DEVELOPMENT OF LCABYG FOR THE DANISH BUILDING SECTOR DRIVERS FOR THE DEVELOPMENT AND APPLICATION OF THE TOOL

.

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Why, how, when?

2014

The Danish Government: Political strategy for buildings with Vision for a Voluntary Sustainability Class in the Building Code



2015 National LCA-tool LCAbyg launched in April 2015 + Several publications



-Trafik- og Byggestyrelse

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In brief

- Developed by The Danish Building Research Institute for the Danish Transport, Construction and Housing Authority
- National freely available tool developed for the Danish building sector
- First version launched in April 2015
- New beta version in January 2019 with focus on early design stages
- Over 3000 users, about 300-500 users each month



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It is being used



Use of LCAbyg

CONDITIONS

Short time to develop a robust tool for different users in Denmark



Classical tool structure



FOKUS in the tool development:

- Transparency
- Understand
- Learn
- Improve



Comparing and choosing between alternatives

ling	g components				110.000					
	Type	Building component			Construction			alculated weigh		
	Foundation	Strip roundation	Sinp rounda	uon (500 x 500 mr	n)	134 m		80.802 kg	Ξ	
	Structure	Concrete columns	Concrete col	umn (300 x 300 m	m)	330 m		12.778 kg		
	Structure	Concrete beams	Concrete be	am (300 x 750 mm	l)	300 m		194.940 kg		
	Storey partition	Basement noor	Basement no	oring w/ EPS insu	(350 mm)	832 m ⁻		660.908 kg		
	Exterior wall	End wall	Exterior W	an w/ EPS insulatio	in (750 mm)	530 m*		213.031 Kg		
Exterior wall End wall			Exterior Wall	w/ mineral wool i	insulation and prickwork (50	6242		291.4/1 Kg		
	Contentor Wall	light racade construct	Light facade	construction w/ st	teer and mineral wool insul	624 m-		55.554 Kg		
	Heln		Move up					Delete arrow		
ling	products in construction: Name Concrete C30/37	Strip foundation (500 x 500 m Product stage Concrete C30/37 Co	m) End o poncrete C30/37, EOL	f life stage	Quantity U 0,25 m ⁵ /m	nit factor	Service I	ife Calculated q	uantity 33,5	
ling	products in construction: Name	Strip foundation (500 x 500 m Product stage	m) End o	f life stage	Quantity U	nit factor	Service I	ife Calculated q	uantity	
ling C	Name Name Concrete C30/37	Strip foundation (300 x 500 m Product stage Concrete C30/37 C Steel, reinforcing steel E	m) End o poncrete C30/37, EOL npty waste process	f life stage (for reinforcing ste	Quantity U 0,25 m ³ /m etel etc.) 3 kg/m	nit factor	Service I	ife Calculated q 120 years 120 years	uantity 33,5 402	
ling C	products in construction: Name Concrete C30/37 Steel, reinforcing steel	Strip foundation (500 x 500 m Product stage Concrete C30/37 C Steel, reinforcing steel	m) End o poncrete C30/37, EOL npty waste process	f life stage (for reinforcing ste	Quantity U 0,25 m ³ /m kel etc.) 3 kg/m	nit factor	Service I	ife Calculated q 120 years	uantity 33,5 = 402 +	
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Quick overview of quantities and understand the massflow

uulding	Ruilding components	Operation	Quantity	Reculte	Analycic	Report	Projec	t comparie	m						
ununiy	Building components	operation	Quantity	Results	Andrysis	Report	Flojec	t companis	Л						
Juant	ity														
lere vou	can see the project by wei	aht and quanti	ity												
iere you	can see the project by we	gin and quant	icy												
			Description	Fille	d in quantit	/ Cal	culated q	uantity	We	ight	Service life	fe			
4 Build	ding components		Total building			-		-	3.48	1.069 kg					
D B	uilding base		Main group			-		-	8	0.802 kg		-			
D D	rimary buildning comp	opento	Main group						3 36	8 962 kg					
	innary building comp	onents	Main group			12		1.00	0.00	0.962 kg					
P C	ompletions		Main group			-		-	2	0.005 Kg					
⊳ In	stallations		Main group			-		-		442 kg		-			
				Project	Help										
				Building	Building con	nponents	Operation	Quantity	Result	s Analysis	Report	Project comparison			
				-											
				Quar	ntity										
				Here ye	u can see the pr	oject by weig	iht and quantit	ty .							
								Descr	iption	Filled	in quantity	Calculated quantity	Weight	Service life	-
				⊿ Bu	ilding compon	ents		Total build	ing				- 3.481.069 kg	-	
			21	4	Building base			Main grou	0		-		- 80.802 kg		1 L
					Foundation			Type			124 -		- 80.802 kg		1
					 Strip Tou A Strip 	ndation	(500 × 50	Construction	mpone	nt	134 m		- 80.802 kg		
			>		- Suip	increte C30	/37	Building pr	oduct		0.25 m ³ /m	33.5 m	³ 80.400 kg	120 år	r
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				4	Primary buildr	ing compo	inents	Main group	0		-		- 3.368.962 kg	-	-
				_	Exterior wa	I		Туре			-		- 539.876 kg	2-	-
lumbers	in green are not added up	in the total bu	ilding sum (dem	olit	A Basemer	nt wall		Building co	mpone	nt	330 m ²		- 213.051 kg	-	-
					# Baser	nent wall v	/ EPS insu	Constructio	n		0.2 - 3 - 2	00 -	- 213.051 kg	-	
					EP	S insulation	n (Styrotoa	Building p	oduct		0,3 m ⁻ /m ⁻	99 n	1 2.247 kg	80 ar	1
					0	increte C30	vaterproof	Building p	oduct		$0.26 \text{ m}^3/\text{m}^2$	85.8 m	a ³ 205.920 kg	120 År	r
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					End wall			Building co	mpone	nt	515 m ²		- 291.471 kg	-	-
					4 Exter	or wall w/	mineral w	Constructio	n		-		- 291.471 kg	2	-
					Br	icks, facing		Building pr	oduct		0,09 m ³ /m ²	45,32 m	1 ³ 81.576 kg	120 år	r
					M	ortar, maso	nry mortar	Building pr	oduct		0,02 m ³ /m ²	10,3 n	1 ³ 15.450 kg	120 år	r
					M	neral wool	, facade sy	Building p	oduct		0,25 m ³ /m ²	128,75 m	1 ³ 5.955 kg	80 år	r -
					CC	increte C30	/3/	Building p	oduct		0,15 m°/m°	77,25 m	1- 185.400 kg	120 år	1
					A Light fac	ade constr	uction	Building of	mnone	ot	624 m ²	3.090 k	- 35,354 kg	120 ar	
				1.1	- LIGHT 100	MAR COUNTE	March 10/11	sanang co	m polic		MA. T 111		SALANT NY		10 M

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Analysis with pre-defined figures



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Last but not least: Understanding WHEN, HOW MUCH and WHY



Whole life carbon assessment for an office building – an example



Consequences of using static versus forecasting - and how results are presented!









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There is a large potential to reduce the embodied impacts



Our goals have been to:

- Increase building designer's awareness
- Let them understand where, in the building life cycle, reductions can be achieved
- Significant to focus on simplifying the process
- Finding ways of communicating complex LCA results to the users
- Perform comparisons of different construction solutions and material uses within the tool.
- Developing predefined visualization of results that were believed to qualify the designer to identify hotspots and to understand and mitigate the major impacts throughout the building's life cycle.
- Encourage the user to shuffle around between the numerical results and the figures in order to understand







