GreenDelta

sustainability consulting + software

EPD creation for building and construction sector: new software implementation

Cristina Rodríguez, Andreas Ciroth, Michael Srocka
GreenDelta GmbH

Vancouver, LCA XV, 7 October 2015

Content

- Introduction to the ÖKOBAU.DAT database
- The new EPD Editor in openLCA
- Conclusions and next steps

The ÖKOBAU.DAT database

ÖKOBAU.DAT database

- German EPD database for construction (>700 products):
  - Mineral building materials
  - Insulation
  - Wood Products
  - Metals
  - Paints and sealants
  - Construction of plastics
  - Components of windows, doors and curtain walls
  - Building technology
  - Others
- Developed by Thinkstep, KIT and Online now! within research projects funded by German Ministry for Environment, Nature Conservation, Construction and Nuclear Safety (BMUB)
- Available since 2013
- Compliant with DIN EN 15804 and ISO 14025

ÖKOBAU.DAT database

- Intended users:
  - Building certification bodies (e.g. DGNB, BREEAM, LEED)
  - Designers, architects and planners
  - EPD program holders and manufacturers for distributing their EN 15804 EPDs

www.oekobaudat.de

Challenges

- Simplify EPD data sets creation

- Enhance data availability and sharing

EPD editor

EPD Editor in openLCA

EPD Editor

- Supported by the German Institute for Construction, Urban and Spatial Planning (BBSR)
- Goal:

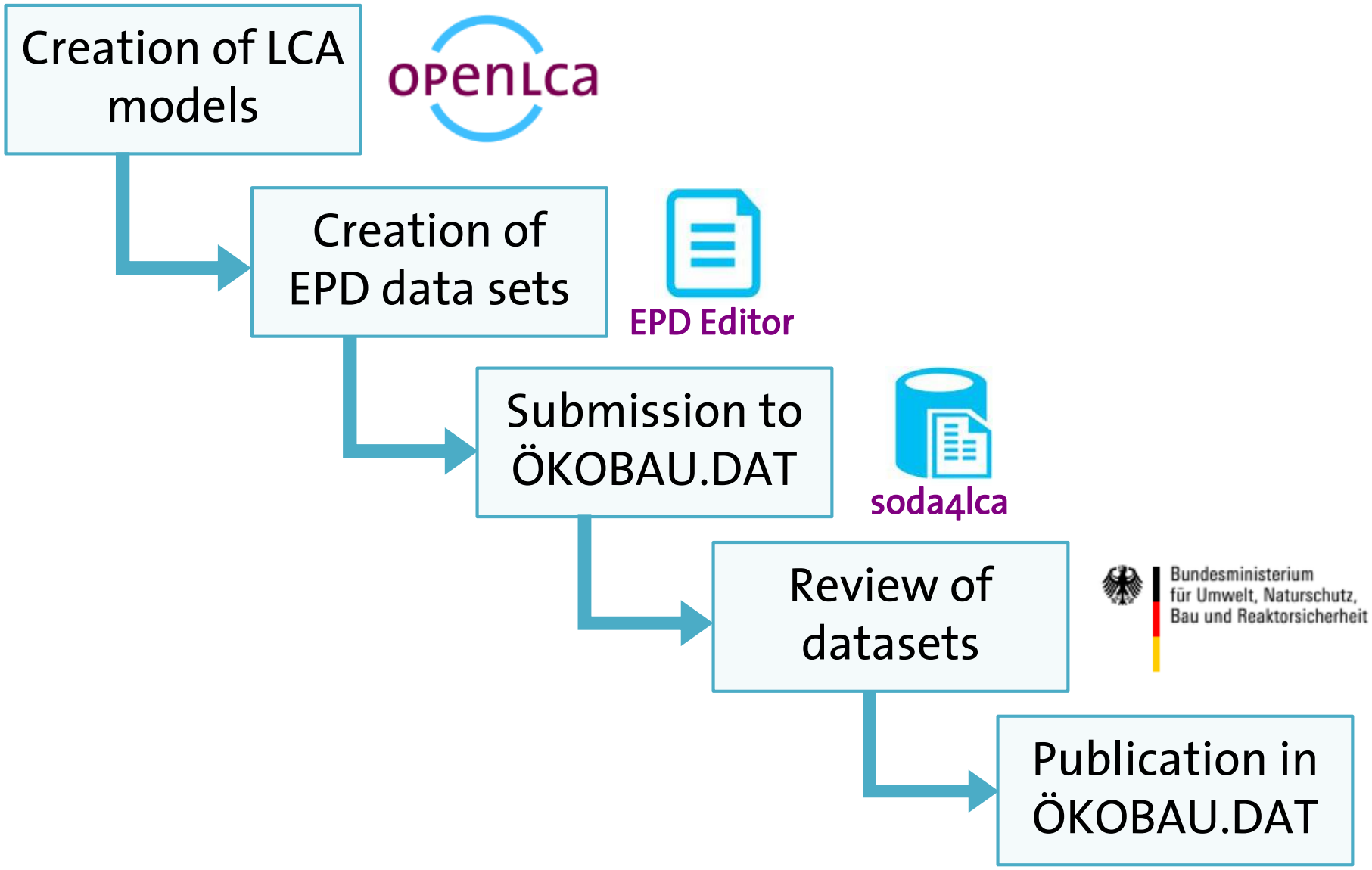
  To integrate in openLCA a plugin for creating EPD data sets compliant with the EN 15804, allowing data sharing with the ÖKOBAU.DAT database
- Free, open source toolkit:

openLCA

EPD Editor

soda4lca

Creation of new EPD data sets

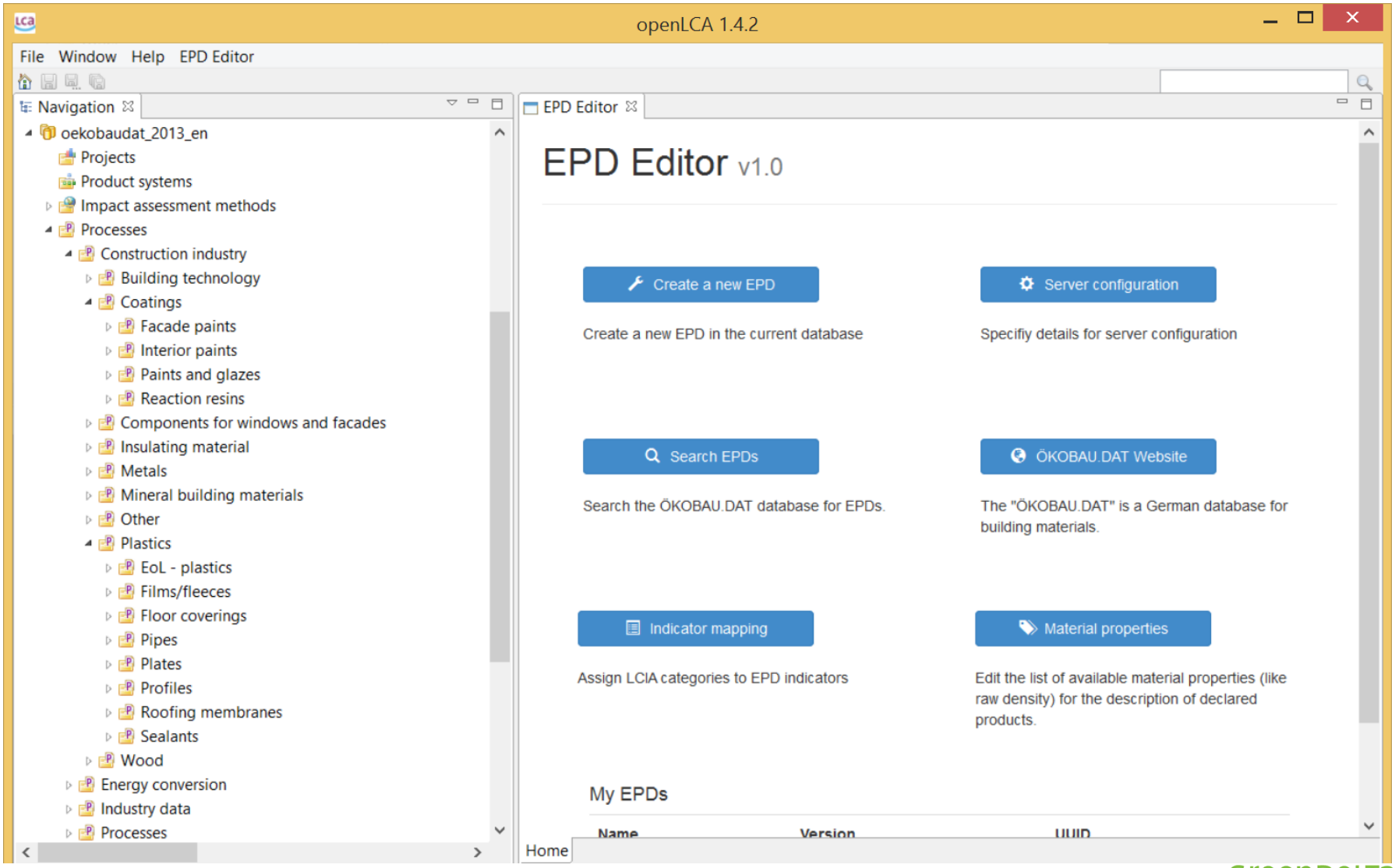


Creation of LCA models

- Modeling of product systems in openLCA
  - Data:
    - New processes created by the user
    - GaBi databases (prescribed in the PCRs) , ecoinvent, ELCD, etc.
    - Import of existing models into the software also possible:
      → Supported import formats: ILCD, EcoSpold1, EcoSpold2, Excel, JSON, zolca
  - All functionalities from openLCA

→Automatic and graphical creation of product systems available

EPD Editor in openLCA

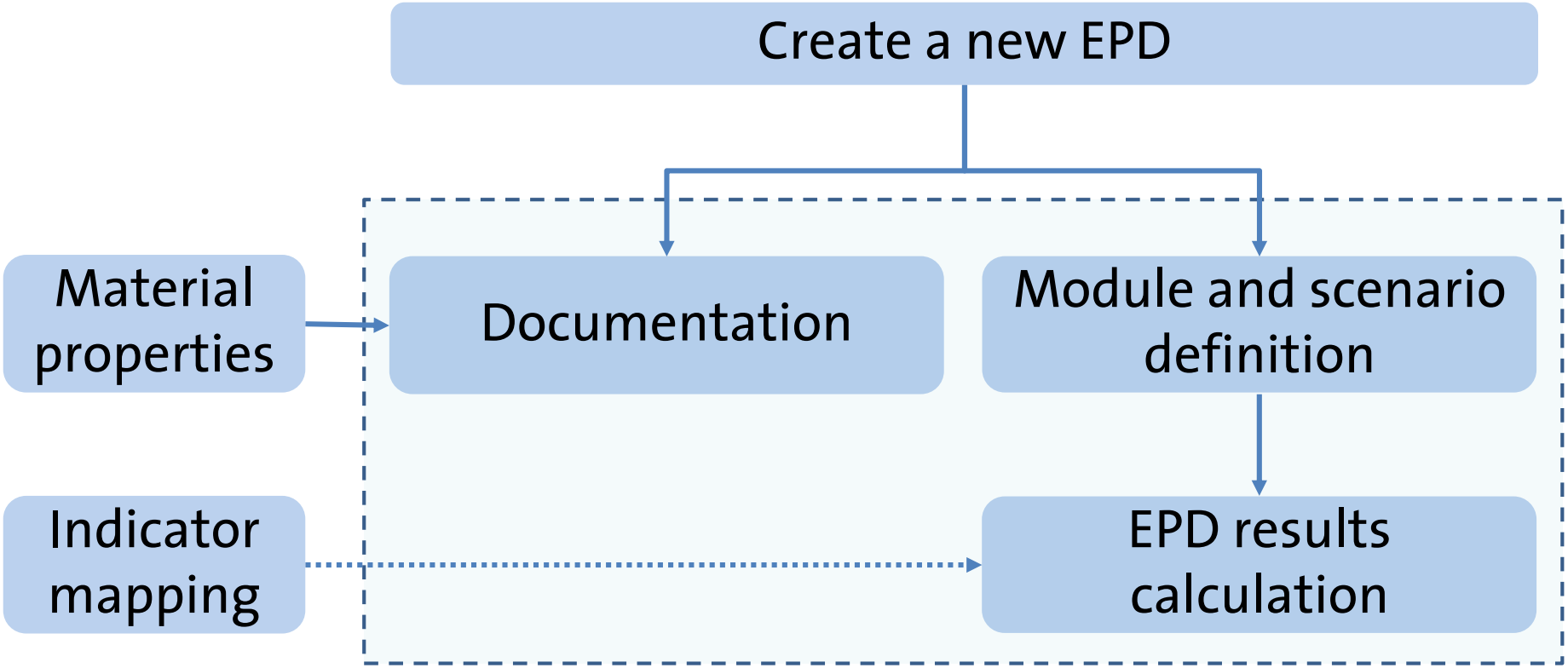


GreenDelta

Functions of the EPD Editor

- Create and edit EPD data sets
  - Direct connection to the calculation results in openLCA
- Data exchange with the database ÖKOBAU.DAT
  - Supports Advanced ILCD format for EPD data sets
  - Data exchange via the soda4LCA protocol

Creation of EPD data sets

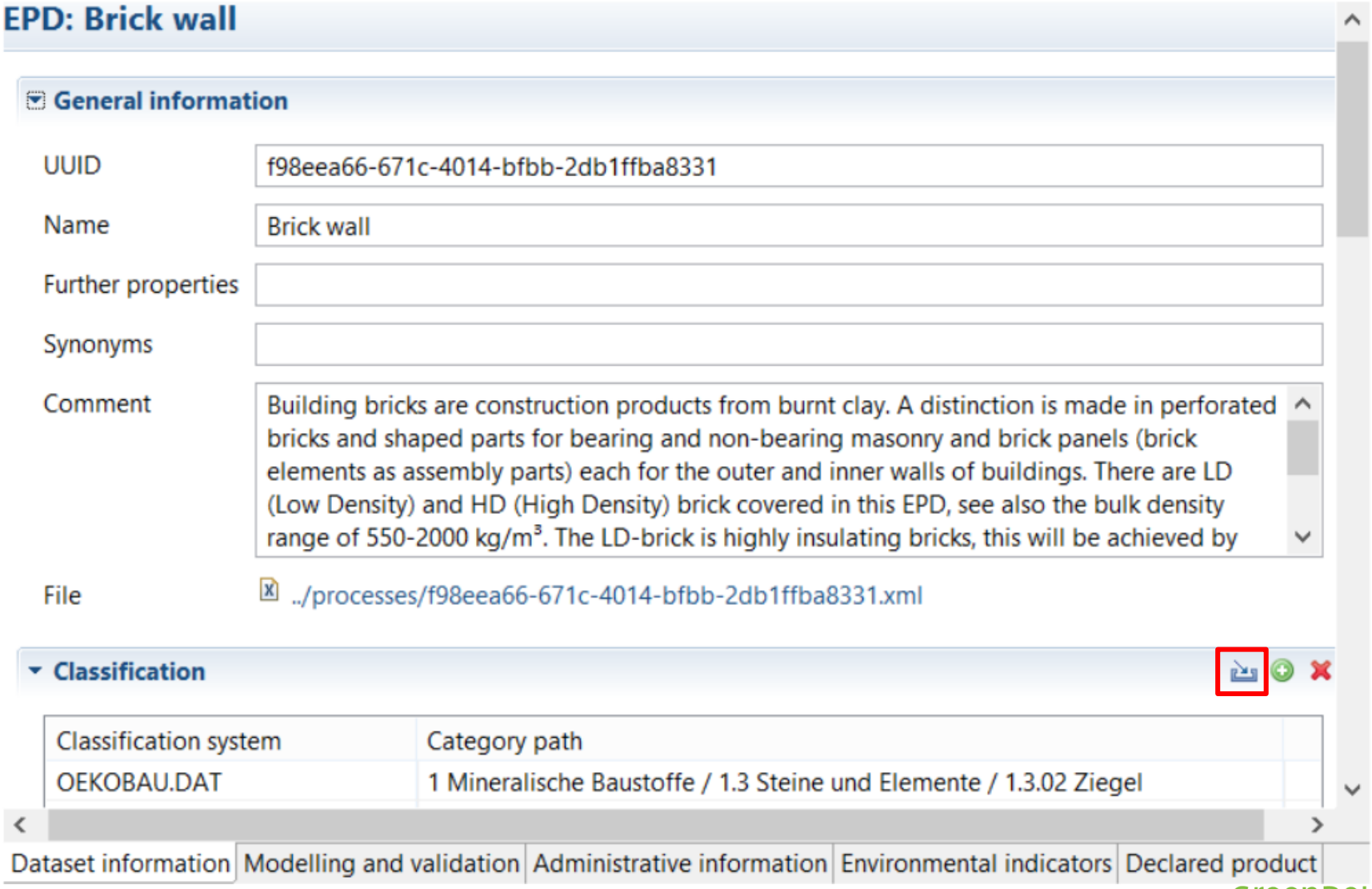


Documentation of EPD data sets

- Different documentation fields available:

Data set information	Modelling and validation	Administrative information	Declared product
• General information • Classification • External documentation sources • Safety margins • Time • Geography • Technology • Flow diagrams or pictures	• Subtype • Use advice • LCA method • Data sources • Reviews	• Data entry • Publication and ownership	• General information • Vendor information • Declared unit • Material properties

Documentation of EPD data sets



Documentation of EPD data sets

Declared product

General information

UUID	e08d6bc8-4d01-12a5-da9e-0a8eb0222be9
Flow	1 m³ Mauerziegel ()
File	../flows/e08d6bc8-4d01-12a5-da9e-0a8eb0222be9.xml
Generic product	
Version	00.01.000

Vendor information

Declared unit

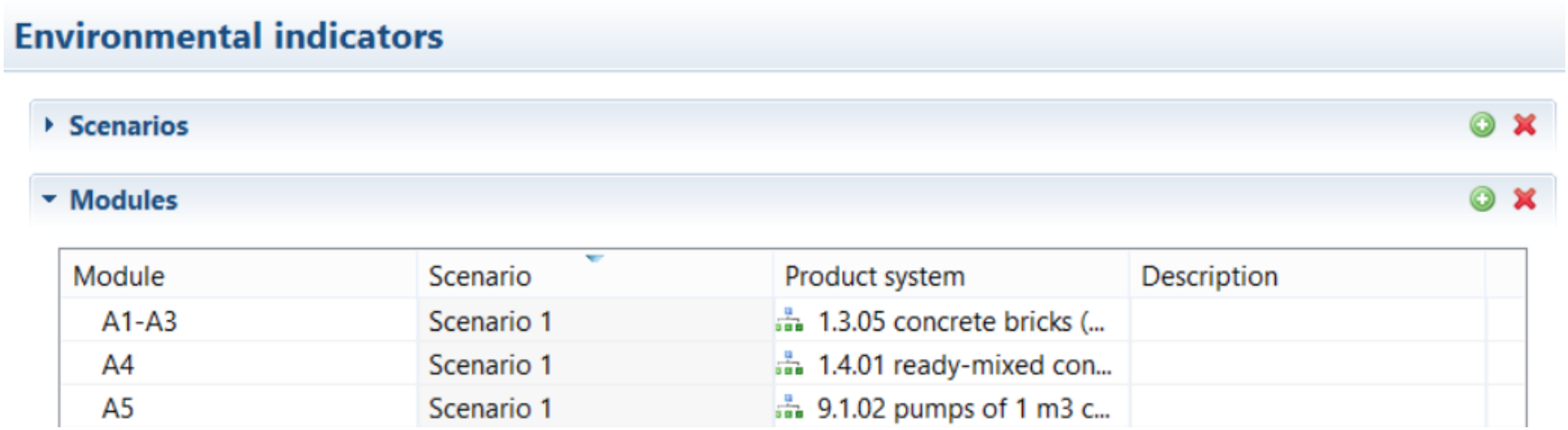
Amount	1.0
Unit	m3

Material properties

Property	Value	Unit
Gross density	575.00000	kg/m^3

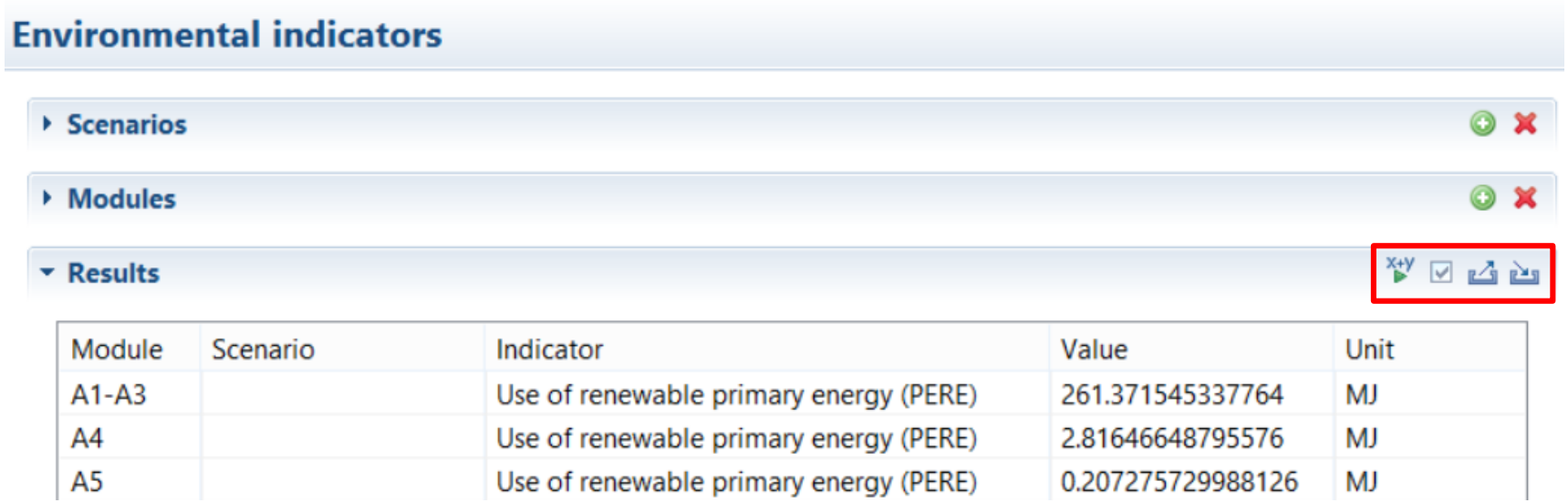
Definition of modules and scenarios

- Add relevant EN 15804 modules
  - Product systems from openLCA represent each module
- Different scenarios can be created



Calculation of EPD results

- Calculation of the EPD results per module, scenario and indicator
  - EN 15804 compliant method included by default
- Results can be exported and imported as Excel



Module	Scenario	Indicator	Value	Unit
A1-A3		Use of renewable primary energy (PERE)	261.371545337764	MJ
A4		Use of renewable primary energy (PERE)	2.81646648795576	MJ
A5		Use of renewable primary energy (PERE)	0.207275729988126	MJ

LCIA method - Indicator mapping

Indicator mapping

Impact assessment method

EN 15804:2012

Environmental parameters

Indicator	Category	Unit
Acidification potential of soil and water (AP)	Acidification potential of soil...	kg SO2-Äqv.
Depletion potential of the stratospheric ozone layer (ODP)	Depletion potential of the str...	kg R11-Äqv.
Eutrophication potential (EP)	Eutrophication potential (EP)	kg Phosphat-Äqv.
Formation potential of tropospheric ozone (POCP)	Formation potential of tropo...	kg Ethen-Äqv.
Global warming potential (GWP)	Global warming potential (G...	kg CO2-Äqv.

Resource parameters

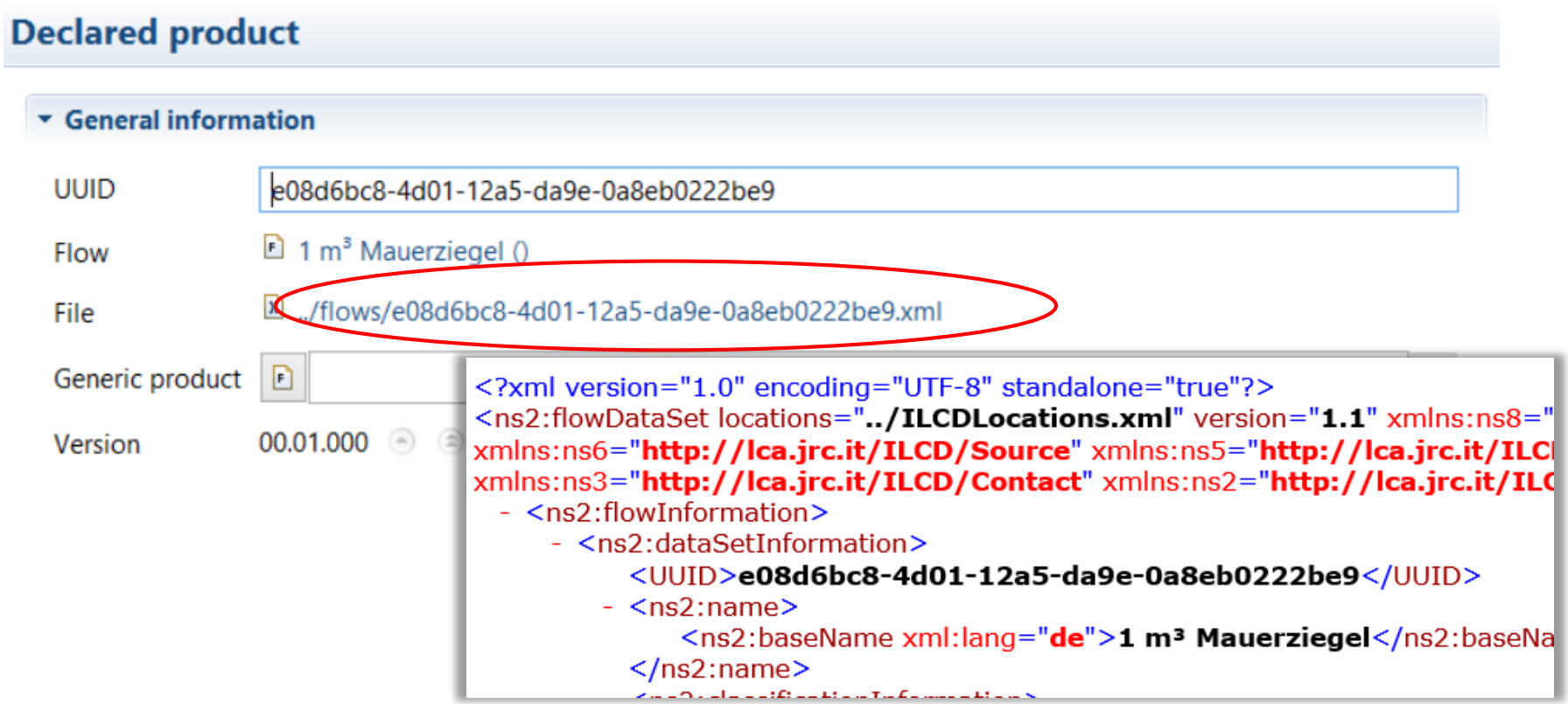
Waste parameters

Output parameters

Indicator	Category	Unit
Components for re-use (CRU)	Components for re-use (CRU)	kg
Exported electrical energy (EEE)	Exported electrical energy (E...	MJ
Exported thermal energy (EET)	Exported thermal energy (EET)	MJ

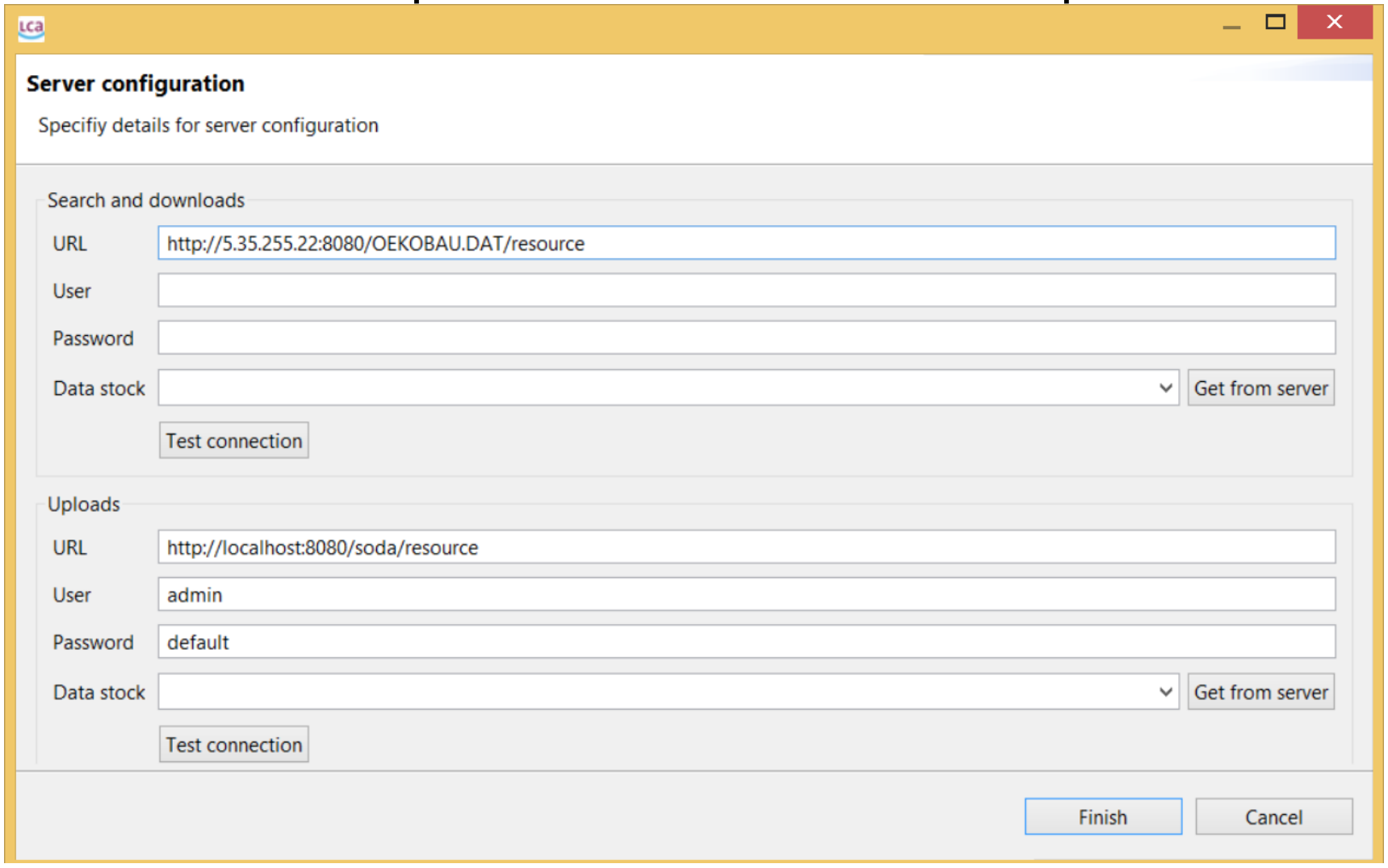
Storage of EPD data sets

- Internal data storage
  - EPD data sets saved in the openLCA database
  - Versioning included



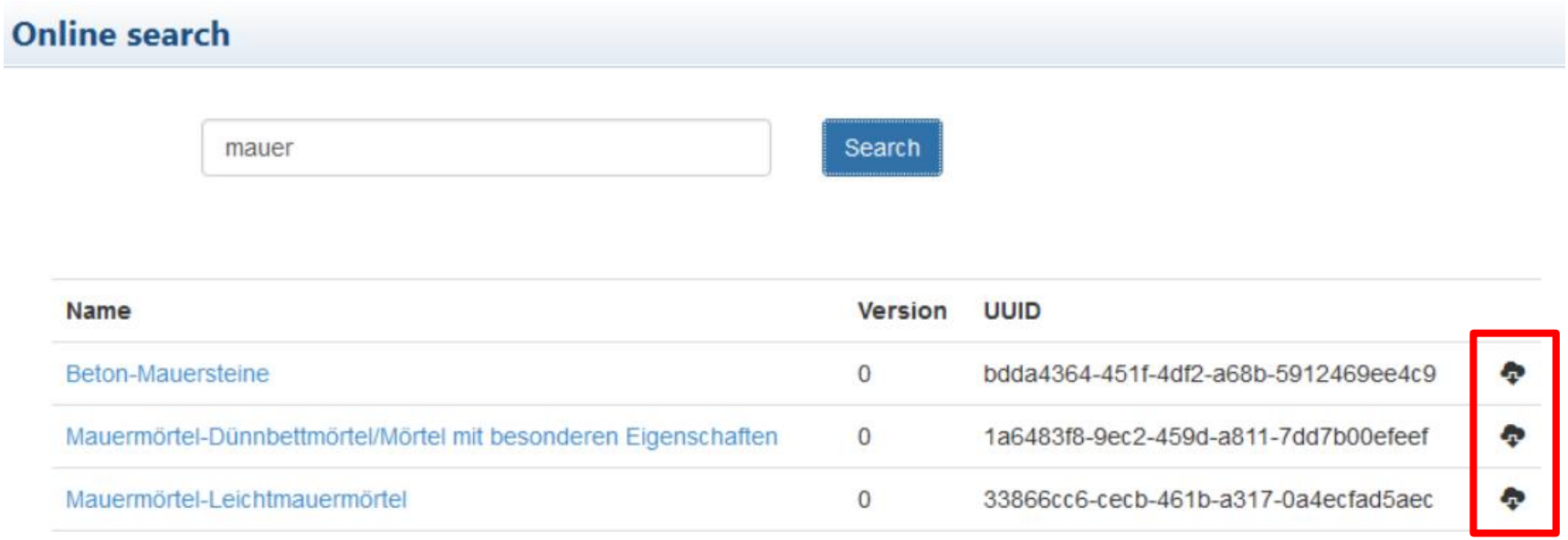
Data exchange

- Download and upload data sets from/to the specified server



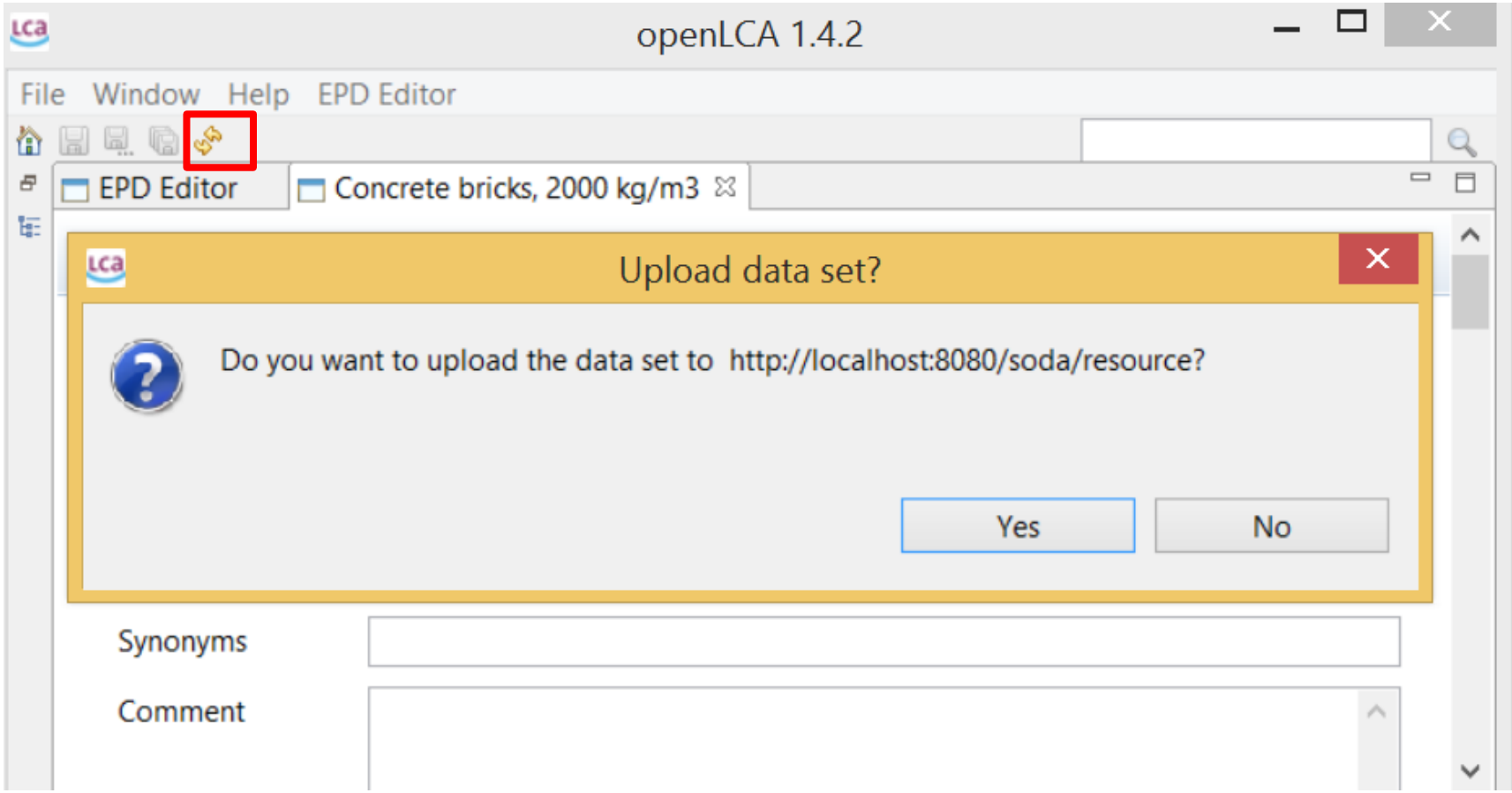
Data exchange

- Search of data sets in the online database
- Data sets can be downloaded and edited



Data exchange

- Upload of data sets to an ILCD node via soda4LCA protocol



Uploaded EPD data sets

Process Data set: Mauerziegel (en)

Process information

Key Data Set Information	
Location	DE
Reference year	2015
Name	Mauerziegel
Use advice for data set	Gültigkeitsbereich: Die Anwendung dieses Dokumentes ist auf Mauerziegel beschränkt, die von Mitgliedsunternehmen der A von 23 Mitgliedsunternehmen Daten aus dem Jahr 2013 zur Verfügung gestellt. Diese Mitglieder repräsentieren nach Anzahl Firmen liegt - nach Produktionsmenge - bei etwa 97 % des deutschen Marktes. Systemgrenze: Typ der EPD: Wiege bis Bah Produktherstellung inklusive der Verpackungsmaterialien (Module A1-A3). Der Transport zur Baustelle (Modul A4) sowie die E (Modul A5) sind ebenfalls Teil der Systemgrenzen. Nach Ablauf der Nutzungsdauer wird das Produkt rückgebaut (Modul C1). einer Inertstoffdeponie vorgesehen (Modul C4), 96 % können weiterverwertet werden. Gutschriften infolge des Recyclings vo thermischen Verwertung der Verpackung innerhalb des Moduls A5 werden ebenfalls in Modul D berücksichtigt. Das Nutzungs diesen Modulen. Da sich die Module B6 und B7 auf den Betrieb des Gebäudes beziehen und die Nutzung des Produkts in ke diese Module nicht relevant für Mauerziegel und haben damit keine Umweltauswirkungen.
Technical purpose of product or process	Je nach Konstruktion der Wände finden Mauerziegel verschiedener Formen Anwendung für massive Bauteile wie Kellerwände
Classification number	1.3.02
Classification	Class name : Hierarchy level ◦ OEKOBAU.DAT: 1.3.02 Mineralische Baustoffe / Steine und Elemente / Ziegel ◦ IBUCategories: 02 Bauprodukte / Mauerwerk und Mörtel / Ziegel
General comment on data set	Mauerziegel sind Bauprodukte aus gebranntem Ton. Es wird unterschieden in Hochlochziegel und Formteile für tragendes un Innenwände von Gebäuden. Es werden LD- (low densitiy) und HD- (high density) Ziegel in dieser EPD behandelt, siehe auch Ziegel, dies wird durch die Zugabe von Porosierungsmitteln in der Produktion erreicht wird. Mauerziegel können zusätzlich mi Grundlage der Ökobilanzergebnisse in dieser EPD ist eine Durchschnittsbildung aller deutschen Werke, die als gewichteter M Als repräsentatives Produkt wurde ein Ziegel mit einer Rohdichte von 575 kg/m³ ausgewählt.
Copyright	Yes
Owner of data set	Arbeitsgemeinschaft Mauerziegel im Bundesverband der Deutschen Ziegelindustrie e.V.
Quantitative reference	
Reference flow(s)	1 m³ Mauerziegel - 1.0 m3 (Volume)
Time representativeness	

GreenDeLTa

Uploaded EPD data sets

Validation

Type of review	Scope / Method(s) of review	Data quality indicators	Review details	Reviewer name and institution	Subsequent review comments	Complete review report
Accredited third party review		No records found.		IBU		

Compliance Declarations

Compliance	Compliance system name DIN EN 15804	Approval of overall compliance	Nomenclature compliance	Methodological compliance	Review compliance	Documentation compliance	Quality compliance
Compliance	Compliance system name ISO 14025	Approval of overall compliance	Nomenclature compliance	Methodological compliance	Review compliance	Documentation compliance	Quality compliance

▸ **Administrative information**

▾ **Environmental indicators**

Indicators of life cycle

Indicato	Directio	Unit	Product A1-A3	Transpo A4	Installat A5	Use B1	Mainten B2	Repair B3	Replace B4	Refurbi B5	Operati energy use B6	Operati water use B7	De-constru C1	Transpo C2	Waste process C3	Disposa C4	Recycli Potentia D
Erneuerb Primären als Energietr (PERE)	Input	MJ	261.4	2.816	0.2073	0	0	0	0	0	-	-	0.1888	1.74	1.56	0.3624	-9.523
Erneuerb Primären zur stoffliche Nutzung (PERM)	Input	MJ	0	0	0	0	0	0	0	0	-	-	0	0	0	0	0
Total erneuerba Primären (PERT)	Input	MJ	261.4	2.816	0.2073	0	0	0	0	0	-	-	0.1888	1.74	1.56	0.3624	-9.523

GreenDelta

Conclusions and outlook

Conclusions

- Now, creating and sharing EPD-datasets is easy and available in an open source software

- Versioning and authoring system allows management of these data sets very easily

Next steps in EPD Editor development

- The EPD Editor could be extended to meet other standards for other type of products

- Automatic EPD report generation (html format)

→ Support welcome!

GreenDelta

sustainability consulting + software

Thank you!

Contact: Cristina Rodríguez

GreenDelta GmbH

Müllerstrasse 135, 13349 Berlin, German

rodriguez@greendelta.com

www.greendelta.com