

Biodiversity impact – Urban Living

For the calculation of the biodiversity impact for Urban Living the material quantities are based on building-level life cycle assessments (LCAs) developed from detailed information provided by VELUX. To ensure consistency between the collected data and the available background data, the materials have been grouped according to representative datasets. The database utilised for the assessment is Ecoinvent v.3.11. For some materials it has been necessary to utilise multiple datasets to represent one material. The grouped materials and quantities required for the 1.814 m² building are listed in Table 1. Furthermore, the biodiversity impact related to energy consumption has been assessed for the Danish energy market and the consumption outlined in the LCA on building level, which is 0 kWh/m²/year for electricity and 42,7 kWh/m²/year for heat. Due to licensing and payment restrictions, it is not possible to disclose the specific values of biodiversity impact for each individual material, nor the energy mix.

The assessment of biodiversity impact is carried out through the life cycle impact assessment method Impact World+. Currently, this method provides the most comprehensive framework that accounts for a wide range of environmental impacts, including emissions to air, water and soil, and use of land, and the impact on biodiversity.

Table 1 - Materials and quantities for Urban Living

Material	Amount [kg]	Material	Amount [kg]
Concrete C45+ (Reuse)*	465.505	Paint	3.026
Concrete C45+	120.366	Elevator	2.609
Gravel (Reuse)*	120.195	Plywood	2.592
Structural timber	116.771	Fibreboard	2.541
Gypsum plasterboard	96.810	Roofing felt	2.250
Wood wool insulation	77.319	Photovoltaic panel	1.995
Concrete C25 (Reuse)*	71.857	Wood board (hard wood)	1.381
Levelling layer, cement	70.978	Floor heating system	1.252
Cross laminated timber (CLT)	35.156	Radiator	1.042
Concrete stairs	26.135	Ventilation canal, steel	1.016
Wood, pine (Reuse)*	18.605	Adhesive mortar	799
Mesh reinforcement (Reuse)*	18.071	Pipe, stainless steel	707
Cover plaster	15.392	EPDM rubber	439
Glazing 3 layer	10.128	Vapour barrier	369
Ventilation aggregate	9.426	Polypropylene pipe	362
Galvanised steel (Reuse)*	7.375	Membrane, float	309
Mineral insulation stone wool	5.503	Alu - PEX	116
Ceramic tiles (Reuse)*	5.157	Surface treatment, lasur	88
Window frame, wood	5.013	Surface treatment, powder coat	86
Steel	4.159	PEX pipe	49
Wood, pine	3.939	Circulation pump	26
Aluminium	3.544	Mineral insulation EPS	14
Total	-		1.330.471

* Not included in the biodiversity impact assessment

The resulting biodiversity impacts related to the building project Urban Living is shown in Figure 1 and Table 2. The results show a relatively high contribution from operational energy, which is partly due to the fact that the overall biodiversity impact is relatively low since 53 % of the material quantities are reuse. The reused materials enter the system for the building without impact. The impact from energy consumption is significantly higher, because the operational energy covers required heat, and the biodiversity impact is higher for heat production compared to electricity production.

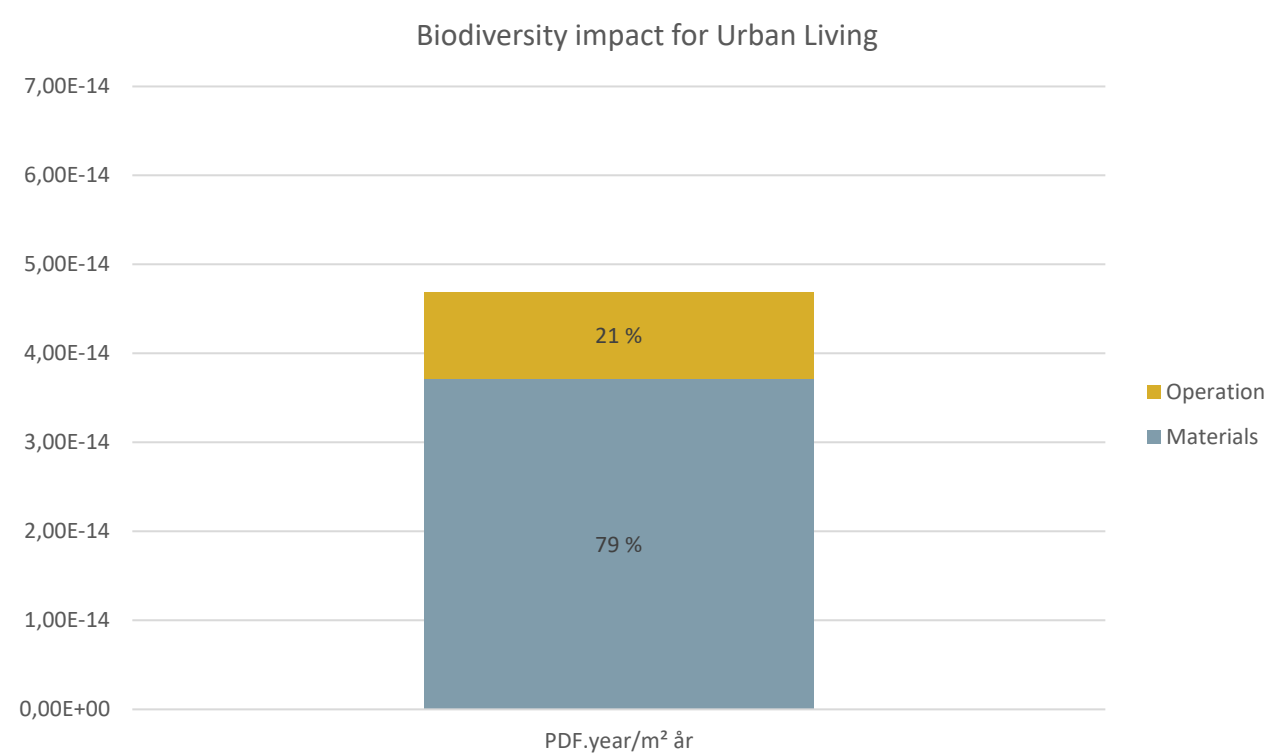


Figure 1 - Biodiversity impact related to Urban Living

Table 2 - Numerical results related to Urban Living

Living Attic	Operation	Material	Total
	PDF.year/m² year		
Results	9,73E-15	3,72E-14	4,69E-14
%	21	79	100