

GreenDeLTa

sustainability consulting + software

EPD creation for building and construction sector: new software implementation

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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:

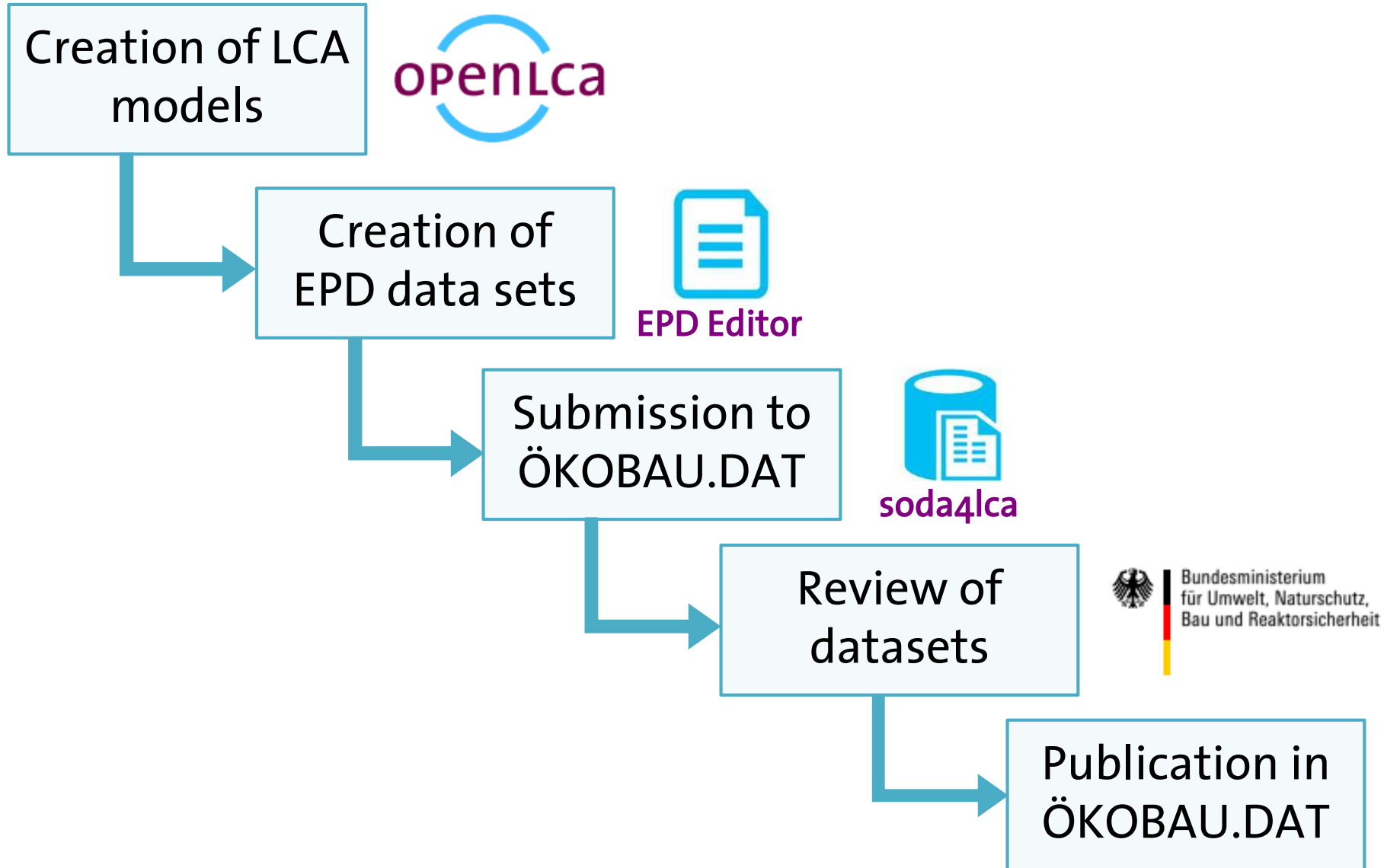


EPD Editor



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

openLCA 1.4.2

File Window Help EPD Editor

Navigation

- oekobaudat_2013_en
 - Projects
 - Product systems
 - Impact assessment methods
 - Processes
 - Construction industry
 - Building technology
 - Coatings
 - Facade paints
 - Interior paints
 - Paints and glazes
 - Reaction resins
 - Components for windows and facades
 - Insulating material
 - Metals
 - Mineral building materials
 - Other
 - Plastics
 - EoL - plastics
 - Films/fleeces
 - Floor coverings
 - Pipes
 - Plates
 - Profiles
 - Roofing membranes
 - Sealants
 - Wood
 - Energy conversion
 - Industry data
 - Processes

EPD Editor v1.0

Create a new EPD

Create a new EPD in the current database

Server configuration

Specify details for server configuration

Search EPDs

Search the ÖKOBAU.DAT database for EPDs.

ÖKOBAU.DAT Website

The "ÖKOBAU.DAT" is a German database for building materials.

Indicator mapping

Assign LCIA categories to EPD indicators

Material properties

Edit the list of available material properties (like raw density) for the description of declared products.

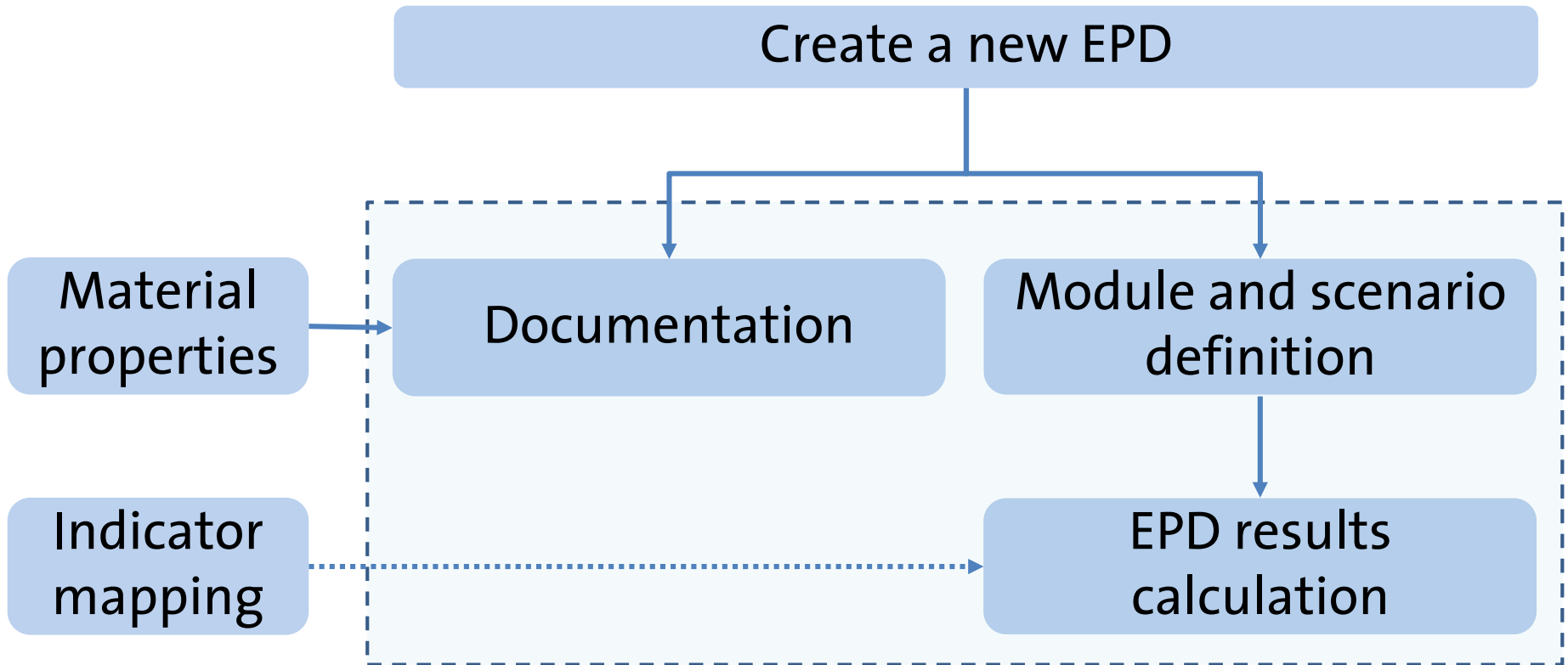
My EPDs

| Name | Version | UUID |
|------|---------|------|
|------|---------|------|

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 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none">• General information• Classification• External documentation sources• Safety margins• Time• Geography• Technology• Flow diagrams or pictures | <ul style="list-style-type: none">• Subtype• Use advice• LCA method• Data sources• Reviews | <ul style="list-style-type: none">• Data entry• Publication and ownership | <ul style="list-style-type: none">• General information• Vendor information• Declared unit• Material properties |

Documentation of EPD data sets

EPD: Brick wall

General information

| | |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UUID | f98eea66-671c-4014-bfbb-2db1ffba8331 |
| Name | Brick wall |
| Further properties | |
| Synonyms | |
| Comment | Building bricks are construction products from burnt clay. A distinction is made in perforated bricks and shaped parts for bearing and non-bearing masonry and brick panels (brick elements as assembly parts) each for the outer and inner walls of buildings. There are LD (Low Density) and HD (High Density) brick covered in this EPD, see also the bulk density range of 550-2000 kg/m ³ . The LD-brick is highly insulating bricks, this will be achieved by |
| File |  ./processes/f98eea66-671c-4014-bfbb-2db1ffba8331.xml |

Classification



| Classification system | Category path |
|-----------------------|--------------------------------------------------------------------|
| OEKOBAU.DAT | 1 Mineralische Baustoffe / 1.3 Steine und Elemente / 1.3.02 Ziegel |


Documentation of EPD data sets

Declared product



▼ General information

UUID

Flow  1 m³ Mauerziegel ()

File  ../flows/e08d6bc8-4d01-12a5-da9e-0a8eb0222be9.xml

Generic product  

Version 00.01.000  

▶ Vendor information

▼ Declared unit

Amount

Unit








▼ 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

Environmental indicators

| Scenarios   | | | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|-------------------------------------------------------------------------------------|------------------------------|-------------|
| Modules   | | | | |
| Module | Scenario | Product system | | Description |
| A1-A3 | Scenario 1 |  | 1.3.05 concrete bricks (...) | |
| A4 | Scenario 1 |  | 1.4.01 ready-mixed con... | |
| A5 | Scenario 1 |  | 9.1.02 pumps of 1 m3 c... | |

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

Environmental indicators

Scenarios

Modules

Results

x+y


☒

| 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


Declared product

▼ General information

UUID

Flow  1 m³ Mauerziegel ()

File  [../flows/e08d6bc8-4d01-12a5-da9e-0a8eb0222be9.xml](#)

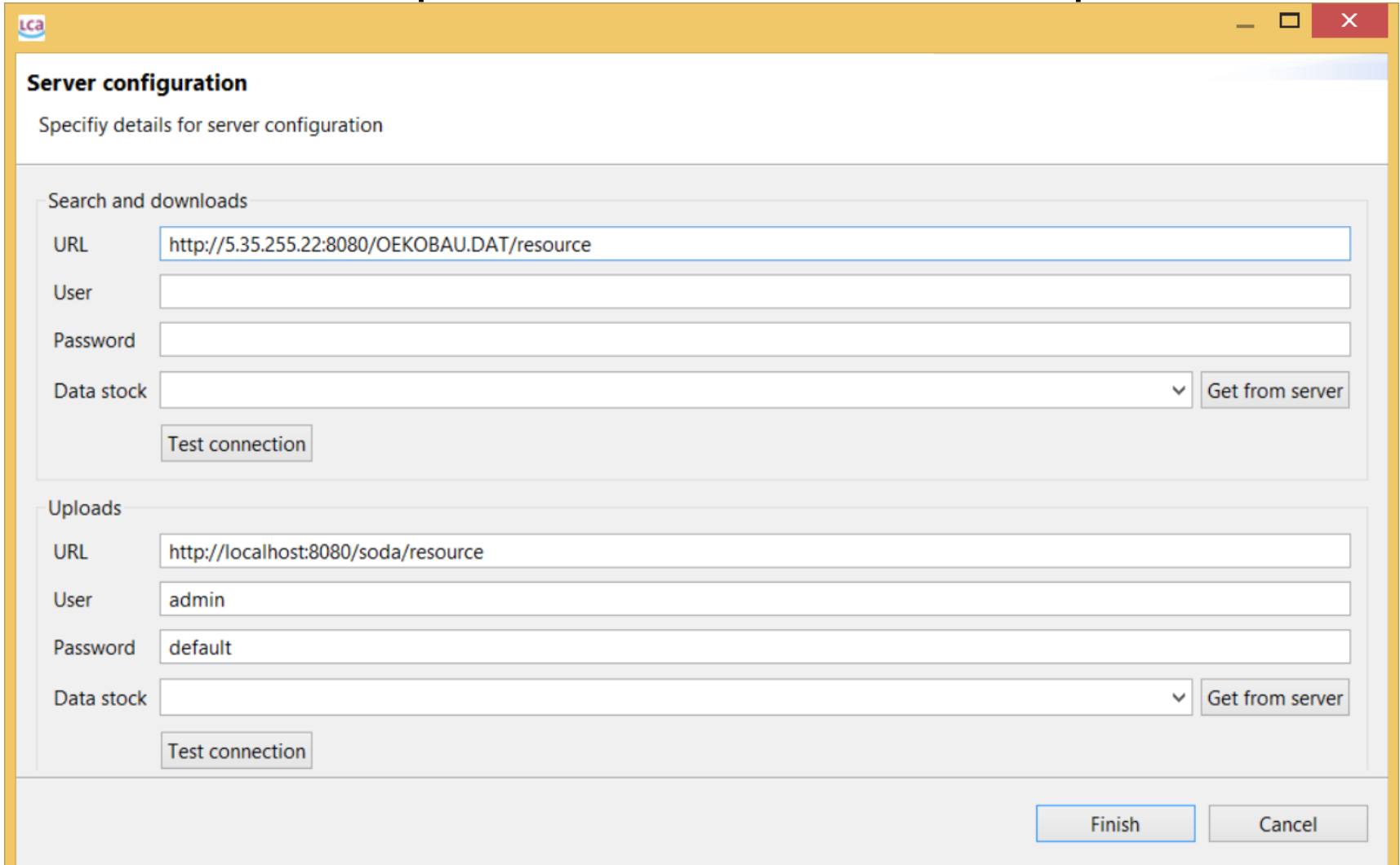
Generic product 

Version 00.01.000  

```
<?xml version="1.0" encoding="UTF-8" standalone="true"?>
<ns2:flowDataSet locations="../ILCDLocations.xml" version="1.1" xmlns:ns8="
xmlns:ns6="http://lca.jrc.it/ILCD/Source" xmlns:ns5="http://lca.jrc.it/ILCD
xmlns:ns3="http://lca.jrc.it/ILCD/Contact" xmlns:ns2="http://lca.jrc.it/ILCD
- <ns2:flowInformation>
  - <ns2:dataSetInformation>
    <UUID>e08d6bc8-4d01-12a5-da9e-0a8eb0222be9</UUID>
  - <ns2:name>
    <ns2:baseName xml:lang="de">1 m³ Mauerziegel</ns2:baseName>
  </ns2:name>
  <ns2:classificationInformation>
```

Data exchange

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



The screenshot shows a 'Server configuration' dialog box with a yellow title bar and standard Windows window controls. The dialog is divided into two main sections: 'Search and downloads' and 'Uploads'. Each section contains fields for URL, User, Password, and Data stock, along with a 'Test connection' button and a 'Get from server' button. The 'Search and downloads' section has a URL field with the text 'http://5.35.255.22:8080/OEKOBAU.DAT/resource'. The 'Uploads' section has a URL field with the text 'http://localhost:8080/soda/resource', a User field with the text 'admin', and a Password field with the text 'default'. The 'Data stock' field in both sections is a dropdown menu with a downward arrow. The 'Finish' button is highlighted with a blue border, and the 'Cancel' button is a standard gray button.

Server configuration
Specify details for server configuration

Search and downloads

URL:

User:

Password:

Data stock:

Uploads

URL:

User:

Password:

Data stock:

Data exchange

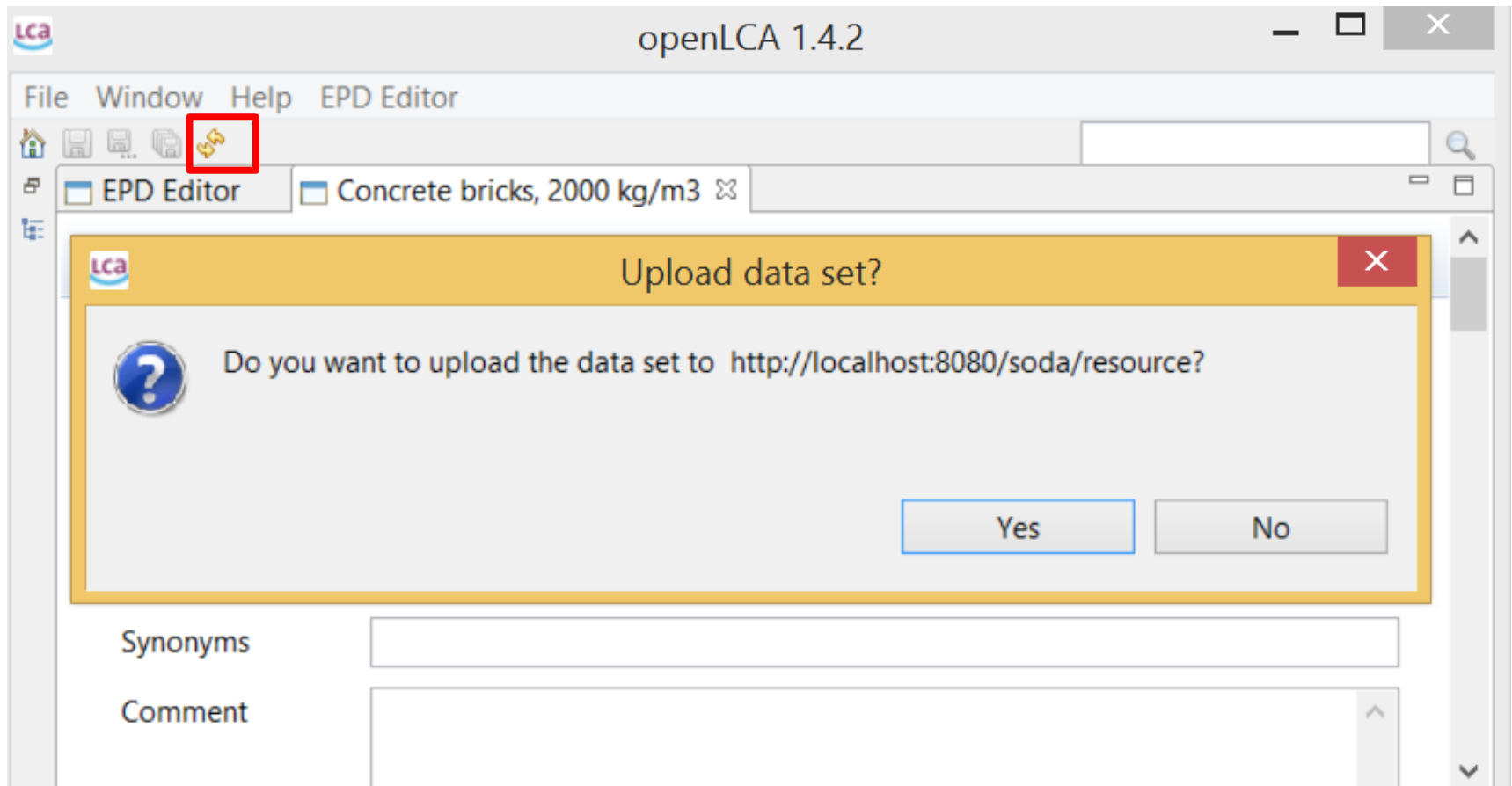
- Search of data sets in the online database
- Data sets can be downloaded and edited

Online search

| Name | Version | UUID | |
|--------------------------------------------------------------------------------|---------|--------------------------------------|---------------------------------------------------------------------------------------|
| Beton-Mauersteine | 0 | bdda4364-451f-4df2-a68b-5912469ee4c9 |  |
| Mauermörtel-Dünnbettmörtel/Mörtel mit besonderen Eigenschaften | 0 | 1a6483f8-9ec2-459d-a811-7dd7b00efeef |  |
| Mauermörtel-Leichtmauermörtel | 0 | 33866cc6-cecb-461b-a317-0a4ecfad5aec |  |

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 Arbeitsgemeinschaft Mauerziegel im Bundesverband der Deutschen Ziegelindustrie e.V. von 23 Mitgliedsunternehmen Daten aus dem Jahr 2013 zur Verfügung gestellt. Diese Mitglieder repräsentieren nach Anzahl der Firmen liegt - nach Produktionsmenge - bei etwa 97 % des deutschen Marktes. Systemgrenze: Typ der EPD: Wiege bis Baufeld. Produktherstellung inklusive der Verpackungsmaterialien (Module A1-A3). Der Transport zur Baustelle (Modul A4) sowie die Entsorgung (Modul A5) sind ebenfalls Teil der Systemgrenzen. Nach Ablauf der Nutzungsdauer wird das Produkt rückgebaut (Modul C1). Eine Inertstoffdeponie vorgesehen (Modul C4), 96 % können weiterverwertet werden. Gutschriften infolge des Recyclings von thermischen Verwertung der Verpackung innerhalb des Moduls A5 werden ebenfalls in Modul D berücksichtigt. Das Nutzungsmodul D ist in diesen Modulen. Da sich die Module B6 und B7 auf den Betrieb des Gebäudes beziehen und die Nutzung des Produkts in keinem dieser 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 <ul style="list-style-type: none"> OEKOBAD.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 und nichttragendes Mauerwerk. Es werden LD- (low density) und HD- (high density) Ziegel in dieser EPD behandelt, siehe auch die Tabelle der Ziegel, dies wird durch die Zugabe von Porosierungsmitteln in der Produktion erreicht. Mauerziegel können zusätzlich mit einer Schutzschicht versehen sein. Grundlage der Ökobilanzergebnisse in dieser EPD ist eine Durchschnittsbildung aller deutschen Werke, die als gewichteter Mittelwert 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 representation | |

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 | | | | | | | | | | | | | | | | | |
| | | | Product A1- A3 | Transport A4 | Installation A5 | Use B1 | Maintenance B2 | Repair B3 | Replacement B4 | Refurbishment B5 | Operative energy use B6 | Operative water use B7 | Deconstruction C1 | Transport C2 | Waste process C3 | Disposal C4 | Recycling Potential D |
| Erneuerbare Primärenergieträger (PERE) | Input | MJ | 261.4 | 2.816 | 0.2073 | 0 | 0 | 0 | 0 | 0 | - | - | 0.1888 | 1.74 | 1.56 | 0.3624 | -9.523 |
| Erneuerbare zur stofflichen Nutzung (PERM) | Input | MJ | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | - | - | 0 | 0 | 0 | 0 | 0 |
| Total erneuerbare Primärenergie (PERT) | Input | MJ | 261.4 | 2.816 | 0.2073 | 0 | 0 | 0 | 0 | 0 | - | - | 0.1888 | 1.74 | 1.56 | 0.3624 | -9.523 |

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!

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Thank you!

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