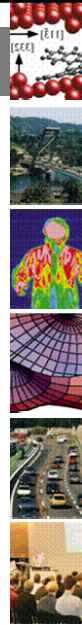


# Strategic Position of Life Cycle Assessment Databases in the Context of Sustainable Development

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## Content

### [i] introduction

- Life Cycle Assessment
- Life Cycle Inventory / Inventory Database

### [ii] ecoinvent

- What is ecoinvent ?
- Who is behind ecoinvent ?
- Where to find / how to use ?

### [iii] Sustainable Development / Integrated Product Policy (IPP)

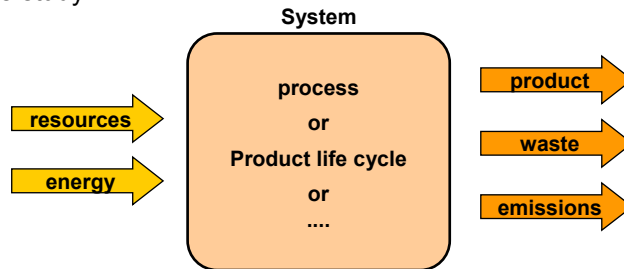
### [iv] ecoinvent in the context of SD/IPP

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## What is Life Cycle Assessment (LCA) ?

1. **Establishing** the **exchanges** of a system with its environment = Input-Output relation
2. **Assessment** of **environmental relevance** of these inputs and outputs
3. Interpretation of the results by taking into account the primary goals of the study ...



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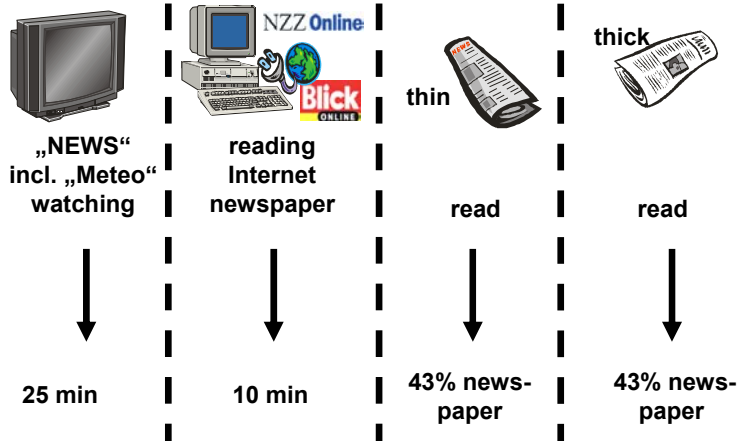
## an Example ...



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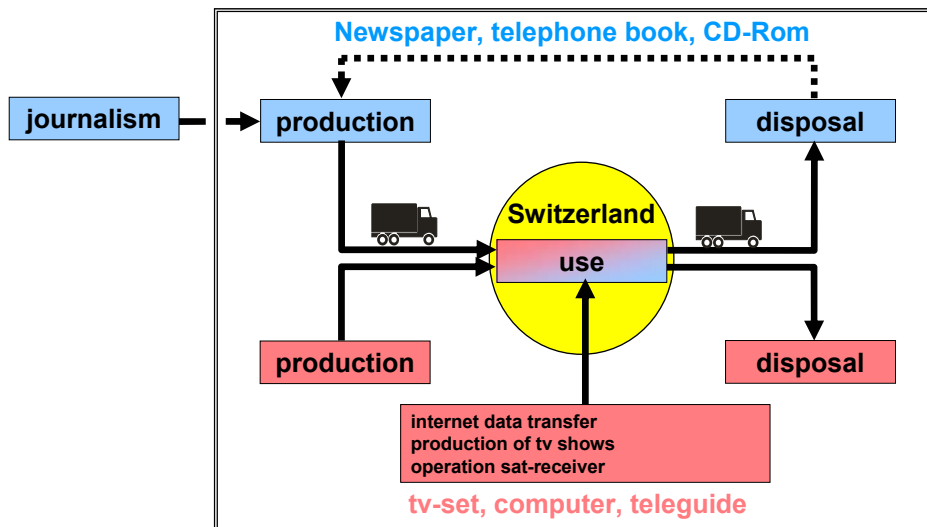
## an Example ...



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## an Example ...



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# an Example ...

Betriebliche Adressen 1998		Umschlag	Infotel / BusinessNo.	Verz.Dept. / Bestoff.
<b>1. Input</b>				
1.1 Energie				
Elektrizität	9526 MWh	1.18E-03	3.44E-02	2.26E-03
Heizöl	3371 MWh	3.38E-05	9.85E-04	6.56E-05
1.2 Material				
Papier, Total		35.72	198.15	41.28
schwarze Druckfarbe	262 t	4.78E-02	1.49E+00	9.30E-02
farbige Druckfarbe	346 t	0.00	1.71	0.11
Druckplatten	41 t	6.86E-03	2.00E-01	1.33E-02
Entwickler	19513 L	8.79E-04	2.56E-02	1.71E-03
Fixierer	372 L	1.06E-03	3.16E-02	2.11E-03
Wasser				
	17318 m3	1.29E-06	3.77E-05	2.51E-06
Gummilücher	81 kg	1.39E-02	4.01E-01	2.67E-02
Feuchtwasserzsilze	39000 L	6.61E-03	1.93E-01	1.29E-02
DW Waschmittel VOC	666 L	1.19E-04	3.36E-03	2.24E-04
DW Waschmittel nonVOC	56530 L	7.75E-03	2.26E-01	1.51E-02
Schmeiss	4454.3 L	7.57E-04	2.23E-02	1.47E-03
Kältemittel R22	13 kg	2.21E-03	6.43E-02	4.26E-03
Packmittel	32 t	5.44E-03	1.56E-01	1.06E-02
Karton	9 t	1.53E-03	4.46E-02	2.97E-03
<b>2. Output</b>				
2.1 Produkte				
Druckzeugnisse	32148 t	32.38	179.63	37.42
2.2 Emissionen Luft				
CO	145.6 kg	0.02	0.50	0.03
CO2	853000 kg	101.44	2955.13	197.01
CH4	12.1 kg	0.00	0.04	0.00
N2O	669 kg	7.86E-02	2.39	1.59E-01
N2O	6.5 kg	7.73E-04	2.26E-02	1.50E-03
SOx	810 kg	9.63E-02	2.81	1.87E-01
Staub	0.9 kg	1.07E-04	3.12E-03	2.06E-04
NM/VOC (Feuerung)	20 kg	0.00	0.07	0.00
NM/VOC (Prozess)	1.43 kg	1.43	41.56	2.77
2.3 Emissionen Wasser				
Abwasseremenge Total	17318 m3	1.29E-06	3.77E-05	2.51E-06

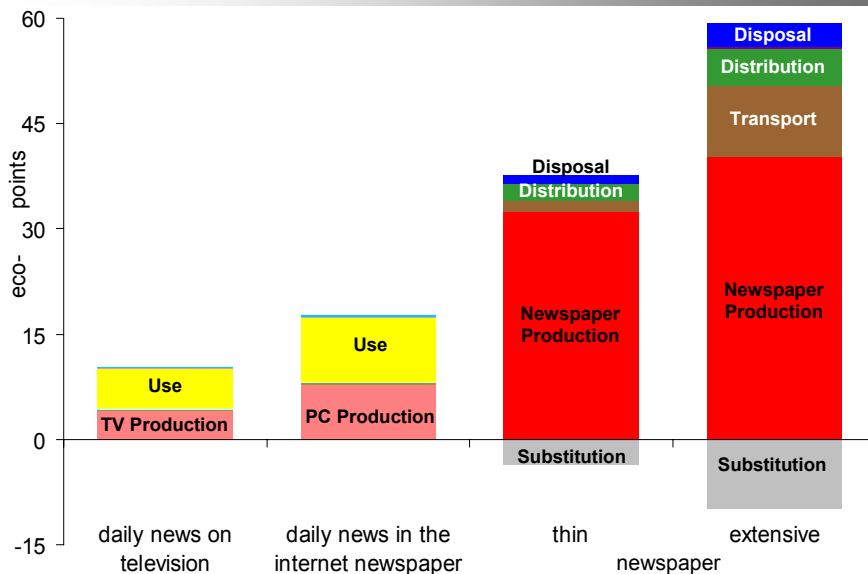
## INVENTORY

- energetic resources
- resources
- air emissions
- water emissions
- soil emissions
- waste

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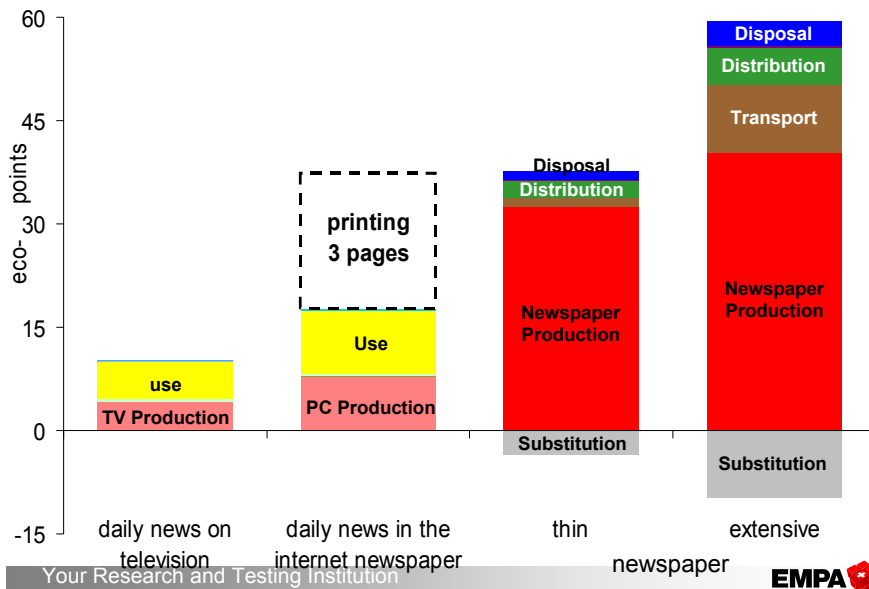
# an Example ...



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## an Example ...



## Life Cycle Inventories - what's this ?

- **Input-Output-Data** of a specific process / a specific material
- A life-cycle inventory database contains **Standard-Data** for often used processes / materials
- **facilitates** to the user to **establish** an LCA



## Goals of ecoinvent

Establish a database ...

- with a huge amount of **harmonised, quality insured** and **updated** Life Cycle Inventories of materials and processes,
- valuable for **Swiss** and **western European** conditions,
- publicly **accessible** via Internet (Access fee !) and
- updated in a regular manner ( = **every 2 to 3 years** new calculated).

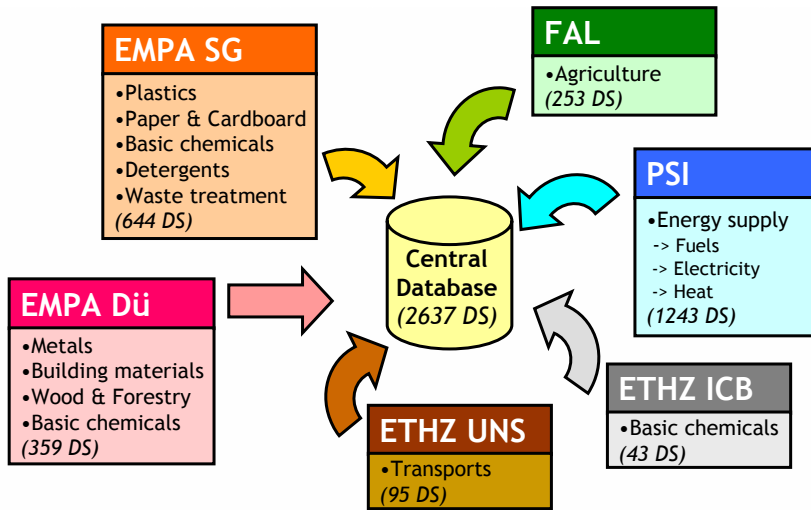
Therefore this database allows to the industry ...

- a **much easier and faster** establishing of LCA's, and
- **strengthen** thus **acceptance & reliability** of its calculated results.

## Data collection

- Data delivered as unit process raw data  
(exception APME plastics data)
- Connected to product systems in the ecoinvent database
  - maximum transparency,
  - maximum consistency,
  - maximum flexibility (punctual updates, if necessary),
  - maximum co-ordination effort.
- More than 2'500 unit processes =  
more than 2'500 product systems !

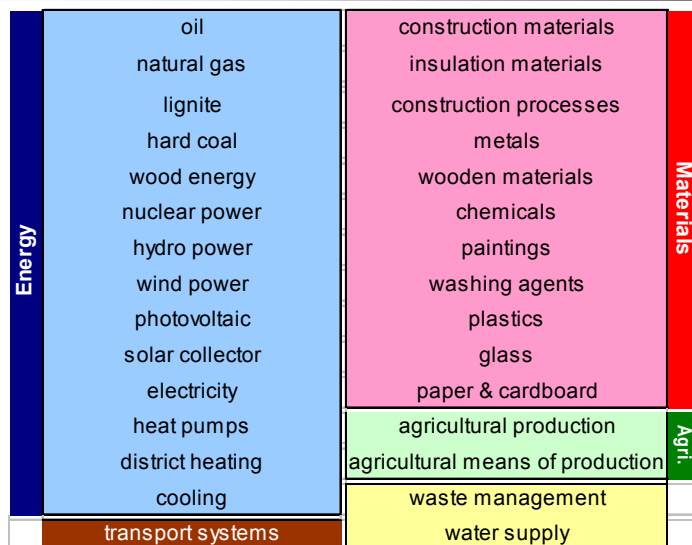
## Content: economic sectors covered



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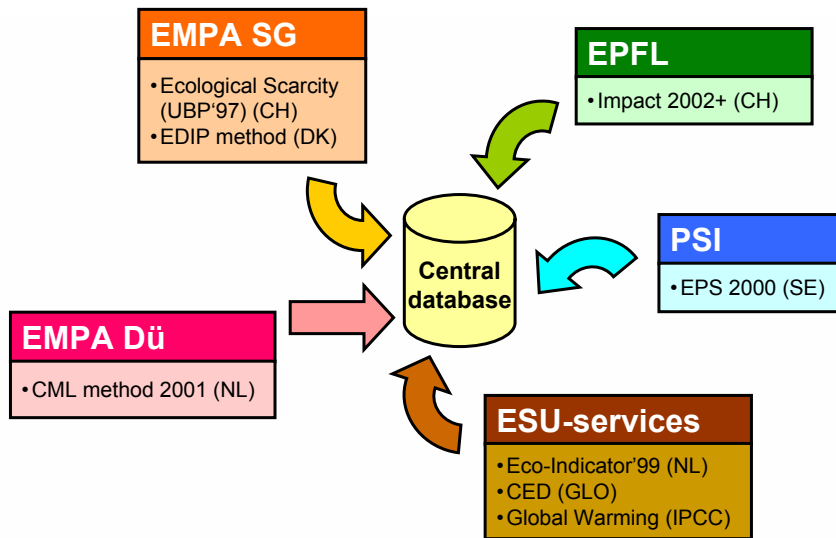
## Content: the different data categories



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## Content: the LCIA methods included



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## ecoinvent and LCA tools

	ecoinvent database	SimaPro 6.0	Umberto 4.3
Release, maintenance, and update of large background databases	+++	+	+
Online access to database	+++	-	-
Uncertainty assessment	+++	+++	-
Daily LCA case studies work	-	+++	++
Company's material and energy accounting	-	+	+++
Parametrised modelling	-	-	+++
Process trees, contribution analysis	-	+++	+++




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## Access and Costs

- Project costs (Cash): 1.15 Mio EUR  
(shared by: 1/3 ETH Domain, 2/3 Federal Offices)  
plus 1.2 Mio EUR own contributions
- Product costs: costs for access toecoinvent Data v1.0:
  - Guests free of charge
  - Members EUR 1'200.- (excl. VAT)
- Periodical update planned (every 2-3 years)
- Extension with additional sectors planned, e.g.:  
Mechanical engineering, electronics, building services,  
wastes / sludges at metal extraction

## History of Sustainable Development

		<i>View of industry</i>
1960 s	Confrontation 	Deranging people, Rejection
1970 s 1980 s	Recession 	Costs, Work
1990 s	Sustainable Development 	Taking into account - advantages - risks

## Sustainable Development ...

“Sustainable development is a development that is able to meet the needs of the present generation **without** resulting in restrictions that would keep future generations from meeting their respective needs.”

*Brundtland Report, 1987*



**inter-temporal contract between successive generations**

## Situation in Switzerland

### Swiss Constitution (1999)

#### Article 2 *Aims*

<sup>1</sup> The Swiss Confederation shall protect the liberty and rights of people and safeguard the independence and security of the country.

<sup>2</sup> It shall promote the common welfare, the sustainable development, the internal cohesion and the cultural diversity of the country.

<sup>3</sup> It shall seek to guarantee the greatest possible equality of opportunity.

<sup>4</sup> It shall commit itself to supporting the long-term preservation of natural resources and in favour of a just and peaceful international order.

⋮

#### Article 73 *Sustainable Development*

The Confederation and the Cantons shall work to establish a lasting equilibrium with nature, in particular enhancing both its capacity to renew itself and the way it is used by man.

(Swiss Constitution 1999, English edition, see [www.admin.ch](http://www.admin.ch))

## Situation in Switzerland

Swiss Constitution

... Governmental reaction



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## Swiss strategy

**Plan of Action (10 action areas with 22 measures)**

### Action Areas:

- Economic policy and public services
- Financial policy
- Education, research, technology
- Social cohesion
- Health
- Environment and natural resources
- Spatial and settlement development
- Mobility
- Development cooperation and the promotion of peace
- Methods and instruments

*[Swiss Federal Council, 2002]*

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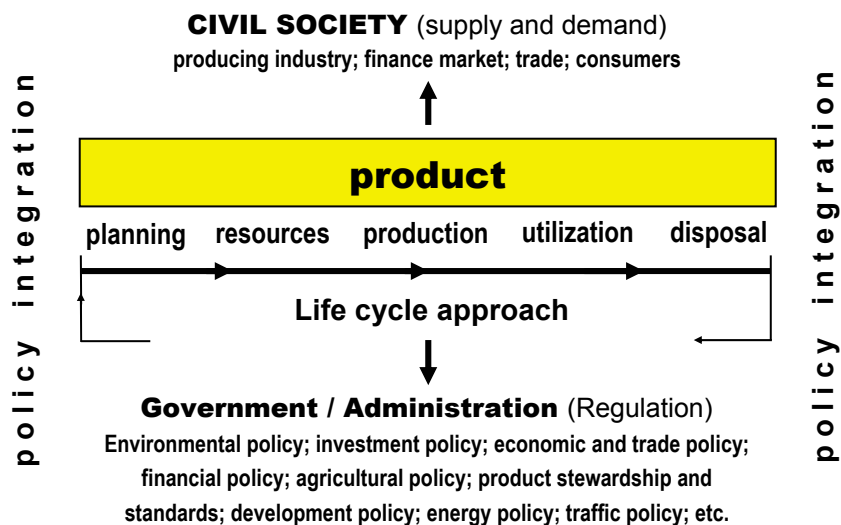


## Action area 2 "Financial policy"

### Measure 4 "Introduction of an integrated product policy"

- Principles of sustainable development on the product level (goods and services)
- Shift public sector and consumer demand towards products that meet **high economic, environmental and social standards**
- Stringent economic, environmental and social requirements throughout the whole life cycle of products
- **Principles of IPP** at every stage in the formulation and implementation of policies relating to products
- Criteria and instruments for all policies of relevance to IPP

## Integrated Product Policy (IPP)



## Integration of IPP in Switzerland

### 7 domains for implementation among others

- Public procurement
  - goods and services
  - Buildings
- Agriculture
- Product responsibility
- Competence center for Life Cycle Assessment

Further infos: [www.environment-switzerland.ch/products](http://www.environment-switzerland.ch/products)

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## Competence Center for Life Cycle Assessment

*„Making high quality ecological data available with a view to carrying out and evaluating quantitative life cycle analyses. Creating the basis for calculating e.g. grey energy, product life cycles and external costs.“*

- **Central idea of creating such a center in the framework of IPP:**
  - Creating **confidence** to quantitative life cycle considerations
  - **Promotion** of the **application** of such life cycle considerations
- **Implementation in the environmental area:**
  - high quality data
    - => **ecoinvent Center - Swiss center for LCI**
  - application of these data, scientifically founded and oriented to practice
    - => **ecoinvent Competence center for LCA**

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## Realization of SD / IPP

### IF

- Sustainable development shouldn't stay only a theoretical concept – but result in changes according to Rio'92 / Johannesburg 2002
- Sustainable development, especially in its translation of IPP, shall be introduced into the political system,
- Sustainable development shall become operational and measurable

### THEN

- all actors involved need as THE basis of their actions reliable facts & figures;

### As it is a truth that ...

- *«what is not measurable is not manageable».*

## Consequences

- There is only ONE way to establish the necessary basis for a reliable integrated product policy ...
- to make complete calculations of real existing value-added chains with
  - Data for each single step available,
  - Data, that can be trusted really,
  - Data, that are quality insured.

### Thus:

- There is no other way than to establish comprehensive Life Cycle Inventory Databases

## Consequences

### ■ Life Cycle Inventories =

Basis for an **Integrated Product Policy (IPP)**

### ■ Integrated Product Policy (IPP) =

Basis for an actual implementation of **Sustainable Development (SD)**

→ This unbreakable connection between sustainable development, integrated product policy and life cycle inventories shows the **strategic importance** of the latter ones ...

*“Without Life Cycle Inventories  
there is no Sustainable Development.”*

P.W. Gilgen, Empa

## International integration

As value-added chains in the real world will NOT stop at national boarder lines of a economic region (e.g. county of Sao Paulo), their representation in a Life Cycle Inventory database shall NEITHER be limited to national systems:

**The Commission should also support the creation of a “harmonised European life cycle analysis database“. This would supply data for product declarations, possibly joining up with the UN environmental programme, which is already involved in this area (ED 28/08/02).**

Quelle: Europe's Environmental News Service (ENDS), Issue 1305 / Thursday, October 10, 2002; <http://www.environmentdaily.com>

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## International integration



-> SETAC Europe Working Group  
«Data availability & Data Quality» (1998 - 2001)

-> Coordination WG 3 «Data base» within  
COST Action 530 «Sustainable Materials Technology -  
Life Cycle Inventories for Environmentally Conscious  
Manufacturing Processes» (2001 - 2006)



-> project proposal (work in progress)  
development of a common European data (exchange)  
format

-> UNEP-SETAC Life Cycle Initiative; LCI programme  
active participation in TF2 (Rolf Frischkencht), TF3  
(Roland)



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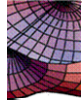
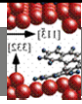
Thank you for your attention ...

Strategic Position of  
Life Cycle Assessment  
Databases in the Context  
of Sustainable Development

More Information:

[www.empa.ch/tsl](http://www.empa.ch/tsl)  
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