

Single-Family House
52.5%
corresponding to 676,427 m² ERA

Multi-Family House
47.5%
corresponding to 1,849,008 m² ERA



Figure S2: Archetype 2_1919–1945

Single-Family House
62.3%
corresponding to 528,062 m² ERA

1919–1945
4124 Samples
8.9% of dataset

Multi-Family House
37.7%
corresponding to 1,088,542 m² ERA

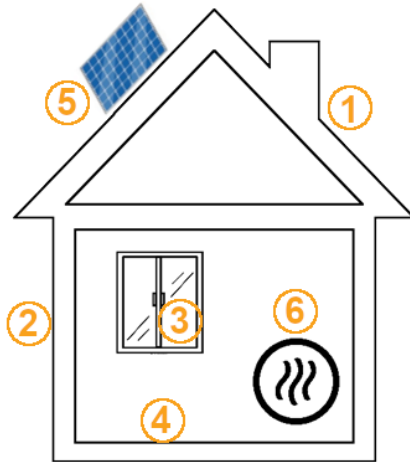
General infos:

ERA [m²]: 154 - 195 - 248
Envelope factor: 1.71 - 1.93 - 2.16
Number of floors: 2 - 2 - 3
Floors height [m]: 2.4 - 2.4 - 2.5

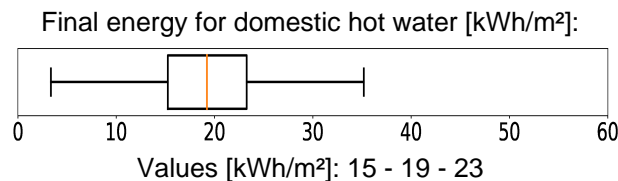
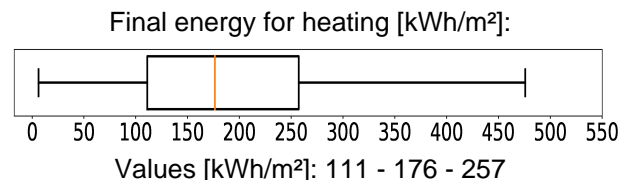
Construction type:

Medium: 47%
Heavy: 45%
Light: 8%

- ① Roof:
U-value [W/m²K]:
0.26 - 0.44 - 0.8
Surface [m²]:
75 - 96 - 123
- ② Wall:
U-value [W/m²K]:
0.5 - 0.9 - 1.1
Surface [m²]:
144 - 184 - 225
- ③ Window:
U-value [W/m²K]:
1.4 - 1.8 - 2.5
Surface to ERA ratio:
0.13 - 0.16 - 0.16
- ④ Floor:
U-value [W/m²K]:
0.55 - 0.9 - 1.3
Surface [m²]:
64 - 82 - 104



- ⑤ Photovoltaic:
Occurrence: 4.7%
Power [kW]:
3.2 - 6.0 - 11.2
- ⑥ Primary energy source:
Fuel oil: 43%
Gas: 26%
Heat pump: 12%
Wood: 10%
Electricity: 7%
District heating: 2%



Global energy efficiency



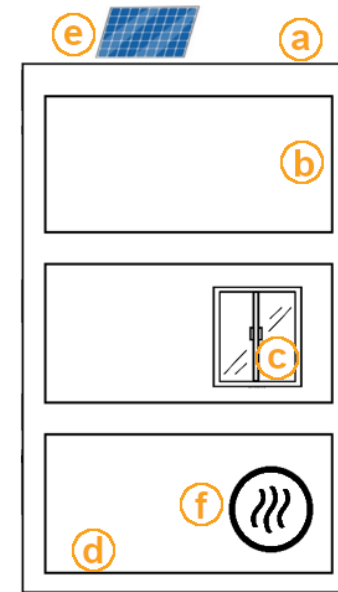
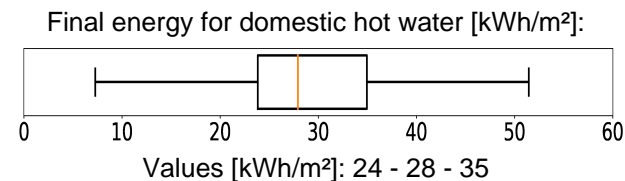
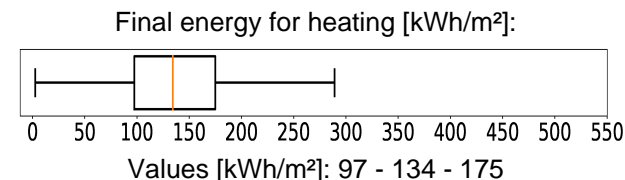
Envelope efficiency



Envelope efficiency



Global energy efficiency



General infos:

ERA [m²]: 352 - 546 - 869
Envelope factor: 1.12 - 1.38 - 1.66
Number of floors: 3 - 3 - 4
Floors height [m]: 2.4 - 2.5 - 2.7

Construction type:

Heavy: 61%
Medium: 37%
Light: 2%

- a Roof:
U-value [W/m²K]:
0.3 - 0.57 - 1.0
Surface [m²]:
132 - 184 - 254

- b Wall:
U-value [W/m²K]:
0.68 - 0.98 - 1.2
Surface [m²]:
269 - 358 - 511

- c Window:
U-value [W/m²K]:
1.5 - 1.8 - 2.5
Surface to ERA ratio:
0.13 - 0.15 - 0.16

- d Floor:
U-value [W/m²K]:
0.65 - 1.1 - 1.4
Surface [m²]:
110 - 159 - 217

- e Photovoltaic:
Occurrence: 1.9%
Power [kW]:
8.6 - 10.5 - 24.7

- f Primary energy source:
Fuel oil: 44%
Gas: 38%
Heat pump: 6%
District heating: 6%
Wood: 3%
Electricity: 3%

Figure S3: Archetype 3_1946–1960

Single-Family House
60.8%
corresponding to 633,299 m² ERA

1946–1960
5523 Samples
11.9% of dataset

Multi-Family House
39.2%
corresponding to 1,933,982 m² ERA

General infos:
ERA [m²]: 142 - 180 - 227
Envelope factor: 1.8 - 2.02 - 2.27
Number of floors: 2 - 2 - 2
Floors height [m]: 2.4 - 2.4 - 2.4

Construction type:
Medium: 47%
Heavy: 44%
Light: 9%

① Roof:
U-value [W/m²K]:
0.25 - 0.44 - 0.8
Surface [m²]:
75 - 95 - 121

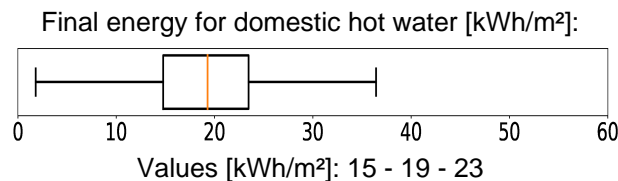
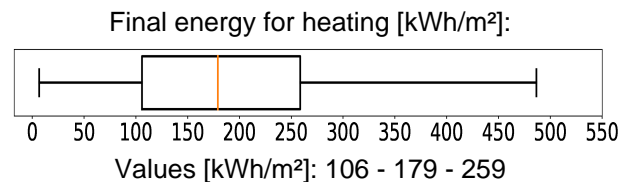
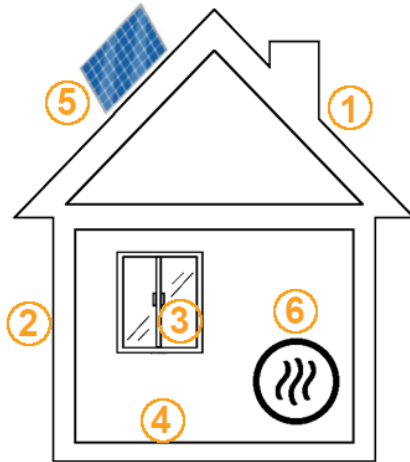
② Wall:
U-value [W/m²K]:
0.43 - 0.81 - 1.1
Surface [m²]:
133 - 168 - 205

③ Window:
U-value [W/m²K]:
1.3 - 1.6 - 2.4
Surface to ERA ratio:
0.14 - 0.16 - 0.17

④ Floor:
U-value [W/m²K]:
0.6 - 0.98 - 1.5
Surface [m²]:
68 - 86 - 110

⑤ Photovoltaic:
Occurrence: 5.3%
Power [kW]:
5.5 - 8.0 - 10.0

⑥ Primary energy source:
Fuel oil: 50%
Heat pump: 18%
Gas: 17%
Wood: 8%
Electricity: 6%
District heating: 1%



Global energy efficiency

E

Envelope efficiency

F

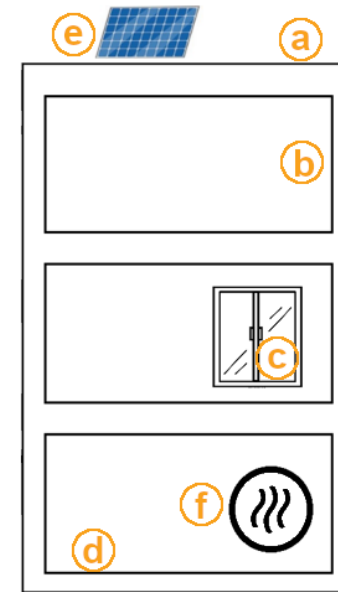
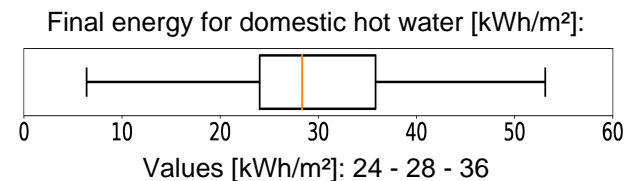
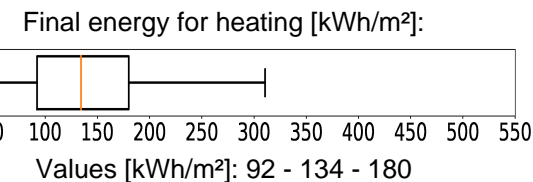


Envelope efficiency

F

Global energy efficiency

D



General infos:
ERA [m²]: 475 - 681 - 1122
Envelope factor: 1.1 - 1.29 - 1.55
Number of floors: 3 - 3 - 4
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:
Heavy: 65%
Medium: 34%
Light: 1%

① Roof:
U-value [W/m²K]:
0.3 - 0.55 - 1.0
Surface [m²]:
167 - 225 - 326

② Wall:
U-value [W/m²K]:
0.4 - 0.9 - 1.1
Surface [m²]:
311 - 428 - 647

③ Window:
U-value [W/m²K]:
1.5 - 1.7 - 2.2
Surface to ERA ratio:
0.13 - 0.16 - 0.16

④ Floor:
U-value [W/m²K]:
0.62 - 1.2 - 1.5
Surface [m²]:
157 - 204 - 298

⑤ Photovoltaic:
Occurrence: 2.4%
Power [kW]:
8.6 - 13.5 - 31.0

⑥ Primary energy source:
Fuel oil: 54%
Gas: 27%
District heating: 11%
Heat pump: 4%
Electricity: 2%
Wood: 2%

Figure S4: Archetype 4_1961–1970

Single-Family House
52.3%
corresponding to 661,018 m² ERA

1961–1970
6375 Samples
13.7% of dataset

Multi-Family House
47.7%
corresponding to 3,766,041 m² ERA

General infos:

ERA [m²]: 146 - 190 - 244
Envelope factor: 1.82 - 2.04 - 2.35
Number of floors: 1 - 2 - 2
Floors height [m]: 2.4 - 2.4 - 2.4

Construction type:

Heavy: 49%
Medium: 45%
Light: 6%

① Roof:
U-value [W/m²K]:
0.27 - 0.47 - 0.8
Surface [m²]:
82 - 109 - 141

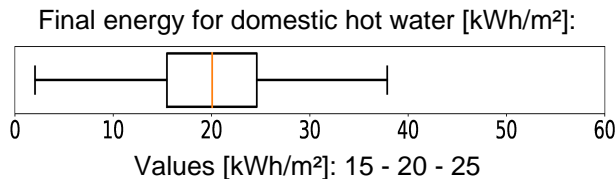
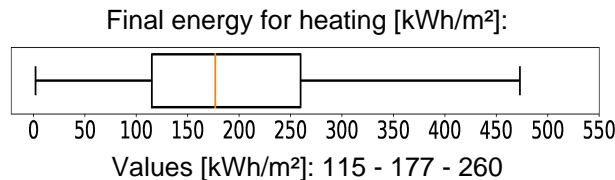
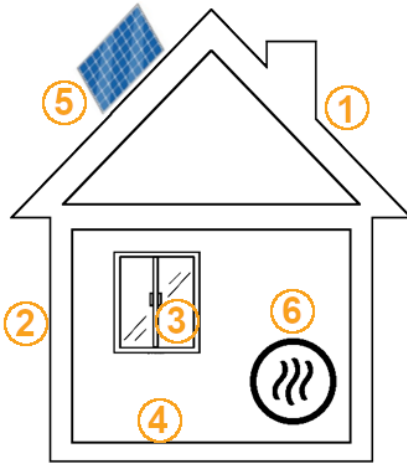
② Wall:
U-value [W/m²K]:
0.45 - 0.7 - 1.0
Surface [m²]:
126 - 163 - 205

③ Window:
U-value [W/m²K]:
1.3 - 1.7 - 2.5
Surface to ERA ratio:
0.15 - 0.16 - 0.19

④ Floor:
U-value [W/m²K]:
0.63 - 1.0 - 1.5
Surface [m²]:
75 - 99 - 128

⑤ Photovoltaic:
Occurrence: 4.0%
Power [kW]:
4.9 - 8.7 - 11.7

⑥ Primary energy source:
Fuel oil: 61%
Heat pump: 15%
Gas: 10%
Electricity: 7%
Wood: 6%
District heating: 1%



Global energy efficiency

E

Envelope efficiency

F

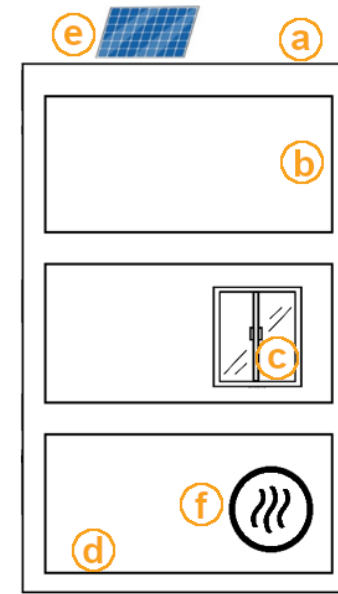
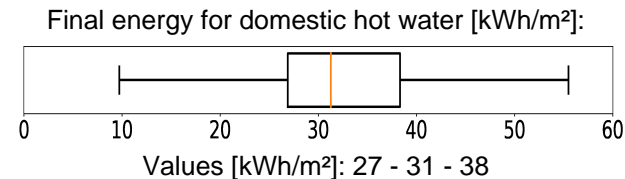
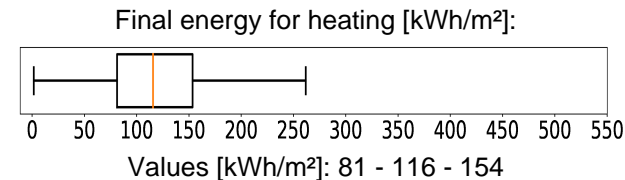


Envelope efficiency

F

Global energy efficiency

D



General infos:

ERA [m²]: 618 - 970 - 1581
Envelope factor: 1.04 - 1.2 - 1.39
Number of floors: 3 - 4 - 5
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:

Heavy: 71%
Medium: 28%
Light: 1%

Roof:
U-value [W/m²K]:
0.29 - 0.48 - 0.83
Surface [m²]:
196 - 271 - 380

Wall:
U-value [W/m²K]:
0.35 - 0.67 - 1.1
Surface [m²]:
372 - 545 - 818

Window:
U-value [W/m²K]:
1.5 - 1.7 - 2.2
Surface to ERA ratio:
0.15 - 0.16 - 0.17

Floor:
U-value [W/m²K]:
0.7 - 1.2 - 1.5
Surface [m²]:
185 - 260 - 369

Photovoltaic:
Occurrence: 1.9%
Power [kW]:
13.4 - 20.0 - 25.1

Primary energy source:
Fuel oil: 59%
Gas: 27%
District heating: 9%
Heat pump: 3%
Wood: 1%
Electricity: 1%

Figure S5: Archetype 5_1971–1980

Single-Family House
57.8%
corresponding to 915,779 m² ERA

1971–1980
7519 Samples
16.1% of dataset

Multi-Family House
42.2%
corresponding to 4,623,873 m² ERA

General infos:

ERA [m²]: 161 - 200 - 250
Envelope factor: 1.76 - 1.99 - 2.27
Number of floors: 2 - 2 - 2
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:

Medium: 48%
Heavy: 47%
Light: 5%

Roof:

U-value [W/m²K]:
0.3 - 0.41 - 0.6
Surface [m²]:
86 - 115 - 147

Wall:

U-value [W/m²K]:
0.4 - 0.56 - 0.8
Surface [m²]:
127 - 163 - 205

Window:

U-value [W/m²K]:
1.3 - 1.7 - 2.5
Surface to ERA ratio:
0.15 - 0.16 - 0.19

Floor:

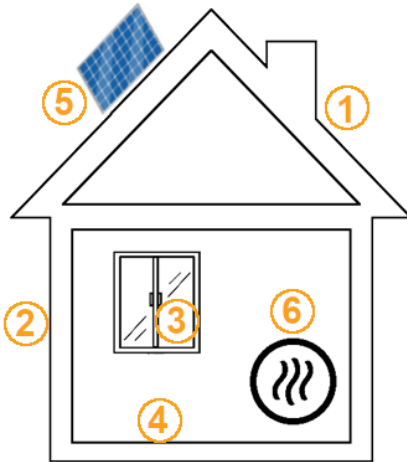
U-value [W/m²K]:
0.6 - 0.88 - 1.3
Surface [m²]:
77 - 103 - 132

Photovoltaic:

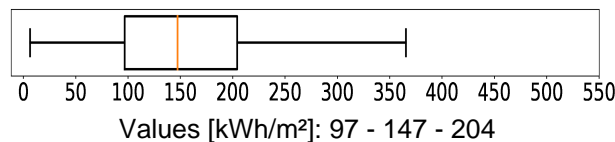
Occurrence: 4.9%
Power [kW]:
5.4 - 7.6 - 11.7

Primary energy source:

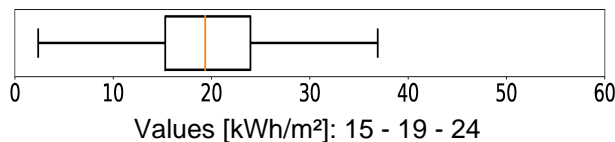
Fuel oil: 51%
Electricity: 20%
Heat pump: 15%
Gas: 7%
Wood: 5%
District heating: 2%



Final energy for heating [kWh/m²]:



Final energy for domestic hot water [kWh/m²]:



Global energy efficiency

Envelope efficiency



Envelope efficiency

Global energy efficiency



General infos:

ERA [m²]: 677 - 1073 - 1820
Envelope factor: 1.03 - 1.2 - 1.38
Number of floors: 3 - 4 - 5
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:

Heavy: 72%
Medium: 27%
Light: 1%

Roof:

U-value [W/m²K]:
0.29 - 0.49 - 0.7
Surface [m²]:
219 - 295 - 418

Wall:

U-value [W/m²K]:
0.44 - 0.67 - 0.97
Surface [m²]:
382 - 584 - 884

Window:

U-value [W/m²K]:
1.5 - 1.8 - 2.5
Surface to ERA ratio:
0.15 - 0.16 - 0.17

Floor:

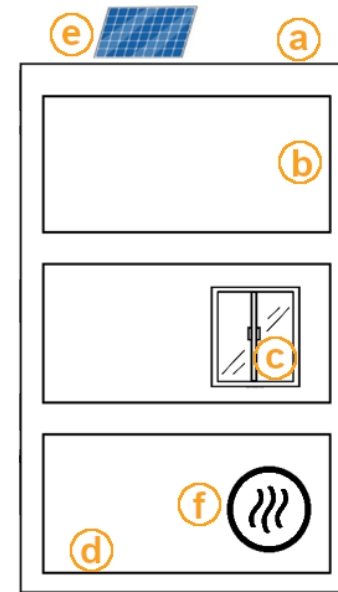
U-value [W/m²K]:
0.71 - 1.0 - 1.5
Surface [m²]:
203 - 278 - 397

Photovoltaic:

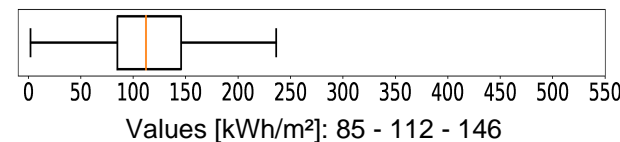
Occurrence: 1.1%
Power [kW]:
14.8 - 15.0 - 20.0

Primary energy source:

Fuel oil: 66%
Gas: 20%
District heating: 8%
Electricity: 3%
Heat pump: 2%
Wood: 1%



Final energy for heating [kWh/m²]:



Final energy for domestic hot water [kWh/m²]:

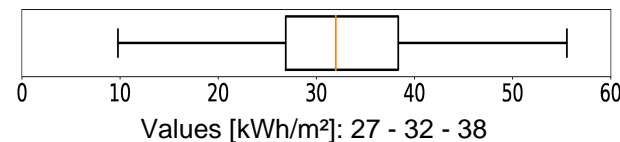


Figure S6: Archetype 6_1981–1990

1981–1990
6874 Samples
14.8% of dataset

Single-Family House
62.0%
corresponding to 904,562 m² ERA

Multi-Family House
38.0%
corresponding to 3,219,269 m² ERA

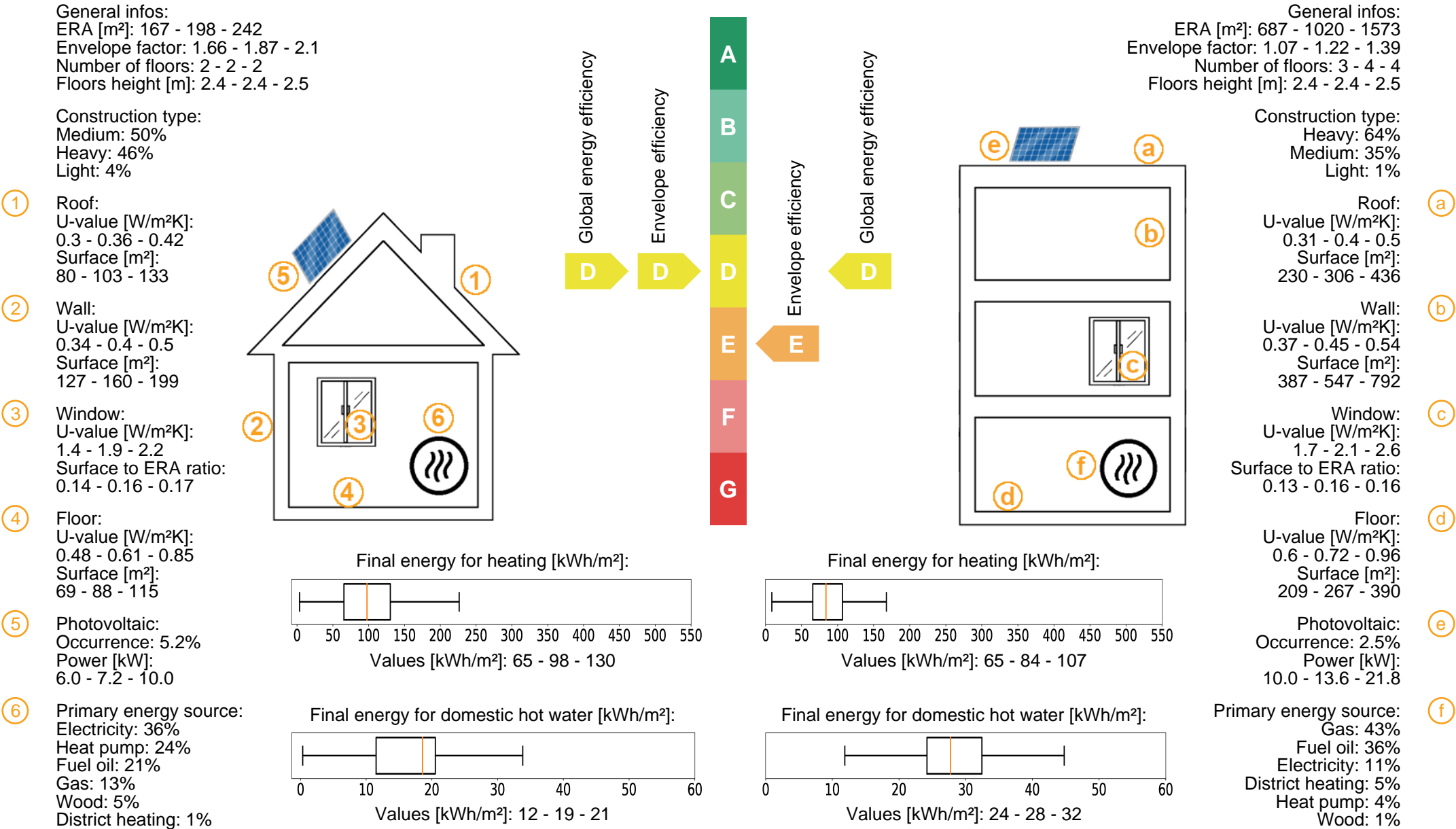


Figure S7: Archetype 7_1991–2000

Single-Family House
60.4%
corresponding to 471,918 m² ERA

1991–2000
3651 Samples
7.8% of dataset

Multi-Family House
39.6%
corresponding to 1,775,431 m² ERA

General infos:
ERA [m²]: 166 - 199 - 242
Envelope factor: 1.61 - 1.82 - 2.05
Number of floors: 2 - 2 - 3
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:
Heavy: 48%
Medium: 46%
Light: 6%

① Roof:
U-value [W/m²K]:
0.29 - 0.34 - 0.38
Surface [m²]:
76 - 96 - 125

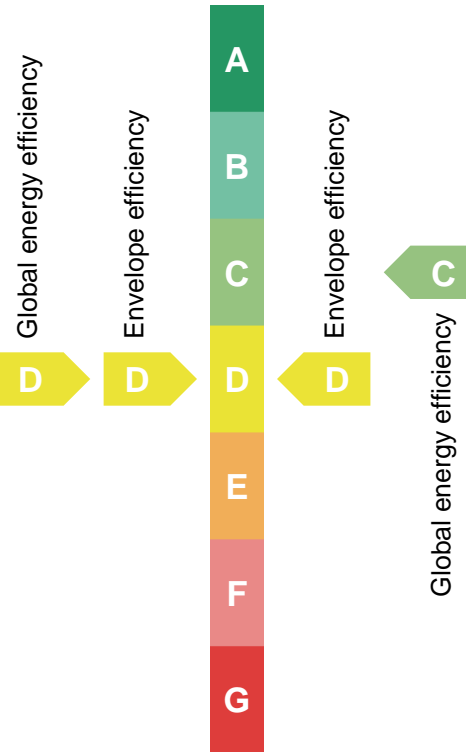
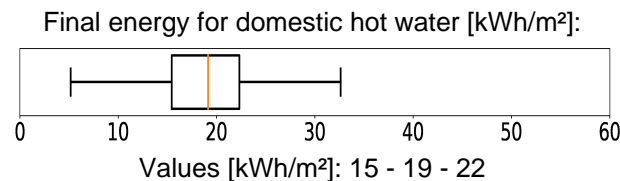
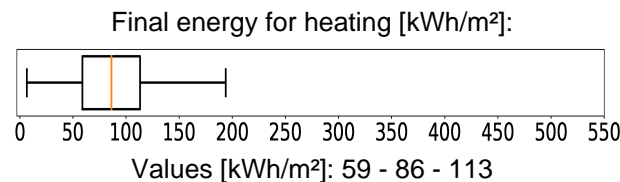
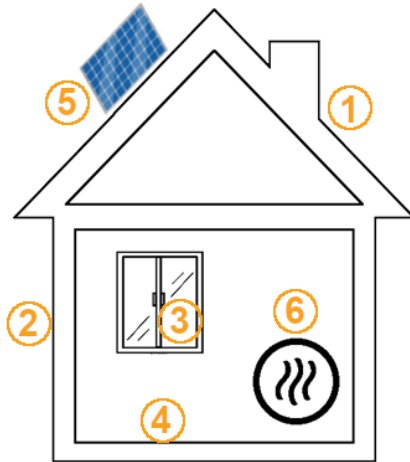
② Wall:
U-value [W/m²K]:
0.3 - 0.35 - 0.4
Surface [m²]:
127 - 164 - 206

③ Window:
U-value [W/m²K]:
1.5 - 1.7 - 2.0
Surface to ERA ratio:
0.15 - 0.16 - 0.17

④ Floor:
U-value [W/m²K]:
0.43 - 0.55 - 0.7
Surface [m²]:
65 - 81 - 105

⑤ Photovoltaic:
Occurrence: 6.4%
Power [kW]:
3.5 - 5.1 - 8.8

⑥ Primary energy source:
Fuel oil: 35%
Gas: 30%
Heat pump: 22%
Electricity: 8%
Wood: 4%
District heating: 1%



General infos:
ERA [m²]: 720 - 1044 - 1502
Envelope factor: 1.1 - 1.24 - 1.39
Number of floors: 3 - 3 - 4
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:
Heavy: 66%
Medium: 33%
Light: 1%

① Roof:
U-value [W/m²K]:
0.3 - 0.35 - 0.4
Surface [m²]:
253 - 323 - 464

② Wall:
U-value [W/m²K]:
0.33 - 0.4 - 0.45
Surface [m²]:
402 - 546 - 765

③ Window:
U-value [W/m²K]:
1.6 - 2.0 - 2.1
Surface to ERA ratio:
0.14 - 0.16 - 0.17

④ Floor:
U-value [W/m²K]:
0.5 - 0.6 - 0.75
Surface [m²]:
214 - 276 - 390

⑤ Photovoltaic:
Occurrence: 1.0%
Power [kW]:
6.0 - 10.5 - 10.5

⑥ Primary energy source:
Gas: 50%
Fuel oil: 37%
District heating: 4%
Heat pump: 4%
Electricity: 3%
Wood: 2%

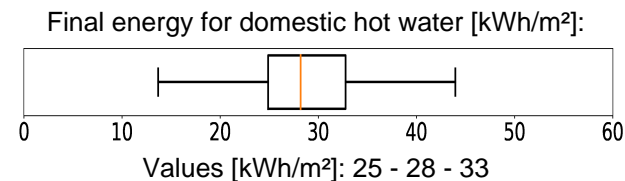
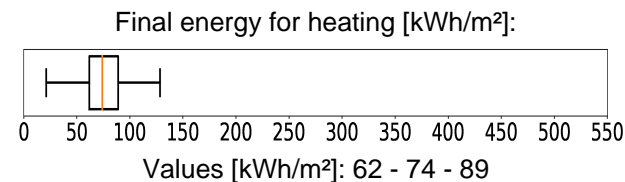
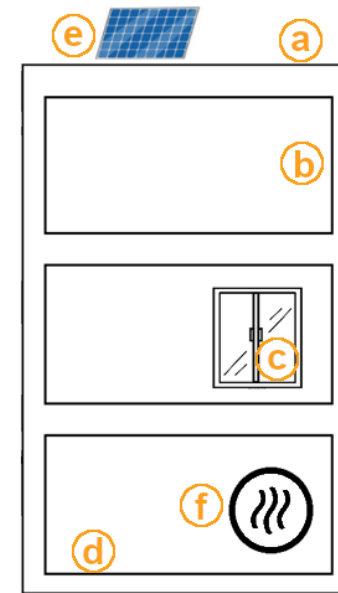


Figure S8: Archetype 8_2001–2010

Single-Family House
53.1%
corresponding to 326,448 m² ERA

2001–2010
2895 Samples
6.2% of dataset

Multi-Family House
46.9%
corresponding to 1,813,825 m² ERA

General infos:

ERA [m²]: 172 - 201 - 245
Envelope factor: 1.66 - 1.88 - 2.1
Number of floors: 2 - 2 - 3
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:

Heavy: 50%
Medium: 41%
Light: 9%

① Roof:
U-value [W/m²K]:
0.22 - 0.26 - 0.3
Surface [m²]:
79 - 97 - 122

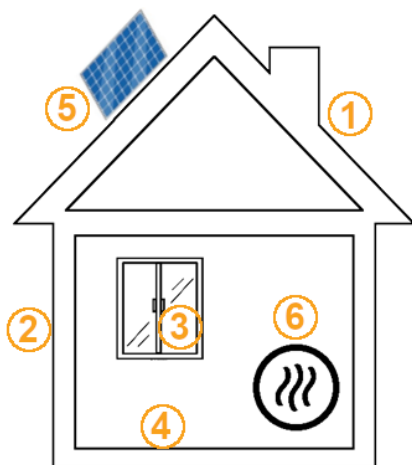
② Wall:
U-value [W/m²K]:
0.25 - 0.3 - 0.35
Surface [m²]:
141 - 178 - 215

③ Window:
U-value [W/m²K]:
1.4 - 1.5 - 1.5
Surface to ERA ratio:
0.15 - 0.16 - 0.18

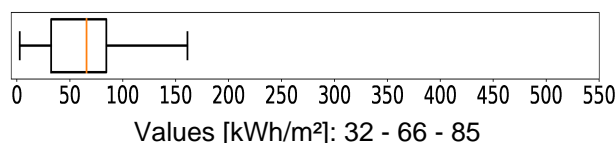
④ Floor:
U-value [W/m²K]:
0.3 - 0.38 - 0.5
Surface [m²]:
68 - 84 - 106

⑤ Photovoltaic:
Occurrence: 5.3%
Power [kW]:
5.7 - 7.0 - 10.4

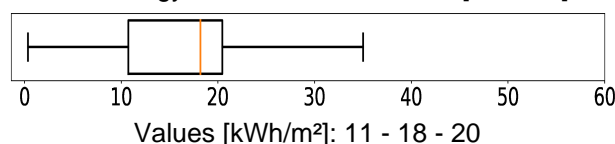
⑥ Primary energy source:
Gas: 36%
Heat pump: 32%
Fuel oil: 25%
Wood: 4%
Electricity: 2%
District heating: 1%



Final energy for heating [kWh/m²]:



Final energy for domestic hot water [kWh/m²]:



Global energy efficiency

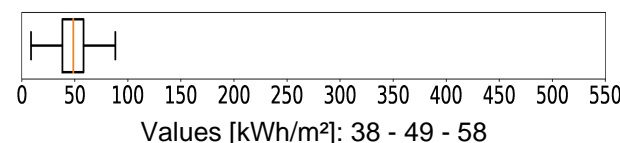
Envelope efficiency



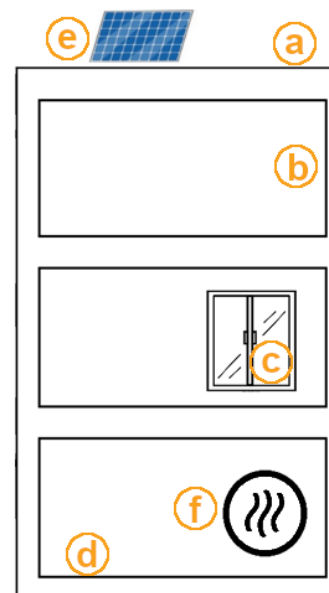
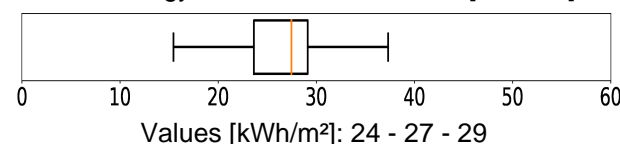
Envelope efficiency

Global energy efficiency

Final energy for heating [kWh/m²]:



Final energy for domestic hot water [kWh/m²]:



General infos:

ERA [m²]: 776 - 1110 - 1677
Envelope factor: 1.06 - 1.2 - 1.38
Number of floors: 3 - 4 - 4
Floors height [m]: 2.4 - 2.4 - 2.5

Construction type:

Heavy: 72%
Medium: 27%
Light: 1%

Roof:
U-value [W/m²K]:
0.23 - 0.3 - 0.3
Surface [m²]:
250 - 324 - 473

Wall:
U-value [W/m²K]:
0.25 - 0.3 - 0.35
Surface [m²]:
414 - 581 - 812

Window:
U-value [W/m²K]:
1.4 - 1.5 - 1.5
Surface to ERA ratio:
0.15 - 0.16 - 0.17

Floor:
U-value [W/m²K]:
0.3 - 0.4 - 0.46
Surface [m²]:
229 - 296 - 424

Photovoltaic:
Occurrence: 0.3%
Power [kW]:
2.2 - 2.2 - 2.2

Primary energy source:
Gas: 65%
Fuel oil: 16%
Heat pump: 9%
District heating: 6%
Wood: 4%

Figure S9: Archetype 9_2011–2019

Single-Family House
45.1%
corresponding to 404,907 m² ERA

2011–2019
4135 Samples
8.9% of dataset

Multi-Family House
54.9%
corresponding to 2,675,423 m² ERA

General infos:

ERA [m²]: 172 - 206 - 250
Envelope factor: 1.81 - 2.04 - 2.27
Number of floors: 2 - 2 - 3
Floors height [m]: 2.4 - 2.4 - 2.7

Construction type:

Heavy: 48%
Medium: 42%
Light: 10%

① Roof:
U-value [W/m²K]:
0.15 - 0.17 - 0.2
Surface [m²]:
85 - 100 - 128

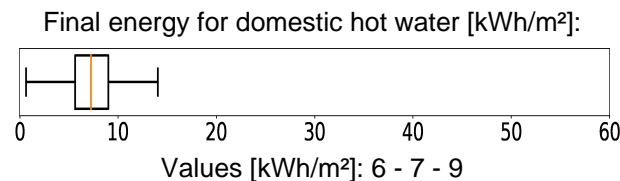
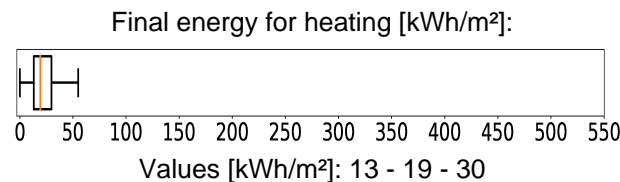
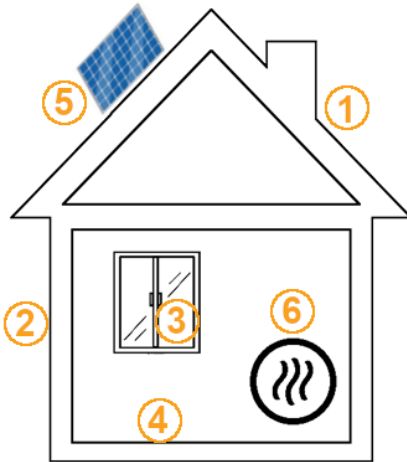
② Wall:
U-value [W/m²K]:
0.15 - 0.17 - 0.19
Surface [m²]:
147 - 181 - 216

③ Window:
U-value [W/m²K]:
0.93 - 1.0 - 1.2
Surface to ERA ratio:
0.16 - 0.18 - 0.23

④ Floor:
U-value [W/m²K]:
0.17 - 0.21 - 0.27
Surface [m²]:
78 - 94 - 118

⑤ Photovoltaic:
Occurrence: 16.6%
Power [kW]:
4.3 - 7.0 - 9.0

⑥ Primary energy source:
Heat pump: 73%
Gas: 13%
Wood: 7%
District heating: 5%
Fuel oil: 1%
Solar heating: 1%



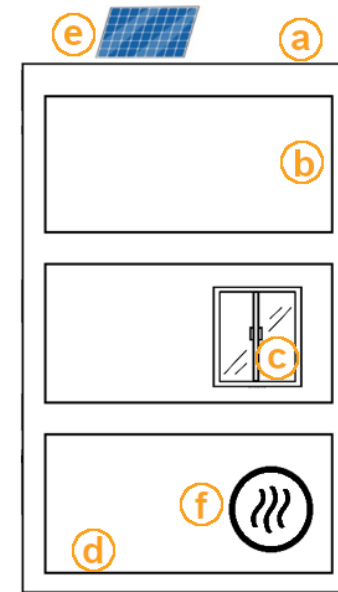
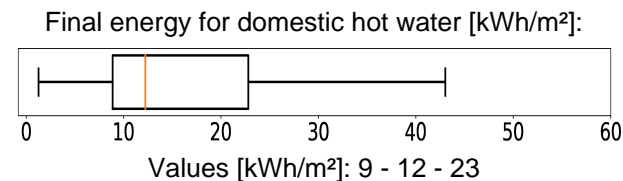
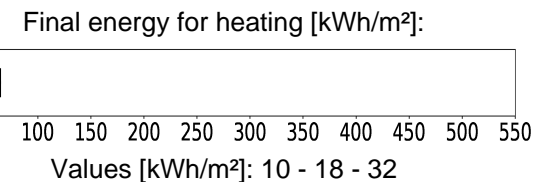
Global energy efficiency

Envelope efficiency



Envelope efficiency

Global energy efficiency



General infos:

ERA [m²]: 626 - 963 - 1456
Envelope factor: 1.15 - 1.33 - 1.56
Number of floors: 3 - 3 - 4
Floors height [m]: 2.4 - 2.4 - 2.8

Construction type:

Heavy: 68%
Medium: 30%
Light: 2%

Roof:
U-value [W/m²K]:
0.14 - 0.17 - 0.2
Surface [m²]:
236 - 319 - 442

Wall:
U-value [W/m²K]:
0.15 - 0.17 - 0.2
Surface [m²]:
390 - 523 - 738

Window:
U-value [W/m²K]:
0.9 - 1.0 - 1.3
Surface to ERA ratio:
0.16 - 0.18 - 0.22

Floor:
U-value [W/m²K]:
0.18 - 0.23 - 0.31
Surface [m²]:
217 - 292 - 411

Photovoltaic:
Occurrence: 16.2%
Power [kW]:
7.7 - 15.0 - 26.6

Primary energy source:
Heat pump: 47%
Gas: 27%
District heating: 14%
Wood: 10%
Fuel oil: 1%
Solar heating: 1%