



Federal Institute for
Research on Building,
Urban Affairs and
Spatial Development

within the Federal Office for
Building and Regional Planning



Zukunft Bauen

Forschung für die Praxis | Volume 11

ÖKOBAUDAT

Basis for the building life
cycle assessment

Contractors

IBO



Österreichisches Institut für Bauen und Ökologie GmbH

IBO – Österreichisches Institut für Bauen und Ökologie GmbH
1090 Wien

ok★worx

Oliver Kusche Research & Consulting

Oliver Kusche Research & Consulting
79100 Freiburg

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ÖKOBAUDAT

Basis for the building life cycle assessment

Supported by



Federal Ministry
of the Interior, Building
and Community

ZUKUNFT BAU
RESSORTFORSCHUNG



Dear Readers,

A life cycle assessment describes the environmental and climate-related effects of a product during its entire life cycle – from the extraction of raw materials to the production of the materials, the manufacture of the product, the use stage through to all processes at the end of the product life cycle.

The BBSR database ÖKOBAUDAT supports the preparation of life cycle assessments for entire constructions. On the basis of indicators, the datasets describe the possible environmental and climate-related effects of building materials and building products. The data can be imported into all common building life cycle assessment tools.

ÖKOBAUDAT, which is based on open source software, is unique in this way. The environmental database meets all criteria of the European standard for environmental product declarations (EN 15804 “Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products”). The possibility of importing and exporting data via online interfaces as well as conformity with European standards are important prerequisites for ensuring that life cycle assessment data is prepared in a standardised manner throughout Europe.

This new version of our brochure describes the technical and content-related quality characteristics of ÖKOBAUDAT, indicates the tools that can be used to calculate life cycle assessments and explains how data can be imported into and exported from ÖKOBAUDAT.

ÖKOBAUDAT is supported by funds from the Zukunft Bau Ressortforschung of the Federal Ministry of the Interior, Building and Community (BMI).

I hope you will find this brochure insightful reading.

A handwritten signature in black ink that reads "Markus Eltges". The signature is written in a cursive, slightly slanted style.

Dr. Markus Eltges

Director of the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR) within the Federal Office for Building and Regional Planning (BBR)

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What is ÖKOBAUDAT?



The ÖKOBAUDAT-Plattform

ÖKOBAUDAT is a platform with data, information and links related to the life cycle assessment of construction works. With ÖKOBAUDAT, the Federal Government has provided one of the most comprehensive and high-quality databases – both nationally and internationally – for life cycle assessment data of construction products. ÖKOBAUDAT is published in German and English at www.oekobaudat.de [1]. At the platform's core is the online database with life cycle assessment datasets on building materials, construction, transport, energy and disposal processes. ÖKOBAUDAT offers both generic datasets and specific environmental product declaration datasets from diverse companies or associations. Via suitable interfaces, datasets are imported into the ÖKOBAUDAT database or exported in order to use them for building life cycle assessments. In addition to the database, tools are provided to generate and record EPD data in the appropriate data format and to validate it for conformity with the required data format.

The data is subject to strict quality requirements and can be used in many different building assessment systems. The database system with its search and filter functions enables user-friendly online searches of the datasets. Current EPD datasets are continuously updated. Previous datasets are archived online to ensure no information is lost.

EN 15804-compliant data

With the ÖKOBAUDAT database, the BMI has provided all stakeholders with a consistent data pool for the life cycle assessment of construction works – currently more than 1,200 datasets on all important construction product groups, and these have been in compliance with EN 15804 since 2013. EPD data is continuously updated. A new ÖKOBAUDAT release is published approx. once a year with the update of the generic datasets.

Image above:
Source: enzberg/IBO

ÖKOBAUDAT

- › online database
- › compliant with the Assessment System for Sustainable Building (BNB)
- › EN 15804-compliant
- › high data consistency
- › verified data quality
- › free of charge
- › standardised data format
- › data transfer to advanced tools

BNB-compliant data and additional data

ÖKOBAUDAT is the mandatory database for the Assessment System for Sustainable Building (Bewertungssystem Nachhaltiges Bauen, BNB) [2]. For consistency reasons, BNB-compliant datasets must be based on the background database GaBi. The ÖKOBAUDAT platform also offers datasets based on ecoinvent background data. In all other respects, this data fully adheres to the ÖKOBAUDAT requirements in terms of quality and data format and, in justified cases, can therefore be used for BNB life cycle assessments.

Who is responsible for ÖKOBAUDAT?

The publisher of ÖKOBAUDAT is the BMI [3].

Responsibility under the Press Act lies with the BBSR [4] in the BBR.

ÖKOBAUDAT and its related tools were developed with the involvement of the German building materials industry and within the framework of research projects as part of the Zukunft Bau innovation programme, in which, amongst others, beibob medienfreunde, greendelta, IBO (Austrian Institute for Healthy and Ecological Building), KIT (Institute for Applied Computer Science), ok*worx consulting, Online Now! GmbH and thinkstep were involved.

The BMI provides the ÖKOBAUDAT data free of charge and without any restrictions. They are primarily intended for performing life cycle assessment of buildings. The respective owners of the datasets remain responsible for the contents and values.

The screenshot displays the ÖKOBAUDAT database search results. The header includes the Federal Ministry of the Interior, Building and Community logo and the ÖKOBAUDAT Sustainable Construction Information Portal. The main content area shows a search results table with the following data:

Name	Languages	Classification	Location	Valid Until	Type	Owner
3- und 5-Schicht Massivholzplatte (Durchschnitt DE)	de	3.2.01 Holz / Holzwerkstoffe / 3- und 5-Schichtplatten	DE	2022	representative dataset	Thunen-Institut für Holzforschung
4.3.03 Aluminium die-cast parts; aluminium cast part	en, de	4.3.03 Metalle / Aluminium / Gussteile aus Aluminium	DE	2021	generic dataset	thinkstep
Abdichtungen im Verbund auf Basis von Methacrylaten, hochfest	de	5.8.03 Beschichtungen / Deckbeschichte / Deckbeschichte	DE	2018	generic dataset	Deutsche Bauchemie

Figure 1:
The ÖKOBAUDAT database system.
Source: BBSR

Life cycle assessments and environmental product declarations

Image above:
Source: enzberg/IBO

Whereas in the classic planning process only the environmental effects of a building’s energy requirements as per the Energy Saving Ordinance (Energy Performance Certificate) are taken into consideration, with the holistic planning approach, which is the approach pursued in sustainable construction, ecological effects of the materials used in the building are also included. The entire life cycle is taken into account, from material production and building construction, to the regular maintenance of the construction, dismantling and disposal of the materials. The environmental effects are calculated using a life cycle assessment (LCA).

What are life cycle assessments?

A life cycle assessment is a method for assessing the environmental effects of one or more product systems based on all the essential material and energy flows. It includes the recording of material and energy flows (life cycle inventory analysis), the classification and characterisation of the recorded substances in terms of their environmental effects (impact assessment) and the subsequent evaluation (Figure 2). Here the term “product systems” refers to products, systems, procedures and behaviour patterns.

Structure of the life cycle assessment – overview

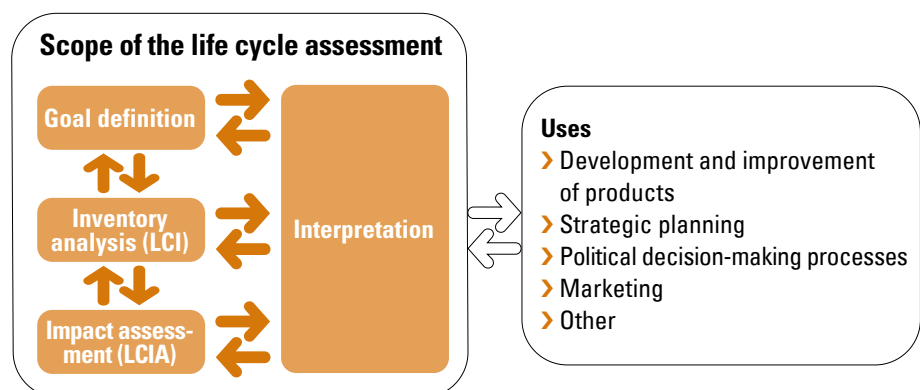


Figure 2:
A life cycle assessment is drawn up in four analysis steps.
Source: ISO 14040

If the results are to be used to make comparative statements between two product systems, the life cycle assessment must be subject to a critical review by an independent expert. Principles and framework as well as the requirements and guidelines for life cycle assessments are regulated in the international standards ISO 14040 and ISO 14044.

What are environmental product declarations (EPDs)?

Environmental product declarations provide environmental data on the basis of predetermined parameters. The abbreviation EPD is also widely used in German. An EPD contains life cycle assessment data as an essential element. This comprises parameters on resource requirements, waste materials and environmental impact categories.

In addition to environmental data and information, an EPD contains the product's essential technical and functional properties. This means that the product data can be used as elements in the life cycle assessment of building components and buildings, and products with equivalent functions can be compared with each other.

Environmental declarations are primarily intended for exchanging information within the supplier industry.

Product category rules (PCRs)

Product category rules represent the basis that EPDs – in addition to the standards – must refer to. PCRs contain all the product-specific rules, requirements and test procedures. The product category rules are drawn up in consultation with the interested parties and are examined by a committee of independent third parties (PCR review panel). The core rules for the product category of construction products are listed in EN 15804.

Development and operation of an EPD programme

An overview of the steps involved in developing and operating an EPD programme can be found in Annex A of ISO 14025. According to ISO 14025, key organisational elements of an EPD programme are:

- the programme operator – responsible for managing the EPD programme
- the PCR review panel – responsible for checking the PCRs (product category rules) and verifying the EPDs that are drawn up
- the product group forums – responsible for drawing up the PCRs
- the interested parties (manufacturers, suppliers, associations, users, consumers, non-governmental organisations, government offices, etc.). – The programme operator is responsible for ensuring that the interested parties are appropriately involved.

Core rules for construction products (EN 15804)

EN 15804 “Sustainability of construction works – Environmental product declarations – Core rules for the product category of construction products” provides the key rules for drawing up environmental product declarations (EPDs) for construction products. The rules apply to all construction product types (“horizontal standard”) in order to minimise branch-specific (“vertical”) deviations. At the European level, the standard therefore provides an essential basis for ensuring that the environmental effects of construction products, building services and building processes are determined, verified and represented in a consistent manner. In Europe, most EPD programme operators have switched to EN 15804. EN 15804+A1:2014, which is expected to be replaced in 2019 by EN 15804+A1:2014+A2:2019, is currently still valid (see also section “New draft standard – EN 15804+A2”).

Life cycle modules

The clear subdivision of the life cycle of construction materials and buildings into life cycle stages (“information modules”) is one of the key accomplishments of EN 15804. Here the building’s life cycle is divided into Modules A to C (Figure 3). Modules A1–A3 describe the product stage, Modules A4 and A5 the construction process stage (transport to the construction site and construction/installation), Modules B1–B7 the use stage and Modules C1–C4 the end of life stage including demolition and transport. A key change introduced with EN 15804 is that it is not permitted to offset the benefits and loads gained from the reuse, recovery or recycling of a product against the expenditure at the start of the life cycle and to present this in the form of a single value. Instead, this potential is shown in a separate Information Module D (Figure 3).

This clarifies which positive or negative environmental effects can be expected at which point in time.

Product stage			Construction process stage		Use stage					End of life stage				Benefits and loads beyond the system boundary
Raw material supply	Transport	Manufacturing	Transport	Construction-installation process	Use	Maintenance	Repair	Replacement	Refurbishment	De-construction demolition	Transport	Waste processing	Disposal	Reuse-Recovery-Recycling - potential
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
					B6	Operational energy use								
					B7	Operational water use								

Figure 3:

Life cycle modules in accordance with EN 15804. Source: EN 15804

Indicators

EN 15804 defines a total of 24 indicators which must be included in EPDs for construction products:

Indicators of environmental effect:

- › global warming potential (GWP)
- › ozone depletion potential (ODP)
- › acidification potential (AP)
- › eutrophication potential (EP)
- › photochemical ozone creation potential (POCP)
- › abiotic resource depletion potential – elements for non-fossil resources (ADP elements)
- › abiotic resource depletion potential – fossil fuels (ADP fossil fuels)

Indicators of resource use

- › use of renewable primary energy excluding renewable primary energy resources used as raw materials (PERE)
- › use of renewable primary energy resources used as raw materials (material use; PERM)
- › total use of renewable primary energy resources (PERT)
- › use of non-renewable primary energy excluding non-renewable primary energy resources used as raw materials (PENRE)

- › use of non-renewable primary energy resources used as raw materials (material use; PENRM)
- › total use of non-renewable primary energy resources (PENRT)
- › use of secondary material (SM)
- › use of renewable secondary fuels (RSF)
- › use of non-renewable secondary fuels (NRSF)
- › use of freshwater resources (FW)

Indicators of waste:

- › hazardous waste disposed (HWD)
- › non-hazardous waste disposed (NHWD)
- › radioactive waste disposed (RWD)

Indicators of output of material and energy flows:

- › components for re-use (CRU)
- › materials for recycling (MFR)
- › materials for energy recovery (MER)
- › exported energy (EE + carrier)

Life cycle modules and indicators in ÖKOBAUDAT

In ÖKOBAUDAT the environmental parameter values are indicated in a data sheet for all life cycle modules (Figure 4).

Indicator	Direction	Unit	Production A1-A3	Transport C2	Disposal C4	Recycling Potential D
Use of renewable primary energy (PERE)	Input	MJ	9.412	0.003323	0.09138	-6
Primary energy resources used as raw materials (PERM)	Input	MJ	0	0	0	0
Total use of renewable primary energy resources (PERT)	Input	MJ	9.412	0.003323	0.09138	-6
Use of non-renewable primary energy (PENRE)	Input	MJ	34.94	0.05458	0.4988	-21.32
Non-renewable primary energy resources used as raw materials (PERSM)	Input	MJ	48.4	0	0	0
Total use of non-renewable primary energy resources (PENRT)	Input	MJ	83.34	0.05458	0.4988	-21.32

Figure 4: Environmental parameters for various life cycle stages as indicated in ÖKOBAUDAT. Source: BBSR

European standardisation committee Sustainability of construction works

EN 15804 is part of a series of standards whose purpose is to describe and evaluate the sustainability of construction works. All of these standards are drawn up by the Technical Committee CEN/TC 350 Sustainability of construction works. Other outputs of the CEN/TC 350 include EN 15978 “Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method”, which provides the basis for the life cycle assessment of buildings in the Assessment System for Sustainable Building (see page 15).

New draft standard – EN 15804+A2

Parallel to the development of environmental product declarations in accordance with EN 15804, the European Commission has initiated a further development on information regarding the environmental performance of products: the “Product Environmental Footprint” (PEF) is intended to enable a ranking of products in relation to their environmental performance. The PEF is also based on the life cycle assessment (LCA), but with other conventions that were first defined in the Joint Research Centre’s (JRC) “PEF Guide” of December 2012. An amendment to the M350 mandate for the construction sector will align the two provisions. The result of this mandate amendment will be EN 15804+A1:2014+A2:2019. Here the following changes are expected compared to EN 15804+A1:2014:

- › The set of indicators is being extended by the additional indicators introduced in the PEF (human toxicity and ecotoxicity, toxicity of particulate matter and radioactivity as well as land use and soil quality).
- › Both approaches will use the same characterisation factors based on the JRC’s research results.
- › For some indicators (EP, AP, POCP, water use), the calculation methods or indicators will change.
- › For the contribution to the greenhouse effect, the three subcategories GWP fossil (from fossil sources), GWP biogenic (from biogenic sources) and GWP luluc (from land use and land use changes) are given in addition to the total (GWP total).
- › The biogenic carbon content in the product and in the packaging should be indicated as additional information.
- › Modules C (end of life stage) and D (benefits and loads beyond the system boundary) will be mandatory in the EPD. Only products that change their physical properties during use, e.g. cement, are excluded.
- › In addition, the requirements for the functional and declared unit as well as for data quality are specified.

This means extensive changes to the previous life cycle assessment method, so EPD data calculated according to the new method is not comparable with existing EPD data. Therefore, “old” and “new” data should not be mixed in building life cycle assessments. During a transitional period until the complete switch to the new standard, the BBSR will offer the two sets of indicators separately in ÖKOBAUDAT. For the BNB system, new benchmarks are derived on the basis of the new indicator values. This will also require a transitional period until sufficient data is available with the new indicator values.

Using ÖKOBAUDAT

Assessment System for Sustainable Building (BNB)

The BNB [2] provides a scientifically sound and planning-based evaluation system for office, administrative, teaching and laboratory buildings. It gives equal consideration to the different life cycle stages of buildings while taking into account the ecological, economic and sociocultural quality as well as technical and process aspects (Figure 5). The BNB and its system variants are essentially aimed at constructors in the public sector.

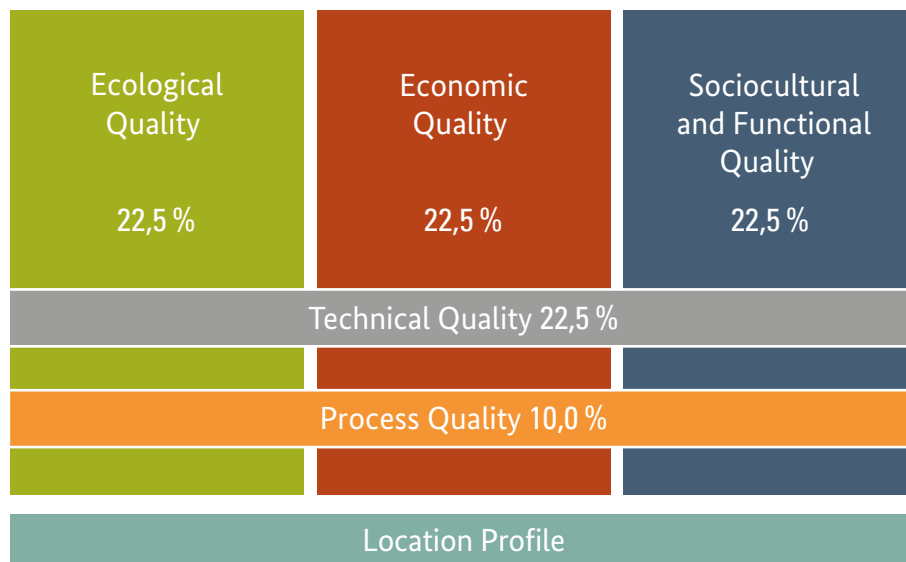


Figure 5:

In the BNB system, ecological, economic, sociocultural, technical and process aspects as well as site characteristics are represented. Source: BBSR

The core criteria of the BNB system were developed by the former Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB), with scientific support from the BBSR, in a two-year cooperative collaboration with the German Sustainable Building Council (DGfB). Since then, the various system variants and their

Image above:

Source: enzberg/IBO

modules have been regularly updated and published by the BBSR. The assessment bases/ methods are based on the currently applicable German laws, directives and regulations as well as national standards and guidelines for non-residential buildings.

Voluntary use of the BNB system by other market players and the recognition of other assessment systems by the BMI are subject to a separate regulatory procedure.

With the introduction of the revised Guideline for Sustainable Building for the new construction of civil federal construction measures in the first quarter of 2011, the mandatory use of the Assessment System for Sustainable Building and hence the obligation to perform life cycle assessment calculations at the building level came into effect for the first time, for four federal construction projects. In 2013 the obligation was extended to all major civil federal construction measures. Since 2016, even the corresponding BNB use has required life cycle assessment variant analyses.

In BNB the following life cycle assessment indicators are assessed for the corresponding life cycle modules in accordance with EN 15804 (Figure 6):

Effects on the global environment

- 1.1.1 Global warming potential (GWP)
- 1.1.2 Ozone depletion potential (ODP)
- 1.1.3 Photochemical ozone creation potential (POCP)
- 1.1.4 Acidification potential (AP)
- 1.1.5 Eutrophication potential (EP)

Resource use

- 1.2.1 Primary energy requirement

ÖKOBAUDAT is the mandatory database for assessing global environmental effects in the BNB system. The tool eLCA (see page 18) provided by the BBSR must be used as a calculation tool in the BNB.

Ecological Quality	Ecological Quality	Sociocultural and Functional Quality	Technical Quality	Process Quality	Location Quality
CRITERIA OVERVIEW – NEW CONSTRUCTION AND COMPLETE REFURBISHMENT MODULES					
ECOLOGICAL QUALITY					22.5 %
Effects on Global and Local Environment					
1.1.1 Global Warming Potential					
1.1.2 Ozone Depleting Potential					
1.1.3 Photochemical Ozone Creation Potential					
1.1.4 Acidification Potential					
1.1.5 Eutrophication Potential					
1.1.6 Risks to the Local Environment					
1.1.7 Sustainable Material Extraction/Biodiversity					
Demand of Resources					
1.2.1 Primary Energy Demand					
1.2.3 Drinking Water Demand and Quantity of Wastewater					
1.2.4 Land Consumption					

Figure 6:

Representation of the individual criteria for the main criteria group Ecological Quality in the Assessment System for Sustainable Building. Source: BBSR



Life cycle assessment in the BNB – an example of Efficiency House Plus Federal Environment Agency “House 2019”

When planning the Efficiency House Plus (a building which, over the course of a year, gains more energy than the building and its users consume) Federal Environment Agency “House 2019” (Figure 7), the BBR goal was to generate the amount of energy needed to operate the building for a year by using renewable energy sources and to actively minimise the environmental effects resulting from the construction. The corresponding life cycle assessment calculations were carried out using ÖKOBAUDAT data. The resulting global warming potential is extremely low compared to a conventional building, therefore making an important contribution to the Federal Government’s CO₂ reduction policy at the building level.

Figure 7:

BNB gold-certified Efficiency House Plus¹
Federal Environment Agency “House 2019”,
completed in 2013. Photographer: Andreas
Meichsner

¹ Brochure “What makes an Efficiency House Plus?”, available at: www.bmi.bund.de [5].

eLCA software – a tool for building life cycle assessment



With the eLCA software [6], the online life cycle assessment tool for buildings, the environmental effects of buildings can be easily and quickly determined and assessed taking into consideration the entire life cycle. The basis for the calculation and assessment is the calculation rules in the BNB system.

The core component of eLCA is the component editor (Bauteileditor). In the component editor users can model components very easily and clearly (Figure 8). Changes can be made to the materials used and dimensions at any time. The dynamic graphic displays the component with the corresponding materials and enables the user to visually inspect the input data. In addition, an integrated component library with typical example constructions helps the user to work with eLCA. The templates can be loaded into the particular project and individually adapted to the specific conditions.

Fassade Ost [103790] BUILDING ELEMENT

General | LCC

Name*
Fassade Ost

OZ
[]

Description
[]

Number installed* Reference size*
29.82 m²

attributes
U-value: 0.12 R_w: 51
BNB 4.1.4
Dismantling Separation: Utilization

1 Gipskartonplatte (Feuerschutz), 12.50mm
2 Gipskartonplatte (Feuerschutz), 12.50mm
3 Mineralwolle (Innenausbau-Dämmung), 100.00mm
4 Konstruktionsvollholz, 100.00mm
5 OSB (Durchschnitt), 18.00mm
6 Mineralwolle (Fassaden-Dämmung), 180.00mm
7 Konstruktionsvollholz, 180.00mm
8 Mineralwolle (Fassaden-Dämmung), 100.00mm
9 Konstruktionsvollholz, 100.00mm
10 PE-HD mit PP-Vlies zur Abdichtung, 1.00mm
11 Schnittholz Lärche (12% Feuchte/10,7% H2O), 25.00mm
12 Aluminium-Rahmenprofil, pulverbeschichtet, 8.00mm
13 Isolierglas 2-Scheiben, 10.00mm

459 mm

Save Delete As template Recommend

Linked modules (from interior to exterior)

module (opaque)	number installed	DIN 276									
1. IBO_AW_01	23.82 m ²	336 exterior wall cladding, inside	Edit Delete Delete ⋮								
<i>lifecycle</i>			GWP	ODP	POCP	AP	EP	Total PE	PE n. ren.	PE ren.	ADP
manufacture			-108.7924	3.9588E-7	0.0730	0.8122	0.1183	8.1218E3	4.1682E3	3.9536E3	1.8526
Disposal			204.0762	-3.1852E-7	-0.0138	-0.1393	-0.0111	-2.3774E3	-2.2072E3	-170.2042	-0.9225
Servicing			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
total			95.2839	7.7361E-8	0.0592	0.6729	0.1073	5.7444E3	1.9610E3	3.7834E3	0.9301
<i>dimensions</i>	718.56 kg										
2. IBO_AW_01	23.82 m ²	331 exterior load-bearing walls	Edit Delete Delete ⋮								

Figure 8:

Representation of components in eLCA: the components are presented directly in a dynamic graphic. The resulting environmental effects can be read immediately.

Source: BBSR

With the aid of the assistant, complex components can also easily be created in eLCA (Figure 9).

350 ceilings BUILDING - BUILDING CONSTRUCTION

Create a new building element

Treppenassistent

Name*

Type of staircase
 solid staircase cheek staircase Central stringer

Abmessungen

Tread width* m Number of steps*

Step increment cm Pitch* cm Appearance* cm

Tread Thickness* cm Depth* cm

Material*
[select](#)

Riser Thickness cm Height cm

Material
[select](#)

soffit design

Thickness* cm	length m	Calculated length m	Share %
<input type="text" value="20"/>	<input type="text" value="0.35"/>	0.35	<input type="text" value="accept"/>
Material* select			<input type="text" value="100"/>
Material select			<input type="text" value="0"/>

Figure 9:

Assistants help eLCA users to create complex components. Source: BB

The results – the calculated environmental effects – are derived from the proportion of the building construction that the components represent and the amount of energy needed to operate the building for a year. They can be read directly and can be compared with the benchmarks for the assessment systems. The project results are then shown as a percentage of the benchmark (Figure 10).

benchmarks EVALUATION

Accounting period: 50 years
 Reference surfaces (NGF): 250 m²
 benchmark system: BNB - 2011-1
 Note: This project variant includes **11** Materials with a different useful life.

Print PDF

total INKL. DISPOSAL, MANUFACTURE, USE

indicator	unit	total / m ² _{NGF@}	target	BNB benchmark
GWP	kg CO2 equiv.	24.1308488522		100.00
ODP	kg R11 equiv.	8.2939827492E-8		100.00
POCP	kg ethene equiv.	5.4017741204E-3		100.00
AP	kg SO2 eqv.	0.0265878295		100.00
EP	kg PO4 equiv.	2.6729424805E-3		100.00
Total PE	MJ	393.6539792315		100.00
PE n. ren.	MJ	375.0007518686		100.00
PE ren.	MJ	18.6532273630		5.00
ADP	kg Sb equiv.	0.1720973917		

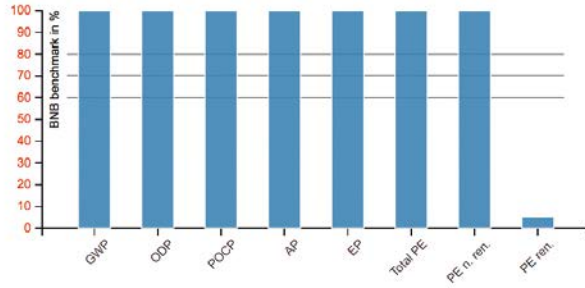


Figure 10:

Benchmarking the environmental effects in eLCA. Source: BBSR

Practical evaluations integrated in eLCA present the calculated results clearly and transparently, and thereby enable detailed analysis of the results (Figure 11).

► Results for Building Materials

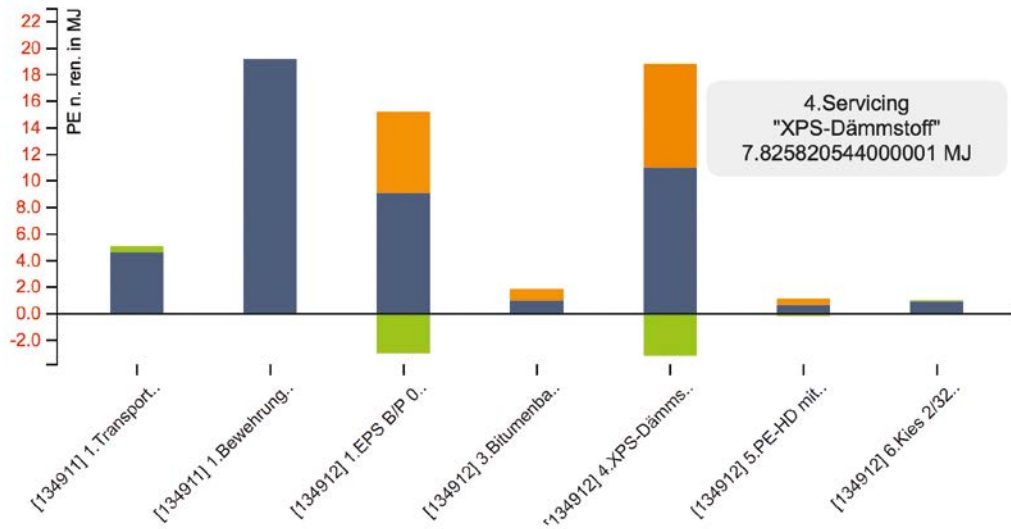


Figure 11:

Material-related evaluation of the PENRT (total use of non-renewable primary energy resources) in eLCA. Source: BBSR

■ Production
 ■ Use stage
 ■ End of life

The calculations are based on the ÖKOBAUDAT datasets. To ensure that ÖKOBAUDAT building material datasets that do not represent the entire life cycle can also be used directly in life cycle calculations, the missing data is completed in eLCA with the aid of generic disposal datasets (and the required version is selected here in each case).

eLCA is provided free of charge in German, English and Spanish by the BBSR online [6].

Scope of functions in eLCA:

- › dynamic screen graphics
- › transparent calculations
- › comparison of variants
- › BNB-compliant results
- › graphical evaluation
- › life cycle analysis of new buildings and existing buildings
- › BNB-compliant linking of material datasets over the life cycle
- › import and export interfaces
- › online availability



National and international cooperation

With ÖKOBAUDAT, the Federal Government has provided one of the most comprehensive and high-quality databases – both nationally and internationally – for life cycle assessment data of construction products. This refers to areas such as the number of datasets, the quality of the data contents and their high data consistency. ÖKOBAUDAT is highly recognised internationally and is used in life cycle calculations within building certification systems. In addition to the Federal Government's BNB, the DGNB and the Green Building Council Denmark, for example, refer to ÖKOBAUDAT. In addition, ÖKOBAUDAT data is used worldwide for studies and life cycle assessments.

Digitisation

At national level, the BBSR has established a consistent digitised infrastructure for the delivery of data to ÖKOBAUDAT and the transfer of data to associated tools such as the building life cycle assessment tool eLCA (see Figure 12). The prerequisites for the digitised processes were the establishment of ÖKOBAUDAT as an online database (soda4LCA, see p. 37), the development of the data format (ILCD+EPD, see p. 31) and the provision of suitable data interfaces (API). Furthermore, the BBSR provides the following tools developed through its research projects:

- › EPD Editor (modelling or transfer of EPD to EPD datasets in ILCD+EPD data format, see p. 37),
- › validation tool (for checking the data format before data transfer to ÖKOBAUDAT, see p. 37) and
- › eLCA (building life cycle assessment tool based on ÖKOBAUDAT datasets, see p. 18).

ÖKOBAUDAT is therefore the focal point of a comprehensive infrastructure consisting of data producers, data suppliers, databases and data users. Data is delivered and transferred via standardised or individual interfaces.

Image above:
Source: enzberg/IBO

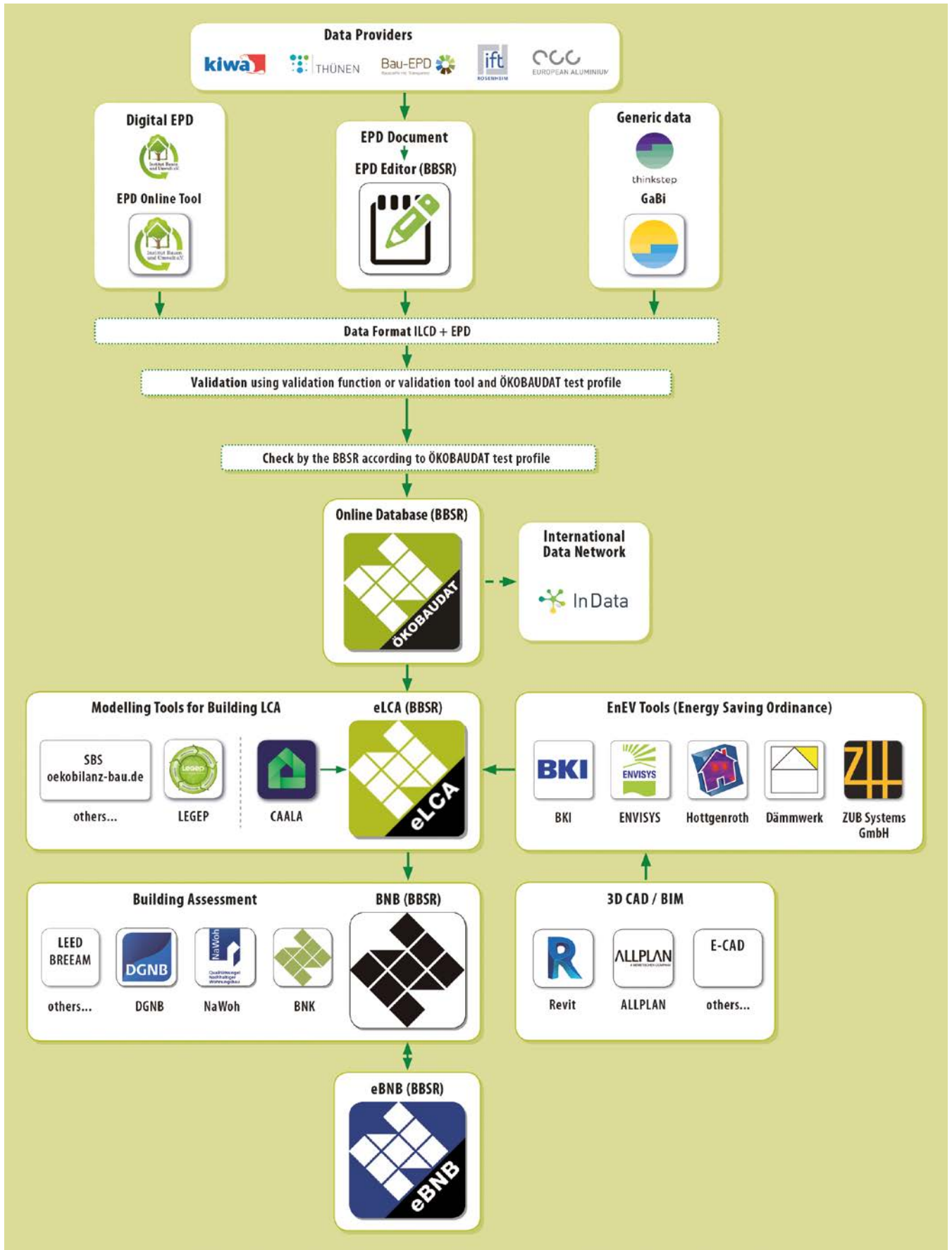


Figure 12: Digital data exchange via standardised processes – data generation, delivery, distribution and use. Source: BBSR

Building Information Modelling

Digitisation and building information modelling (BIM) are essential topics for the construction industry. By providing environmental product declarations in machine-readable form, ÖKOBAUDAT already provides an important building block for digitisation. ÖKOBAUDAT plug-ins in BIM applications enable automated creation of building life cycle assessments during the planning process. It is also important to incorporate the requirements of the BIM world into the further development of ÖKOBAUDAT and the data format. In November 2018, via Zukunft Bau the project “Life Cycle Assessment and BIM in Sustainable Building” was therefore launched, which establishes the necessary technical, organisational and contractual requirements and foundations for the implementation of life cycle assessments on the basis of ÖKOBAUDAT as a BIM application case for future BIM pilot projects of the Federal Government.

National cooperation

ÖKOBAUDAT Users’ Advisory Group

The continuous further development and optimisation of the corresponding processes and the tools used requires coordination between the stakeholders. An important body is the ÖKOBAUDAT Users’ Advisory Group, in which the BBSR provides data suppliers, tool developers, representatives of building certification systems, life cycle assessment experts and standardisation representatives with an important platform for exchanging information, initiating further developments and harmonising processes.

Advisory Board – programme operators

There is a continuous exchange between the BBSR and EPD programme operators, for example through the BBSR’s membership in the corresponding advisory boards.

Research (supervision) and use of ÖKOBAUDAT in research

Since the subject of life cycle assessment has an impact on many areas and the publicly accessible data of ÖKOBAUDAT and the tools offered to the public (especially eLCA) are widely used, the BBSR supervises not only the research projects of the Zukunft Bau Ressortforschung but also, for example, projects of the Federal Environment Agency, university institutions and the like.

Round Table on Sustainable Building

ÖKOBAUDAT and its associated tools are an important part of the BNB. Connection and coordination takes place via the Round Table on Sustainable Building. Developments (such as new benchmarks, update of the overall system) are presented and discussed there.

International cooperation

The BBSR supports sustainable construction and broad use of life cycle assessments in the international context through various activities.

Internationalisation of life cycle assessments

The digitised infrastructure associated with ÖKOBAUDAT and provided by the Federal Government including a network of data and tools already envisages an international

database structure. Compliance with internationally used standards and the open source-based tools facilitate global data exchange. With the development of the ILCD+EPD data format and the corresponding digital structures and tools, Germany has assumed a pioneering role and created the prerequisites and starting point for major international developments.

In order to facilitate access to life cycle assessments and to make the contents as well as the data and tools for life cycle assessments available internationally, all website contents of ÖKOBAUDAT are available in English. Since 2018, the generic datasets have, consequently, been entered in ÖKOBAUDAT bi-lingually (German and English). EPD datasets can also be entered bi-lingually or in English respectively. The datasets can be found via search tables and keywords.

Research

Internationalisation is also being driven forward by commissioning research projects in which the international coordination of the ILCD+EPD format, the infrastructure for international data searches or the establishment of rules are financially supported. Many of these research results are incorporated in the work of the WG InData (see below). The existing life cycle assessment infrastructure of the BNB is currently being further developed and optimised to meet the requirements of an international data network. The international harmonisation efforts and developments such as the revised EN 15804+A2 require changes in the backend and frontend as well as in the workflows and instruction documents. Rules for the use of datasets from the international data network in the BNB need to be established.

Standardisation and committees

An important aspect for the BBSR as the operator of ÖKOBAUDAT is international harmonisation and standardisation. To actively support and participate in the drafting of regulations, the BBSR sends delegates to major standardisation committees, such as CEN/TC 350 Sustainability of construction works, mastermind of EN 15804, or ISO/TC59/SC17, which develops a standard for the application of environmental product declarations in building information modelling (BIM). By participating in standardisation committees, German positions and interests can be represented and the further development of basic principles and instruments can be shaped in accordance with the current state of standardisation.

Scientific publications

The BNB, new developments in the field of life cycle assessment and the results of research projects are regularly presented at scientific conferences at home and abroad, in particular at the regional (SBE) and world (WSBE) conferences of the Sustainable Built Environment conference series.

Cooperation and networking

International networking takes place via recognised and internationally active suppliers of EPD data such as Bau EPD GmbH, based in Austria, or European Aluminium. Other European EPD programme operators are currently applying for recognition.

Since its foundation, ÖKOBAUDAT has been in contact with the European association of EPD programme operators, the ECO Platform, in order to integrate coordinated procedures or requirements, e. g. for verification, into its own processes if necessary.

International Open Data Network for Sustainable Construction (InData)

The “International Open Data Network for Sustainable Construction” (InData) was founded in 2015 on the initiative of the BBSR. InData is an informal, non-profit working group of interested stakeholders whose main objective is to establish an international network structure for EPD/LCA data – online-based and using open source software. Using a common data format in an open network structure shall allow for open access to data and flexible application options, while maintaining individual ownership and responsibility for the data. Data is provided and organised by each supplier, while at the same time available to users across the data network.

The InData initiative uses the ILCD+EPD data format developed for ÖKOBAUDAT. Conformity rules are established to ensure high data quality. The initiative operates its own website at <https://www.indata.network/> [7], where all information about InData is available.

Considering the significant increase in the number of EPD programme operators, generated EPDs and BIM applications in the construction sector, the InData platform is gaining in importance. Here, providers of EPD/LCA data agree on a common format and on common rules for the provision of EPD data for building LCA. Participants from 12 countries are currently supporting InData (Austria, Belgium, Denmark, France, Germany, Great Britain, Italy, the Netherlands, Norway, Spain, Sweden, Turkey). Following ÖKOBAUDAT, five of the actors have already established executable databases based on the ILCD+EPD format in order to connect to the InData network. With its developments, ÖKOBAUDAT is a pioneer and a player in an international network.

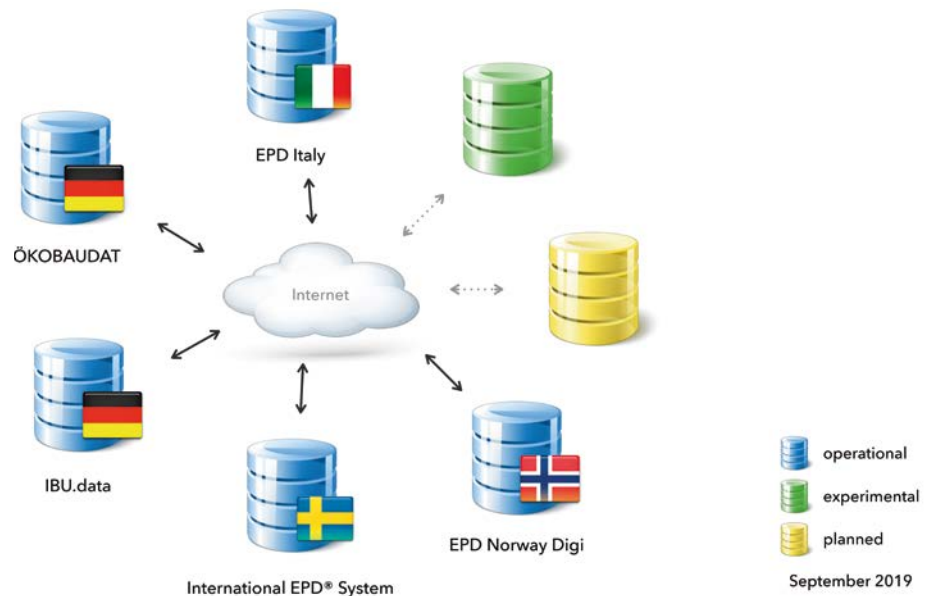
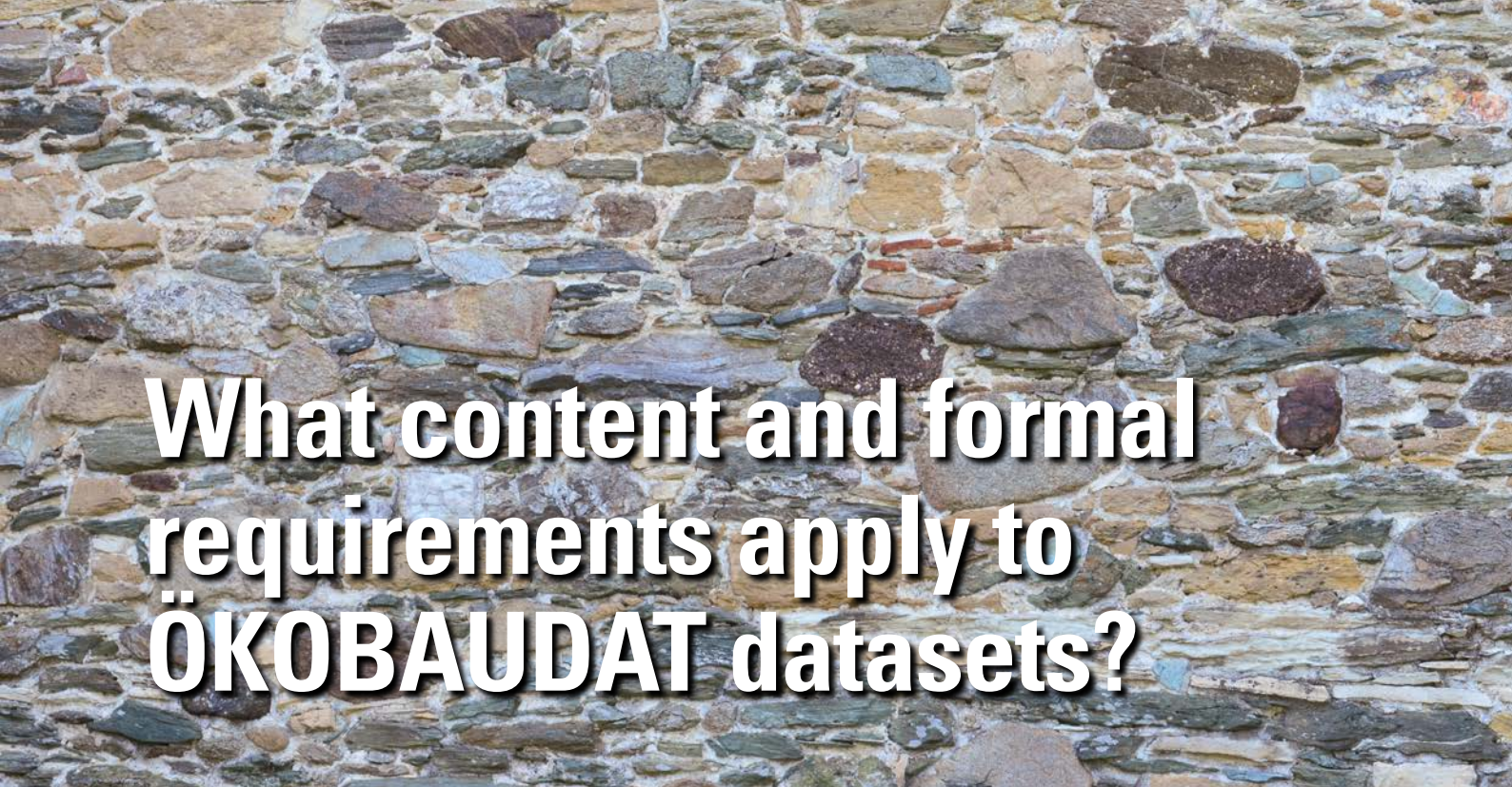


Figure 13:
International LCA data network.
Source: BBSR

Within the InData network, an international data search will be possible in the future. With a search function contained on the InData website, datasets can be found in all involved database nodes. The search function is based on the developments for the ÖKOBAUDAT data search. It was further developed and tested within the scope of research projects of the BBSR. The BBSR makes these developments available in order to realise the international InData network.



What content and formal requirements apply to ÖKOBAUDAT datasets?

To ensure high data quality and consistency, all data providers must take into account the “Principles for acceptance of LCA data in ÖKOBAUDAT”. The complete current document can be found on the ÖKOBAUDAT website (under Downloads).

Data categories

Generally the life cycle assessment data in ÖKOBAUDAT can, depending on its origin, be divided into Data Categories A to C. Generic datasets in ÖKOBAUDAT correspond to Data Category C.

Category A data (EPDs with programme operation)

Data in Category A is life cycle assessment data in accordance with EN 15804 from environmental product declarations (EPDs). Behind the EPD is a programme that operates in accordance with EN ISO 14025. The programme instructions and product category rules (PCRs) must be available for the public to be read, and must have been compiled in accordance with EN 15804 and EN ISO 14025.

Category B data

(Verified EPDs/life cycle assessment data in accordance with EN 15804)

Data in Category B is not generated as part of an EPD programme that operates in accordance with EN ISO 14025 (Category B1) or is not published as part of an EPD (Category B2). However, it has been externally verified/subject to a critical review like the Category A data.

Submitting Category B data requires coordination with the ÖKOBAUDAT Users’ Advisory Group. Here the respective requirements for the submission of data to ÖKOBAUDAT are set out depending on the requirements, including the origin of the data. In principle, proof of compliance with EN 15804 must be provided separately for the respective datasets via an external verification process (Category B1) or critical review (Category B2) by the applicant or supplier of life cycle assessment data. The critical review must be in the form

Image above:
Source: enzberg/IBO

of an “external review”, which has to be carried out analogously to verification according to EN ISO 14025. Similarly, the requirements for Category A data apply to the datasets in Category B..

Category C data (“generic datasets”)

Data in Category C is generated based on EN 15804, but is not subject to an external review by an independent third party. Category C data includes replacement data that ÖKOBAUDAT provides for product categories for which no Category A or Category B data is available (“generic data”). This life cycle assessment data is provided with uncertainty margins of 10 % to 30 % when the data is generated. Generic datasets are commissioned by the BBSR where necessary and prepared in accordance with uniform, consistent procedures audited by independent third parties. They correspond to the requirements for modelling and calculation of LCA data formulated in the ÖKOBAUDAT principles.

Other datasets of Category C are not included in ÖKOBAUDAT.

Other data

Life cycle assessment data that is not compliant with EN 15804 (note: this can also include verified EPDs in accordance with EN ISO 14025) is on principle not included in ÖKOBAUDAT.

Data transfer to ÖKOBAUDAT

Currently the BBSR recognises the following institutions for the delivery of life cycle assessment data to ÖKOBAUDAT (Figure 14):

Category A (EPD data with programme operation)

- › Bau EPD GmbH [8]
- › European Aluminium [9]
- › IBU Institut Bauen und Umwelt e. V. [10]
- › ift Rosenheim GmbH [11]
- › Kiwa BCS Öko-Garantie GmbH [12]

Category B (critically reviewed life cycle assessment data)

- › Johann Heinrich von Thünen-Institut [13]

Category C (“generic data”)

- › thinkstep AG [14]



Figure 14:
ÖKOBAUDAT data suppliers.
Source: BBSR

Formal submission criteria

To ensure data quality in ÖKOBAUDAT, life cycle assessment data must fulfil several fundamental requirements (Table 1):

- › The EPD programme corresponds to the specifications of ISO 14025 (only applies to Category A data).
- › There are product category rules (PCRs), or similar rules for generating datasets in Category B2, respectively.
- › The datasets have been subject to an inspection by an independent external third party (verification in accordance with EN ISO 14025 or an external critical review).
- › The data was generated/calculated in accordance with EN 15804.
- › The owner of the datasets has approved the use of the data in ÖKOBAUDAT.
- › All the required declarations/information have been supplied.
- › The period of validity for the data has been indicated.
- › The datasets have been subject to a format check (Validation Tool) and plausibility check (completeness, plausibility) before approval in ÖKOBAUDAT.

The complete and currently applicable “Principles for acceptance of LCA data in ÖKOBAUDAT” have been published on the ÖKOBAUDAT website.

Rules/proof	Data category		
	Category A	Category B1	Category B2
(1) EPD programme operation (EN ISO 14025)	X		
(2) Set of rules (PCR) (EN ISO 14025)	X	X	(X)
(3) External EPD verification (ISO 14025)/ external review (based on ISO 14025)	X	X	X
(4) EPD (Type A and B1)/life cycle assessment data (Type B2) in accordance with EN 15804	X	X	X
(5) The datasets fulfil the other formal requirements.	X	X	X
(6) The data fulfils the modelling requirements	X	X	X
Acceptance in ÖKOBAUDAT	If the criteria are fulfilled, datasets are generally accepted	As no general set of rules is available, an external review must be carried out for each dataset.	

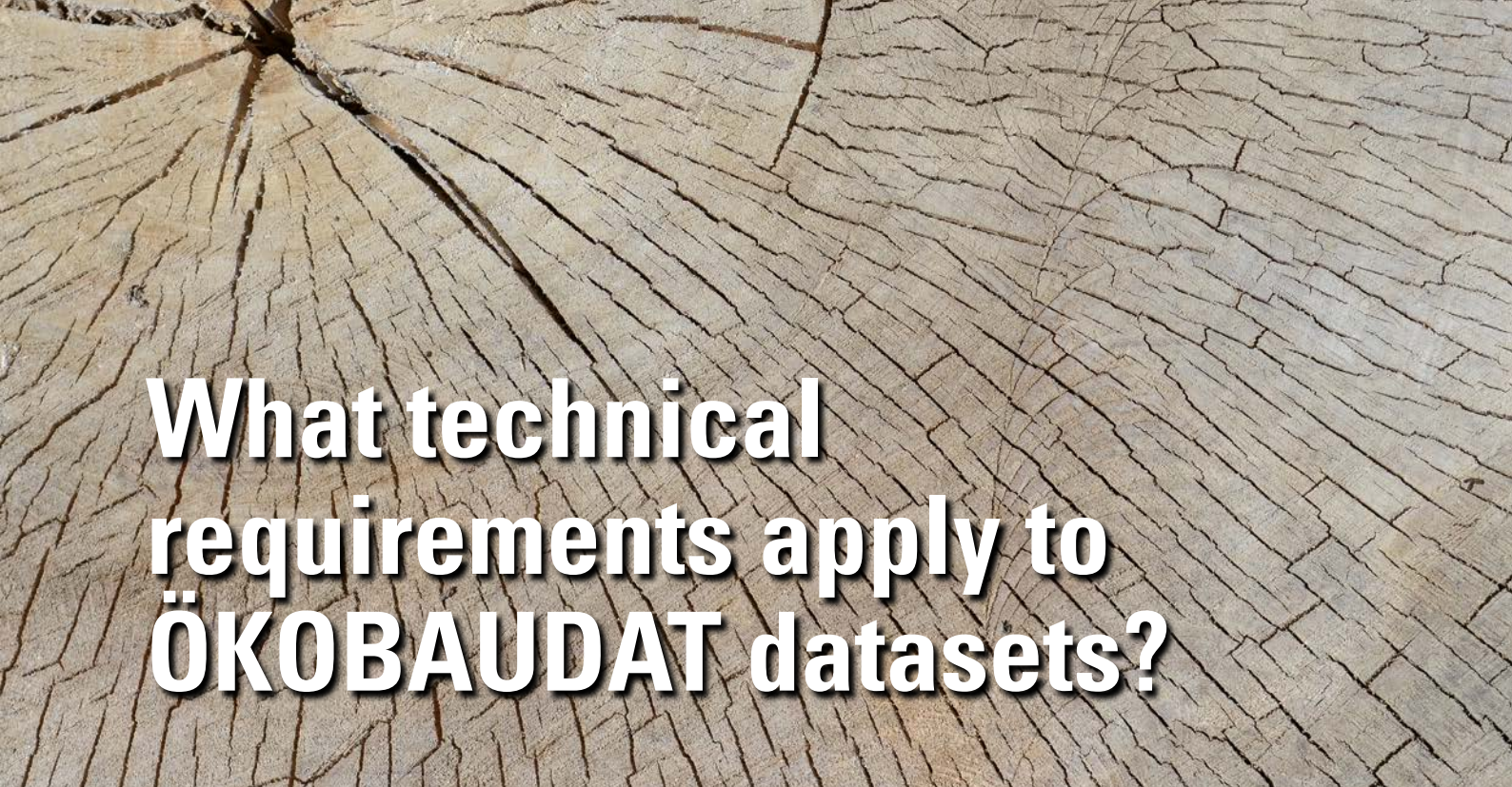
Table 1:
Acceptance of data in ÖKOBAUDAT

Requirements for modelling and calculation of indicators for life cycle assessment datasets

EN 15804 allows various interpretations in several areas relevant to modelling and evaluation. To ensure high consistency and comparability of the ÖKOBAUDAT datasets, specifying requirements have been formulated for ÖKOBAUDAT, including:

- › Datasets for the BNB must be based on the background database GaBi [15]. If data from other sources (other background databases, literature data, etc.) was used in the life cycle assessment, this must be indicated in the dataset and a reason provided. The data used must either not have a significant influence on the result or must be equivalent to the GaBi data modelling in terms of method and data quality.
- › On the ÖKOBAUDAT platform, additional datasets are published; these essentially meet the requirements of ÖKOBAUDAT, but are based on ecoinvent background data [16]. They are only intended for use in the BNB in exceptional cases, they are therefore not available in either the downloadable ZIP file or in the life cycle assessment tool eLCA.
- › The life cycle assessment data is not intended to contain any credits for CO₂ certificates because CO₂ certificates are political measures for offsetting greenhouse gas emissions that are not related to the production process itself.
- › Carbon uptake must be included as a negative value in the calculation of A1–A3 scenarios. Counting twice is not permitted.
- › Module B1 must be modelled solely with reference to inherent product characteristics (for example, energy savings generated by using the product must not be presented in B1).
- › Module D may be declared only if the information module it refers to is also part of the system boundary.
- › When modelling the end of life, it is possible to compare several scenarios with each other for Modules C and D. Each disposal scenario must be calculated and declared separately.
- › Energy flows generated within Modules A1–A3 and whose temperature level is comparable with that of the required thermal energy can be treated as a closed loop. This applies until the amount of energy needed in Modules A1–A3 is reached. Generated energy in excess of this amount must be allocated in accordance with the rules in EN 15804.

The complete and currently applicable modelling rules have been published in “Principles for acceptance of LCA data in ÖKOBAUDAT” on the ÖKOBAUDAT website.



What technical requirements apply to ÖKOBAUDAT datasets?

All relevant technical and formal rules for the ÖKOBAUDAT database are summarized in the ÖKOBAUDAT Manual. The current version can be found on the ÖKOBAUDAT website (under Downloads).

ILCD+EPD data format

Syntactically, ÖKOBAUDAT datasets correspond to the ILCD data format [17] with extensions for EPD data that cannot be presented in the ILCD format. In simplified form this adapted ILCD format is called ILCD+EPD data format. Further information on the ILCD+EPD data format can be found on the ÖKOBAUDAT website (under Downloads).

Dataset types in ÖKOBAUDAT

ÖKOBAUDAT differentiates between four dataset types in order to express the representativity of life cycle assessments:

- › **specific dataset** – manufacturer/manufacturing company-specific dataset for a specific product
- › **average dataset** – average datasets provided by industrial associations, several companies or several works (i.e. on the basis of data on the industrial production of companies)
- › **representative dataset** – data that is representative for a country/region (for example average for Germany)
- › **template dataset** – unspecific datasets for specific products created on the basis of a “template EPD”

There is also the generic data dataset type:

- › **generic dataset** – generic data in accordance with EN 15804 and other data that is not modelled on the basis of industrial data (for example on the basis of literature, expert knowledge, etc.)

Image above:
Source: enzberg/IBO

The type of dataset must be indicated for every dataset (in the “Subtype” field).

Table 2 shows the possible variations of dataset types occurring in ÖKOBAUDAT for the respective data category.

The dataset type is of decisive importance for the applicability of life cycle assessment datasets.

The type of “conformity check” required depends on the data category (Category A to Category C, see page 27 and onwards). It is not indicated in the data format.

Depending on what is being viewed, ÖKOBAUDAT data can also be divided into the groups: construction products and other life cycle data.

Group	Data category	Description	Database	Conformity check	Dataset type (“subtype” in the data format)
Construction product datasets	A	Construction product EPD in programme operation	Manufacturer, works location	Independent external verification via programme operation	specific dataset
			Association, country		average dataset
	B1	Construction product EPD without programme operation	Manufacturer, works location	Independent external verification without programme operation	template dataset
			Association, country		specific dataset
	B2	Construction product dataset (no EPD)	Manufacturer, works location	Independent external critical review	average dataset
			Representative data for a country/region		template dataset
Construction product datasets	C	Construction product dataset (no EPD)	Replacement data for a country/region	No	generic dataset
Other life cycle data		Transport processes			
Use processes					
General end-of-life processes					
Energy supply					

Table 2:
Data categories and dataset types
in ÖKOBAUDAT

Language

In the context of federal responsibility, data and corresponding text information shall preferably be available in German. However, datasets and corresponding textual information only available in English are acceptable in ÖKOBAUDAT since mid-2018. In the search table, the language can be recognized by the flag symbol. Technically, datasets can be displayed in several languages in ÖKOBAUDAT if the contents have been delivered accordingly. Therefore, more and more datasets are already bilingual in German and English.

Note: the data supplier is responsible for the correct reproduction of the dataset contents in all languages in which a dataset is to be published.

Product categories

The datasets must be allocated to one of the given product categories. The current product categories can be found on the ÖKOBAUDAT website (under Downloads).

If there is no suitable product category available in ÖKOBAUDAT, the data provider must submit a proposal to the BBSR so as to establish a new category.

1. Mineral building products
1.1 Binder
1.1.01 Cement
1.1.02 Lime
1.1.03 Gypsum
1.1.04 Clay

Figure 15:
Example of product categories
in ÖKOBAUDAT. Source: BBSR

Identification of datasets

Each dataset is indicated by a universally unique identifier (UUID). If there are small changes or corrections within the dataset, a version number is incremented so that the latest version can be identified at all times. If an EPD is updated (new calculation with new reference year), a new dataset must be generated for this with a new UUID.

Presentation of the indicator values

The environmental indicators required in accordance with EN 15804 are shown in ÖKOBAUDAT (see page 12). If no data is available for individual indicator values, the value must be indicated with a dash (“-”) (“0” means a calculated or proven “0”). All indicators that are assessed in the BNB must be present in all cases.

As in EN 15804, Modules A1 to A3 (product stage) may be indicated individually and/or in aggregated form; all other modules must be presented individually. The total of A1 to A3 must be calculated from the individual values A1 to A3 (no rounded data).

At least three significant decimal places must be entered.

References

All product, contact and source datasets referenced from the actual EPD dataset and, if necessary, connected external documents (for example PDF documents and diagrams) must be provided if these are not already contained in ÖKOBAUDAT. Alternatively this data can also be provided on a publicly accessible internet web server and connected accordingly.



Data exchange

Data delivery to ÖKOBAUDAT

One groundbreaking aspect for simplified digitised processes is, in particular, the option to directly import life cycle assessment data into ÖKOBAUDAT via suitable interfaces.

There are several ways to import data:

Direct import from other software systems

EPD programme operators can transfer life cycle assessment data directly into ÖKOBAUDAT online from their own database systems via a suitable interface. Institut Bauen und Umwelt e.V. follows this route: Via an interface, it can import the authorised EPD datasets into the ÖKOBAUDAT backend from its own EPD online tool [18].

Import via the EPD Editor

The life cycle assessment data is entered via the publicly available EPD Editor and, from here, is imported into the ÖKOBAUDAT backend. The following data suppliers are currently using this method to transfer their life cycle assessment datasets to ÖKOBAUDAT:

- › Bau EPD GmbH (EPD data)
- › European Aluminium (EPD data)
- › ift Rosenheim (EPD data)
- › KIWA BCS Öko Garantie GmbH (EPD data)
- › Thünen Institute (representative average datasets for wood and wood-based materials in Germany)

The EPD Editor incl. operating instructions can be found on the ÖKOBAUDAT website at Downloads.

Importing in ILCD+EPD format

The generic data is supplied by thinkstep in ILCD+EPD format via an export interface integrated in the GaBi software. The data supplied in this way is then imported into the ÖKOBAUDAT backend.

Image above:
Source: enzberg/IBO

Validation of datasets

With all import channels, the data must be checked with a validation function or the validation tool before being transferred to ÖKOBAUDAT. Only after successful validation can the data supplier export the data to the ÖKOBAUDAT backend. The automatic validation checks for completeness and irrational content with the indicator values. Since the BBSR attaches great importance to ensuring that only consistent data of high quality is provided, an independent expert also regularly checks the delivered datasets randomly to see if there are possible irregularities.

ÖKOBAUDAT Release

A new ÖKOBAUDAT release is published approx. once a year with the update of the generic datasets. Since 2018, accepted EPD programme operators/data suppliers have been able to constantly transfer datasets to ÖKOBAUDAT. At regular intervals, a current version is kept for the archive. These ÖKOBAUDAT database versions are clearly identified by the year, issue number of the corresponding year and date (e.g. ÖKOBAUDAT 2019-I dated 27.02.2019). Ongoing minor additions or corrections are dated and documented in a correction list.

Use of ÖKOBAUDAT datasets

Use of ÖKOBAUDAT datasets in life cycle assessment tools

In the BNB, data from ÖKOBAUDAT is transferred to the life cycle assessment tool eLCA and used for calculations and evaluations within the evaluation system (see also Chapter "Using ÖKOBAUDAT"). The data can also be imported by commercial life cycle assessment tools or BIM tools, and used for further calculations.

Browsing the ÖKOBAUDAT database

The ÖKOBAUDAT database can be found on the website under "Database". The two databases "ÖKOBAUDAT" and "Additional datasets" (based on ecoinvent), in which the user can browse alternately, can be found on the homepage. For consistency reasons, BNB-compliant datasets must be based on the background database GaBi. This data can be found under "ÖKOBAUDAT". The "additional datasets" were created on the basis of the background database "ecoinvent". With the exception of the used background database, this data fully adheres to the ÖKOBAUDAT requirements in terms of quality and data format and, in justified cases, can be used for BNB life cycle assessments.

The search and filter functions of the ÖKOBAUDAT database system enable extended user-friendly online searches of the datasets. The dataset search in ÖKOBAUDAT can be called up by selecting "Database search" under "Database". Here the database can be searched and filtered according to different fields such as name, type of dataset, validity or geographical representativeness and – as in the ÖKOBAUDAT Browser – by product categories.

List datasets (Total number of entries: 692 of 1203) (Page 1 of 14)

Show Category Browser Reset Filter and Sorting

Name ▲	Languages	Classification	Location	Valid Until	Type	Owner	
Search...	en ▼ de ▼	Search...	Choose ▼	select ▼	Choose ▼	Search...	
4.3.03 Aluminium die-cast parts; aluminium cast part	en de	4.3.03 Metalle / Aluminium / Gussteile aus Aluminium	DE	2021	<input type="text" value="Q"/> ×	kstep	👁️
Sewer pipe ABS; ABS	en de	6.1.02 Kunststoffe / Rohre / Abwasserrohre	DE	2021	<input type="checkbox"/> Generic Dataset	kstep	👁️
Sewer pipe GFK; glass-fibre reinforced	en de	6.1.02 Kunststoffe / Rohre / Abwasserrohre	DE	2021	<input type="checkbox"/> Representative Dataset	kstep	👁️
Sewer pipe PE-HD; PE-HD	en de	6.1.02 Kunststoffe / Rohre / Abwasserrohre	DE	2021	<input type="checkbox"/> Average Dataset	kstep	👁️
Sewer pipe PP; PP	en de	6.1.02 Kunststoffe / Rohre / Abwasserrohre	DE	2021	<input type="checkbox"/> Specific Dataset	kstep	👁️
Sewer pipe PVC; PVC	en de	6.1.02 Kunststoffe / Rohre / Abwasserrohre	DE	2021	<input type="checkbox"/> Template Dataset	kstep	👁️
Acrylate sealing compound; Acrylate	en de	6.7.06 Kunststoffe / Dichtmassen / Acrylat	DE	2021	generic dataset	thinkstep	👁️
Aluminium section; aluminium semi-finished sheet product, including primary production, transformation and recycling	en de	4.3.02 Metalle / Aluminium / Aluminiumprofil	EU-28	2021	generic dataset	thinkstep	👁️
Aluminium wing sash profile, powder coated; 0,98 kg/m	en de	7.1.05 Komponenten von Fenstern und Vorhangfassaden / Rahmen / Profile / Aluminium	DE	2021	generic dataset	thinkstep	👁️
Aluminium casement frame section, thermally separated, powder coated; 1,51 kg/m	en de	7.1.06 Komponenten von Fenstern und Vorhangfassaden / Rahmen / Profile / Aluminium thermisch getrennt	DE	2021	generic dataset	thinkstep	👁️

Figure 16:

Search and filter functions in the ÖKOBAUDAT database system.

Source: BBSR

Terms of use

The following terms of use apply to the use of ÖKOBAUDAT datasets (see ÖKOBAUDAT website for latest version):

The BMI provides the ÖKOBAUDAT data free of charge and without any restrictions. They are primarily intended for performing life cycle assessment of constructions.

Data in ÖKOBAUDAT are provided with great care. The data providers undertake to comply with the conditions of admission. The data is subjected a random check for conformity, completeness and consistency. However, BMI/BBSR assume no responsibility for the accuracy of the data. Responsibility for content and values remains with the owner of the records. A liability for deficiencies in the data, in particular also for consequential damages, is not taken over by BMI/BBSR. This also applies in the case of the transfer of data to data users (third parties). The free distribution of unmodified data is permitted, provided that the source is named.

With regard to the correct use of the ÖKOBAUDAT datasets for construction products, reference is made to EN 15804: „[...] comparison of the environmental performance of construction products [...] shall be based on the product’s use in and its impacts on the building, and shall consider the complete life cycle (all information modules).“

ÖKOBAUDAT is not designed for performing life cycle assessment of building products.

Software and interfaces

soda4LCA and API interface

In technical terms, the ÖKOBAUDAT database is based on the software soda4LCA [19] and is equipped with a standardised interface (API) for data exchange. Via the interface, other applications and software tools can read datasets from ÖKOBAUDAT and import them directly in to ÖKOBAUDAT with the corresponding authorisations. The API documentation is provided on the ÖKOBAUDAT website (under Downloads) in HTML and PDF formats.

EPD-Editor

In the EPD Editor, an independently executable software tool, datasets can be generated in ILCD+EPD format. For example, information from an existing EPD that is only available as a PDF document can be manually transferred to ILCD+EPD format. The link to the EPD Editor and the download link for the corresponding manual can be found on the ÖKOBAUDAT website under Downloads.

Validation Tool

Before datasets are imported into the backend of ÖKOBAUDAT, the data format and product category allocation must be checked with the validation tool. The tool runs on a standalone, cross-platform basis. It is highly user-friendly and intuitive. Instructions for use can be found on the ÖKOBAUDAT website (under Downloads). A link to the latest version of the validation tool and the test profile can also be found there. [20]

Reading ÖKOBAUDAT datasets

ÖKOBAUDAT is available as an online database under the Database tab (ÖKOBAUDAT browser or search). The complete ÖKOBAUDAT database can also be downloaded in XML format as a ZIP file (under Downloads). A CSV extract of datasets that have been prepared especially for BNB evaluations is also available. The zipped ÖKOBAUDAT versions released in recent years can also be found under the menu item "Database/Archive".

No authorisation is required to export data from the database.

Every dataset is indicated by a universally unique identifier (UUID). The BBSR can provide the identification numbers for different ÖKOBAUDAT versions on request.



Appendix

Standards

- DIN EN ISO 14020 Umweltkennzeichnungen und -deklarationen – Allgemeine Grundsätze (ISO 14020:2000); German version EN ISO 14020:2001, February 2002 (Environmental Labels and Declarations – General Principles)
- DIN EN ISO 14025 Umweltkennzeichnungen und -deklarationen – Typ III Umweltdeklarationen – Grundsätze und Verfahren (ISO 14025:2006), German and English version EN ISO 14025:2011 (Environmental Labels and Declarations – Type III Environmental Declarations – Principles and Procedures), October 2011
- DIN EN ISO 14040 Umweltmanagement – Ökobilanz – Grundsätze und Rahmenbedingungen (ISO 14040:2006); German and English version EN ISO 14040:2006 (Environmental Management – Life Cycle Assessment – Principles and Framework)
- DIN EN ISO 14044 Umweltmanagement – Ökobilanz – Anforderungen und Anleitungen (ISO 14044:2006); German and English version EN ISO 14044:2006 (Environmental Management – Life Cycle Assessment – Requirements and Guidelines)
- DIN EN 15804 Nachhaltigkeit von Bauwerken – Umweltproduktdeklarationen – Grundregeln für die Produktkategorie Bauprodukte; German version DIN EN 15804+A1:2014, issue date: July 2014 (Sustainability of Construction Works – Environmental Product Declarations – Core Rules for the Product Category of Construction Products)
- DIN EN 15978 Nachhaltigkeit von Bauwerken – Bewertung der umweltbezogenen Qualität von Gebäuden – Berechnungsmethode; German version EN 15978:2011, January 2012 (Sustainability of construction works – Assessment of Environmental Performance of Buildings – Calculation Method)

Image above:
Source: enzberg/IBO

Abbreviations

API	Application programming interface
BBR	Federal Office for Building and Regional Planning
BBSR	Federal Institute for Research on Building, Urban Affairs and Spatial Development
BMI	Federal Ministry of the Interior, Building and Community
BNB	Assessment System for Sustainable Building
CO2	Carbon dioxide
eLCA	Software provided by the BMI/BBSR for building life cycle assessment (bauteileditor.de)
EPD	Environmental product declaration
GaBi	The life cycle assessment database Ganzheitliche Bilanzierung
ILCD	International Reference Life Cycle Data System
LCA	Life cycle assessment
ÖKOBAUDAT	Platform provided by the BMI/BBSR with data, information and links related to the life cycle assessment of construction works
PCRs	Product category rules
Soda4LCA	Software on which the ÖKOBAUDAT database is based in technical terms
WG InData	Working group International open Data Network for Sustainable Construction

Websites

1. www.oekobaudat.de
2. www.bnb-nachhaltigesbauen.de
3. www.bmi.bund.de
4. www.bbsr.bund.de
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14. www.thinkstep.com
15. www.gabi-software.com
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17. <http://eplca.jrc.ec.europa.eu>
18. <https://epd-online.com>
19. <http://www.iai.kit.edu/soda4LCA>
20. <https://bitbucket.org/okusche/ilcdvalidationtool/>

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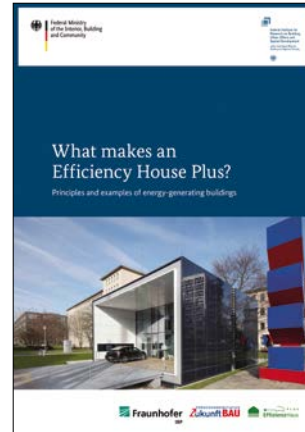
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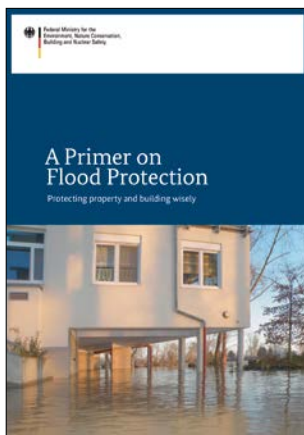
WECOBIS – Web-based information system on ecological building materials



Sustainable Building by the Federal Government – Principles – Methods – Tools



What makes an Efficiency House Plus? – Principles and examples of energy-generating buildings



A Primer on Flood protection – Protecting property and building wisely



Digital Construction World – The Magazine of the "Zukunft Bau" research initiative



ÖKOBAUDAT – Grundlage für die Gebäudeökobilanzierung

The brochures are available free of charge.

You can find the ordering information and the downloads at:
www.zukunftbau.de/publikationen/

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Division II 6 Building and Environment
Dr.-Ing. Tanja Brockmann

Authors

Hildegund Figl
Co-authors:
Tanja Brockmann
Veronika Huemer-Kals
Oliver Kusche
Nicolas Kerz
Stephan Rössig

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ÖKOBAUDAT is a platform with data, information and links related to the life cycle assessment of construction works. At the platform's core is the online database with life cycle assessment datasets on building materials, construction, transport, energy and disposal processes. The datasets are subject to strict quality requirements and therefore provide planners, architects and constructors with a reliable basis for scientifically sound calculations of the influences of construction works on the environment.

ÖKOBAUDAT is provided free of charge to the general public by the Federal Ministry of the Interior, Building and Community (BMI) with support from the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR).

This brochure describes the technical and content-related quality characteristics of **ÖKOBAUDAT**, indicates tools that can be used to calculate life cycle assessments, and explains how data can be imported to and exported from **ÖKOBAUDAT**.

For more than ten years, **Zukunft Bau** has been a source of important new ideas for architecture and construction and builds bridges between building research and building practice. The focus is on gaining construction-related knowledge on current research topics such as climate protection, material and resource efficiency, digitisation, cost-effective construction and demographic change. With this in mind, **Zukunft Bau** offers a platform for researching, designing, testing and communicating corresponding innovative approaches. The aim is to explore new framework conditions in the construction industry and to establish research as a method for planning and building on a broader scale. The **Zukunft Bau** innovation programme is supported by the Federal Ministry of the Interior, Building and Community (BMI) together with the Federal Institute for Research on Building, Urban Affairs and Spatial Development (BBSR).



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