



Swiss Centre for Life Cycle Inventories

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ecoinvent v3 - new dimensions for international LCI databases

3rd International ecoinvent meeting

St.Malo, 2012.10.04.

Bo Weidema

ecoinvent Centre



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Introducing the new dimensions



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- New dimensions in **system modelling**
- New **mathematical** dimensions
- New dimensions of **flows**
- New dimensions in **size**
- New **geographical** dimensions
- New dimensions in **data supply**

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New dimensions in system modelling



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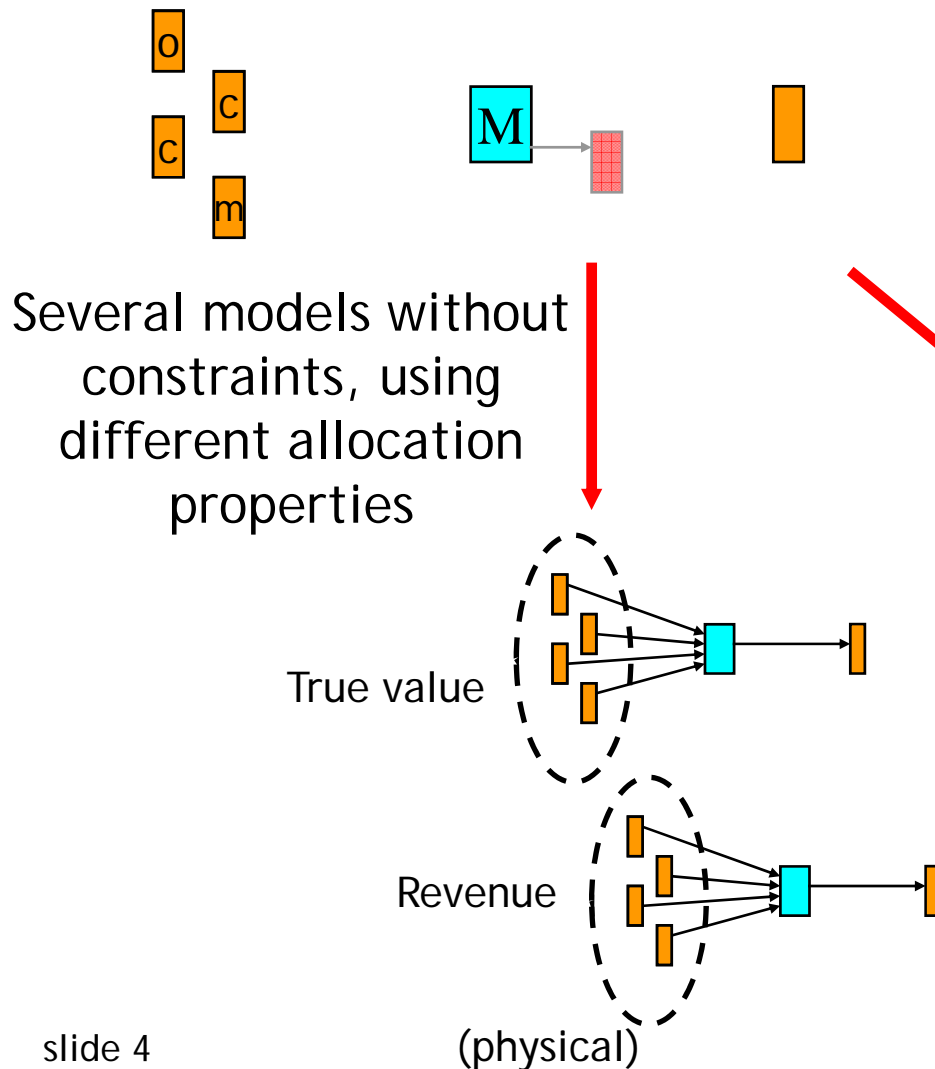
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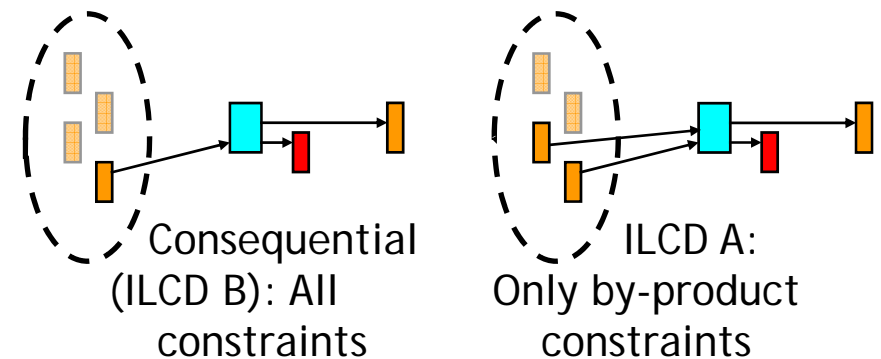
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One simple, unlinked
system of datasets

Several models with
different constraints,
using substitution



Trust in Transparency!



New mathematical dimensions

Exchange		gypsum quarry operation, CH 2003			
Type	Name	Unit	Amount	Mathematical Relation	Comment
0 - Referenc...	gypsum, mineral	kg	0.65656	$\text{gypsum_PV}/(\text{anhydrite_rock_PV} + \text{gypsum_PV})$	The amount was calculated relative to the production volumes. ...
0 - Referenc...	anhydrite rock	kg	0.34343	$\text{anhydrite_rock_PV}/(\text{anhydrite_rock_PV} + \text{gypsum_PV})$	The amount was calculated relative to the production volumes.

Amount

Formula

Explanation

Parameters

Parameter		gypsum quarry operation, CH 2003			
Name	Unit	Variable Name	Amount	Mathematical Relation	Comment
sum of reference products	kg	sum_RP	1	1	It's the ...

Variable names can be used in formulas, e.g. to express how in combined production an exchange is physically related to a (co-)product output

New dimensions of flows



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Previously one-dimensional: Only one amount and one unit

Now: Unlimited number of properties, e.g. dry mass, carbon,...

Exchange Properties					
Unit		Exchange Property		steel production, converter, low-a	
		Name	Unit	Amount	Comment
MJ		carbon content, fossil	dimensionless	0.86915	81.7% C and 6% water in wet mass (ecoinvent v2.1 report 6_VI Tab
		carbon content, non-fossil	dimensionless	0	
		dry mass	kg	0.0328...	wet mass minus 6% water
		water content	dimensionless	0.06383	water mass/dry mass
		water in wet mass	kg	0.0020...	6% of wet mass
		wet mass	kg	0.0349...	28.6 MJ/kg
kg		carbon content, fossil	dimensionless	0.13043	CaMg(CO ₃) ₂
		carbon content, non-fossil	dimensionless	0	CaMg(CO ₃) ₂
		dry mass	kg	1	
		water content	dimensionless	0	water mass/dry mass
		water in wet mass	kg	0	
		wet mass	kg	1	
kWh					
kg		carbon content, fossil	dimensionless	0.07	Ferrochromium is a master alloy of iron and chromium, containing
		carbon content, non-fossil	dimensionless	0	

Balances can be calculated
for each property

New dimensions in size



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- Above 9000 datasets (more than double from v2.2)
 - Approx. 6000 transforming activities
 - Approx. 3000 products (and therefore market activities)
 - > 5000 global datasets and > 3000 local
 - Approx. 300 geographical child datasets
-
- Building on and expanding existing work, rather than starting from scratch

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New geographical dimensions



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- Towards a truly global database:
 - global datasets required for every locally implemented activity
 - global market datasets for every product
 - cooperation with local data networks
- Parent/Child functionality to make maintenance of large amounts of local datasets easier
- Geographies now defined with GIS coordinates:
 - automatic linking of supply chains using local markets
 - option to automate site-dependent impact assessment

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New dimensions in data supply



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- Decentralisation of data supply
- More central data additions and consistency checks



Data providers

Central
additions



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New dimensions in data supply



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- Decentralisation of data supply
- More central data additions and consistency checks

Not a contradiction:

- more data decentralized providers, but also
- **limiting** demand on data providers for data they may not have:
 - Who produces the inputs?
 - What allocation factors to apply?
 - Is my output a by-product or a waste?
 - What is the production and consumption mix?
 - What is the price of the products?
 - What is the elemental composition?
 - What is the transport distance and mode?
 - What is the amount and type of packaging?

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New dimensions in data supply



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- So more and more of data are or will be supplied by central projects or routines, while still being editable by individual data providers.
- Both these trends are likely to increase in the **future**:
 - Crowd sourcing: More and more people involved in data supply and editing through increasingly easy tools
 - Cross-cutting data complementation, e.g. for consistency in reporting of toxic emissions, or adding new exchanges such as water, noise and social indicators

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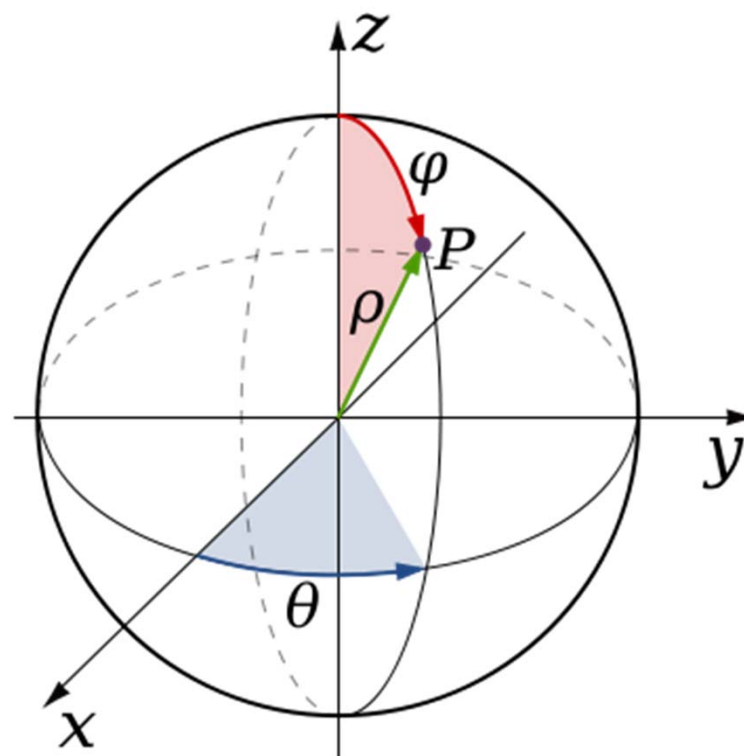
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Welcome to your new ecoinvent

- Expanding the dimensions for international LCI databases



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