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Supplemental tables

Table S1: Specification for the residential building envelope

	Values	Solution
External walls	$U = 0.12 \text{ W/m}^2\text{K}$	Timbered wall with 350 mm insulation.
External roof	$U = 0.10 \text{ W/m}^2\text{K}$	Compact roof with approximately 450 mm insulation.
Slab on ground	$U = 0.07 \text{ W/m}^2\text{K}$ ($U = 0.06 \text{ W/m}^2\text{K}$)	Floor construction with 500 mm insulation. U- value in brackets takes into account the thermal resistance of the ground.
Windows	$U = 0.65 \text{ W/m}^2\text{K}$	Three layer low energy windows, with insulated frame.
Doors	$U = 0.65 \text{ W/m}^2\text{K}$	Well insulated doors.
Normalized thermal bridge value	$\psi'' = 0.03 \text{ W/m}^2\text{K}$	Detailed thermal bridge design
Air tightness	$N50 < 0.3 \text{ ach@50 Pa}$	Detailed design of a continuous vapour and wind barrier, good quality assurance in craftsmanship and pressure testing of the building in two stages (when the wind barrier is mounted and when the building is finished).

Table S2: Specification for the office building envelope

	Values	Solution
External walls	$U = 0,12$ W/m^2K	Timber frame wall with 350 mm insulation.
External roof	$U = 0.09$ W/m^2K	Compact roof with approximately 450 mm insulation.
Floor above cellar*	$U = 0.11$ W/m^2K	Floor construction with 350 mm insulation, facing unheated basement.
Windows	$U = 0.75$ W/m^2K	Three layer low energy windows, with insulated frame.
Doors	$U = 0.75$ W/m^2K	Passive house door solutions.
Normalized thermal bridge value	$\psi'' = 0.03$ W/m^2K	Detailed thermal bridge design
Air tightness	$N50 < 0.3$ ach@50 Pa	Detailed design of a continuous vapour and wind barrier, good quality assurance in craftsmanship and pressure testing of the building in two stages (when the wind barrier is mounted and when the building is finished).
Heat loss factor (basement)	0.78	Taking into account the increased thermal resistance of the unheated basement

* *U-value taking into account the heat loss factor of the unheated basement*

Table S3: Specification for the HVAC installations for the residential building

	Values	Technical solution
Heat recovery	$\eta = 85 \%$	Rotary wheel heat exchanger.
Specific fan power	$SFP = 1.0$ $\text{kW}/(\text{m}^3/\text{s})$	Low pressure air handling unit (AHU) and low pressure ducting system.
Installed cooling emission capacity	$Q''_{\text{cool}} = 0 \text{ W}/\text{m}^2$	No cooling
Installed heat emission capacity	$Q''_{\text{heat}} = 18$ W/m^2	Installed capacity for hydronic floor heating and radiators.

Table S4: Specification for the HVAC installations for the office building

	Values	Technical solution
Heat recovery	$\eta = 86 \%$	Rotary wheel heat exchanger.
Specific fan power	$SFP = 1.0$ $\text{kW}/(\text{m}^3/\text{s})$	Low pressure air handling unit (AHU) and low pressure ducting system.
Installed cooling emission capacity	$Q''_{\text{cool}} = 10$ W/m^2	Low installed capacity, so it can be run as free cooling (just circulation pumps) based on bore holes.
Installed heat emission capacity, alternative 1	$Q''_{\text{heat}} = 30$ W/m^2	Installed capacity to preheat supply air, so no room heating is needed.
Installed heat emission capacity, alternative 2	$Q''_{\text{heat}} = 15$ W/m^2	Installed capacity for hydronic radiators.

Table S5: Renewable energy systems for the residential and the office buildings

	Residential	Office
Vertical solar collector	8.3 m ² vacuum collectors (3374 kWh/a)	28.7 m ² vacuum collectors (9208 kWh/a)
Heat pump	Air-source heat pump	Ground-source heat pump
SPF heating system	3.74	3.7
SPF cooling system	-	25
PV panels	69 m ² (horizontal roof) (11,3 MWh/a)	398 m ² (horizontal roof) 225 m ² (façade) (103 MWh/a)