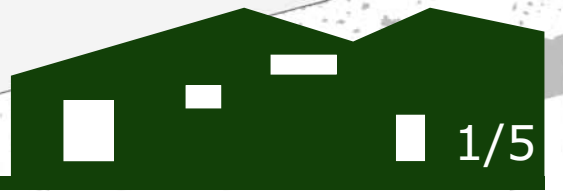
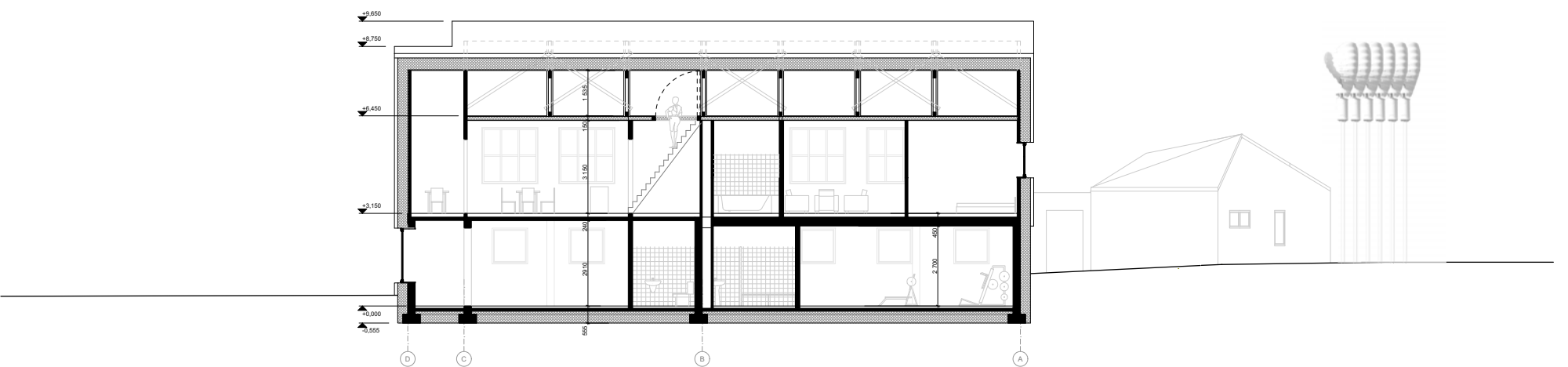
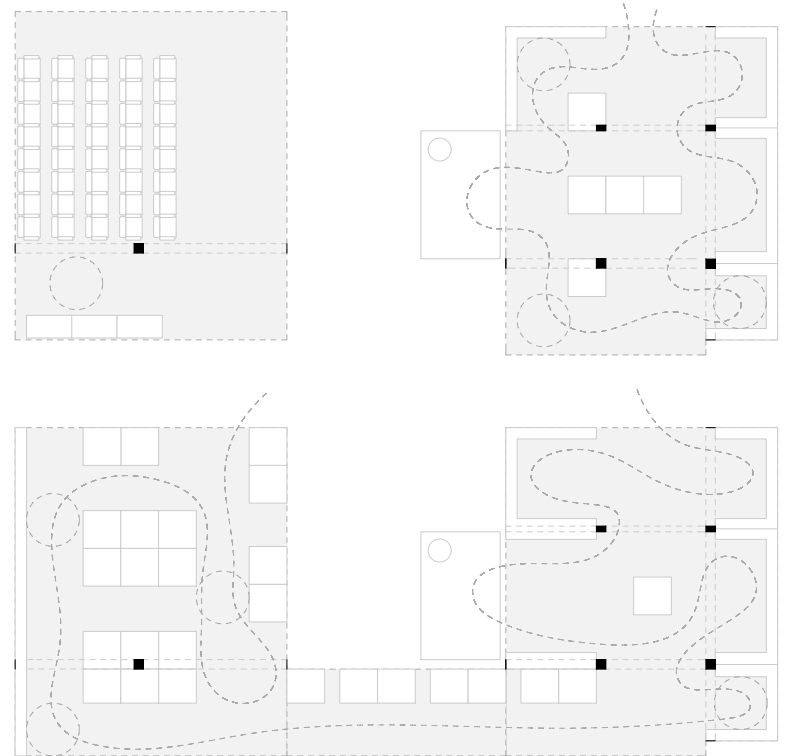
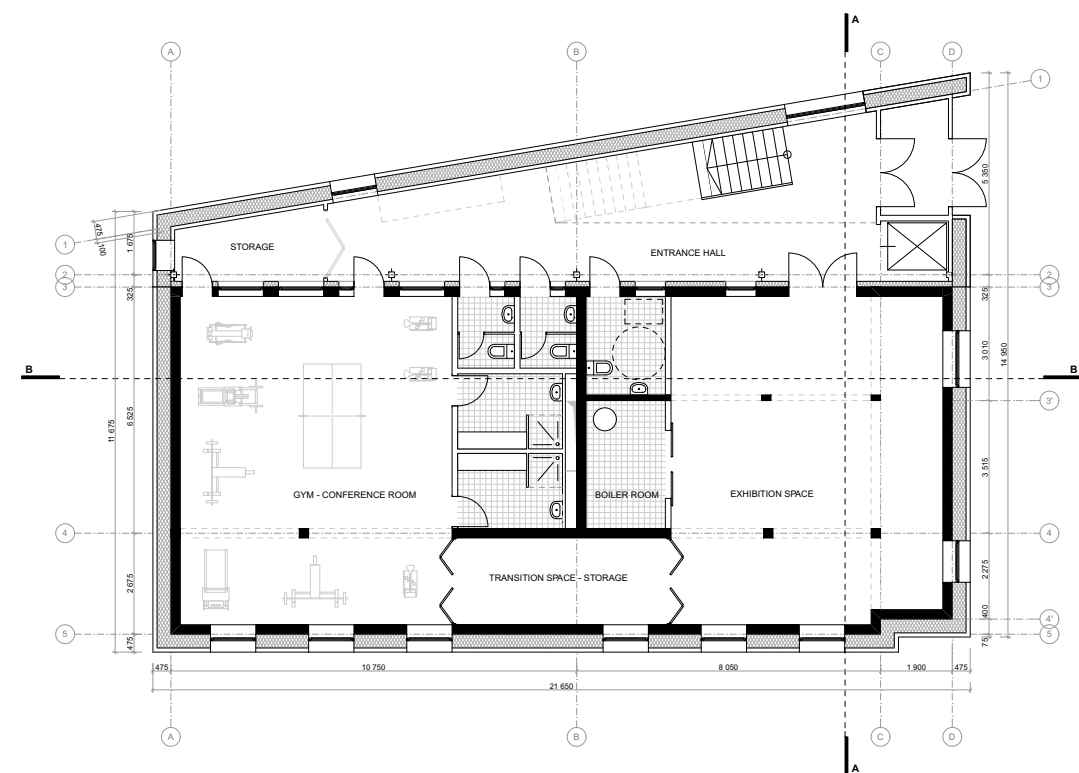
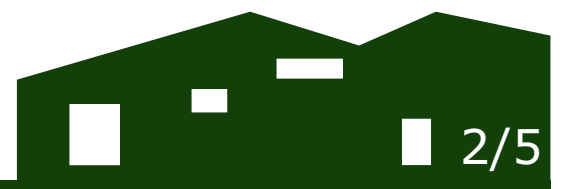


Linesøya Environmental Centre



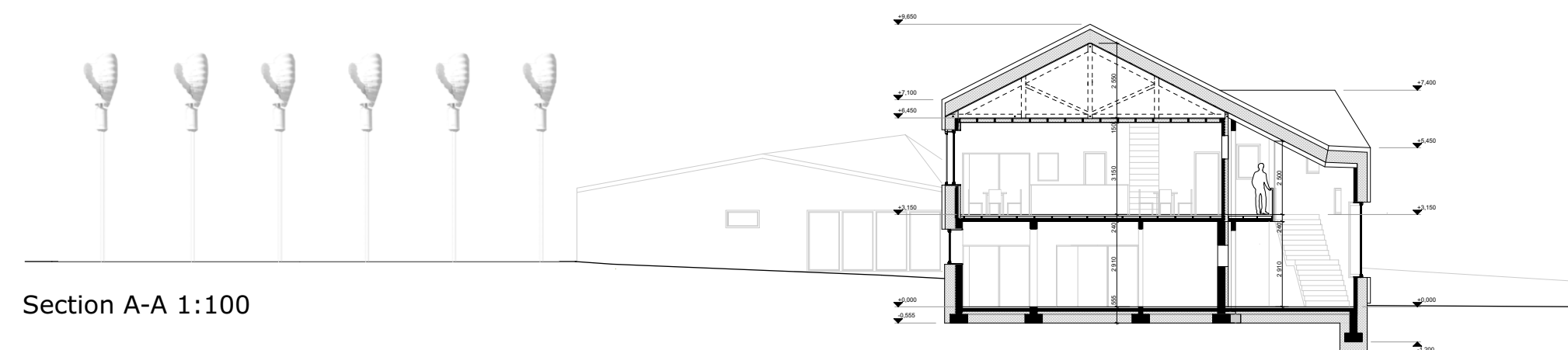
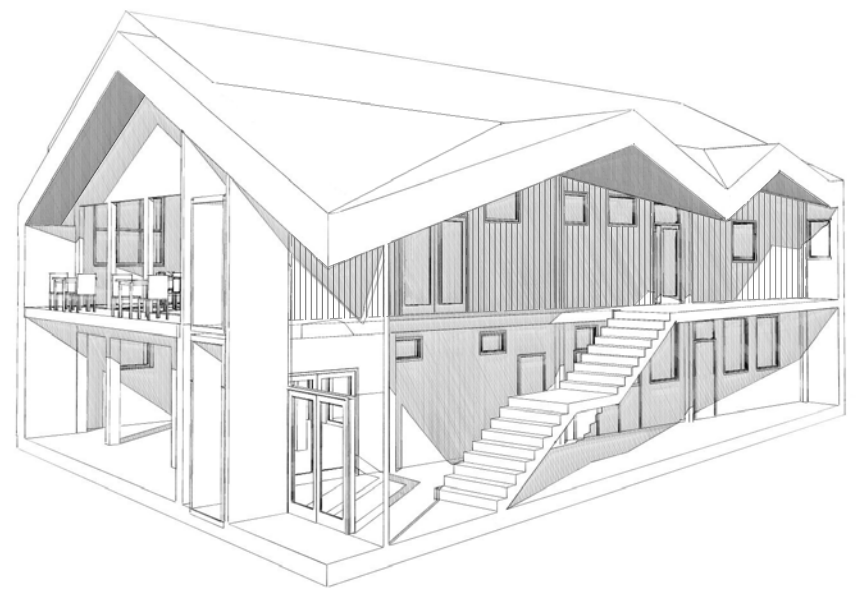
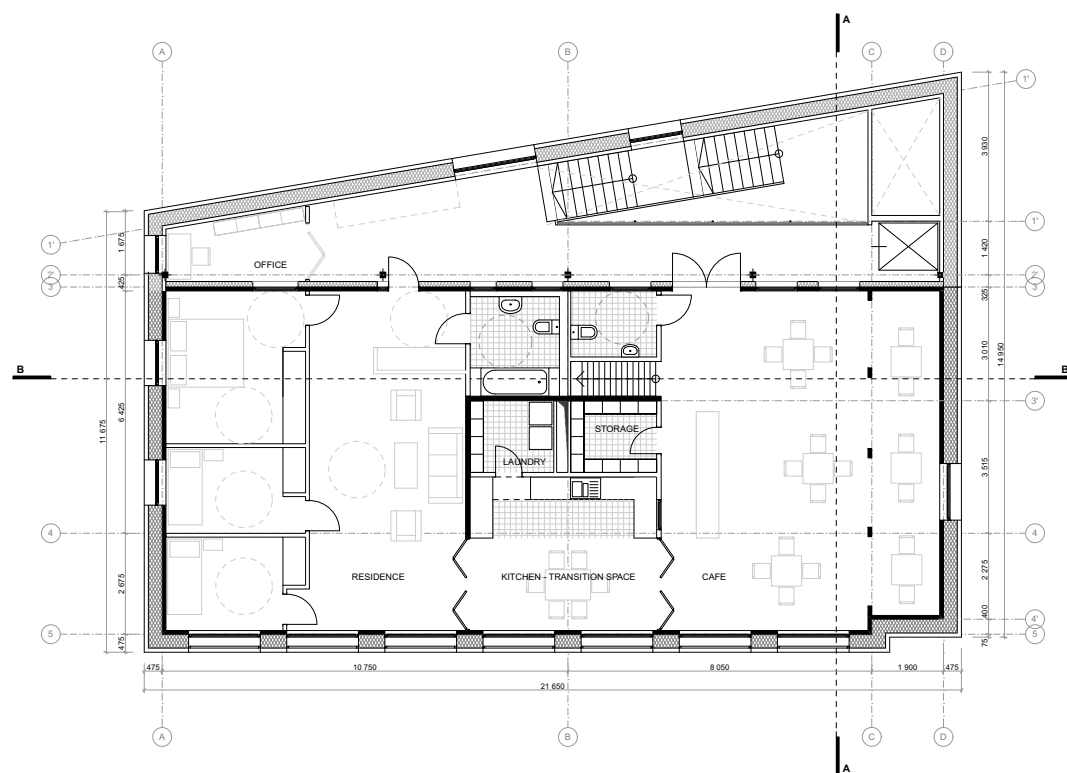


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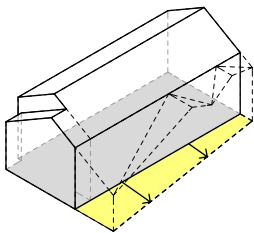


2/5

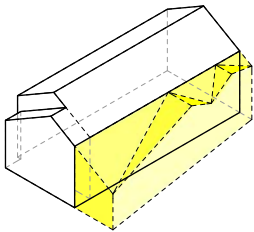
Pablo Alarcó. Isabelle Davoult. Alise Plavina. AAR4616 Integrated Energy Design Project



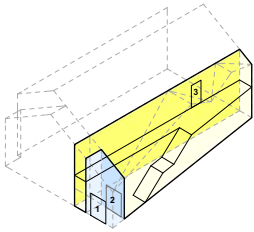
Strategies



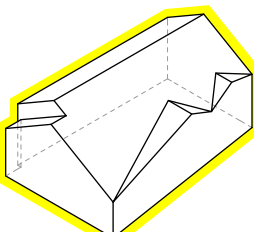
1 INCREASED COMPACTNESS



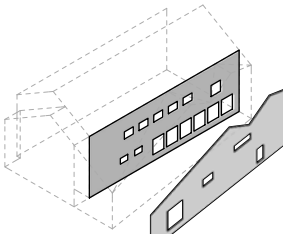
2 BUFFER ZONE FROM NORTH



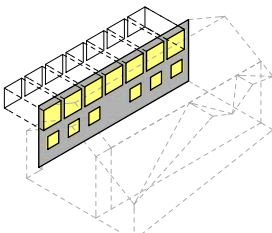
3 THERMAL SEPARATION



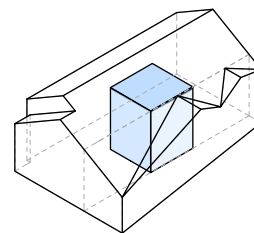
4 EXTERNAL INSULATION



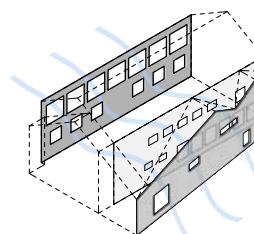
5 REDUCED NORTH GLAZING



6 OPTIMIZED SOUTH GLAZING + SHADING



7 CENTRALIZED SERVICE CORE



8 CROSS VENTILATION

- 10 Stone slates
- 30 Rafters
- 30 Counter rafters/ Air gap
- 3 Roofing felt
- 25 Roofing boards
- 30 Rafters/ Air gap
- Wind barrier
- 200 Rockwool Flexi A-plate
- 200 Rockwool Flexi A-plate
- 18 OSB

$U_{\text{roof}} = 0.1 \text{ W/ m}^2\text{K}$

Triple-glazed window NorDan NTech 0.7

$U_{\text{window}} = 0.7 \text{ W/ m}^2\text{K}$

Single-glazed window

$U_{\text{window}} = 5.1 \text{ W/ m}^2\text{K}$

- 28 Two layers of cladding boards
- 36 Battens
- 36 Counter battens/ Air gap
- 200 Rockwool Flexi A-plate
- 18 OSB (low S_d value)
- 123 Rockwool Flexi A-plate
- 60 Massive wood
- 18 OSB (high S_d value)
- 48 Rockwool Flexi A-plate
- 10 Interior cladding

$U_{\text{wall}} = 0.1 \text{ W/ m}^2\text{K}$

Triple-glazed window NorDan NTech 0.7

$U_{\text{window}} = 0.7 \text{ W/ m}^2\text{K}$

- PP Filter fleece
- 30 Drainage layer
- 380 Foam glass insulation
- 10 Waterproofing - polymer bitumen
- 250 Concrete

$U_{\text{wall}} = 0.1 \text{ W/ m}^2\text{K}$

- 22 Parket flooring
- 120 Battens / Mineral wool
- 10 Interior cladding

- 3 Linoleum
- 6 MDF
- 22 Parket flooring
- 70 Battens / Air gap
- 10 Sound insulation
- 120 Reinforced concrete

- Flooring
- OSB
- 50 Mineral wool/ battens
- 15 Sound insulation
- Vapour barrier
- 100 Reinforced concrete
- PE foil
- 380 Foam glass insulation
- 10 Polymer bitumen - 2 layers
- 50 Clean mortar layer
- 200 Setting layer - drainage
- PP filter fleece

$U_{\text{floor}} = 0.1 \text{ W/ m}^2\text{K}$

Section 1:20

Process



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ENERGY

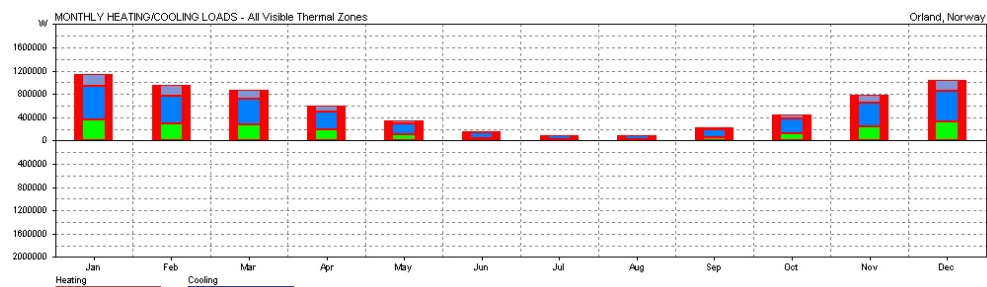
First calculations: According to NS 3700 Passivhus, full residential use:
The final energy demand is 40094, 64 kWh/a, i.e. 84, 82 kWh/m²a

Second assumption: occupancy factor according to the “user's schedule” file: 44% of occupancy in the non residential part
Coefficient Of Performance used:

Heat pump: 2, 34
Solar panels: 8, 55

The new energy building is then 26265, 52 kWh/a; 55, 56 kWh/m²a.

Energy calculations

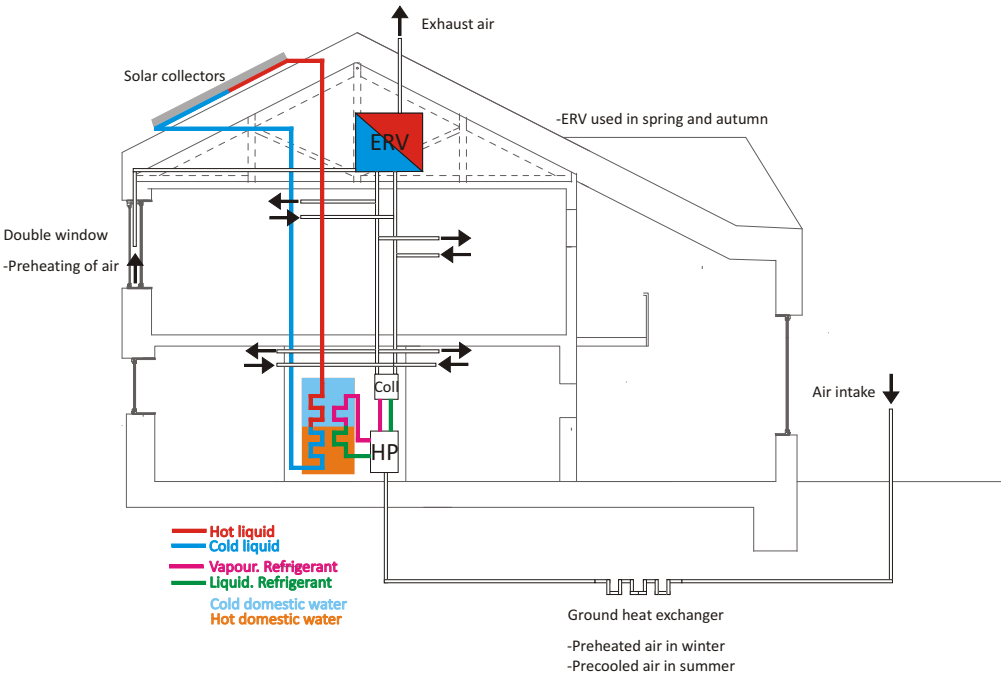


Net energy demand

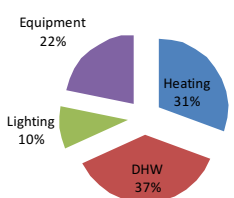
Details of the calculations

	kWh/(m²a)	residential	kWh/(m²a)	cultural	kWh/a
Heating	15	105,4	13,5	367,3	6539,55
DHW	29,8	105,4	13,112	367,3	7956,9576
Lighting	8	105,4	3,52	367,3	2136,096
Equipment	17,5	105,4	7,7	367,3	4672,71
TOTAL:					21305,3136

Mechanical system diagram

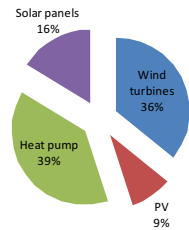


Net energy demand



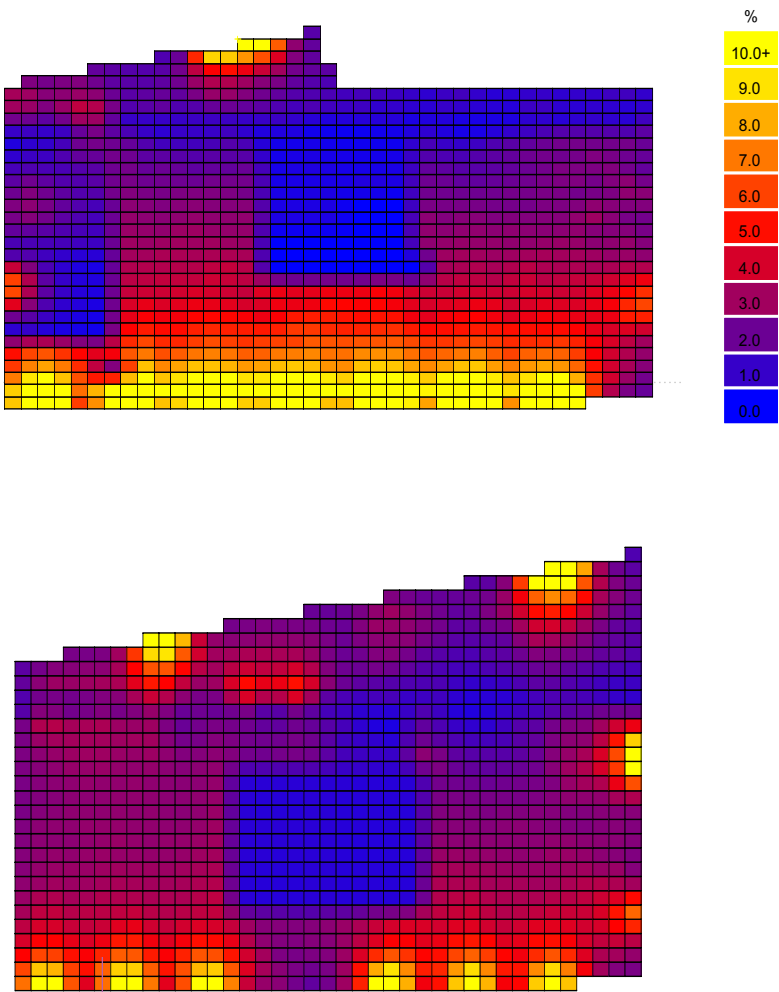
Heating: 6539 KWh/a 16,3 KWhm2/a
DHW: 7956 KWh/a
Lighting: 2136 KWh/a
Equipment: 4672 KWh/a
Use of heat pump: 4494 KWh/a
Use of solar panels: 465 KWh/a

Energy production



Wind: 9438 KWh/a
PV: 7635 KWh/a
Heat pump: 10518 KWh/a
Solar: 4285 KWh/a

Daylight analysis



Double windows in south facade

