The world's most consistent and transparent Life Cycle Inventory database

ecoinvent

ecoinvent v3.3, v3.4 and beyond

LCM 2017

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Ecoinvent v3.3 & v3.4

- The v3.3 was released August 2016. The v3.4 will be in September 2017.
- Improvements made by the versions:
  - Data
    - Improvement of Swiss Supply Chains
    - Agriculture and food (WFLDB data)
    - Natural Gas supply chains
    - Plastics recycling (PE and PET in CH, US, RER)
    - Chemicals
    - Electricity production and market mixes
  - Features
    - Documentation: PDF print-out
    - Product caracterisation (price, CPC classification)

v3.3: Swiss supply chains

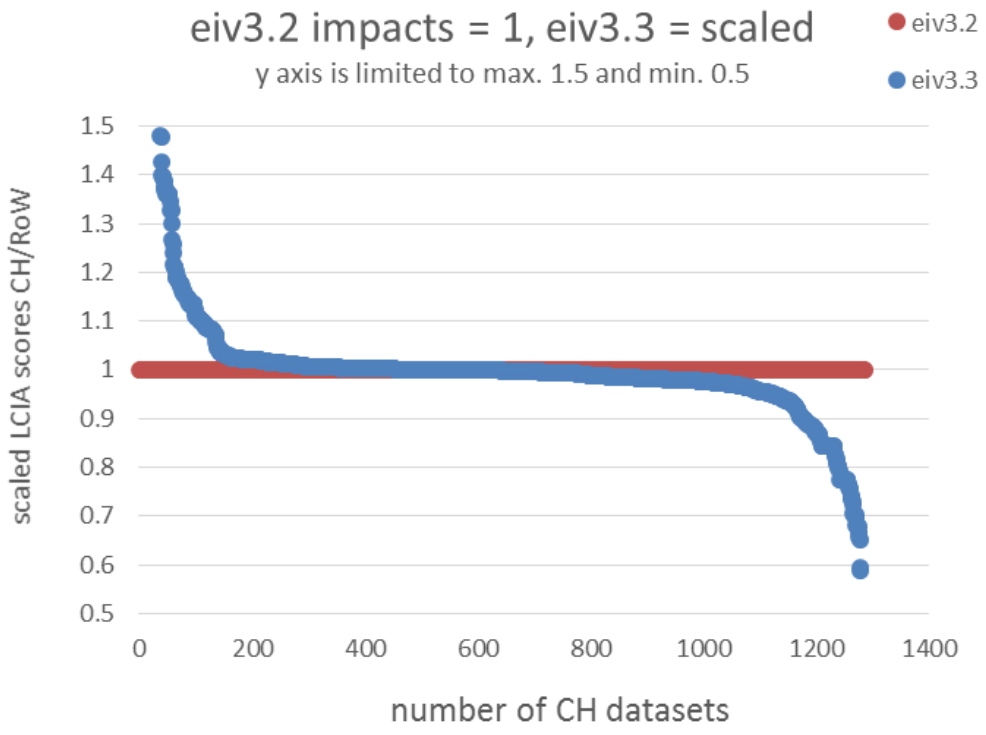
- The old ecoinvent v2.2 Swiss supply chains were evaluated to identify the most used products within Switzerland.

- Several measures were taken to improve the supply chains of these products, and make sure CH products have CH supply chains when appropriated

  - Direct activity links introduced (services, infrastructures)
  - Regional Swiss markets introduced
  - Swiss transport distances (specific data from Switzerland)

Evaluation of the results of the update on supply chains

- Comparison of the final LCIA scores of the all CH activities in ecoinvent v3.3 versus v3.2



76% no change
13% lower impacts than in v3.2
10% higher impacts than in v3.2

v3.3: Agrifood from World Food LCA Database (WFLDB)

WORLD FOOD LCA DATABASE

- Co-founders are Quantis and Agroscope

Quantis
Sustainability counts

Agroscope

- Several partners:

ADEME
Bayer CropScience
Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra
Swiss Confederation
Federal Office for the Environment FOEN
KraftHeinz
GENERAL MILLS
MARS
Mondelēz International
MONSANTO
Nestlé
PEPSICO
syngenta
YARA

WFLDB in ecoinvent v3.3

- Over 400 datasets from WFLDB were published in v3.3:
  - vegetables, fruits, and cereals:
    - asparagus, carrots, onions, potatoes, tomatoes
    - almonds, apples, apricots, bananas, cocoa beans, green coffee beans, lemons, mandarins, oranges, peaches, pears, strawberries
    - maize, oat, rice, sweetcorn, wheat
  - sugar and confectionery
    - beet and cane sugar
    - cocoa, mint, vanilla






v3.4: updated data in Natural Gas

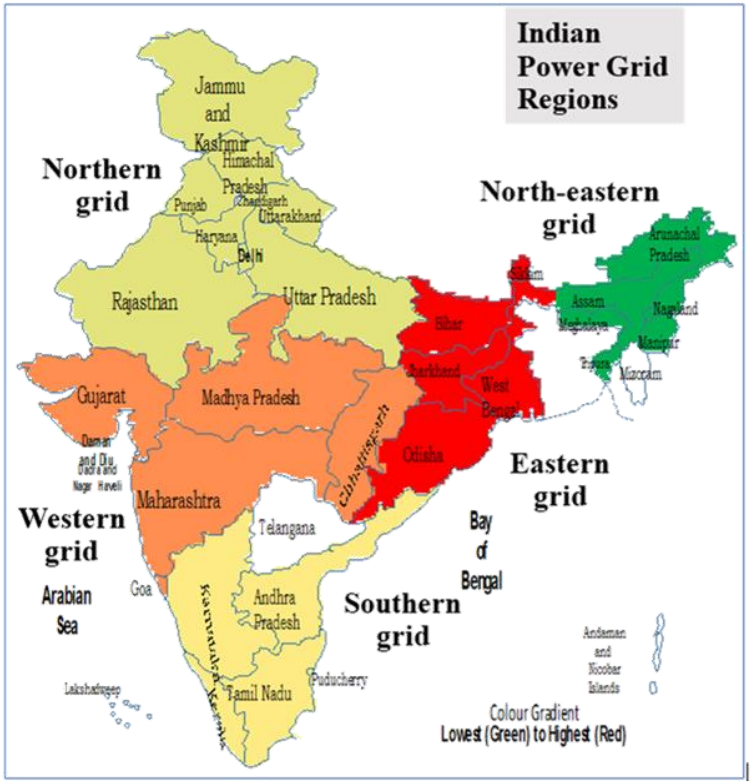
- With v3.4, ecoinvent will deliver an updated natural gas value chain in Europe.
- A total of 130 datasets have been updated, concerning extraction activities, imports and transport of natural gas within Europe.

v3.4: new and updated data in electricity - market mixes

- All national market mixes for electricity in all system models will be improved to reflect the latest available data.
- In the attributional system models, market compositions will be available for all 142 countries, which are part of the IEA statistics: 100% of (statistically represented) global electricity generation will be covered by country-specific market data.
- The consequential system model will contain new electricity market compositions for 40 countries, based on projections from the EU and the IEA.

v3.4: new and updated data in electricity - India

- Electricity production in India
  - modeled at the 29 State Level (160 DS),
  - representing the 4 national power grids.
  - IN as market group



v3.4: updated data in the Chemical sector

- With v3.4 we will update and introduce new chemical production activities, transposing to the database the work we did for the PEF initiative.

- On the product level more than 120 chemicals were updated and 50 new ones added to the database.

v3.4: plastics recycling

- New data on plastic recycling will help improving the coverage of recycling activities within the ecoinvent database.
- v3.4 will add more than 50 new activities, covering sorting and recycling activties of post-consumer PET and PE packaging materials into secondary granulates, as well as PE recovery into light fuel oil by thermal depolymerisation.
- Scope: Europe, CH and USA.

Development v3.3: PDF reports

Ecoinvent 3.2 dataset documentation

reefer production, intermodal shipping container, 40-foot, high-cube, R134a as refrigerant - GLO

Dataset identification

Activity name	reefer production, intermodal shipping container, 40-foot, high-cube, R134a as refrigerant
Geography	GLO (Global)
dataset UUID	13bfa010-65d2-4cc5-a4a3-c4836c8ddfe2
Synonyms	freight container ISO container sea can
ISIC 4 classification	2920:Manufacture of bodies (coachwork) for motor vehicles; manufacture of traile
Time period	2010-01-01 to 2014-12-31 Valid for the entire period
Dataset type	Ordinary transforming activity
Technology level	Current
Version - system model	3.2 - undefined

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Notes: This document contains only an extract of the information in the dataset. Additional data about properties of exchanges, mathematical relations, parameters, and contact information for authors and reviewers are available in the full dataset, e.g. through the ecoinvent website. Amount and identity of the exchanges in an undefined dataset are independant of modeling choices in by the different system models. Linked dataset are available in separate documents.

Link to the dataset on the ecoinvent website

Dataset authorship

Role	Date	Name	Contact
Data generator	2014-10-15	Tereza Levova, ecoinvent Centre active author	levova@ecoinvent.org
Data entry	2014-10-15	Tereza Levova, ecoinvent Centre	levova@ecoinvent.org
Review	2014-12-19	Emilia Moreno Ruiz, ecoinvent Centre	moreno@ecoinvent.org
Review	2014-12-19	Christian Bauer, Paul Scherrer Institute	christian.bauer@psi.ch

Exchange summary

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Reference products	Material for treatment	Byproduct classif.	Amount
reefer, intermodal shipping container, 40-foot, high-cube, R134a as refrigerant	no	allocatable product	1.0 unit

Inputs from technosphere	Amount
polyurethane, rigid foam	4.98e+2 kg
refrigeration machine, R134a as refrigerant	1.0 unit
steel, low-alloyed, hot rolled	3.02e+3 kg
synthetic rubber	5.89 kg
welding, arc, steel	70.1 m
zinc coat, pieces	4.33e+2 m2

Dataset description

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General comments

This dataset represents production of reefer (refrigerated container), 40-foot, high-cube ISO standard container.

The intermodal shipping containers are basically metal boxes which are used for storage and transport of goods. The advantage of using these containers is, that they can be easily transferred from one type of transport to another without the necessity of unloading the goods.

There are several types and sizes of the containers mainly related to the historical development of intermodal container transport in the given region. There is a continuous effort in the standardization of the container sizes. Below see the table of the different sizes of the intermodal shipping containers as defined by the ISO standard (ISO 6346:1995, ISO 1161:1984, ISO 1496-1:2013).

		20' container		40' container		40' high-cube container		45' high-cube container	
		imperial	metric	imperial	metric	imperial	metric	imperial	metric
external dimensions	length	19' 10 1/2"	6.058 m	40' 0"	12.192 m	40' 0"	12.192 m	45' 0"	13.716 m
	width	8' 0"	2.438 m	8' 0"	2.438 m	8' 0"	2.438 m	8' 0"	2.438 m
	height	8' 6"	2.591 m	8' 6"	2.591 m	9' 6"	2.896 m	9' 6"	2.896 m
interior dimensions	length	18' 8 13/16"	5.710 m	39' 5 45/64"	12.032 m	39' 4"	12.000 m	44' 4"	13.556 m
	width	7' 8 19/32"	2.352 m	7' 8 19/32"	2.352 m	7' 7"	2.311 m	7' 8 19/32"	2.352 m
	height	7' 9 57/64"	2.385 m	7' 9 57/64"	2.385 m	8' 9"	2.650 m	8' 9 15/16"	2.698 m
door aperture	width	7' 8 1/8"	2.343 m	7' 8 1/8"	2.343 m	7' 6"	2.280 m	7' 8 1/8"	2.343 m
	height	7' 5 1/4"	2.280 m	7' 5 1/4"	2.280 m	8' 5"	2.560 m	8' 5 49/64"	2.585 m
internal volume		1,169 ft³	33.1 m³	2,385 ft³	67.5 m³	2,660 ft³	75.3 m³	3,040 ft³	86.1 m³
maximum gross weight		66,139 lb	30,400 kg	66,139 lb	30,400 kg	68,008 lb	30,848 kg	66,139 lb	30,400 kg
empty weight		4,850 lb	2,200 kg	8,380 lb	3,800 kg	8,598 lb	3,900 kg	10,580 lb	4,800 kg
net load		61,289 lb	28,200 kg	57,759 lb	26,600 kg	58,598 lb	26,580 kg	55,559 lb	25,600 kg

Reefer is used for transport of goods which need atmosphere (mainly temperature) control during the transport. The difference between the dry cargo containers is, that reefers have foam insulation and attached refrigeration unit. The external size is the same as in case of dry cargo containers, but the internal volume is smaller due to the fact, that the space is partially taken by the refrigeration unit and the insulation.

Data for the life cycle inventory of this container were taken from different sources, primarily from the documentation of different container producers. The main sources of information is the technical documentation

Development v3.3: Social LCA

- We colaborate with the Social Hotspots database to help them creating a version of their database that can be used in the framework of ecoinvent

- For that, they will match products using information we have for ours:
  - Prices for products, except waste materials (useful for other purposes)
  - Classification of products (CPC)

Further outlook to the database development, beyond v3.4

- ecoinvent is already working for future v3.5 and v3.6:
- By supporting consistent LCI creation with adapted tools, and easier data entry process,
- By supporting the collection of a big amount of data improving the regional coverage of the database,
- By improving the quality of the European value chains in the database.

Easing LCI creation for final users and data providers

- Making available different tools to generate the LCI inventories in a consistent and easy way, considering different technologies to allow maintaining a regional relevance.

- Waste treatment tool: can be used to generate relevant datasets related to waste management, including landfill (also open field), incineration (also open fire).

- Refinery tool: can be used to generate relevant refinery processes, based on crude compostion and type of technology.

Easing LCI creation for final users and data providers

- Waste water treatment tool: can be used to generate relevant datasets related to wastewater management, including free dumping.

- Agriculture LCI tool: helps generating inventories related to agriculture (crop production), applying the emission models currently in use in the database, but also have room to accept new models (related to other conditions of aridity, rainfall...).

Easing LCI creation for data providers

- Easing data integration, facilitating the integration of 3rd party data into the database.

- Exploring the options on how to improve the handling of large amounts of data being submitted to the database at the same time.

Improving data number and quality in emerging regions

- The SRI project (Sustainable Recycling Industries) is an initiative funded by the Swiss State Secretariat for Economic Affairs (SECO).

- The purpose of the component coordinated by ecoinvent is the creation of reliable, consistent and transparent regionalised LCIs in South America (Brazil, Peru, Colombia), South Africa and India.

- Data cover all main sectors of economic interest for each region.

Agrifood sector

- This sector will be expanded in the three regions, covering their specific relevant crops or livestocks:
  - Cereals: millet, wheat, maize
  - Legumes: lentils, guar,
  - Fruits: mango, mandarine, oranges
  - Roots: curcuma, yuca, ginger

  - Fish: captured or aquaculture
  - Beef production

Electricity production and coal mining

- Electricity is being modeled in the regions Latin America and South Africa.
  - including solar tower power plants for South Africa
  - detailing the national grids.

- Data on hard coal representative for the regions India and South Africa is being collected.
- The data will cover from extraction (mining), to cleaning and exporting.

Building materials and Metal sector

- Cement and concrete production are being modeled for the three SRI regions.

- Relevant data for each region regarding metal extraction and production is being gathered:
  - iron and steel (India)
  - precious metals (South Africa), like PGM, gold and silver...
  - precious metals (Latin America), like copper, gold, lead, zinc, silver...

Textile

- Data on this sector is being collected in India and Bangladesh.
- Data will cover from fibre cultivation (linnen, cotton, jute or kenaf...), to weaving, dyeing and textile production.
- Silk production is also included in this sector.

Transport and Tourism

- Improving data coverage on road, rail and water transport in the three regions.

- Oceanic and air transport addressed at a global level.

- Generic activities for hotel stays are being modeled, representing mainly Latin America (Brazil, Peru).

Water supply

- The focus is still on the three SRI regions, but the scope of this data collection is global, covering in total 23 countries (including all countries with known intense water use).

- Modeling covers tap water production, irrigation and cooling water, representing several technologies in each case.

Improving value chain modeling

- The v3.3 improved the accuracy of Swiss supply chains, reinstalling local suppliers in the value chains when this was appropriated (missing local suppliers or missing consumption mixes were added).

- A similar work is being now done at an European level. Value chains are being systematically analysed to ensure they represent the actual supply.

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Thank you for your attention!
Questions?

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