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RICARDO

Waide Strategic Efficiency

Preparatory study for BACS

04/03/2020

Task 5

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Brussels, DG ENER

3rd of March 2020

Agenda

- 10h00-10h05: Welcome and introduction to study (DG ENER)
- 10h05-10h15: Tour de table +agenda(VITO)
- 10h15-10h30: Overview of draft Task 1 work (VITO)
- 10h30-10h45: Task 1 Q&A on functional unit and scope
- 10h45-11h00: Overview of initial draft Task 2 work (Waide)
- 11h00-11h20: Overview of initial draft Task 3 work (VITO)
- 11h20-11h30: coffee break
- 11h30-11h50: Overview of initial draft Task 4 work (Ricardo)
- **11h50-12h00: Overview of initial draft Task 5 work (VITO))**
- 12h00-12h20: Discussion on the base case selections (VITO)

Task 5: introduction to the used LCA method

- **MEErP**: Methodology for Ecodesign of Energy-related Products
- **EcoReport tool** developed for MEErP assessments
- Simplified **Life Cycle Analysis (LCA)** tool
- Latest version from 2014
- Translates product-specific characteristics (from Task 1-4) into environmental impact indicators per product
- Life cycle impact assessment data of 91 materials included
- Excel-based tool
- **Life Cycle Cost (LCC)** assessments also possible

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Task 5: product specific inputs-LCC

- This is elaborated for BC1 (excel tool uploaded on the website)
- If needed a more complex LCC tool can be added (e.g. ED PV, ED batteries)

nr	INPUTS FOR EU-Totals & economic Life Cycle Costs Description		unit
A	Product Life	30	years
B	Annual sales	10607214,9533	mln. Units/year
C	EU Stock	0,00	mln. Units
D	Product price	€ 0,00	Euro/unit
E	Installation/acquisition costs (if any)	€ 0,00	Euro/ unit
F	Fuel rate (gas, oil, wood)	€ 17,778	Euro/GJ
G	Electricity rate	€ 0,200	Euro/kWh
H	Water rate		Euro/m3
I	Aux. 1: None		Euro/kg
J	Aux. 2 :None		Euro/kg
K	Aux. 3: None		Euro/kg
L	Repair & maintenance costs	€ 0,00	Euro/ unit
M	Discount rate (interest minus inflation)	4%	%
N	Escalation rate (project annual growth of running costs)	4%	%
O	Present Worth Factor (PWF) (calculated automatically)	30,00	(years)
P	Ratio efficiency STOCK: efficiency NEW, in Use Phase	1,00	

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Task 5: product specific inputs-LCA data

- **Production data:** So far, there is little or no evidence that a higher functionality BACS has different production needs that a lower functionality BACS **> hence neglected?** <>Could be part of sensitivity analysis in Task 6?
- **Distribution data:** see production
- **End of life:** see production
- **Use phase direct impact** = 0 kWh/y because the analysis is only concerned with any additional self-consumption

Task 5: product specific inputs-LCA data

- Use phase indirect impact, comes from calculated results in Task 4 input is:
  - the final or total energy demand of building for electricity
  - For gas heating: 'the annual average heat output power in GJ' hence can accou ing

Pos nr	USE PHASE Description	indirect ErP impact	unit	Subtotals
211	ErP Product service Life, in years (see comment)	30	years	
	Electricity			
212	On-mode: Consumption per hour, cycle, setting, etc.	15,9	kWh	15,9
213	On-mode: No. of hours, cydes, settings, etc. / year	1	#	
214	Standby-mode: Consumption per hour	0	kWh	0
215	Standby-mode: No. of hours / year	0	#	
216	Off-mode: Consumption per hour	0	kWh	0
217	Off-mode: No. of hours / year	0	#	
	TOTAL over ErP Product Life	0,48	MWh (=000 kWh)	66
	Heat			
218	Avg. Heat Power Output (when saving use a negative value)	119,3	kW	
219	No. of hours / year	1	hrs.	
220	Type and efficiency (Click & select)	104,5%		71 -Gas, condensing 101
	TOTAL over ErP Product Life	12,33	GJ	
	Consumables (excl. spare parts)			material
221	Water	0	m^3/year	84-Water per m3
222	Auxiliary material 1 (Click & select)	0	kg/year	86 -None
223	Auxiliary material 2 (Click & select)	0	kg/year	86 -None
224	Auxiliary material 3 (Click & select)	0	kg/year	86 -None
225	Refrigerant refill (Click & select type, even if there is no refill)	0	kg/year	1-none; 0000
	Maintenance, Repairs, Service not affected			

Task 5: draft LCA results for BC1

» .. they are obviously related to modelling the impact from indirect gas and electricity use by 1 m² of building

Life Cycle phases -->		PRODUCTION			DISTRI-	USE	END-OF-LIFE			TOTAL
Resources Use and Emissions		Material	Manuf.	Total	BUTION		Disposal	Recycl.	Stock	
Materials	unit									
Bulk Plastics	kg			0		0	0	0	0	0
TecPlastics	kg			0		0	0	0	0	0
Ferro	kg			0		0	0	0	0	0
Non-ferro	kg			0		0	0	0	0	0
Coating	kg			0		0	0	0	0	0
Electronics	kg			0		0	0	0	0	0
Misc	kg			0		0	0	0	0	0
Extra	kg			0		0	0	0	0	0
Auxiliaries	kg			0		0	0	0	0	0
Refrigerant	kg			0		0	0	0	0	0
Total weight	kg			0		0	0	0	0	0
Other Resources & Waste							debet	see note! credit		
Total Energy (GER)	MJ	0	0	0	0	17,355	0	0		17,355
of which, electricity (in primary MJ)	MJ	0	0	0	0	4,293	0	0		4,293
Water (process)	ltr	0	0	0	0	-185	0	0		-185
Water (cooling)	ltr	0	0	0	0	-185	0	0		-185
Waste, non-haz / landfill	kg	0	0	0	0	2,212	0	0		2,212
Waste, hazardous/ incinerated	kg	0	0	0	0	68	0	0		68
Emissions (Air)										
Greenhouse Gases in GWP100	kg CO2 eq.	0	0	0	0	905	0	0		905
Acidification, emissions	g SO2 eq.	0	0	0	0	1,021	0	0		1,021
Volatile Organic Compounds (VOC)	g	0	0	0	0	105	0	0		105
Persistent Organic Pollutants (POP)	ng i-Teq	0	0	0	0	10	0	0		10
Heavy Metals	mg Ni eq.	0	0	0	0	43	0	0		43
PAHs	mg Ni eq.	0	0	0	0	10	0	0		10
Particulate Matter (PM, dust)	kg	0	0	0	0	21	0	0		21
Emissions (Water)										
Heavy Metals	mg Hg/20	0	0	0	0	18	0	0		18
Eutrophication	g PO4	0	0	0	0	1	0	0		1

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Task 5: draft LCA results for BC1

» .. they are obviously related to modelling the impact from indirect gas and electricity use by 1 m² of building

Table . Life Cycle Costs per product and Total annual expenditure (2005) in the EU-27

	Products Item	LCC new product		total annual consumer expenditure in EU27
D	Product price	0	€	0 mln.€
E	Installation/ acquisition costs (if any)	0	€	0 mln.€
F	Fuel (gas, oil, wood)	234,536	€	0 mln.€
F	Electricity	95,400	€	0 mln.€
G	Water	0	€	0 mln.€
H	Aux. 1: None	0	€	0 mln.€
I	Aux. 2 :None	0	€	0 mln.€
J	Aux. 3: None	0	€	0 mln.€
K	Repair & maintenance costs	0	€	0 mln.€
	Total	**330**	€	0 mln.€

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Task 5: EU totals

» .. This needs Task 2 to market data in Mm², see template hereafter

Task4+5(BAU)/4+6(BAT) references:	BC1hoBAU	BC2hoBAU	BC3apBAU	BC4apBAU	BC5whBAU	BC6whBAU	BC7ofBAU	BC8ofBAU
market	Residential				Non Residential			
building type (& design)	L38 house		EN 15232 shoe box model		EN 15232 shoe box model		L38 office	
Activity (EN 15232)	not defined	not defined	not defined	not defined	Shop R	Shop N	office	office
age type	renovated	new LEB	renovated	new LEB	renovated	new LEB	renovated	new LEB
Task 5 Base Case #	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
study reference	**house R**	**house N**	**flat R**	**flat N**	**Shop R**	**Shop N**	**office R**	**office N**
EU climate zone (see MEErP)	average	average	warm	warm	cold	cold	average	average
annual BACS sales proxy 2015	10,6	TBD	TBD	TBD	TBD	TBD	TBD	TBD
annual BACS stock proxy 2015	TBD	TBD	TBD	TBD	TBD	TBD	TBD	TBD

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Task 5: conclusions

- Task can easily built on the previous 8 base cases
- In principle a BACS function is not obvious to model in a product tool but **it showed to work when considering 1 m² of building equipped with BACS which is the functional unit defined in Task 1**
- Task 4 had three different BACS factors and by using the Ecoreport tool this impact is converted into a single set of MEErP impact indicators (14 in total)
- 14 indicators include GWP and GER
- By using GER (MJ) one can align MEErP with the EPCs of EPBD which requires certificates in kWh/m²/y primary energy (3,6 MJ = 1 kWh)
- Consequently it is **recommended to use GER as a leading parameter for Task 6 optimization**, in this way it would align with EPBD.

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