



Swiss Centre for Life Cycle Inventories

A joint initiative of the
ETH domain and Swiss
Federal Offices

ETH



3rd International ecoinvent Meeting

ecoinvent v3 – an introduction to the new features & data

Saint-Malo, France, October 5, 2012



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ecoinvent a common platform for your LCI datasets

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- Available Tools
 - Quality Guidelines & EcoSpold v2
 - Editorial Board
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ecoinvent
data **v3**

LCIA Results

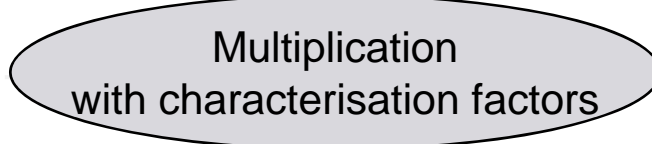
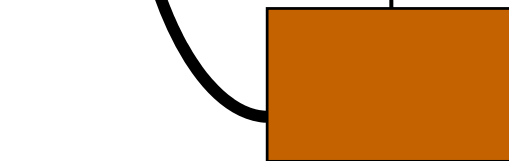
**System Expansion
approach**

**Allocation
approach**

**Cumulative
LCI Data**

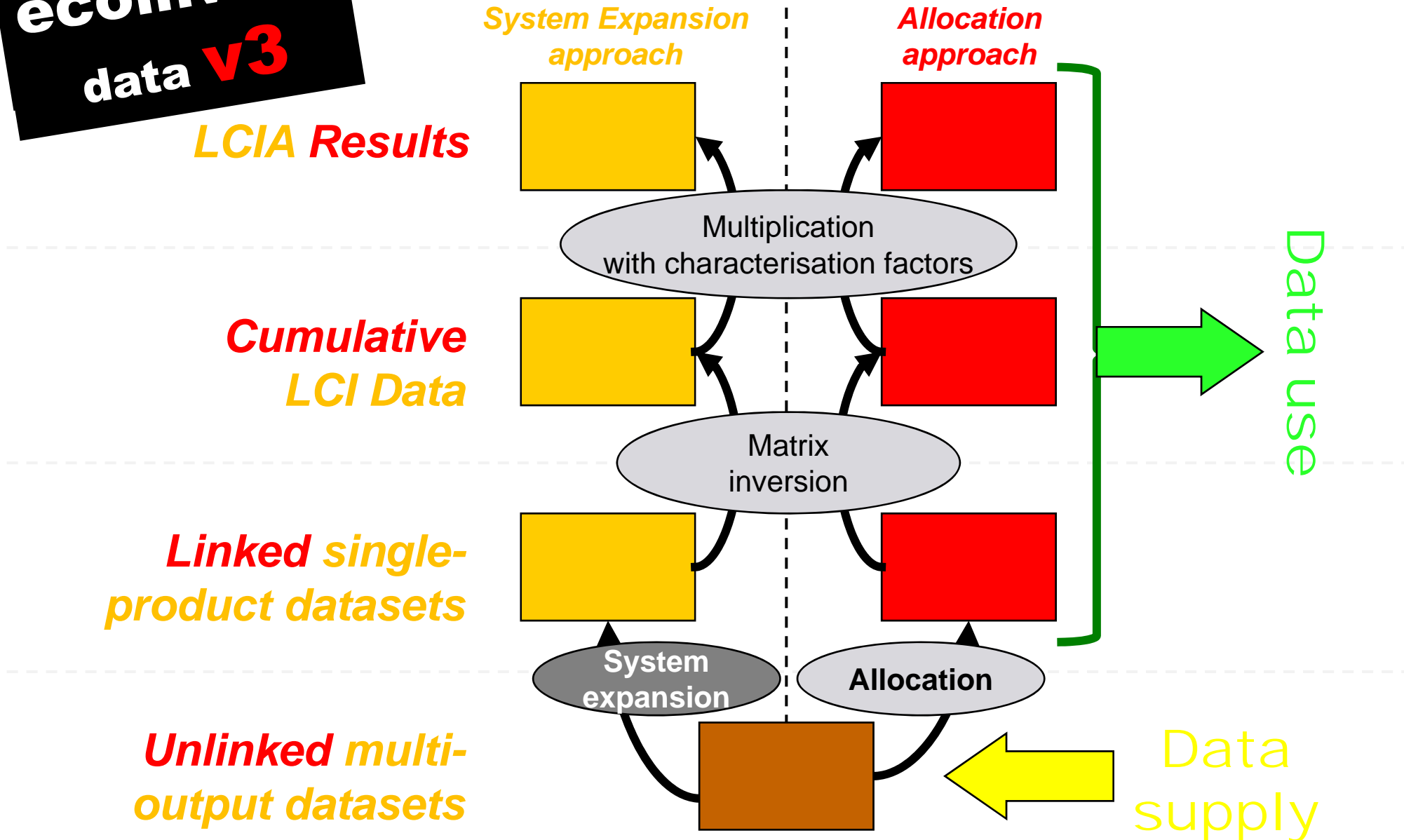
**Linked single-
product datasets**

**Unlinked multi-
output datasets**



Data use

**Data
supply**

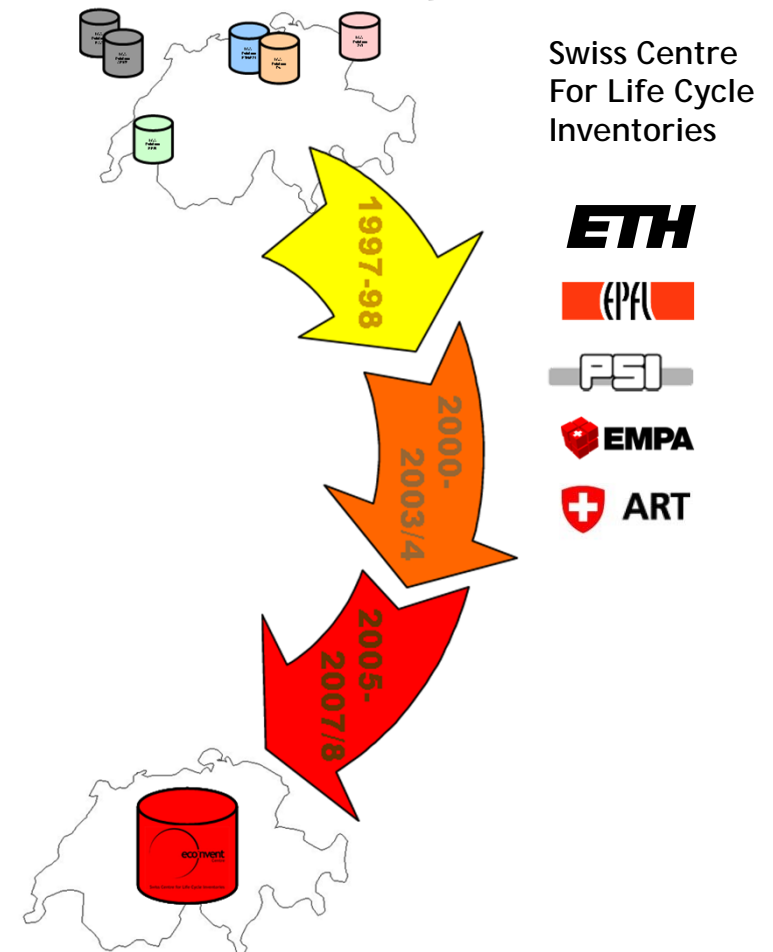


Introduction

ecoinvent v1 & v2



- Before 1996: Different institutes (ETH, ...), each with their database
- 1997-1998 / **Pilot project**: system specification and first draft version of quality guidelines
- 2000-2004 / **Project „ecoinvent 2000“**:
 - finalisation of ecoinvent quality guidelines
 - establishing the database ecoinvent v1 (~ 2700 unit processes)
- 2005-2008 / **Project ecoinvent v2**:
 - update and extension of ecoinvent database from v1 to v2 (~4'000 unit processes)



- **Data work lead by institutes & by selected consultant companies** (coordinated by the ecoinvent management) and funded by the Swiss Federal Offices & in-kind contributions



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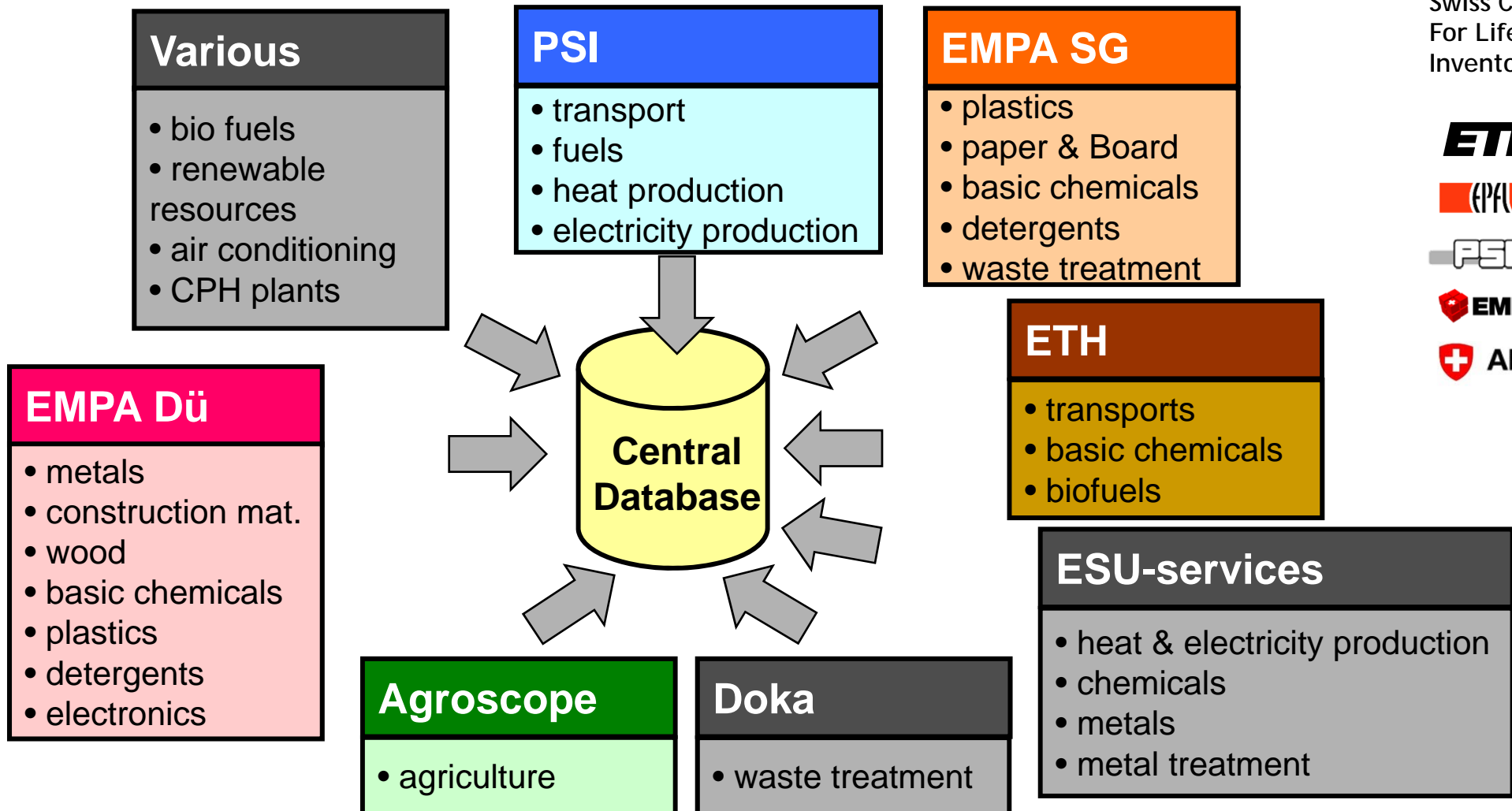
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Introduction

ecoinvent v3



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- 2008-2012 / **Project ecoinvent v3:**
 - new software for data collection; ecoEditor
 - revision of the structure of the database
 - selective update / extension of content
 - adaptation of the existing content to the new database structure
 - new datasets
 - talk pages; documents, terminology, discussion list

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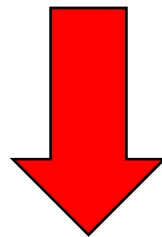
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(Future) Data Strategy



ecoinvent

a **common platform** for your LCI datasets



**“share your research results
in our database”**

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(Future) Data Strategy



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■ Why to submit data?

- **share your research** with experts all around the world
- datasets are presented with the **name of the data provider** and her/his contact information
- you **invest only your time**, we offer consulting on how to use our tool (ecoEditor) and review by an expert
- companies can demonstrate their **environmental commitment** by making their data available through ecoinvent

(Future) Data Strategy



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■ Why to submit data to ecoinvent?

- ecoinvent is **independent** and organized as a **non-profit** organization
- one of the **most trusted** LCI sources
- apply **thorough review process**, high quality is ensured
- ecoinvent is **fully transparent**, every value is documented including uncertainty information
- offer possibility for companies to present data in a way that **confidentiality is respected**, without compromising the transparency

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Internationalization project



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- **International supply chains** demanded international data collection
- Now the most used global database of known quality
- Growth can be **problematic**:
 - ◆ Expertise at ecoinvent Centre Switzerland/Europe-centered
 - ◆ Data for different regions benefit from local expertise
 - ◆ International data collection ideally organized in a collaboration of regional data collection networks

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Cooperation of LCI initiatives



- Cooperation with several emerging economies to support LCI networks in developing countries, supported by the Swiss government (SECO)

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- The goal is to:
 - ◆ Build expertise on life cycle thinking and LCA
 - ◆ Create capacity for LCI data collection
 - ◆ Create background data for local (and global) studies
 - ◆ Grow into self-sustaining regional LCI competence centres

Problems of starting LCI networks



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- Local **level of expertise** in life cycle-based methods can be low
 - ◆ Little experience with LCI data collection
- Lack of local environmental studies compared to developed countries, so **less basis for background data**
 - ◆ Local conditions can differ significantly from other regions
- Inventory **databases** need a certain “critical mass” to be useful
 - ◆ Gaps in process chains will introduce errors in the results

Case study: Coal power



- Coal power constitutes ~ 70% of Indian generation

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	Germany	India
Calorific value of burned coal	27.7 MJ/kg	15.7 MJ/kg
Emission abatement	Desulphurisation, denitrification, and dedusting operating in most power plants	In most power plants only dedusting
CO ₂	92 g/MJ coal	96 g/MJ coal
NO _x	0.06 g/MJ coal	0.63 g/MJ coal
SO ₂	0.07 g/MJ coal	0.89 g/MJ coal
PM _{2.5}	0.005 g/MJ coal	0.202 g/MJ coal
Net efficiency of power plant	36 %	32 %

Case study: Coal power

ReCiPe
points/kWh

0.16

0.14

0.12

0.1

0.08

0.06

0.04

0.02

0

India

Germany

■ Remaining substances

■ Nitrogen oxides

■ Sulfur dioxide

■ Particulates, < 2.5 μ m

■ Hard coal in ground

■ Carbon dioxide, fossil

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Indirect linking in ecoinvent v3



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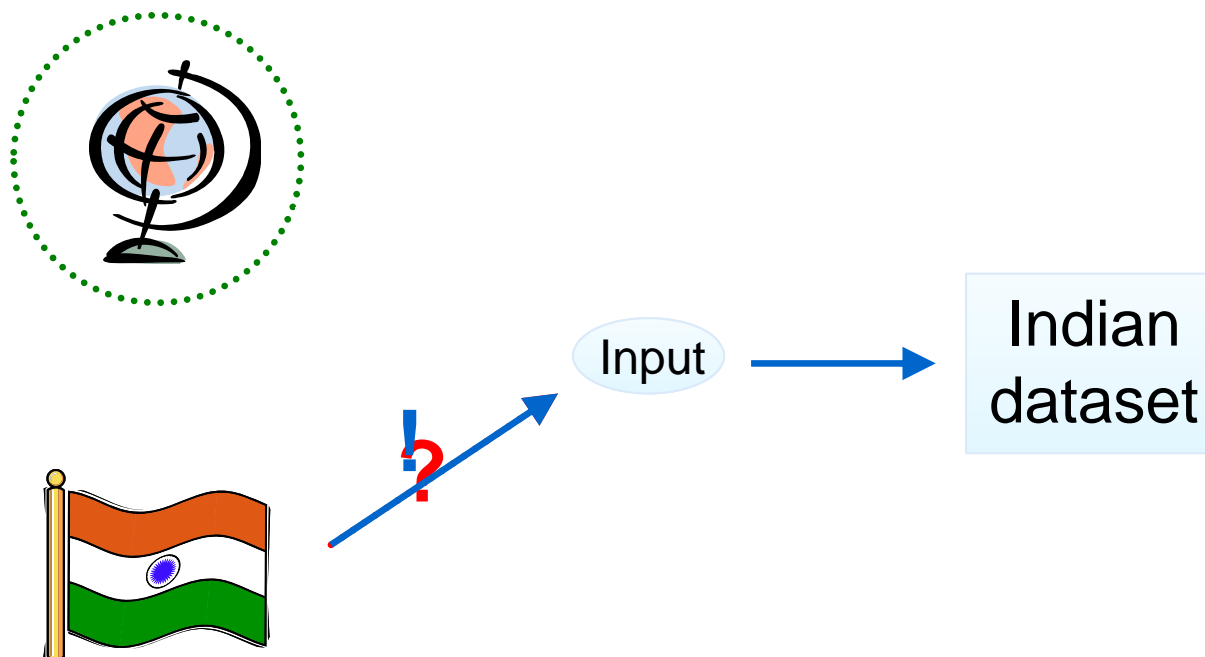
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Conclusions - Internationalization



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- The ecoinvent Centre is building a **network of collaboration partners**
- We wish to support other LCI initiatives by **offering** our **structure** and **experience**
- **Integrating** with existing data helps to **create datasets** and to reach **critical mass** for high quality database
- Transparent **unit-process** inventory modeling **facilitates** cooperation and data exchange

Available tools



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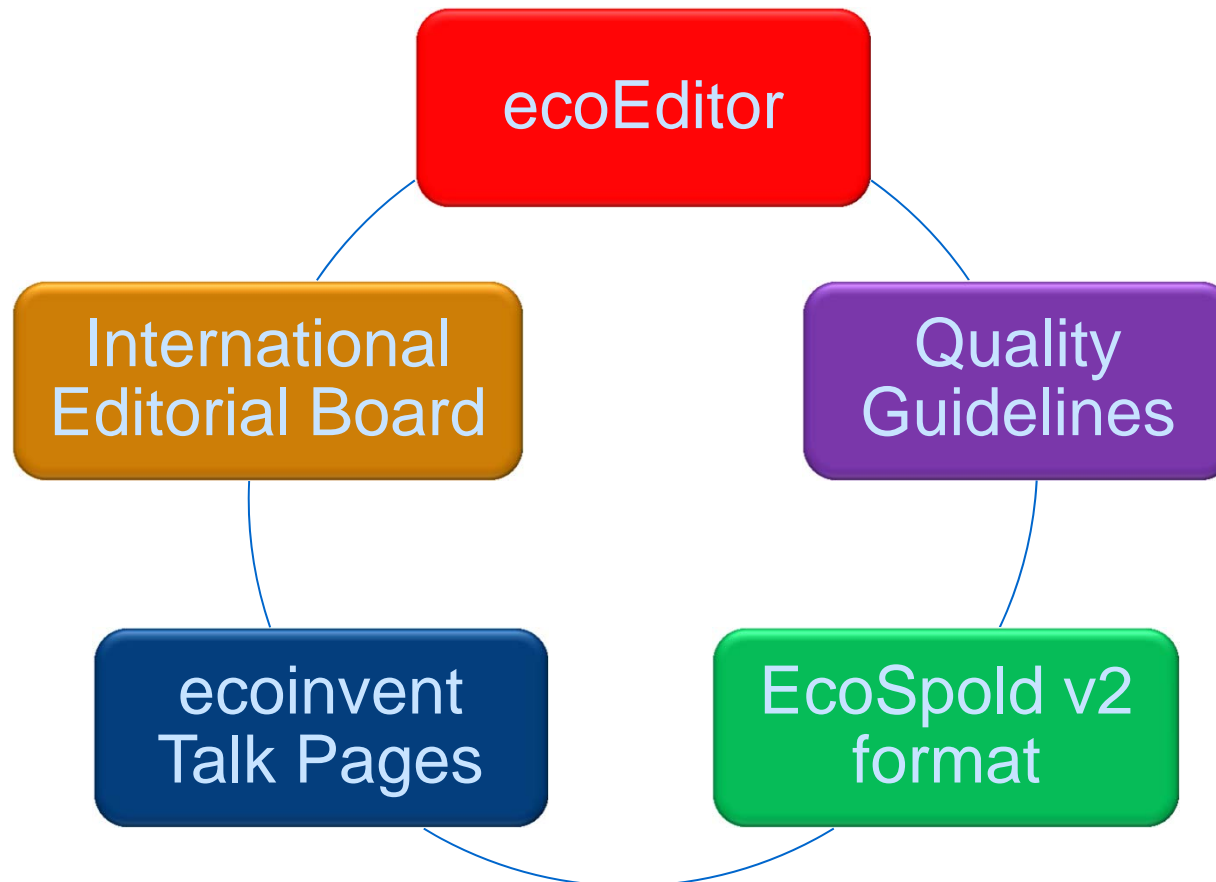
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(i) the Quality Guidelines



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Aims to ensure a **coherent data acquisition & reporting** across the various activity areas & data providers involved.

- encompasses **definitions** of ...
 - different types of datasets,
 - level of detail required,
 - how completeness is ensured,
 - good practice for documentation,
 - naming conventions, and
 - rules for the reporting of uncertainty.
- covers the procedures for ...
 - validation, review, and embedding new datasets into the database;
 - calculation of attributional & consequential models, and
 - arriving at accumulated results of product systems.

<http://www.ecoinvent.org/ecoinvent-v3/quality-guidelines/>

(ii) ecoSpold v2 format



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... in order to **take advantage of all the new developments**, this revision of the ecoSpold format has become necessary.

- Structural changes
- Facilitating DB maintenance and extension, e.g. by:
 - parent-child relationships between activity datasets;
 - geographical information via GIS coordinates;
 - formulas and variables in numerical fields;
 - Use of UUIDs for internal references;
- Better support for alternative modelling options and data exchange with the ILCD format;
- Support for mass balances, energy balances and monetary balances;
- Support for language versions;
- Support for better documentation.

(iii) editorial board

... performs the review, validation and editing of the ecoinvent datasets before inclusion in the ecoinvent database.

- Under the **supervision of LCI Expert Group** (which is maintaining ecoinvent data quality guidelines and software systems);
- each editor is responsible for a **specific expertise area** (as **activity**, **geographical**, **language**, **inventory-indicator**, **meta-data** or **LCIA** editor);
- in each case, a lead editor and one/more co-editors share the work.

Available tools

(iv) ecoEditor tool



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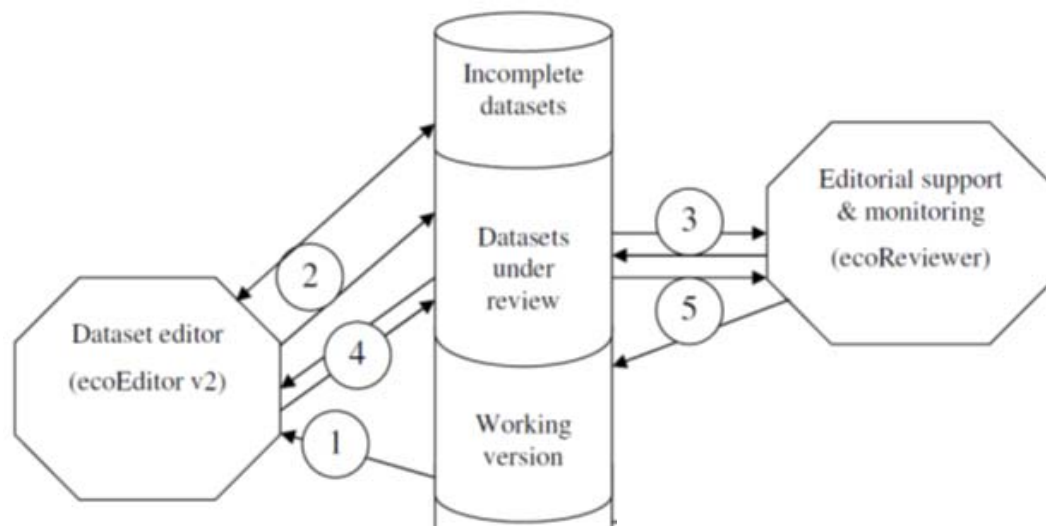
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... for data suppliers and editors to **create, edit, review** & to **upload datasets** for ecoinvent database version 3



- Supports data supplier by ...
 - offering **access to the new features** of ecoinvent;
 - a **structured collection** of the necessary **data**;
 - built-in **help texts in order to guide** the collection process;
 - **validation** of entries.

DOWNLOAD FOR FREE!

<http://www.ecoinvent.org/ecoinvent-v3/ecoeditor-v2/>

Available tools

(iv) ecoEditor tool



The screenshot displays the ecoEditor for ecoinvent version 3 interface. The main window shows the 'Exchange Properties' tab for a 'soybean oil refinery operation, US 2008'. It lists various exchange properties such as carbon content, dry mass, water content, and wet mass, along with their units and amounts. A secondary window shows the 'Edit Mathematical Relation' dialog with the formula $1 / (\text{lifetime_capacity_kg} * \text{utilization_rate})$. Another window shows the 'Activity Description' tab with a list of activities and their types.

Exchange Properties Table (soybean oil refinery operation, US 2008)

Name	Unit	Amount	Comment
carbon content, fossil	dimen...	0	NaOH
carbon content, non-fossil	dimen...	0	NaOH
dry mass	kg	1	
water content	dimen...	0	water mass/dry mass
water in wet mass	kg	0	
wet mass	kg	1	
carbon content, fossil	dimen...	0	In Tab 17.4, ecoinvent
carbon content, non-fossil	dimen...	0.768	In Tab 17.4, ecoinvent
dry mass	kg	1	
water content	dimen...	0	water mass/dry mass
water in wet mass	kg	0	
wet mass	kg	1	
carbon content, fossil	dimen...	0.0017899	
carbon content, non-fossil	dimen...	0	
dry mass	kg	0.00033748	
water content	dimen...	2962.2	
water in wet mass	kg	0.99966	
wet mass	kg	1	
lifetime	year	50	
lifetime capacity [kg]	kg	1.0139E+	According to literature

Exchange Table

Type	Name	Unit
5 - FromTec...	heat, district or industrial, natural gas	MJ
5 - FromTec...	sodium hydroxide, without water, in 50% solution...	kg
5 - FromTec...	soybean oil, crude	kg
5 - FromTec...	tap water, at user	kg
5 - FromTec...	vegetable oil refinery	unit

Activity Description Table

Type	Name
0 - Referenc...	soybean
2 - ByProdu...	soap
2 - ByProdu...	wastew...
4 - ToEnviro...	Water
4 - FromEnv...	Water, c...
5 - FromTec...	sodium
5 - FromTec...	vegetab...
5 - FromTec...	heat, dis...
5 - FromTec...	electric...
5 - FromTec...	soybean
5 - FromTec...	tap water

TimePeriod

Start Of Period	End Of Period	Data Valid For Entire Period	Comment
01.01.200...	31.12.200...		Energy da...

MacroeconomicScenario

Value	Comment
Business...	

Production User: roland.hischier

Available tools

(v)ecoinvent databases



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■ Main features of the Tool

- sorted according to the ISIC code;
 - additional **documents**
 - additional **information**
 - **terminology**
- **FAQ** – frequently asked questions
- **discussion** forum
- **accessible to everybody** (not only for those who buy the license)

Conclusion



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- ecoinvent offers you a **platform** together with a **complete toolbox** (incl. services) in order to establish and share life cycle inventory datasets of a high quality;
- ... and since providing data to ecoinvent is free, the ecoinvent Centre has no financial interest and gets a **very trustworthy source of LCA** results.

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... and a (very) last point !



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- In order that the **same data** (e.g. from Industry Association) can be used **in various** databases, **gate-to-gate datasets** need to be provided; as only such data allow **a consistent & reliable use** in different environments (databases) ...

... and ecoinvent offers you an ideal platform to do so ...!

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Thank you



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