laubholz, an Waldstrasse
infrastructureProcess	no
amount	1
unit	m3
category	wooden materials
subCategory	extraction
localCategory	Holzbaustoffe
localSubCategory	Gewinnung
includedProcesses	planting, caring, harvesting (by chain saw) and transport to the nearest forest road of hardwood
generalComment	The data are measured in Germany. It can be assumed that they are valid for all of Europe. The environmental impacts are allocated to the products by value. Die Synonyme wurden beim Testen des Editors von Hir eingetragen.
infrastructureIncluded	0
Synonyms	Hartholz bois dur
<i>Geography</i>	hardwood, to forest road
location	RER
text	Assumption for production in Europe based on measurements in Germany

file:///C:/ecoinvent/ecospcold/EcoSpold\_Examples/EcoSpold\_Examples\_0.3.3/Laubrundholz\_0.3 Version Hir210102.html#dataset4dataset

Start | Microsoft Excel - Mapped | hardwood, to forest r... | 09:52





hardwood, to forest road - Microsoft Internet Explorer

Datei Bearbeiten Ansicht Favoriten Extras ?

**Process Information** *hardwood, to forest road*

Reference function *hardwood, to forest road*

datasetRelatesToProduct	no
name	hardwood, to forest road
localName	Laubholz, an Waldstrasse
infrastructureProcess	no
<b>amount</b>	1
unit	m3
category	wooden materials
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infrastructureIncluded	0

**Geography** *hardwood, to forest road*

location	RER
text	Assumption for production in Europe based on measurements in Germany

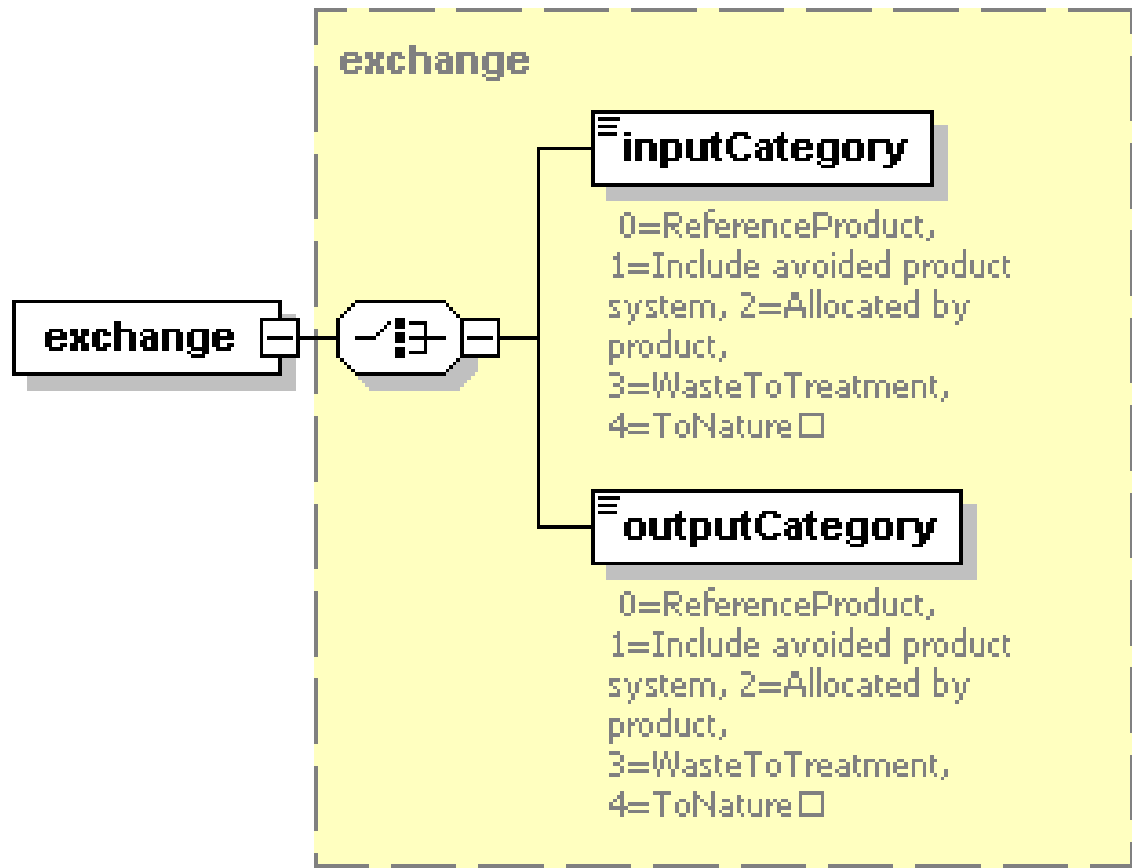
**Technology** *hardwood, to forest road*

Arbeitsplatz





# Data (Exchange) Format: Details for Exchange





hardwood, to forest road - Microsoft Internet Explorer

Adresse file:///C:/ecoinvent/ecospold/EcoSpold\_Examples/EcoSpold\_Examples\_0.3.3/Laubrundholz\_0.3%20Version%20Hir210102.html#dataset1flowData

### Flow Data

Exchanges

From Nature

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
5	Carbon dioxide, in air		yes	1190.8	kg	lognormal
4	Occupation, forest, intensive		yes	2142.85714285714	m2a	lognormal

From Technosphere

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
3	construction, forest road	RER	yes	7.71428571428571E-02	m	lognormal
2	diesel, burned in building machine	GLO	yes	1.42428571428571	MJ	lognormal
1	power sawing, with catalytic converter	RER	yes	0.9624	h	lognormal

Allocated By-product

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
7	residual wood, hardwood, at forest road	RER	yes	0.49	m3	lognormal
6	round wood, hardwood, at forest road	RER	yes	0.51	m3	lognormal

### Detailed Exchanges

From Nature

Occupation, forest, intensive (4)

local Name	mean Value	2142.85714285714
local Category	min Value	
local Subcategory	max Value	
CAS Number	mostlikely Value	
formula	coefficient of Variance	0.0
general Comment	reference to Source	
	page Numbers	

Carbon dioxide, in air (5)

local Name	mean Value	1190.8
local Category	min Value	
local Subcategory	max Value	
CAS Number	mostlikely Value	
formula	coefficient of Variance	0.0
general Comment	reference to Source	
	page Numbers	

From Technosphere





hardwood, to forest road - Microsoft Internet Explorer

Flow Data hardwood, to forest road

Exchanges hardwood, to forest road

From Nature hardwood, to forest road

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
resource/in air						
5	Carbon dioxide, in air		yes	1190.8	kg	lognormal
resource/land						
4	Occupation, forest, intensive		yes	2142.85714285714	m2a	lognormal

From Technosphere hardwood, to forest road

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
3	construction, forest road	RER	yes	7.71428571428571E-02	m	lognormal
2	diesel, burned in building machine	GLO	yes	1.42428571428571	MJ	lognormal
1	power sawing, with catalytic converter	RER	yes	0.9624	h	lognormal

Allocated By-product hardwood, to forest road

Number	Name	Location	Infra	Mean value	Unit	Uncertainty type
7	residual wood, hardwood, at forest road	RER	yes	0.49	m3	lognormal
6	round wood, hardwood, at forest road	RER	yes	0.51	m3	lognormal

Detailed Exchanges hardwood, to forest road

From Nature hardwood, to forest road

Occupation, forest, intensive (A)

Arbeitsplatz





## Procedure Data Compilation

- Data supply by individual institutes on a unit process level
- Only direct (in situ) Emissions and requirements
  - => Maximum transparency
  - => Full compatibility





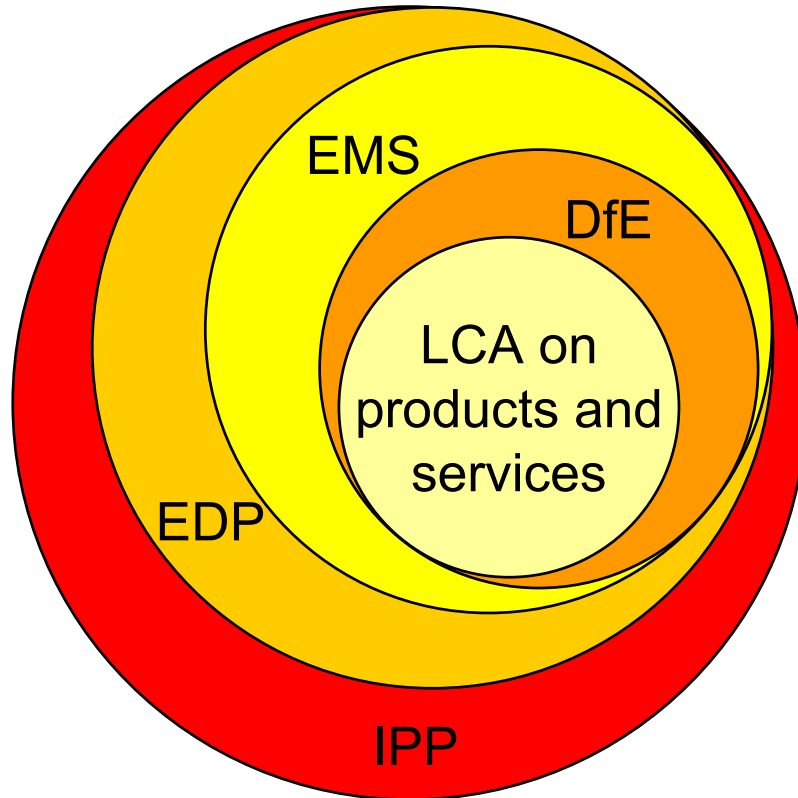
# Unit Process Data

		Unit Processes	
		Transport by Crude Oil Carrier	Heavy Fuel Oil from Refinery
unit		tkm	t
<i>(i) From / To Technosphere</i>			
Transport by Crude Oil Carrier	tkm	1	-10'000
Heavy Fuel Oil from Refinery	t	-1.80E-06	1
<i>(ii) To Nature:</i>			
CO2, Carbon dioxide	g	5.5	180000
SOX, Sulphur oxides	g	0.13	1000
NMVOC	g	8.30E-04	500





# Application of Ecoinvent 2000 Database



- DfE - Design for Environment
- EMS - Environmental Management Systems
- EDP - Environmental Product Declaration
- IPP - Integrated Product Policy





## Outlook I

- XML to facilitate LCI data exchange between LCA software
- Efficient inversion routines for large sparse matrices
- Compatibility with international standards





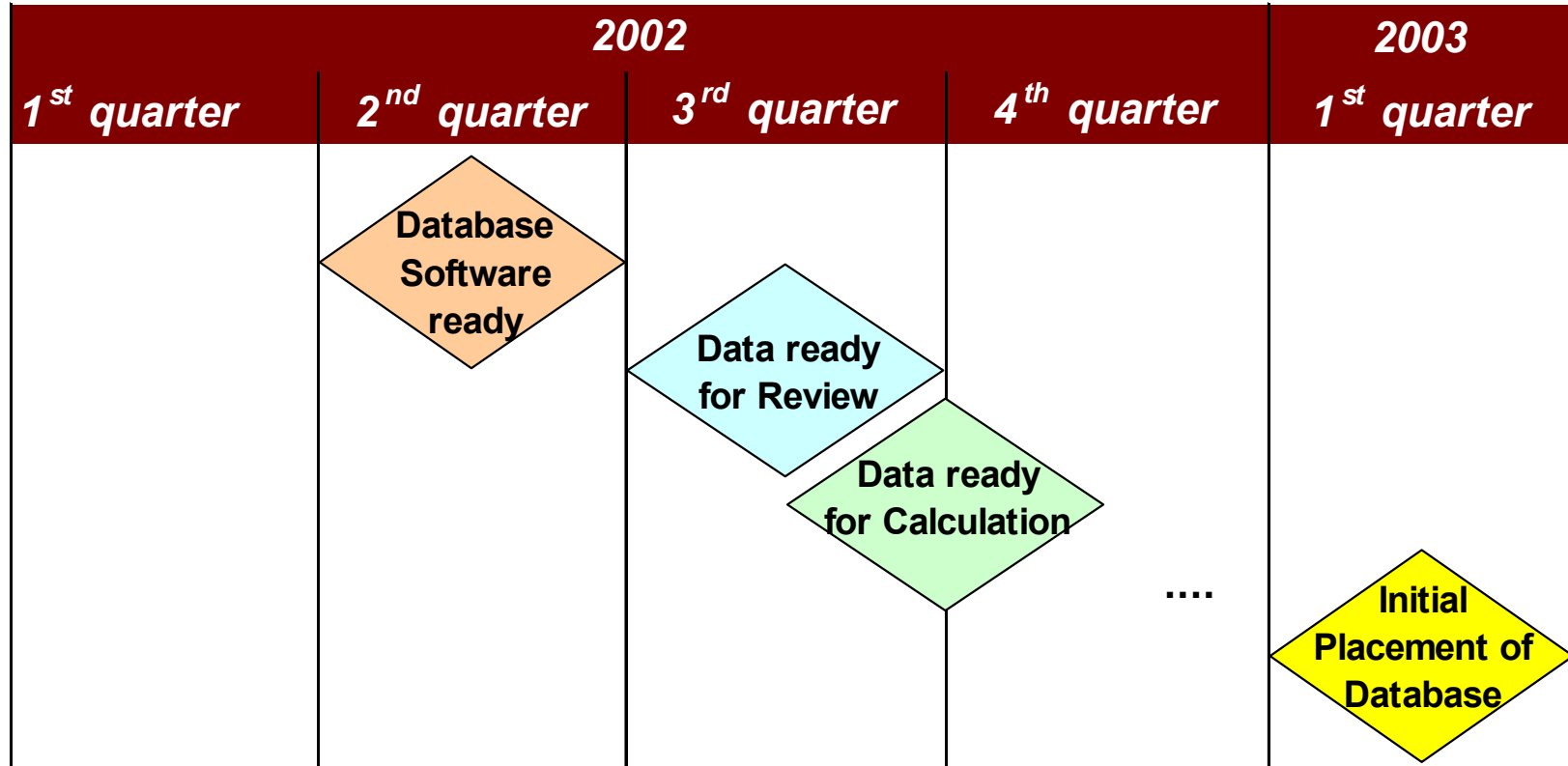
## Outlook II

- Regular update of database content
- Continuous improvement of database
- Include additional economic sectors
- Establish Swiss competence center on Life Cycle Assessment





# Schedule





Further Information at:

[www.ecoinvent.ch](http://www.ecoinvent.ch)

