

BIM and LCA



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BIM

At the present time, the utilisation of the Building Information Modelling (BIM) in the Czech Republic is in a phase of slow development in the Czech building environment. However, in terms of their utilisation in the building practice, the BIM topics in the Czech Republic are highly relevant because of continuously increasing pressures on the building sustainability.

What is the BIM? The Building Information Modelling (BIM) is a process of generating and management of data concerning the building during its life cycle. A typical BIM process utilises three-dimensional, dynamic real-time software supporting productivity growth in the design and execution stages.

BIM

Among the principal benefits of the Building Information Modelling, belong the following items:

- 1. Centralisation of data the BIM accumulates all data into the (shared) central data repository. The design data can be thus used even in the next (after-design) stages of the building life cycle.
- 2. Documentation is created more efficiently according to the degree of documentation, the improvement in work effectiveness is estimated from 10 to 30%.
- 3. Coordination of individual collaborators the BIM process can save up to 20% of costs otherwise incurred because of insufficient cooperation.
- 4. Preparations of supporting documents for pricing of the building the bill of quantities connected with the 3D model is the supporting document for budgeting of construction and installation works. The largest volume of work of a quantity surveyor in building budget estimations represents the composition of the bill of quantities. In case of documentation updates, the bill of quantities is updated automatically.
- 5. Coordination on the construction site interconnections of the 3D model (quantities of individual materials) with construction works.

BIM

At present, traditional designing methods in the form of 2D drawings, or individual 3D models representing the CAD designing (Computer Aided Design), are still widely in use. The individual 3D models are currently used mostly for the design visualisation and its presentation to a developer. In a BIM type software is used, various models and drawings are generated at the same time. In the course of building model creation, the 2D drawings are generated automatically in addition. If a model update is prepared, the changes will take effect automatically in the 2D drawings as well, and the same applies to mutually interconnected documents.





BIM

Through the standardised IFC data format, necessary BIM data can be exchanged and shared in the course of cooperation in the project.



BIM

The BIM model contains geometric and non-geometric information plus additional data (parameters, attributes, properties) that are assigned to individual construction elements and structures (entities). This information can be consequently used for searching of construction elements in the BIM model and obtaining of various specifications.

Air Space	EF-06		^				
	IF-01			* STRUC	TURE AND APPEARANCE		
Aluminium	PR-04				~		<i>₩</i> Ų 169
Brick	EF-04				Lightweight Concrete		>
Brick - Finish	EC-04						<u> </u>
Brick - Structural	ST-02			Fill Orientat	on:	et Origin	
Concrete	EF-01				[M / · · ·		
Concrete - Structural	ST-04			Note: Fill Or	ientation is only available for Comp	osites and Complex Profiles	
Concrete Block - Filler	EF-03	1					
Concrete Block - Structural	ST-05	J			Concrete - 04		•
Fiberboard	IF-04						
Fire Proofing	EC-01			Intercection	Driarita		
	EN-00			Intersection	Priority:		
GENERIC - EXTERNAL CLADI	DING EC-00				Weak		Strong
GENERIC - EXTERNAL FILLER	₹ EF-00			* CLASSI	FICATION AND PROPERTIES		
GENERIC - EXTERNAL MEMI	BRA EM-00				CLASSIFICATIONS		
GENERIC - INSULATION	IN-00				Archicad Classification - v 2.0	Concrete	
GENERIC - INTERNAL CLADE	DING IC-00						
GENERIC - INTERNAL FILLER	IF-00			e	Strength Grade	<undefined></undefined>	
GENERIC - PREFABRICATED	PR-00			*	PHYSICAL PROPERTIES		
GENERIC - STRUCTURAL	ST-00				Load from Catalog	Open Catalog	
Glass	EF-05				Thermal Conductivity	1,150	W/mK
	EN-03				Density	1800,000	kg/m [®]
Gravel					Heat Capacity	1000,000	J/kgK
Gravel Gypsum Plasterboard	IF-02						
Gravel Gypsum Plasterboard Gypsum Plasterboard - Wate	IF-02 erpr IF-03				Embodied Energy	0,740	MJ/kg
Gravel Gypsum Plasterboard Gypsum Plasterboard - Wate Insulation - Fiber Hard	IF-02 erpr IF-03 IN-02				Embodied Energy Embodied Carbon	0,740 0,107	MJ/kg kgCO₂/kg



BIM

The procedure of creating a BIM model at the project designing stage / building construction documentation is as follows:

- 1. A new building construction (static model): concrete, masonry, steel structures, foundations, stairs, ramps, ceilings/floors, etc.
- 2. Layout design and building accessories, elements, and sets: partition walls, bricking-ups, windows, doors, floors, suspended ceilings, roofs, facades, curtain walls, furniture, fixtures & fittings.
- 3. Building service equipment (BSE) installations:
 - a) Main horizontal and vertical routes (risers and backbone pipes).
 - b) Coordination of BSE main routes.
 - c) Positioning of end-elements (heating bodies, HVAC diffusers, lighting fittings, switches, instrument panels, terminals, etc.); the end-element positioning may be modelled by an architect /a designer of the construction part.
 - d) Final connections of the end-elements to the main routes.
 - e) Coordination of final connections and other coordination measures (detailed coordination).
- 4. 3D coordination model for specialised trades vs. static model and construction model: openings, joints, grooves, necessary cladding, builder's work in connection, etc.
- 5. Model detailed finishing: wall tiling, products, sheet-metal lining, railings, parameter filling, etc.
- 6. Bill of quantities, other reports: product tables, areas, reports
- 7. Graphic finalisation of the documentations: dimension figures, legends, notes, layouts, drawings, conventional signs, etc.

Sustainable Development

Sustainability is the ability to maintain a way of life indefinitely (within the limits of life on earth). The depletion of resources must be avoided to make sustainability possible. Sustainability is defined as the ability to meet the basic needs of today without compromising the ability of future generations to meet their basic needs.

Sustainable development is based on three aspects, namely (social, economic and environmental) aspects (or pillars).



image source online, 20230328, taken from : https://juta.co.uk/jutanews/sustainable-construction-development/

LCA

Life Cycle Assesement or life – cycle analysis, ecobalance or cradle – to – grave analysis.

LCA is an analysis aimed at assessment of product lifecycle with regard to its environmental impact. The analysis is applicable to any product, including building materials. LCA assesses inputs and outputs with effect on the environment throughout the assessed product lifecycle.

Environmental impact of building materials is assessed in connection with: raw material extraction, product manufacture, building in structures, operation and disposal.

LCA

LCA focuses on environmental properties of product. All products affect the environment throughout their lifecycle. Environmental impact of product in individual stages of its lifecycle are different.

LCA method is based on **specification of material and energy flows**. Attention is paid to their quantity, nature and seriousness in relation to the environment. **The result of LCA analysis** is **data** that can be divided into two groups. One is **quantitative data** expressing environmental impact and the other is **qualitative data** expressing accuracy of quantitative data, and further description of non-measurable aspects.

The results of LCA analysis are used by contracting authorities (companies) who can use them as the basis of changes for example in product manufacture or by state administrative authorities.

LCA - Study Stages

LCA analysis is divided into 4 stages. They are: definition of goals and scope, inventory analysis, impact assessment and result interpretation.



Archicad

Software especially for 3D / BIM modeling. For team collaboration using BIM Cloud Server technology. Software enabling interprofessional communication based on the IFC (Industry Foundation Classes) data format.

DesignLCA

is a free plugin for Archicad that easily allows you to calculate LCA on your BIM project from early sketching. The best thing is that you don't even have to be a LCA expert.

LCA in the early design phase Sustainability in the building sector has become a major topic worldwide and multiple European countries are working implementing on regulations. This means that we must investigate new ways to assess a building's climate impact already from the early stages. LCA is а detailed method for assessing building's footprint and is still undergoing rapid development in line with increasing demand. However, it is a method that requires a large on included amount of data processes.



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LCA in the early design phase

It is crucial to be able to consider the environmental impact in the initial phases of a project, so that you can continuously see how the geometry and choice of materials can affect the final result. For example, testing different material compositions on e.g. the load-bearing structure, facades, roof, etc. This saves both architects and engineers time, as it provides a better prerequisite for achieving the desired results in the final design LCA.

That is why Graphisoft Center Danmark has developed an Add-on, DesignLCA, for Archicad to estimate impacts from any construction along with the modelling. The Add-on enables you to compare different solutions as well as getting an estimate of the whole perfomance of your building throughout its life cycle.



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DesignLCA

https://www.oekobaudat.de/en.html

Archicad 27 includes a new set of Building Material properties, corresponding to standard environmental indicators.

Property values are based on data of the German ÖKOBAUDAT database. Use these validated properties to document embedded energy and CO₂ footprint data for building lifecycle analysis and sustainability reports.

Building Mate	erials						?	×
D ID	Name	Priority	4	Mama			Editabl	le: 1
	Air Space	^		Name:				_
IF-01	Air Space - Frame			Brick - Stru	ctural			
PR-04	Aluminium Brick			+ STRUCT	URE AND APPEARANCE			
EC-04	Brick - Finish			- CLASSI	FICATION AND PROPERTIES			
ST-02	Brick - Structural				CLASSIFICATIONS			~
EF-01	Concrete				Archicad Classification - v 2.0	Clay Brick	F	1
ST-04	Concrete - Structural							~
EF-03	Concrete Block - Filler			+	ID AND CATEGORIES		_	~
ST-05	Concrete Block - Structural			-	ID	ST-02		
IF-04	Fiberboard				Manufacturer			
EC-01	Fire Proofing				Description			
EN-00	GENERIC - ENVIRONMENT				Participates in Collision Detection			
EC-00	GENERIC - EXTERNAL CLADDING			*	ENVIRONMENTAL			
EF-00	GENERIC - EXTERNAL FILLER			5	Global Warming Potential (GWP)	242.351		
EM-00	GENERIC - EXTERNAL MEMBRAN	E		5	Ozone Depletion Potential (ODP)	0.000		
IN-00	GENERIC - INSULATION			5	Photochemical Ozone Creation Pote	-0.013		
IC-00	GENERIC - INTERNAL CLADDING			5	Acidification Potential (AP)	0.285		
IF-00	GENERIC - INTERNAL FILLER			5	Eutrophication Potential (EP)	0.057		
PR-00	GENERIC - PREFABRICATED			5	Abiotic Depletion Potential (for non	0.000		
ST-00	GENERIC - STRUCTURAL			5	Abiotic Depletion Potential (for fossi	1080.978		
EF-05	Glass			5	Data Source	https://www.oekobaudat.de/OEKOBAU.DAT/resource/proces	se	
EN-03	Gravel			-	COMMON (Materials)	•	_	
IF-02	Gypsum Plasterboard			9	Name	<1Indefined>		~
IF-03	Gypsum Plasterboard - Waterpr	oc		> 5 PA	NEL TEST ATTRIBUTE PAGE			
IN-02	Insulation - Fiber Hard	~	C:					
New	Delete					Cancel	OK	

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ÖKOBAUDAT

Process Data set: Cushione	d Polyvinyl chloride floor coverings according to EN ISO 26986 (en) <u>en</u>	
Tags	Dieser Datensatz ist Bestandteil der ÖKOBAUDAT.	
✓ Process information		
Key Data Set Information		
Location	RER	
Reference year	2019	
Name	Cushioned Polyvinyl chloride floor coverings according to EN ISO 26986	
Use advice for data set	 Scope: In this EPD cushioned polyvinyl chloride floor coverings are declared. The application of this EPD is restricted to cushioned polyvinyl chloride floor coverings produced by the members of the European Resilient Flooring Manufacturers' Institute (ERFMI). Data are based upon production during 2017 in Europe. Data have been provided by 5 companies of ERFMI which represent 100% of ERFMI members. System boundary: Type of EPD: cradle to grave Modules A1-A3 include processes that provide materials and energy input for the system, manufacturing and transport processes up to the factory gate, as well as waste processing. Module A4 includes transport of the floor covering to the place of installation. Module A5 includes the production of offcuts and adhesive for the installation of the floor covering, and incineration of offcuts and packaging material. 	 consumption for the cleaning of the floor covering incl. waste water treatment. The LCA results in this EPD are declared for a one-year usage. Module C1 considers electricity supply for the deconstruction of the flooring. Module C2 includes transportation of the postconsumer waste to waste processing. End of life scenarios are declared for: 100% incineration in a waste incineration plant (WIP) (Scenario 1, C3/1) 100% landfilling (Scenario 2, C4/2) 100% recycling according to information from AgPR, (Arbeitsgemeinschaft PVC-Bodenbelag Recycling) (Scenario 3 - for the recycling scenario the end of waste state is reached after removal from the building) Module D includes potential benefits from all net flows given in module A5 and C3 that leave the product boundary system after having passed the end-of-waste state in the form of recovery and/or recycling potentials.

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ÖKOBAUDAT

Environmental Impact Indicators

Indicator \$	Unit \$	Production A1-A3	Transport A4	Installation A5	Maintenance B2	De- construction C1	Transport C2	Waste processing C3	Disposal C4	Recycling Potential D S1	Recycling Potential D S2	Recycling Potential D S3
Global warming potential (GWP)	kg CO_(2)- Āq.	3.936	0.1635	0.5163	0.284	0.0124	0.0159	3.36	0.121	-1.034	-0.0728	-0.0728
Depletion potential of the stratospheric ozone layer (ODP)	kg CFC11-Ăq.	6.631E-10	4.453E-15	4.24E-11	1.03E-12	5.53E-14	4.34E-16	1.19E-12	3.26E-14	-1.953E-12	-1.41E-13	-1.41E-13
Formation potential of tropospheric ozone photochemical oxidants (POCP)	kg Ethen-Äq.	0.001457	-0.0001164	0.0000899;	0.0000593	0.0000022 ⁻	-0.0000114	0.0000686	0.0000361	-0.0001302	-0.000092	-0.000009

Global Warming Potential (GWP)

the insulating effect of greenhouse gases (GHG) - CO_2 and methane in the atmosphere preventing the earth losing heat gained from the sun. As global temperature rises, it is expected to cause climatic disturbance, desertification, rising sea levels and spread of disease.

Unit: kg CO₂ eq.

The life cycle of any product has four main stages - **raw material sourcing**, **product production**, **product use and product disposal**. The LCA method makes it possible to determine at which stage of the life cycle a product or service has an impact on which environmental area. On this basis, the optimum extraction of the natural resources needed and the amount of waste generated during production and at the end of its 'life' that nature can cope with under certain circumstances can then be found for a given case, for a specific type of product.

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DesignLCA

The Add-on enables you to compare different solutions as well as getting an estimate of the whole perfomance of your building throughout its life cycle.

Prod	luct sta	ige	Constr proc	uction cess		Use stage End of life							Beyond system boundary			
Raw material supply	Transport	Manufactoring	Transport	Construction, installation	Use	Maintenance	Repair	Replacement	Refurbishment	Operational energy use	Operational water use	Deconstruction/demolition	Transport	Waste processing	Disposal	Reuse, Recovery, Recycling potential
A1	A2	A3	A4	A5	B1	B2	B 3	B4	B5	B6	B7	C1	C2	C3	C4	D

Modeling the building components

As mentioned, all building components must be assigned a material composite. Make sure to only use composites with materials containing both thermal properties and **GWP-data in DesignLCA**. The more detailed you model, the more precisely Archicad will produce a quantity extraction and thus a more precise estimate of the building's **CO₂ emissions**. This means that in addition to modeling walls, decks and roofs, you should model columns and beams with an assigned material.

Name	▲	A01 - Thermal insulation system grey EPS				
A01 - Thermal insulation system grey EPS						
💋 A02 - Clay blocks Porotherm 50 EKO+ Profi		Use with:				
🔀 A03 - Clay blocks Porotherm 24 Profi					<u></u>	_
A04 - Clay blocks Porotherm 14 Profi						
A05 - Clay blocks Porotherm 11,5 Profi						
A06 - Clay blocks Porotherm 17,5 Profi						
🐼 A07- Zateplovací systém						
A08- Zateplovací systém				225		£
A09 - Clay blocks Porotherm 11,5 Profi		* EDIT SKIN AND LINE STRUCTURE				
A10 - Železobetonový věnec		✓ Skin and Separator	K#I Line Pen	Type	Ŧ	
🛞 A11 - Železobetonový věnec vnitřní		Utside/Top: Plná čára	1 [— [~] –		
A12 - Železobetonový věnec bez vnitřní omitky		Silicone-grained silicate plaster			2	
🔀 A13 - Železobetonový věnec vnitřní		V ——— Piná čára	14			
🙀 A14 - Zateplovací systém XPS		Penetration of the base	√ 1		0	
A15 - Zateplovací systém šedý EPS (1)		✓ ——— Piná čára	14			
🖗 A16 - Železobetonový věnec vnitřní (1)		Reinforcing glass fiber fabric (leno)	√ 1		0	
D01 - Betonová podkladní deska	0	Piná čára	14			
🔯 D02 - Ž8 základová deska na štěrku z pěnového skla	Ð	Adhesive and leveling compound	√ 1		з	
D03 - Ž8 základová deska na XPS	0	Piná čára	14			
🗱 D04 - Deska na terénu	Ð	Thermal insulation - polystyrene grey EP	√ 1		240	
💯 D05 - Plochá střecha - nosná konstrukce	Ð	Piná čára	14			
💯 D06 - Deska mezi podlažími	ø	Adhesive and leveling compound	√ 1		10	
D07 - Plochá střecha, zátěžové kamenivo	$\otimes \oslash$	✓ ——— Piná čára	14			
🚫 Obecná deska/střecha	0 A	Clay blocks Porotherm 25 EKO+ Profi	√ 1		250	
Obecná střecha/skořepina	AV	Piná čára	14			
🔀 Obecná zeď/skořepina		Penetration of the base - internal	√ 1 [0	
👫 P01 - Lehká plovoucí podlaha, korek	ø	✓ —— Piná čára	14			
P02 - Lehká plovoucí podlaha, parkety	0	Single-layer inner gypsum plaster	√ 1		10	
B05 - Těžká plovoucí podla…lahovým vytápěním, dlažb	a 🌣	Inside/Bottom: Plná čára	1			
💹 P06 - Těžká plovoucí podlaha s topnou rohoží, dlažba	0			_		
P07 - Podhled SDK s akustickou izolací	0 a	Total thickness: [mm]			515	
P08 - Podhled SDK 165	$\otimes \oslash$	Insert Skin Remove Skin				
P09 - Podhled SDK 150	0 a					



3D building model



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Building energy model (BEM)

Thermal Blocks

In order to calculate the model's energy consumption and associated CO₂ emissions, you must group the building's zones into 'Thermal blocks' in **Energy Evaluation**.

Thermal blocks represent a collection of one or more spaces with similar heating or cooling requirements – also called thermostat control equiments and similar operational function. Once you have created a Thermal block in the **EcoDesigner Star tool**, you can assign it to the zones. When these are in place, different parameters can be set in relation to heat consumption, ventilation etc. depending on the type of building. Here, it is important to be aware that all building components must be modeled as an overall composite of materials in order for the tool to calculate correctly. An 'Operation profile' must be set for each Thermal Block. If it e.g. is a classroom, you must assign it the profile 'Classroom, which is set to be in use during the day on all weekdays. You can customize the profiles and create your own as needed.

Under the 'Structures' tab you can access all building structures for each zone in each thermal block. Here you can view e.g. orientation, category and u-value for the selected building part. The u-value is calculated in Archicad based on the material composition, but can be overridden manually if you need to work with a specific u-value.

Energy Model Review - Thermal Blocks	×		
₩ • ② • Ⅲ = = 63	[§] • MFNT	Energy Model Review - Openings	×
🚯 Thermal Blocks 🛆 Structures 🧬 Openings		Thomas Blacks A Structures	
		Internal block	
	UCTTONS	 Doors 	
	OCITONS	D02 - Existing	
E 102 Living room		D02 - Existing	
En 103 Study		D02 - Existing	
E 104 Staircase		D02 - Existing	
발 105 Chamber		D22 - Existing	
L을 106 Entrance hall		> 🖽 Windows	
발 107 Service room			
딸 108 Toilet		Show uniform items as a single entry	
딸 201 Bedroom		√ Total area threshold: 0,00 m²	
딸 202 Dressing room	~	 Opening Properties 	
🕮 🕮 🗙		Туре	Door
		Orientation	West
 Thermal Block Properties 		Opaque Area	1,74 m ²
🚱 001 Thermal block 🔛 Obytné	Energy Model Review - Structure	Glazed Area	2,76 m ²
Sunnha Building Surtemy	A.O.	Opening Catalog	4,50 m
Supply building systems		Total Solar Transmittance	52,00 %
System type System Name	Thermal Blocks Structures	Solar Analysis	✓ Open Analysis
Wentilation Ventilation Ventilation Ventilation Ventilation Ventilation Ventilation Ventilation Ventilation	External Structures	Perimeter	10456 mm
+ Offeating Zennin repense cerpacito	Straight Wall - Existing	Glazing U-value	0,71 W/m ⁻ K
+	Straight Wall - Existing	1	Start Energy Simulation
	Slab - Existing		
	E Slab - Evicting		
×		_	
Start Energy Simulation	straight wai - Existing		
	Straight Wall - Existing		
	Straight Wall - Existing	3	
	Straight Wall - Existing)	
	🔊 Slab - Existing		¥
	📅 Area threshold:	0,00 m²	(b)
	w Chrysteine Daamantika		
	- Structure Properties		
The survey of the local states of the second states	Orientation	West	A
I nermai block	Category	External	
	Thermal Block	001 Thermal bloc	ck
	Name	🔀 A01 - Thermal ins	sulation system grey EPS
	Area	25,78 m²	
	Thickness	515 mm	
	U-value	0,10 W/m ⁴ K	
	Solar Absorptance	85.00 %	
		05,00 /0	
	1		~
			Start Energy Simulation 🔹

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Location and Climate

The location and surroundings have an impact on the energy demand and thus the amount of CO2 emitted from the energy consumption. You can therefore set the location to the specific address for your construction and then the location of the plot in relation to True North. When the location is set, Archicad adapts the weather data for the given area. In Environment Settings, you can set up the environment to avoid modeling the context of the building. Here you can set zone conditions and shade and shelter from surrounding buildings.

C Environment Settings	! ×		Cililate Data	1 ×
Location and Climate:	🔼 Location Settings	? ×	Climate data is ready for simulation	
49,67° N, 18,22° E Location Settings	▼ 🖧 PROJECT LOCATIO	N	Download from Strusoft Climate Server	
Climate source: Strusoft server Climate Data	Project Name:	Edit	O Use ASHRAE IWEC, TMY, WTEC2 file	Browse
Grade Level: to Proj	ct Zero 🕨 Site Full Address:	Edit	Climate source, strusoit server	
Offset Distance O Modeled by Mesh Elements			Climate Type: Moist (A)	Climate Zone Identifier:
Surface Heat Transfer	Latitude:	49,66541420° N ✓		25 N 14
Soil Type: Gravel	↓ Longitude:	18,22210060° E ~	Air temperature	·c ▶ view:
Thermal Conductivity 1,400 W/mK	Time Zone (UTC):	(UTC+01:00) Amster Stockholm, Vídeň 🗸	°C	
Density 2200,00 kg/m ³	Altitude (Sea Level):	180,00 🕨 m	40-	
Heat Capacity 1900,00 7/KgK		Show in Google Maps	30- 20-	
Surroundings: Garden				
Wind Protection	North Angle:	<u>/τα</u> 60,0000000000°	-10	
Horizontal Shading			-20-	ul. Aug. Sep. Oct. Nov. Dec.
				0.20
			Average:	5.50 Le Minimum: 17.5
Cancel	ок	Cancel OK		Cancel OK
O Modeled by Mesh Elements Surface Heat Transfer Soil Type: Gravel Thermal Conductivity 1,400 W/mK Density 2200,00 kg/m³ Heat Capacity 1900,00 J/kgK Surroundings: Garden Ground reflectance 20 Wind Protection Horizontal Shading	Latitude: Longitude: Time Zone (UTC): Altitude (Sea Level): % North Angle:	49,66541420° N ▶ > <	Moist (A) Data Type: Air temperature ⁹ C ⁴⁰ ⁴	 ✓ SA *C ▼ View: ✓ ■ ■ ■ ● ● ● ● ✓ ■ ■ ● ● ● ✓ ■ ■ ● ● ● ✓ ■ ■ ● ✓ ■ ✓ ■ ● ✓ ■ ✓ ■

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Using the DesignLCA palette

When the results from Energy Evaluation have been retrieved, the DesignLCA palette can display a result. The palette can be docked like other Archicad palettes, which makes it easy to work in the model and see quick results in DesignLCA at the same time.

Design	LCA					×				
LCA Ele	ements									
Col.	Туре	Service life	Contribution	GWP	GWP per area	GWP per area per year				
		(year)	(%)	(kg CO2-eq)	(kg CO2-eq/m2)	(kg CO2-eq/m2/a)				
2	Operational energy use (B6)	20	12	58665,19	327,61	6,55				
	Building components	<u>-</u> 4	2	41465,95	231,56	4,63				
	Doors	25		0,00	0,00	0,00				
	Windows	25	37	0,00	0,00	0,00		Material CO2 Report		1 ^
	Inventory	30 🔽	5,00	4146,59	23,16	0,46	Lav	er Name	GWP (kg CO2-eg)	
	Installations	25 🔽	10,00	8293,19	46,31	0,93	(Action Center) Ko	nstrukce - svislé n	14674,29	·
	Construction process (A4, A5)	- 🔽	10,00	4146,59	23,16	0,46		Silicone-grained silicate plaster Penetration of the base	259,79	
_	TOTAL	1990-0000 199	22 2	116717,52	651,79	13,04		Reinforcing glass fiber fabric	. 0,01	
								Thermal insulation - polystyre	. 2414,78	
GWP		Threshold					il energy use (B6)	Clay blocks Porotherm 25 EK	3488,72	
	4%						mponents	Single-layer inner gypsum pla.	. 216,93	
	170		13,0					Penetration of the base - exte	. 52,38	
	0%							Clay blocks Porotherm 24 Pro Clay blocks Porotherm 17.5 Pr	412.61	
								Concrete - structural	3463,80	
							in process (A4, A5)	Thermal insulation - extruded		
			Jupact					Concrete Block - permanet fo	1359,41	
					0,0		4%	Reinforced Concrete - Structu	. 705,20	
	50%						7% Ko	nstrukce - svislé ne…	3418.62	
		al mag					4%	Single-layer inner gypsum pla	142,04	
	36%							Penetration of the base - exte	. 62,41	
			18					Clay blocks Porotherm 14 Pro	. 1026,80	
		E .						Penetration of the base - inter.	17,53	
			4-					Clay blocks Porotherm 11,5 Pr.	81,75	
								Silicone-grained silicate plaster	68,14	
							Penetration of the base	54,46		
								Reinforcing glass fiber fabric	0,00	
								Adhesive and leveling compo	114,06	
			Last update f	Last update from Archicad: 14.04.2023 19:59:50			Thermal insulation - polystyre	661,23	~	
									Default Element Settings	Place Close
Set	ttings Material CO2 Report Pla	ace		(¢) U	pdate results	Generate LCA report	Material CO2 Report			
-										

source online, 20230414, taken from https://www.designlca.com/

Using the DesignLCA palette

	9	5				
Considered service life: 50					year	
Gross floor area:				\checkmark	179,07	m2
Operational CO2 emission:				\checkmark	1173,30	kg/a
Reference floor area:					179.07	m2
Used	LCA pha	JSE5:				
	10	Name Brodust store				
	A1-A5	Froduct stage				
	R1					
	C1	Desconstruction/demolition				
	C2	Transport				
	C3	Waste processing				
\checkmark	C4	Disposal				
	D	Disposal Reuse, Recovery, Recycling potential				
	D	Disposal Reuse, Recovery, Recycling potential				
	C4 D Standard	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a	~
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a Value	0,00 ^
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s:	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s: ne	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA :	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s: ne	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s: ne	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s: ne	Unit type:	kg CO	2eq/m2/a Value	0,00
LCA Stan	C4 D Standard dard nan	Disposal Reuse, Recovery, Recycling potential s: ne	Unit type:	kg CO	2eq/m2/a Value	0,00

Add Remove

ОΚ

VSB	TECHNICAL	FACULTY	DEPARTMENT
կլլ	UNIVERSITY	OF CIVIL	OF BUILDING
	OF OSTRAVA	ENGINEERING	CONSTRUCTIONS

Result

The result can reviewed both in the palette and in the Excel report. In the schedule, the total climate impact can be read in kg CO_2e , CO_2/m^2 and kg $CO_2/m^2/year$.

Furthermore, 2 diagrams are generated for the time being, which respectively shows the distribution of the climate impact in the project and the project's kg $CO_2/m^2/year$ compared to reference values set in the DesignLCA Settings.

А	В	С	D	E	F	G
	Туре	Embodied Carbon	Percentage stage	Service Life	Replacement	GWP
		[kg CO2e]	[%]	[year]		[kg CO2eq]
Use stage (B6)	Operational energy use	1173				5
Product stage and EOL	Building components	41466		50	1	4
(A1-A3, C3, C4)	Doors			25	2	
	Windows			25	2	
]	Inventory	2073	5	30	2	
]	Installations	4147	10	25	2	
Construction process (A4, A5)	Construction process	4147	10			
	TOTAL					11
	Considered period [years]	50				
	Gross floor area [m2]	179				

Thank you for your attention

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