

Comparative Life Cycle Assessment of Standard and Green Roofs

Supporting Information

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Table S1 Mass of material inputs to primary construction and maintenance phases during 50 years service life of the building

SUBSYSTEM	Constructive Element	Material	Lifespan	Mass(ton)	Service life mass (ton)
STRUCTURE	Concrete	Sand	50	1,623	1,623
		Gravel	50	1,270	1,270
		Water	50	141	141
		Cement	50	494	494
	Reinforcement	Steel	50	102	102
	Crashstone	Gravel	50	234	234
	Forms	Wood	50	5	5
ENVELOPE	External wall	Brick	50	294	294
		Mortar	50	75	75
	Windows	Aluminum	40	10	20
		Glass	40	11	22
	Insulation	Polystyrene	50	5	5
INNER WALLS	Interior walls	Brick	50	273	273
		Mortar	50	91	91
		Gypsum	40	103	206
		Paint	10	4	20
	Doors	Oak Wood	40	15	30
FLOOR	Floor	Oak Wood	10	12	60
		Mortar	50	124	124
		Varnish	10	0.34	1.72
		Ceramic	50	13	13
		Limestone	50	8.4	8.4
GRAVEL ROOF	Insulation	Polystyrene	10	1.18	6
	Prot. layer	Glass fiber	10	0.1	0.5
	Membrane	PVC	10	0.9	4.7
	Prot. layer	Glass fiber	10	0.1	0.5
	Protection	Gravel	50	78	78
	Vapour barrier	Polyethylene	10	0.7	3.8
					4,927
GREEN ROOF	Insulation	Polystyrene	50	1.18	1.18
	Prot. layer	Glass fiber	50	0.1	0.1
	Membrane	PVC	50	0.9	0.9
	Prot. layer	Glass fiber	50	0.1	0.1
	Protection	porous concrete	50	49	49
	Substrate	Clay soil (from the building site)	50	17	17
	Vegetal layer	Sedum	50	-	-
					68

Table S2 Changes in environmental impacts relative to the building with common flat roof (BFR) for additions of a green roof with grey water recycling

Impact category	Impact Indicator	% change in TOTAL life cycle impact
Abiotic depletion	ton Sb equiv.	-7.0
Global warming (GWP100)	ton CO2 equiv.	-2.8
Ozone layer depletion (ODP)	kg CFC-11 equiv.	-3.2
Human toxicity	ton 1,4-DB equiv.	-3.3
Photo-chemical oxidation	ton C2H2	-3.4
Acidification	ton SO2 equiv.	-3.1
Eutrophication	ton PO4 equiv.	-6.8
Fresh water aquatic ecotoxicity	ton 1,4-DB equiv.	-2.7
Marine aquatic ecotoxicity	10 ³ ton 1,4-DB equiv.	-2.6
Terrestrial ecotoxicity	ton1,4-DB equiv.	-3.8