**URBEM**

| Region: | Piedmont | Archetype code: |
|---|---|---|
| Building category: | Residential buildings - Single family houses | RES_SINGLE_2011-_F_PIE |
| Period of construction: | > 2010 | |
| Climatic zone: | F | Number of records: | 478 | |

**Description** (the codes associated with walls and slabs refer to the structures described in UNI/TR 11552:2014):

External walls: hollow brick masonry with thermal insulation (cod. MCV02).

Roof slabs: insulated reinforced concrete floor slab for walkable flat roof (cod. COP03), for pitched roof (cod. CIN03) or insulated wooden floor slab for pitched roof (cod. CIN02).

**Data sources:**
EPC databases (100%)

| | Data | Symbol | Unit of measure | Mean value | Standard deviation | Q1 (first quartile) | Median value | Q3 (third quartile) |
|---|---|---|---|---|---|---|---|---|
| **BUILDING GEOMETRY** | Number of floors | $n_f$ | - | - | - | - | - | - |
| | Gross height | $H_g$ | m | - | - | - | - | - |
| | Footprint area | $A_{footprint}$ | m² | - | - | - | - | - |
| | Heated gross floor area | $A_{H;g}$ | m² | - | - | - | - | - |
| | Heated net floor area | $A_{H;n}$ | m² | 134.4 | 73.8 | 96.3 | 126.4 | 155.1 |
| | Heated gross volume | $V_{H;g}$ | m³ | 597.0 | 393.4 | 407.4 | 540.4 | 690.2 |
| | Heated net volume | $V_{H;n}$ | m³ | - | - | - | - | - |
| | Compactness ratio | $A_{env}/V_{H;g}$ | m⁻¹ | 0.82 | 0.17 | 0.72 | 0.82 | 0.92 |
| | WWR – North orientation | $WWR_N$ | - | - | - | - | - | - |
| | WWR – South orientation | $WWR_S$ | - | - | - | - | - | - |
| | WWR – East orientation | $WWR_E$ | - | - | - | - | - | - |
| | WWR – West orientation | $WWR_W$ | - | - | - | - | - | - |
| | Window to useful floor area ratio | $A_{wi}/A_{use}$ | - | 0.21 | 0.07 | 0.17 | 0.20 | 0.25 |
| **ENVELOPE** | Roof type | | - | | | | | |
| | U-value of the roof | $U_{fl;up}$ | W/(m²·K) | - | - | - | - | - |
| | External walls type | | Hollow brick masonry: 59%; Solid Brick masonry: 23%; Unknown: 17%; Prefabricated panels: 1% | | | | | |
| | U-value of the wall | $U_{wl}$ | W/(m²·K) | - | - | - | - | - |
| | Slab on ground floor type | | - | | | | | |
| | U-value of the floor | $U_{fl;lw}$ | W/(m²·K) | - | - | - | - | - |
| | Windows type | | - | | | | | |
| | U-value of the windows | $U_W$ | W/(m²·K) | 1.58 | 0.64 | 1.25 | 1.43 | 1.73 |
| | Shading system type | | - | | | | | |
| **GAINS and VENTILATION** | Occupancy density * | $O_C$ | person/m² | UNI EN 16798-1 - Table A.19 | | | | |
| | Lighting power density * | $W_L$ | W/m² | UNI EN 16798-1 - A.8.3 | | | | |
| | Equipment power density * | $W_A$ | W/m² | UNI EN 16798-1 - A.8.3 | | | | |
| | Type of ventilation | | Natural: 100% | | | | | |
| | Air exchange rate * | $n$ | h⁻¹ | 0.30 | 0.00 | 0.30 | 0.30 | 0.30 |
| **THERMAL SYSTEMS** | Heating system type | | Autonomous: 100% | | | | | |
| | Heating generator | | - | | | | | |
| | Daily operating time of the heating system * | $t_H$ | h | No limitation | | | | |
| | Energy carrier | | Electricity: 38%; Natural Gas: 34%; Solid biomass: 19%; LPG: 7%; Gas Oil: 2% | | | | | |
| | Heating emission sub-system | | - | | | | | |
| | Cooling system type | | - | | | | | |
| | Daily operating time of the cooling system * | $t_C$ | h | - | - | - | - | - |
| | Cooling emission sub-system | | - | | | | | |
| | DHW system type | | Autonomous, coupled with heating: 77%; Autonomous, detached from heating: 18%; Centralized, coupled with heating: 4%; Centralized, detached from heating: 1% | | | | | |
| | DHW generator | | - | | | | | |

\* These values are derived from UNI EN ISO Standards

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| Climatic zone: | F | Number of records: | 478 |

## Numerical variables – GEOMETRY

### NUMBER OF FLOORS



### GROSS HEIGHT



### AREA



☐ Heated gross floor area  ■ Heated net floor area

### VOLUME
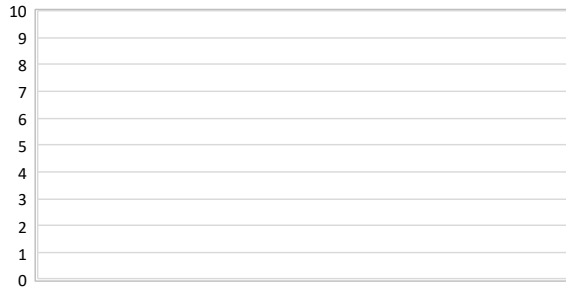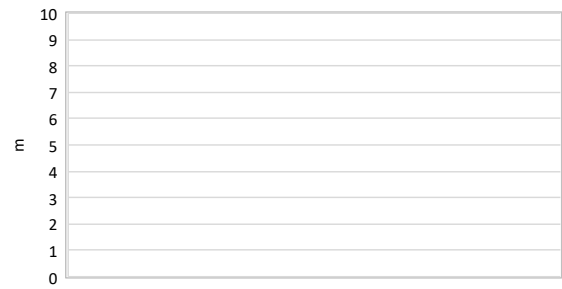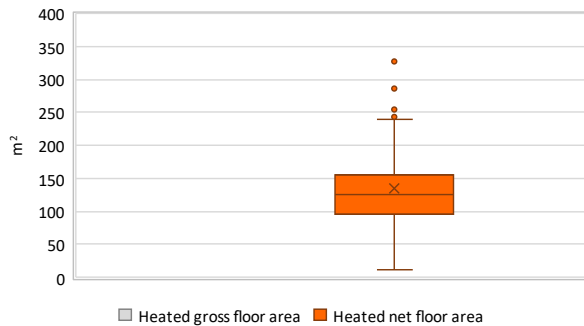


☐ Heated gross volume  ■ Heated net volume
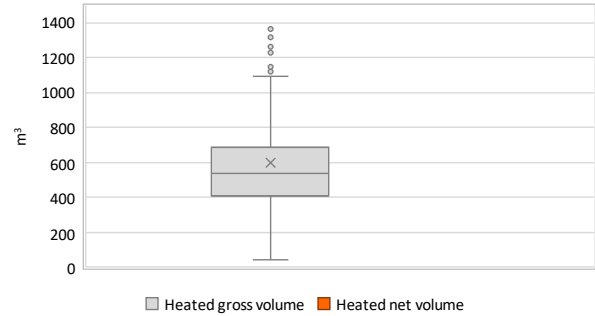
### COMPACTNESS RATIO



### WINDOWS TO WALL RATIO



☐ WWR_N  ■ WWR_S  ■ WWR_E  ☐ WWR_W  ■ Awi/Ause
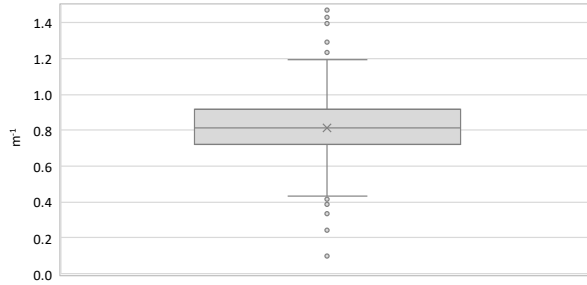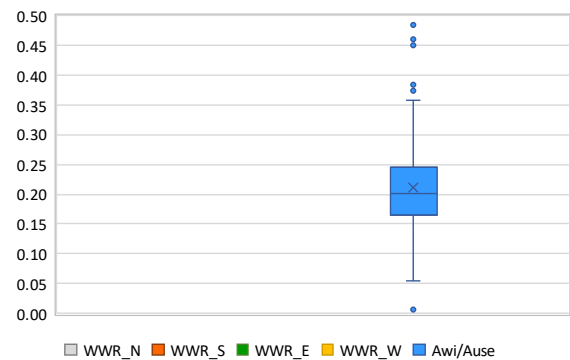
## Numerical variables – ENVELOPE

### OPAQUE BUILDING COMPONENTS U-VALUE



☐ External Walls  ■ Slab on Ground Floor  ■ Roof

### WINDOWS U-VALUE

| Region: | Piedmont | | Archetype code: | |
|---|---|---|---|---|
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| Period of construction: | > 2010 | | | |
| Climatic zone: | F | Number of records: | 478 | |

## ADDITIONAL DATA

| | Data | Symbol | Unit of measure | Mean value | Standard deviation | Q1 (first quartile) | Median value | Q3 (third quartile) |
|---|---|---|---|---|---|---|---|---|
| **THERMAL SYSTEMS** | Heating efficiency or *COP* | $\eta_{H;gen}$ or $COP_{H;gen}$ | - | This value has to be retrieved from suitable datasheets | | | | |
| | Total heating power | $P_{H;gen}$ | kW | 20.3 | 13.7 | 11.2 | 20.0 | 26.0 |
| | Cooling efficiency or *EER* | $\eta_{C;gen}$ or $EER_{C;gen}$ | - | This value has to be retrieved from suitable datasheets | | | | |
| | Total cooling power | $P_{C;gen}$ | kW | 11.8 | 14.3 | 6.4 | 8.4 | 12.2 |
| | Temperature of DHW | $\vartheta_W$ | °C | 40.0 | 0.0 | 40.0 | 40.0 | 40.0 |
| | DHW system power | $P_{W;gen}$ | kW | 20.2 | 49.9 | 8.0 | 18.0 | 25.2 |

## Numerical variables – GAINS, VENTILATION and SYSTEMS USAGE

### AIR EXCHANGE RATE



### OCCUPACY DENSITY



### INTERNAL GAINS POWER DENSITY



### DAILY OPERATING TIME



☐ Heating  ☐ Cooling

**Urban Reference Buildings for Energy Modelling**

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|---|---|---|---|
| Building category: | Residential buildings - Single family houses | | RES_SINGLE_2011-_F_PIE |
| Period of construction: | > 2010 | | |
| Climatic zone: | F | Number of records: | 478 |

## Additional data: other numerical variables that are not included in the archetype
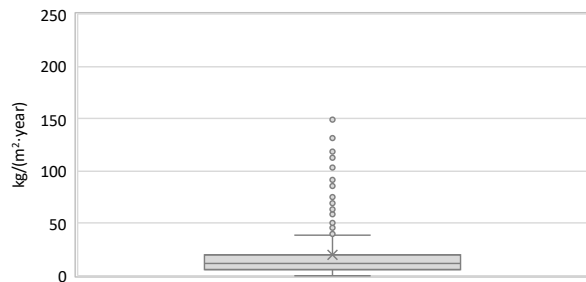
### DHW SUPPLY TEMPERATURE
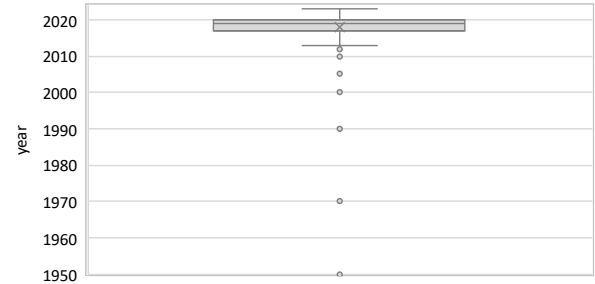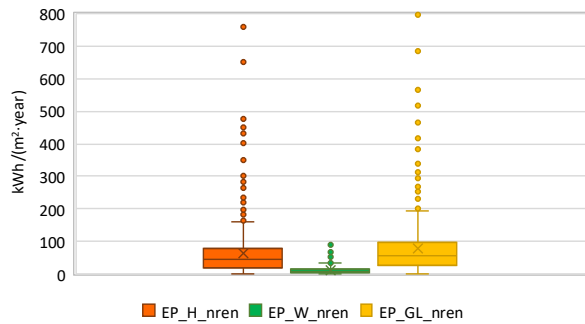


### SYSTEM POWER
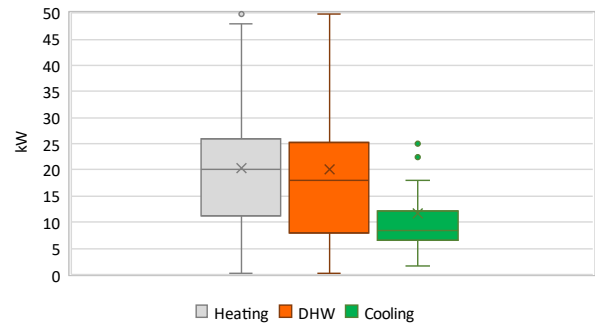


### CO₂ EMISSION



### HEATING SYSTEM INSTALLATION YEAR



### NON-RENEWABLE PRIMARY ENERGY USE



### RENEWABLE PRIMARY ENERGY USE

*Residential buildings – Single family houses – > 2010 – Zone F – Piedmont*