Future development of the ecoinvent database

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ecoinvent after version 3.1

- Version 3 brought many technological and methodological changes and improvements
- Version 3.1 brought a new system model, but also a lot of new and updated data
- The new framework offers much room for development without much technological development
  - Focus on data and update of the core data
  - Development of selected new system models
  - Targeted additions of functionality
  - Increase global coverage of the database
Update of the core data

- Version 3.2 updates electricity and concrete
  - Significant update, replaces older data
- Further sectors would benefit from updates
  - Individual updates and specific improvements of existing data over various versions
- Focus on updates in addition to new data
- Reviews of core sectors
  - Check for reliability and consistency
  - Expand geographical coverage when relevant
  - Identify datasets where newer data are available
  - Carry out individual updates or whole sector updates
Update of the core data

- Metals
- Mining
- Energy and energy resources
- Freight transport
- Waste treatment and Recycling
- Electronics
- ...
Updates and new data planned

- Preliminary plans for v3.3
  - Agriculture and food products (WFLDB, first part)
  - Freight transport
  - Heat pumps for building heating
  - Agricultural data from Tunisia and Brazil
  - ...

- Longer-term plans for new sectors and areas of impact
  › Consumer goods (incl. textiles)
  › Household and office activities
  › Buildings and infrastructure
  › Noise
Developments of new system models

- 3 system models offer choice to the users
- Too many system models lead to potential confusion
- Further models for end-of-life scenarios
  - Consistent scenarios for faster sensitivity analysis
  - Implementation of PEF end-of-life modelling (changed once already, currently undergoing review)
- Other models possible for specialty or non-LCA applications
Development of new functionalities

- Careful evolution of the version 3 system
- Assessment of new methodologies and functionalities
  ‣ Review of benefits, problems and acceptance
- Development of additional functionalities
  ‣ Maintain compatibility
  ‣ Optional and non-intrusive
Market groups

- Activities with large regions may cover many markets for some inputs
  - Electricity markets very developed and regionalized
  - One product input is covered by many supplying datasets
- Sum is of course available and calculable, but software support sometimes lacking
Market groups

Flows

1 kg Gold {US} production | Alloc Rec, U
1.84E4 kg CO2 eq

189 kg Blasting {GLO} | market for | Alloc Rec, U
1.03E3 kg CO2 eq

2.49E4 MJ Diesel, burned in diesel-electric generating set | 2.19E3 kg CO2 eq

7.46E4 MJ Diesel, burned in building machine | 7.02E3 kg CO2 eq

6.71E3 MJ Electricity, medium voltage {WECC, US only} | market for | Alloc Rec, U
6.08E3 kg CO2 eq

8.34E3 MJ Electricity, medium voltage {RFC} | market for | Alloc Rec, U
6.41E3 kg CO2 eq

9.75E3 MJ Electricity, medium voltage {SERC} | market for | Alloc Rec, U
7.74E3 kg CO2 eq

- Electricity, medium voltage {FRCC} | market for | Alloc Rec, U
  441 kg CO2 eq

- Hydrochloric acid, without water, in 30% solution state {RoW} | market for | Alloc Rec, U
  342 kg CO2 eq

- Electricity, medium voltage {NPCC, US only} | market for | Alloc Rec, U
  267 kg CO2 eq

- Sodium cyanide {GLO} | market for | Alloc Rec, U
  227 kg CO2 eq

- Heat, district or industrial, other than natural gas {RoW} | market for | Alloc Rec, U
  83.1 kg CO2 eq

- Lime, packed {GLO} | market for | Alloc Rec, U
  60.4 kg CO2 eq

Trust in Transparency!
Market groups

- Single input facilitates analysis and assessment
- Calculation speed increases in some software tools due to lower network connectivity
- Now available for all major regions for products where many local markets exist
  - Datasets with multiple market inputs still exist in the database, but at lower numbers
- Also support user-requested regions, e.g. UCTE
**Detailed exchanges with technosphere**

**Contribution to impact scores legend:** IPCC 2007 GWP100 | ecocarco 2013 total | ReCiPe H total

**Reference products**
- **shaving, softwood, measured as dry mass**
  - **Comment:** calculated as dry mass
  - **Production volume comment:** Calculated from production volume of reference product using the relative outputs.

**Inputs from technosphere**
- **electricity, medium voltage**
  - **Activity link:** market for electricity, medium voltage - CH
  - **Comment:** data from industry
  - **Uncertainty distribution:** lognormal; Variance with pedigree: 0.2008; Pedigree matrix: [2, 1, 2, 1, 1]

**planing mill**
- **Activity link:** market for planing mill - GLO
- **Comment:** data from industry
- **Uncertainty distribution:** lognormal; Variance with pedigree: 0.4308; Pedigree matrix: [2, 1, 2, 1, 1]

**sawmadow, beam, softwood, raw, kiln dried**
- **Activity link:** beam, softwood, raw, kiln drying - CH
- **Comment:** processed internally within the sawmill
- **Uncertainty distribution:** lognormal; Variance with pedigree: 0.0008; Pedigree matrix: [2, 1, 2, 1, 1]
Regionalized LCIA

- ecospold 2 data format supports GIS-based calculations
  - Mapping information for all activities available
- Regionalized LCIA methods are now available
  - Use and consumption of water
  - IMPACT World+ (coming soon)
  - ...

- Implementation of regionalized LCIA in our internal calculation routine
  - Software tools implement LCIA methods independently
Import and export

- Export to ecospold1 already implemented
- Export to ILCD format under development
  - Lead at the EU’s JRC, contributions from ecoinvent

- Import functionalities for data providers to reduce workloads
  - OpenLCA
  - Excel
  - SimaPro CSV
  - ...?
ecoinvent as a global database

- ecoinvent started as a **Swiss** database
  - **International supply chains** demanded international data collection
  - Now the most used global database of known quality

- Growth can be **challenging**:
  - Expertise at ecoinvent is Switzerland/Europe-centered
  - Data for different regions benefit from local expertise
  - International data collection ideally organized in a collaboration of regional data collection networks
Collaboration with CIRAIG in Canada to build an LCI database for Québec

Data are integrated into the existing global supply chains

Local data collection efforts can rely on global background data and grow organically into local process systems

Other collaborations are now starting to collect and submit data
  - Brazil, South Africa, India, Tunisia

Further interest in collaboration from several other countries
Cooperation of LCI initiatives

- Cooperation with several emerging economies to support LCI networks in developing countries, supported by the Swiss government (SECO)
  - Use the existing expertise of ecoinvent starting out as the Swiss LCI network

- 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 independent and self-sustaining regional LCI competence centres
Conclusions

- Ensure that the core sectors of the database remain valid
- Continue to provide data for new products and sectors
- Provide new system models if beneficial to the user base
- Assess and fine-tune new features of the database
- Development of useful improvements
- Expand the global coverage of the database and form network of collaborators
Data updates? New system models? Where should the database go?

Useful features? Less useful? New sectors?

Thank you for your attention!

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