



Environmental Product Declarations (EPD) in openLCA

A short overview

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Why we integrated an EPD Editor in openLCA

In LCA there is no predetermined path to take for conducting a study and the practitioner has many options and decisions to take concerning for example the scope, data sources or impact indicators. When it comes to publishing the environmental performance of a product in a condensed form, i.e. creating environmental labels, comparability is essential. There are different types of such labels; a distinction is made between labels that are awarded by the producers themselves (type II) and labels that are awarded by third parties (type I and III). Environmental Product Declarations, short EPDs, belong to the group of type III declarations.

To ensure that EPDs are created the same way, experts and stakeholders (e.g. producers) have defined so-called Product Category Rules (PCRs) for different kinds of products. ISO 14025 and DIN EN 15804 state that the application of those PCRs is mandatory for the creation of EPDs and their assessment [1], [2].

In openLCA, a free and open source Life Cycle Assessment (LCA) and footprint software [http://www.openlca.org], there is now an EPD Editor which makes it possible for the user to create EPD datasets according to the international and European standards, to edit EPDs and to upload them onto a server [3]. The Editor was financed through a project with the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR). The EPD Editor is particularly interesting for manufacturers in the building and construction industry. The EPD datasets are built slightly different than usual LCA datasets. They typically do not contain material flows, but only the impact indicators (e.g. no CO2-Emissions, but contribution to Climate Change). Additionally, EN 15804 breaks down the product's life cycle into modules (A1-A3, B1-B6, C1-C4 and D) where A1 contains for example the extraction and processing of raw materials and therefore belongs to the production phase. This structure can also be found in the EPD Editor and the datasets.

For working with EPDs, the Ökobaudat database provides datasets that comply with the specific standards [4]. Those data are already available in EPD format and can be used for the creation and for editing EPDs. For the impact assessment GreenDelta has developed a compatible LCIA method that is available for openLCA [https://nexus.openlca.org/database/Ökobaudat]. GaBi databases – which are prescribed in the PCRs to be used for working with EPDs – are also available for openLCA [https://nexus.openlca.org/database/GaBi].



Figure 1. Concept of the EPD Editor in openLCA

How it looks like in openLCA

The EPD Editor is available as Plugin for openLCA² and can then be added to the navigation bar [5]. Go to File -> Manage Plugins (Figure 2) and choose and install the EPD Plugin (Figure 3). After restarting openLCA the Plugin will be active (Figure 4).



Figure 2. Opening the Plugin Manager in openLCA

Figure 3. Installation of the EPD Editors from Plugin Manager

² For version 1.4.2



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@ agribalyse_v1_2	EPD-Editor v10	
🕅 bioenergiedat		
@ ecoinvent_3_PETstudy		
Tecoinvent_LCIA_methods		
@ ecoinvent3_1_allocation_default_S_U		
<pre>@ ecoinvent3_1_allocation_default_U</pre>		 Serverkonfiguration
<pre>@ econvent3_1_consequential_longterm</pre>		
econvent3_1_cutoff	Eine neue EPD in der aktuellen Datenbank erstellen	Tragen Sie hier die Adressen und Zugangsdaten für entfernte Server ein
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openica4students_1502	Durchsuche die OKOBAU.DAT-Datenbank nach EPDs.	Die OKOBAU DAT ist eine deutsche Datendank für Baumatenalien.
O openica4students_answersFeb2015		
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0 probas_10022015	Indikatorzuordnung	Stateriale/nenschaffen
probas_data_300/2014		
Projekte	Ordne LCIA-Kategorien EPD-Indikatoren zu.	Editiere die Liste der Materialeigenschaften (z.B. Rohdichte), die in deklarierten Produkten verwendet werden
Produktsysteme		können.
Wirkungsabschätzungsmethoden		
Prozesse		
Flüsse	Meine EPDs	
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Figure 4. EPD Editor in openLCA

Using a simple example it is shown here how to create a new EPD with the Editor. For this purpose the product system "Brick wall" was created in advance.

For creating a new EPD, the reference product must already exist in the current database. Once it is created (here: Brick wall), the respective EPD can be created by clicking on real and represent the EPD in the Editor. You are then requested to name the EPD (e.g. Brick wall) and select the reference product (Figure 5).

LCa		
Create a	new EPD	
Create a	new EPD in the current database	
Name	Brick wall	
Filter		
Product	 Deposit products Other Production residues over the life cycle Value goods Brick wall 	
	Finish 📡	Cancel

Figure 5. Creating a new EPD



Click on "Finish" and a new window will open up with the newly generated EPD. Here you can document all relevant information about the EPD in the different tabs at the bottom of the window (Figure 6).

UUID 2518d30b-ebd2-4270-b563-617c11194800 Name Brick wall Further properties Synoryms Comment Comment Comment Conseles/2518d30b-ebd2-4270-b563-617c11194800.xml Cassification System Category path Category path Category path Category path Source Source Source Source Safety margin (m %)	General informat	ion		
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Figure 6. Information tabs for EPD "Brick wall"

In the "Environmental indicators" tab the modules (A1, A2, etc.) to be declared in the EPD can be chosen. By right-clicking in the modules area or by clicking on the green plus (③) in the upper right corner, a new module for the product system is created (Figure 7). The subdivision into modules is an essential part of the PCRs in DIN EN 15804 and defines the system boundaries of the products. In this case the production phase module (A1-A3) and "Brick wall" as product system were chosen. A description of the module (e.g. production phase) can be added optionally.



sectionitos			
Modules			
Module	Scenario	Product system	Description
A1-A3		🚠 Brick wall	production phase
A1			
A3			
A1-A3			
A5			
Re B1			
M B3	Indicator	Value	Unit
B4			
B4 B5 B6			
B4 B5 B6 B7			
B4 B5 B6 B7 C1 C2			
B4 B5 B6 B7 C1 C2 C2 C3			
B4 B5 B6 C1 C2 C3 C4 D			

Figure 7. Selecting modules in the EPD Editor

For initiating the calculation hit the symbol 💱 and the results for the brick wall are calculated (Figure 8).

Scenarios						٥
Modules						٥
Module		Scenario	Product system		Description	
A1-A3			🚠 Brick wall		production phase	
Results						¥¥ 🗹 🖬
Module	Scenario	Indicator		Value	Unit	· · · · ·
A1-A3		Abiotic depletion poten	tial for non fossil resour	0.0	kg Sb eq.	
A1-A3		Abiotic depletion poten	tial for fossil resources (0.0	MJ	
A1-A3		Acidification potential of	of soil and water (AP)	0.0	kg SO2 eq.	
A1-A3		Components for re-use	(CRU)	0.0	kg	
A1-A3		Eutrophication potentia	I (EP)	0.0	kg (PO4)3- eq.	
A1-A3		Exported electrical ener	gy (EEE)	0.0	MJ	
A1-A3		Exported thermal energy	y (EET)	0.0	MJ	
A1-A3		Global warming potenti	al (GWP)	0.0	kg CO2 eq.	
A1-A3		Hazardous waste dispos	ed (HWD)	0.0	kg	
A1-A3		Materials for energy rec	overy (MER)	0.0	kg	
A1-A3		Materials for recycling (MFR)	0.0	kg	
A1-A3		Use of net fresh water (F	W)	0.0	m3	
A1-A3		Non hazardous waste di	spose (NHWD)	0.0	kg	
A1-A3		Use of non renewable p	rimary energy (PENRE)	0.0	MJ	
A1-A3		Use of non renewable p	rimary energy resources	0.0	MJ	
A1-A3		Use of non renewable se	econdary fuels (NRSF)	0.0	MJ	
A1-A3		Depletion potential of t	he stratospheric ozone I	0.0	kg CFC 11 eq.	
A1-A3		Formation potential of t	ropospheric ozone (PO	0.0	kg C2H2 eq.	
A1-A3		Radioactive waste dispo	osed (RWD)	0.0	kg	
A1-A3		Use of renewable prima	ry energy (PERE)	0.0	MJ	
A1-A3		Use of renewable prima	ry energy resources use	0.0	MJ	
A1-A3		Use of renewable secon	dary fuels (RSF)	0.0	MI	

Figure 8. Initiating the calculation



For uploading the generated data to a server, click on the symbol 🗞 in the upper left corner (Figure 9) and confirm the pop up window. In advance, the URL address and data for the server need to be inserted under server configuration in the Editor.

🖩 Navigation 🖾	~ [🗖 EPD Editor 🛛 🗖 Brick wall 🖄		
ecoinvent_3_PET_Battery_Beerbottle ecoinvent_LCIA_methods	*	Environmental indicators	5	
@ ecoinvent3_1_lamp				
<pre>@ elcd_pet_teacher</pre>		Scenarios		
🗇 leer		* Modules		
nrel_2014_electricity_mix		Wouldes		
Inrel_beer_bottle		Module	Scenario	Product system
🕅 oekobaudat_de		A1-A3		Brick wall
🕅 oekobaudat_schulung				
openica_icia_methods_1_5_4				
openIca4students_answersfeb2015				

Figure 9. Uploading the dataset to a server



References:

[1] DIN EN 15804 (2012) Sustainability of construction works – Environmental product declarations – Core rules for the product category of contruction products; German version EN 15804:2012

[2] ISO 14025 (2006) Environmental labels and declarations – Type III environmental declarations – Principles and procedures

[3] <u>http://www.bbsr.bund.de/BBSR/DE/Service/Medieninfos/Ablage_RSSFeed/PM_oekobaudat.html</u> (German)

[4] http://www.oekobaudat.de/en.html

[5] <u>http://www.openlca.org/downloads</u> (Download here the newest version of openLCA)

For questions or comments:

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