2021 Report of Activities
# Table of Contents

1 ECOINVENT V3.8 .................................................................................................................. 3  
1.1 Product Information........................................................................................................ 3  
1.2 Market Information......................................................................................................... 3  
1.3 Database overview ......................................................................................................... 3  
1.4 Better support for GHG Protocol .................................................................................. 4  
1.5 New system model for EPD practitioners ..................................................................... 4  
1.6 LCIA methods................................................................................................................ 4  
1.7 Data Updates.................................................................................................................. 4  

2 CURRENT PROJECTS AND COLLABORATIONS .................................................. 7  
2.1 ORIENTING.................................................................................................................... 7  
2.2 Environmental Footprint Data........................................................................................ 7  
2.3 Life Cycle Inventory ProBas.......................................................................................... 7  
2.4 Refine............................................................................................................................. 8  
2.5 GLAD EF Mapping project ........................................................................................... 8  
2.6 Collaboration: Cornerstone .......................................................................................... 9  
2.7 New system model Allocation, cut-off, EN15804 ......................................................... 9  
2.8 Development of e-learning ........................................................................................... 9
1 ecoinvent v3.8

Version 3.8 of the ecoinvent database was published in September 2021. This update focuses on user comfort, adding enhanced documentation with additional information on products and services, advanced dataset documentation reports and improved market definitions, publishing an enhanced and more complete dataset overview file to accommodate data selection, and offering a detailed overview of the database’s sectorial coverage on the new ecoinvent website. Further, with ecoinvent 3.8 the ecoinvent database integrates around 360 new and 700 updated datasets, including around 70 new products.

1.1 Product Information

The update aims at offering comfort to the users while engaging with the database. All products and services included in the database now integrate a description that supports users in identifying them. The information includes a definition of the product or service as available in the database and examples of use in other industrial sectors. Regarding services, their documentation now incorporates supporting information on how to use them. Overall, ecoinvent 3.8 contains 3’300 unique products and services.

1.2 Market Information

With the release of ecoinvent 3.8, ecoinvent aims at improving the description and information in the market datasets included in the database. Specifically, all market datasets have been reviewed, and their existing meta information has been complemented or completed, in order to make the use and usability of these datasets more coherent and precise for the users of the ecoinvent database.

1.3 Database overview

To provide a more concise overview of the contents of the ecoinvent database, the information about the activities included has been centralized into one file: "Database Overview for ecoinvent 3.8". The file contains the following information:

- The lists of datasets contained in each of the system models, as well as the list of unlinked and unallocated datasets. For version 3.8, each dataset has been assigned to one or more sectors, which helps filter for datasets that can belong to different sectors. Different classification systems are proposed.
- The geographies used in the ecoinvent database. Each geography is assigned a classification, and the geographies that are contained in each geography are indicated.
- The list of the LCIA methods for which ecoinvent calculates impact scores. The version of the methods is indicated, and the original source used for defining the characterization factors is provided.
1.4 Better support for GHG Protocol

With the updates of ecoinvent 3.8, the ecoinvent database now offers the possibility to calculate emissions from electricity according to Scope 2 and Scope 3 Guidance of the GHG Protocol. For that, an additional file can be found in the ‘Files’ section ecoQuery. Separated scope 2 and 3 emission factors for electricity producing activities and electricity markets are now available in a spreadsheet. Emission factors are calculated based on the GWP100 (global warming potential) values from the IPCC 2013 AR5 report. They are representative for the end consumers of electricity and refer to the location-based reporting method, i.e., they represent grid average emission factors. On top of this, the new spreadsheet also provides disaggregated emission and emission factors for individual greenhouse gases or groups of greenhouse gases.

1.5 New system model for EPD practitioners

Acknowledging the increasing importance of Environmental Product Declarations (EPDs) in the construction and manufacturing sector and the need for standardized, accurate, non-misleading communication of the environmental information for products, the ecoinvent association introduced the ‘allocation, cut-off, EN15804’ system model. The aim of this system model is twofold; on the one hand, the ‘allocation, cut-off, EN15804’ facilitates the EPD practitioners to comply with the standard EN15804&A2:2019. On the other hand, the new system model contributes to a harmonization in the calculation of the indicators of the standard. The system model is fully compliant with ISO 14025, ISO 21930 and EN15804&A2:2019. It provides all Life Cycle Inventory (LCI) indicators required by the aforementioned standards and adheres to the end-of-waste criteria set by the European Commission.

1.6 LCIA methods

With ecoinvent 3.8, the latest versions of CML (v4.8 2016) and EF (v3.0 and adapted for EN15804) were added to LCIA methods. More details about impact categories of all implemented methods can be found in the new database overview file.

1.7 Data Updates

Brazilian Data

The Cornerstone project was set up between Rede ACV (the Brazilian business network for LCA) and the ecoinvent Association to improve the availability and access to background data representing key supply chains for Brazil. Rede ACV, through its contractor ACV Brasil, departed from existing content in the ecoinvent database to develop regionalized life cycle inventory (LCI) data representative of the situation in Brazil. The data in ecoinvent 3.8 cover the extraction, import and distribution of crude petroleum oil and natural gas, production of biodiesel (esterification of fatty acid methyl ester, FAME), distribution of diesel (for transport), and road freight transport by lorry. Older ecoinvent datasets have been updated for v3.8 to better reflect the country-specific supply of crude petroleum oil to petroleum refinery operation in Brazil.
Agriculture

The sector features a small update with the representation of new products, such as lentils and peas, and the recontextualization of agricultural services for Canada. Data for these updates were provided by the University of British Columbia and the Food Systems PRISM Laboratory.

Batteries

ecoinvent v3.8 includes new datasets for three types of Li-ion batteries (NCA, NMC111, NMC811) and their production. These datasets were created by the Swiss Federal Laboratories for Materials Science and Technology (EMPA) and incorporate various chemicals, such as cobalt sulphate, disodium disulphite, vinyl carbonate and oxides, and hydroxides for the three battery types. The individual battery components (cathode, anode, high and low voltage systems, cells and battery management systems) are split, and each is represented in an individual dataset. Complementary, a new dataset on lead-acid batteries created by the University of Pforzheim is also included in the v3.8 update.

Chemicals & Plastics

In ecoinvent 3.8, we continued our efforts to update data and strengthen the collaboration with the industry. Data for styrene production was updated with the support of PlasticsEurope and new and updated data for polyurethane foam was provided by EUROPUR.

Electricity

ecoinvent 3.8 contains updated, attributional electricity markets for most countries with a reference year of 2018. In the case of US and Canada, the reference year is 2019. Additionally, the Swiss electricity markets as well as transformation losses (high to medium and medium to low voltage) for all updated markets were adjusted. Data creation and review was done in collaboration with ETH Zurich and the Paul Scherrer Institute (PSI).

Electronics

Version 3.8 includes new datasets on consumer electronic devices. Based on the latest literature data, datasets for smartphone and tablet were added and the existing dataset for laptop was updated. For the mobile devices datasets for a new printed wiring board and liquid crystal display were created. Components in the corresponding supply chain have been adjusted as needed.
Forestry & Wood-based Products

The Wood sector has been updated with new data for bamboo forestry and the production of (intermediate) bamboo construction materials, i.e., bamboo pole, flattened bamboo, and woven bamboo mat. These new datasets were developed by Dr. Edwin Zea Escamilla with the support of the International Organization for Bamboo and Rattan INBAR.

Metals

New and updated datasets for the metals sector have been provided by EMPA (sponsored by the Swiss Federal Office for the Environment, BAFU) for ecoinvent version 3.8. The new data cover the production beryllium, ferroniobium and scandium oxide produced from rare earth tailings. Updates were provided by EMPA for the production of ferrochromium, lithium carbonate, strontium sulfate, tantalum, titanium, as well as for the mining of heavy mineral sands.

Transport

In collaboration with INFRAS, the datasets for air freight (belly and dedicated) transport are updated. The consumption of kerosene and the corresponding emissions were too low (version 3.6 to 3.7.1).

Resource Correction for Biogenic Carbon

In the “allocation, cut-off by classification” system model, the data for the forestry, wood, paper and cardboard sectors, biogenic carbon balances are restored after allocation using a new elementary exchange that allows to follow the process transparently.

Visit our YouTube Channel and watch our recorded webinars for more information about the contents of ecoinvent v3.8.
2 Current Projects and Collaborations

2.1 ORIENTING

ecoinvent participates in a consortium of 17 partners working on the ORIENTING project, a three-year Horizon 2020 project that aims at developing an operational methodology for product Life Cycle Sustainability Assessment.

The first work package (WP) of the project analysed existing approaches for the different methodological elements to be integrated – LCA, social LCA (S-LCA), life cycle costing (LCC), material criticality, and circular economy – to lay a solid scientific foundation of the methodology. Based on this, WPs 2, 3, and 4 were kicked off last summer. WP2 develops the method, WP3 makes it operational, and WP4 applies it in case studies with five different industry partners. ecoinvent is involved in all WPs, but our main task (under WP3) is to provide an ontology and data specifications that facilitate the interoperability of the different methodological elements at the data level. The goal is to deliver this in a final form in October 2022.

More information can be found on the project website or on our website.

2.2 Environmental Footprint Data

The ecoinvent Association participates in the Environmental Footprint (EF) initiative from the European Commission as data creator and an expert member in the Technical Advisory Board and different working groups.

The EF project is currently in its “transition phase” (2019-2024). Within this phase, ecoinvent works on the provision of the update of the pilot phase EF2.0 Chemical data to EF3.0 compliant datasets and its maintenance until the end of 2024.

ecoinvent is also leading a consortium in the creation of more than 1’300 EF3.0 compliant data in various sectors: plastics, renewable materials, agrofood, textiles, chemicals, and others. In the coming years, ecoinvent will maintain its commitment in supporting the European Commission in its endeavour to provide guidelines to assess the environmental footprint of products and organisations under the premise of the “Single Market for Green Products Initiative”. More information can be found here.

2.3 Life Cycle Inventory ProBas

ecoinvent contributed together with IFU (Institut für Umweltinformatik) under the lead of IFEU (Institut für Energie- und Umweltforschung) to the update of the Life Cycle Inventory ProBas published by the Federal Republic of Germany. ProBas is a freely accessible database covering over 8000 datasets in the sectors of energy, materials & products, transport, waste, and diverse services.

In autumn 2021, the German Environmental Agency granted IFEU, in cooperation with IFU and ecoinvent, the update of datasets in their database tool. The datasets are resourced
from ecoinvent’s database and they cover around 200 aggregated datasets and its LCIA results in ILCD-Format of raw materials.

2.4 Refine

In a consortium with IFEU (Institut für Energie- und Umweltforschung Heidelberg), Fraunhofer ISI and Dr. Karl Schoer, ecoinvent works at implementing future development scenarios with a focus on raw material expenditures and environmental impacts for the energy transition in a resource conserving and greenhouse neutral Germany.

In 2021 we focused on the implementation of three different scenarios in ten-year intervals from 2020-2050 and are at the stage of validating and verifying the results. These efforts will be continued and followed by specific analyses and data extracts.

2.5 GLAD EF Mapping project

The ecoinvent Association is actively contributing to the UNEP-hosted Global LCA Data Access (GLAD) network through its Technical Management and Working Groups. In support of its mission to enable users around the world to find and access LCA datasets from different data providers, the ecoinvent database (v3.6) was connected to the GLAD platform in 2020. A prerequisite for the interoperability of LCA data from multiple sources (e.g., background databases) for a common application is a consistent mapping between the different nomenclature systems currently in use within the field of LCA. Initiated within the GLAD Working Group on Nomenclature (WG1), the aim of this project was to develop a common system to map the nomenclature lists for elementary flows (EFs) between four databases connected to GLAD.

The project was coordinated by the ecoinvent Association with financial support from the European Commission (under the REAL project) and the Life Cycle Initiative, and it was implemented in close collaboration with representatives from the U.S. Federal LCA Commons, the Inventory Database for Environmental Analysis (IDEA) of Japan, and the International Reference Life Cycle Data System (ILCD)/Life Cycle Data Network (LCDN) developed by the Joint Research Centre of the European Commission. The project deliverables, mapping resources, and further relevant information will be shared through a public file repository in the coming months. This will enable end-users or conversion tool developers to make improvement suggestions or report errors in the EF mapping files, while also ensuring that any updates to these knowledge resources are documented. The insights and mapping information generated from the project is also providing valuable inputs to the recently initiated GLAD-GLAM dialogue for better harmonization across LCI data and LCIA methods.

More information can be found here.
2.6 Collaboration: Cornerstone

Institutional Partnership with Rede ACV

Since November 2020, the ecoinvent Association is an institutional member of Rede ACV, the Brazilian business network for Life Cycle Assessment (LCA). Within this partnership, ecoinvent supports Rede ACV’s efforts towards improving the availability and interoperability of LCA data in Brazil, and more generally in promoting life cycle thinking in the country. In the joint ‘Cornerstone’ project, Rede ACV, through its contractor ACV Brasil, departs from existing content in the ecoinvent database to develop regionalized Life Cycle Inventory (LCI) data representative of the situation in Brazil. The data shall be included both in the national database SICV Brasil as well as in the ecoinvent database, to the benefit of local users and the international LCA community alike.

The data provided for ecoinvent version 3.8, released in September 2021, covers the extraction, import and distribution of crude petroleum oil and natural gas, production of biodiesel (esterification of fatty acid methyl ester, FAME), distribution of diesel (for transport), and road freight transport by lorry. Older ecoinvent datasets were also updated for v3.8 to better reflect the country-specific supply of crude petroleum oil to petroleum refinery operation in Brazil. Going forward, ACV Brasil and ecoinvent are jointly exploring opportunities to further expand the data coverage for Brazil.

More information can be found here.

2.7 New system model Allocation, cut-off, EN15804

The ecoinvent Association developed the system model Allocation, cut-off, EN15804 to support the needs of Environmental Product Declaration (EPD) practitioners. The system model is compliant with an attributional interpretation of EN15804, ISO21930 and ISO14025 and provides all Life Cycle Inventory (LCI) and Life Cycle Impact Assessment (LCIA) indicators required by the aforementioned standards.

ecoinvent officially released the new system model in 2021 and added necessary information, where required, in the database (e.g., added Lower Heating Values to all relevant products). Currently, ecoinvent is revisiting the modelling of clinker production to account for the end-of-waste criteria in the c-PCR EN16908 and the guidance CEN/TR 16970.

2.8 Development of e-learning

To support the users in the best and most efficient use of the ecoinvent data in various types of assessments, the ecoinvent Association is currently developing training courses offered in the form of e-learning. The e-learning platform will be launched in 2022.