# DELIVERABLE D.T4.1.2

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| **Pilot actions preparation** | **Version 1**<br>**02/2021** |

# D.T4.1.2: Pilot actions preparation

## A.T4.1 PA preparation and investments

Partner Nr. 8 – Sipro Development Agency - Ferrara

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## 1. Introduction

The data collected in this document will present the energy condition of the building, what actions should be taken to improve its energy efficiency during the pilot actions and will outline the implementation plan for the pilot action in Ferrara. This document can be seen as an abridged version of the building energy characteristic made to implementation of the pilot action. It also presents what tools will be used in the activities and what steps should be taken for this purpose.
The aim of this document is to indicate the actions that should be taken in order to successfully implement the pilot action and to present the problematic aspects that must be solved at the initial stage of implementation.

# Pilot Action title:
# "EE actions related to historical buildings in Ferrara – Italy (PA5)"

## Objective of Pilot Action

The aim of the pilot action is to support the Municipality of Ferrara to:

- adopt smart energy tools aim at improving the energy performance of buildings also through the identification of financial tools;
- enlarge the dissemination and awareness raising about energy issues,
- start from the sample of households and citizens reached with CitiEnGov and involve more families

During the implementation of the pilot action, the CitiEngov Energy dashboard will be extended to 45 buildings located in a portion of the district "Giardino" in Ferrara.

One of the stages of preparation of the pilot action was characterized by the experimentation of integration of the OnePlace 3D viewer with the municipal Geonext webGIS application with 3D model of the selected pilot buildings.
The scope of the work is to analyze, from an energy point of view, a series of buildings (45), mostly residential, within the same neighborhood. After the analysis phase, strategies and actions could be defined in future to favor the reduction of energy consumption for the entire city area identified.
The analysis is therefore not focused on a few, single buildings but on buildings with many residential units.

## 2. Buildings data – 45 residential buldings

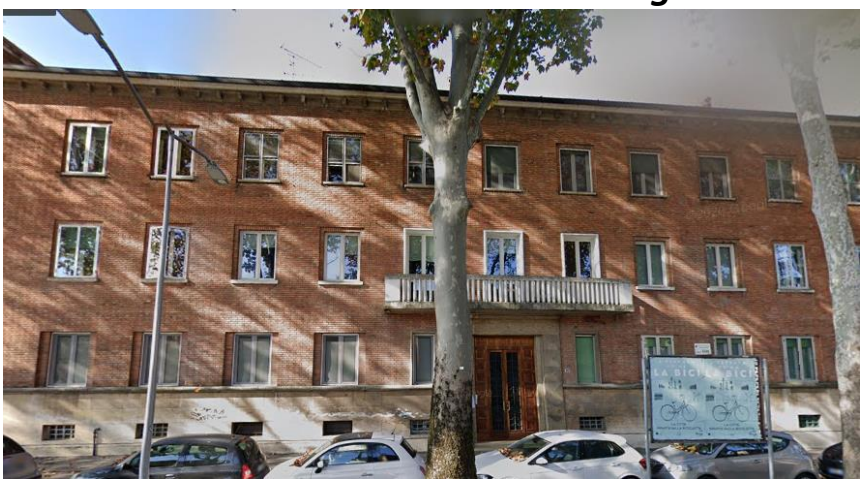
### *#1 Building*

Building address: via Fiume 3
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 18
Number of floors: 6
Building area usage (e.g. residental 95%, ancillary 5%): warehouse(5%),residential(85%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 8 (39.20)
Thermal consumption: 344116,234
Electricity consumption: 36869,5965
Annual CO2 emission: 9,18
Energy efficiency measures: /

## #2 Building

Building address: Corso Isonzo 14
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 18
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential (99%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 4 (65.70)
Thermal consumption: 143472
Electricity consumption: 22182,65
Annual CO2 emission: 26,33
Energy efficiency measures: /

## #3 Building



Building address: Corso Isonzo 16
Year of building: 1961
Type of building (School, public utility ect.): Residential

Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential (99%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (53.00)
Thermal consumption: 124534,68
Electricity consumption: 20196,3255
Annual CO2 emission: 26,6
Energy efficiency measures: /

## *#4 Building*


Building address: Corso Isonzo 22
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(5%),residential(89%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 3 (22.60)
Thermal consumption: 61482,405
Electricity consumption: 6238,35
Annual CO2 emission: 6,05
Energy efficiency measures: /

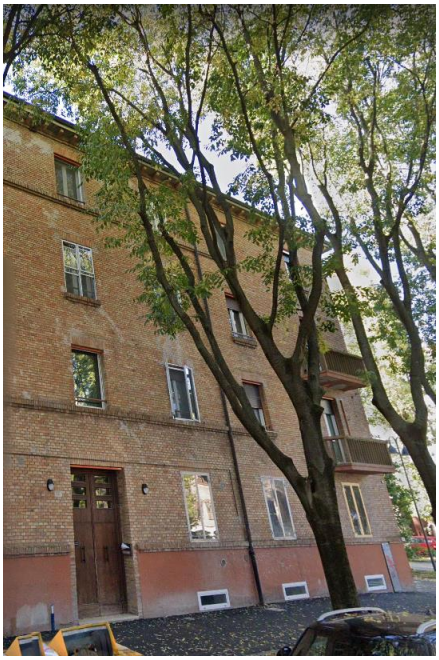
## #5 Building

Building address: Via Fiume 7
Year of building: 1960
Type of building (School, public utility ect.): Residential
Height of building: 17
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): trade(2%), residential(57%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 37 (53.10)
Thermal consumption: 59032,49
Electricity consumption: 25024,6425
Annual CO2 emission: 0,58
Energy efficiency measures: /

## #6 Building

Building address: Via Fiume 14
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(4%),warehouse(2%),trade(6%),residential(82%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 5 (27.50)
Thermal consumption: 198689,479
Electricity consumption: 33606,8295
Annual CO2 emission: 11,73
Energy efficiency measures: /

## *#7 Building*



Building address: Corso Piave 17
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(2%),residential(95%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 5 (44.20)
Thermal consumption: 172208,24
Electricity consumption: 22320,615
Annual CO2 emission: 17,6
Energy efficiency measures: /

## *#8 Building*

Building address: Piazza 24 Maggio 3
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(2%),residential(95%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 5 (44.20)
Thermal consumption: 172208,24
Electricity consumption: 22320,615
Annual CO2 emission: 17,6
Energy efficiency measures: /

## *#9 Building*

Building address: Corso Vittorio Veneto 29
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential(83%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 7 (35.90)
Thermal consumption: 149987,64
Electricity consumption: 1807,08
Annual CO2 emission: 3,45
Energy efficiency measures: /

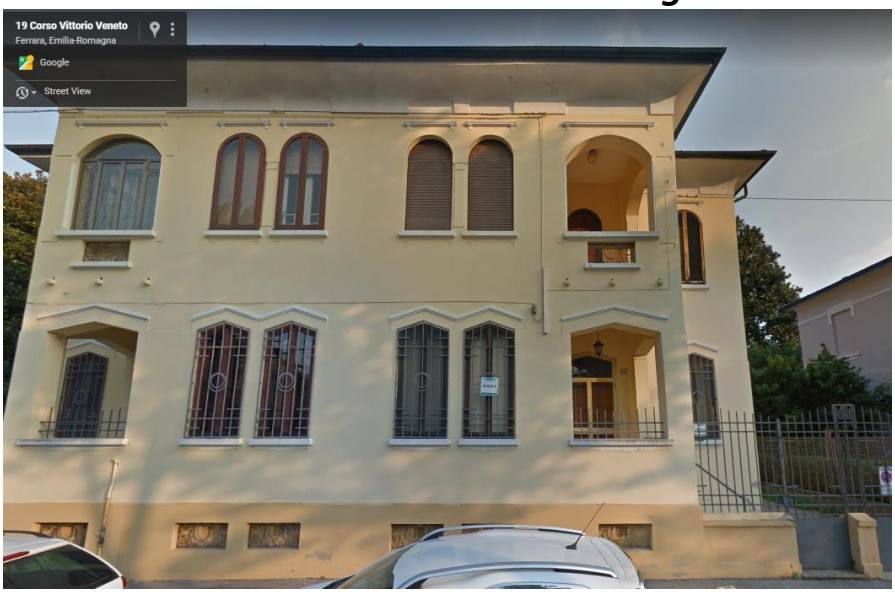
## *#10 Building*

Building address: Corso Vittorio Veneto 25
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(5%),residential(89%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 4 (38.00)
Thermal consumption: 212526,794
Electricity consumption: 3628,04075
Annual CO2 emission: 11,83
Energy efficiency measures: /

## #11 Building

Building address: Corso Vittorio Veneto 23
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(10%),residential(88%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (5.30)
Thermal consumption: 29853,225
Electricity consumption: 5076
Annual CO2 emission: 7,65
Energy efficiency measures: installation of condensing heating system

## #12 Building




Building address: Corso Vittorio Veneto 21
Year of building: 1945

Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(98%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 3 (43.50)
Thermal consumption: 71346,96
Electricity consumption: 1047,88
Annual CO2 emission: 5,43
Energy efficiency measures: /

## *#13 Building*

Building address: Corso Vittorio Veneto 38
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(17%),residential(82%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 80419,02
Electricity consumption: 12785,19
Annual CO2 emission: 18,2
Energy efficiency measures: /

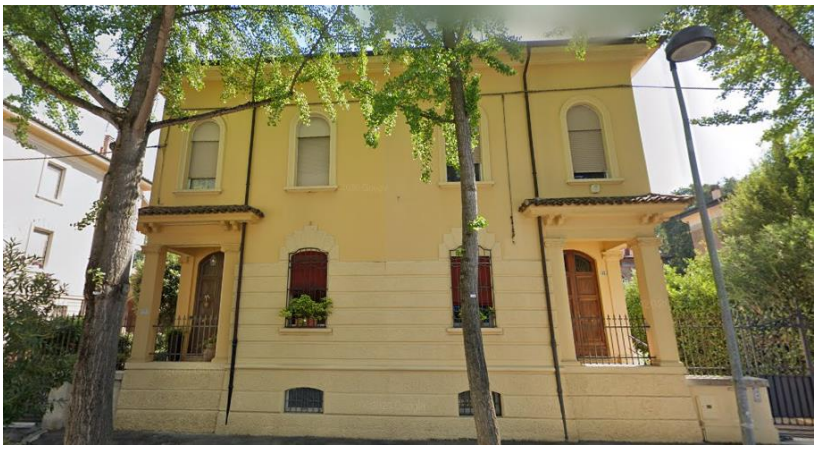
## *#14 Building*

Building address: Corso Vittorio Veneto 28
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(1%),residential(97%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (3.60)
Thermal consumption: 118441,7745
Electricity consumption: 1182,447
Annual CO2 emission: 3,08
Energy efficiency measures: /

## *#15 Building*

Building address: Corso Vittorio Veneto 24
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential(84%),office(3%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 8 (45.80)
Thermal consumption: 284019,312
Electricity consumption: 1166,746
Annual CO2 emission: 4,33
Energy efficiency measures: /

## *#16 Building*



Building address: Via Montegrappa 13
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5

Building area usage (e.g. residental 95%, ancillary 5%): residential(94%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 21 (12.50)
Thermal consumption: 206313,12
Electricity consumption: 2066,4375
Annual CO2 emission: 6,45
Energy efficiency measures: /

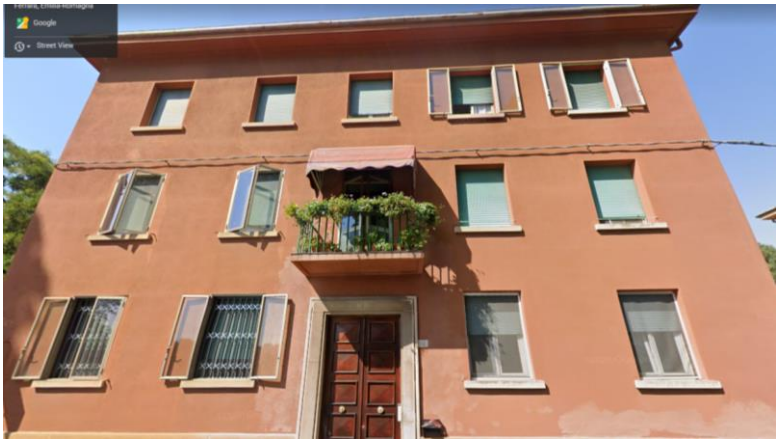
## *#17 Building*

Building address: Piazza 24 Maggio 8
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 13
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(5%),residential(90%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 2 (40.90)
Thermal consumption: 104496
Electricity consumption: 18473,4
Annual CO2 emission: 9,23
Energy efficiency measures: /

## #18 Building

Building address: Via Castel Tebaldo 3
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 13
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(4%),trade(4%),residential(88%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 4 (16.90)
Thermal consumption: 131108,3815
Electricity consumption: 3932,44075
Annual CO2 emission: 5,93
Energy efficiency measures: /

## #19 Building



Building address: Piazza 24 Maggio 12
Year of building: 1945
Type of building (School, public utility ect.): Residential

Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(2%),residential(95%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 80339,76
Electricity consumption: 2055,72
Annual CO2 emission: 5,18
Energy efficiency measures: /

## *#20 Building*

Building address: Via Paolo V 22
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 7
Number of floors: 2
Building area usage (e.g. residental 95%, ancillary 5%): residential(86%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 109375,944
Electricity consumption: /
Annual CO2 emission: 3
Energy efficiency measures: /

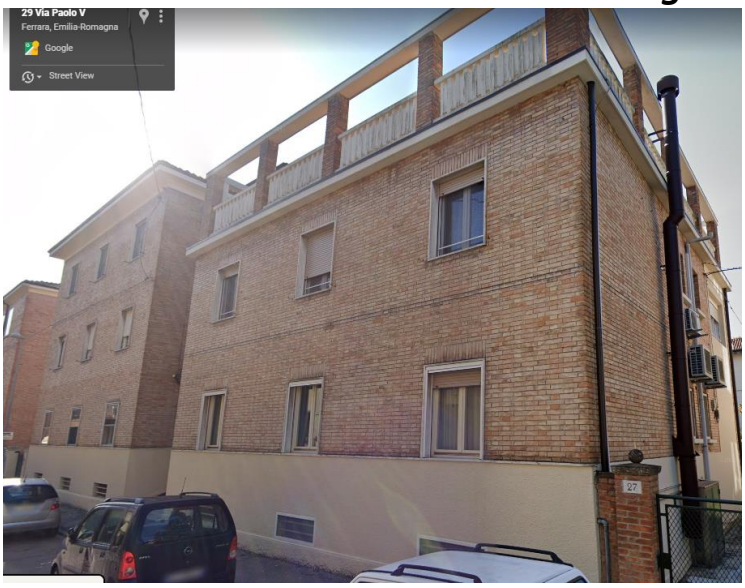
## *#21 Building*

Building address: Via Paolo V 30
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential(86%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 6 (22.90)
Thermal consumption: /
Electricity consumption: /
Annual CO2 emission: /
Energy efficiency measures: /

## *#22 Building*

Building address: Via Paolo V 19
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(86%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (50.90)
Thermal consumption: /
Electricity consumption: /
Annual CO2 emission: /
Energy efficiency measures: /

***#23 Building***




Building address: Via Paolo V 25
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(91%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (58.70)
Thermal consumption: /
Electricity consumption: /
Annual CO2 emission: /
Energy efficiency measures: /

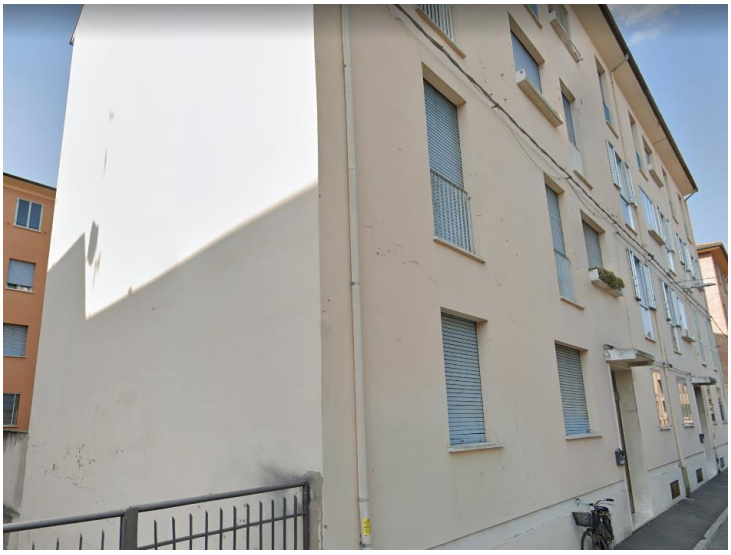
## *#24 Building*

Building address: Via Giovanni Martinelli 3
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(87%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 5 (12.90)
Thermal consumption: /
Electricity consumption: /
Annual CO2 emission: /
Energy efficiency measures: /

## *#25 Building*

Building address: Via Gorizia 4
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential(89%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 5 (63.50)
Thermal consumption: /
Electricity consumption: /
Annual CO2 emission: /
Energy efficiency measures: /

## *#26 Building*

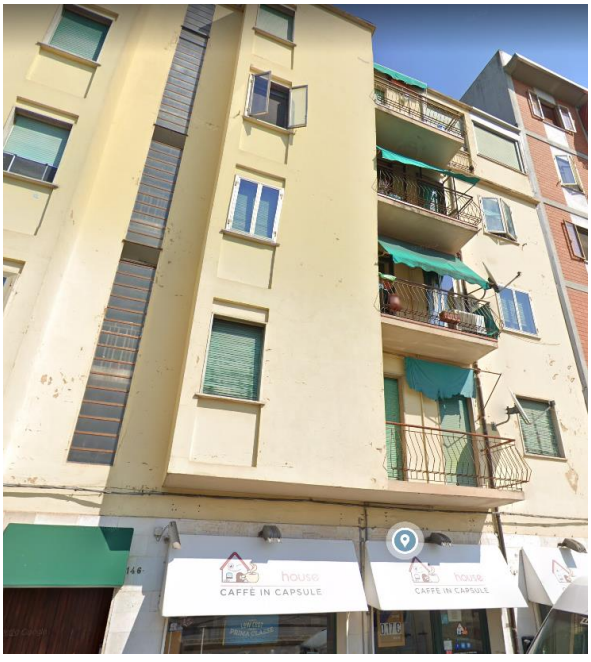


Building address: Via Gorizia 12
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(1%),residential(82%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 160969,05
Electricity consumption: 6463,15125
Annual CO2 emission: 3,8
Energy efficiency measures: /

## *#27 Building*

Building address: Via Giuseppe Agnelli 10
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): warehouse(0%),residential(95%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 170306,895
Electricity consumption: 12100,3575
Annual CO2 emission: 7,1
Energy efficiency measures: /

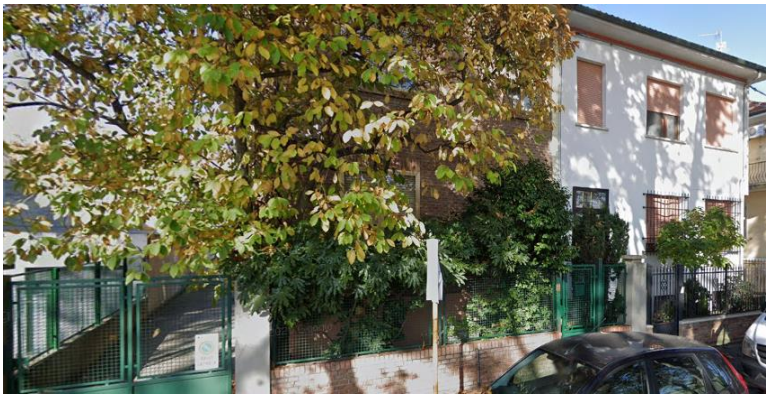
## *#28 Building*




Building address: Via Darsena 144a
Year of building: 1945

Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(5%),residential(89%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 84024,57
Electricity consumption: 5636,05666666667
Annual CO2 emission: 7,7
Energy efficiency measures: /

## *#29 Building*



Building address: Corso Isonzo 74
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(96%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 8 (71.00)
Thermal consumption: 67664,8
Electricity consumption: 1659,536
Annual CO2 emission: 2,93
Energy efficiency measures: /

## *#30 Building*

Building address: Via Giovanni Martinelli 9
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): warehouse(8%),residential(89%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 2 (74.20)
Thermal consumption: 87962
Electricity consumption: 6405
Annual CO2 emission: 13,05
Energy efficiency measures: /

## *#31 Building*


Building address: Via Pietro Nicolini 8
Year of building: 1961
Type of building (School, public utility ect.): Residential
Height of building: 20
Number of floors: 7
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(1%),trade(11%),residential(75%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 13 (38.70)
Thermal consumption: 263360,5525
Electricity consumption: 212025,54
Annual CO2 emission: 20,33
Energy efficiency measures: /

## *#32 Building*

Building address: Via Fortezza 17
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(97%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 3 (81.10)
Thermal consumption: 62239
Electricity consumption: 3318,9375
Annual CO2 emission: 10,43
Energy efficiency measures: /

## *#33 Building*

Building address: Viale 4 Novembre 61
Year of building: 1901
Type of building (School, public utility ect.): Residential

Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(0%),residential(93%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 8 (36.80)
Thermal consumption: 90759,012
Electricity consumption: 12249,17825
Annual CO2 emission: 4,45
Energy efficiency measures: /

## *#34 Building*

Building address: Viale 4 Novembre 41
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): trade(1%),residential(74%),office(1%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 19 (31.40)
Thermal consumption: 505714,825
Electricity consumption: 57795,98
Annual CO2 emission: 5,45
Energy efficiency measures: /

## #35 Building

Building address: Viale 4 Novembre 35
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 14
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): trade(2%),residential(76%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 13 (24.40)
Thermal consumption: 258904,294
Electricity consumption: 8262,903
Annual CO2 emission: 2,88
Energy efficiency measures: /

## #36 Building

Building address: Viale IV Novembre 29

Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(96%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 2 (70.80)
Thermal consumption: 97914,993
Electricity consumption: 1901,262
Annual CO2 emission: 3,23
Energy efficiency measures: /

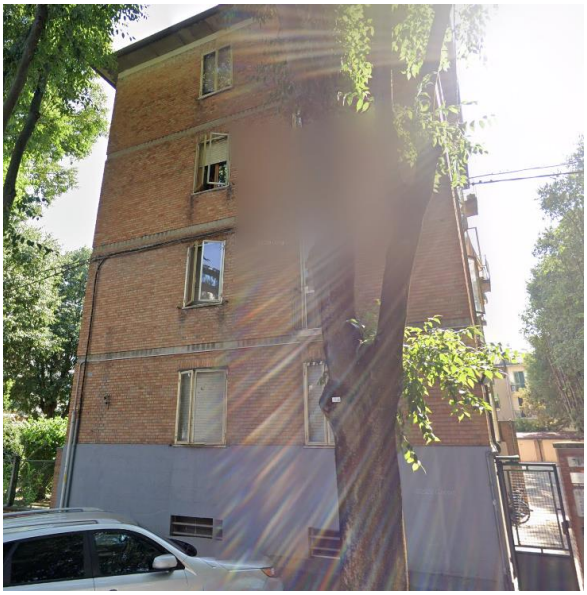
## *#37 Building*

Building address: Corso Piave 39
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): warehouse(2%),trade(0%),residential(75%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 18 (52.70)
Thermal consumption: 288368,76
Electricity consumption: 45341
Annual CO2 emission: 5
Energy efficiency measures: /

## *#38 Building*

Building address: Corso Piave 34
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 16
Number of floors: 5
Building area usage (e.g. residental 95%, ancillary 5%): residential(86%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 15 (51.70)
Thermal consumption: 306349,272
Electricity consumption: 22888,164
Annual CO2 emission: 4,43
Energy efficiency measures: /

## *#39 Building*



Building address: Corso Piave 31
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 10
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): residential(86%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 131503,902
Electricity consumption: 2163,91
Annual CO2 emission: 7,4
Energy efficiency measures: /

## *#40 Building*

Building address: Corso Piave 29
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 10
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(8%),residential(91%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 129879,456
Electricity consumption: /
Annual CO2 emission: 16,35
Energy efficiency measures: /

## *#41 Building*

Building address: Via Paolo 5 31
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 9
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(16%),residential(83%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: 1 (92.10)
Thermal consumption: 75816
Electricity consumption: /
Annual CO2 emission: 31,2
Energy efficiency measures: /

## *#42 Building*

Building address: Via Ortigara 9
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 10
Number of floors: 4
Building area usage (e.g. residental 95%, ancillary 5%): residential(98%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 114234,05
Electricity consumption: /
Annual CO2 emission: 11,9
Energy efficiency measures: /

## *#43 Building*

Building address: Via Ortigara 2
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 11
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): ancillary(6%),residential(93%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 58070,8975
Electricity consumption: 8187,19125
Annual CO2 emission: 4,9
Energy efficiency measures: /

## *#44 Building*


Building address: Via Ortigara 6
Year of building: 1901
Type of building (School, public utility ect.): Residential
Height of building: 12
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): residential(98%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 102925,128
Electricity consumption: /
Annual CO2 emission: 15,7
Energy efficiency measures: /

## *#45 Building*

Building address: Piazza 24 Maggio 23
Year of building: 1945
Type of building (School, public utility ect.): Residential
Height of building: 8
Number of floors: 3
Building area usage (e.g. residental 95%, ancillary 5%): trade(2%),residential(93%)
Energy source: gas
Energy usage by $m^3$ [kWh/m3/year]: /
Thermal consumption: 79500,615
Electricity consumption: 534,7575
Annual CO2 emission: 4,75
Energy efficiency measures:

## 3. Spatial/non-spatial data availability for region.

| Country / Pilot action | Dataset / Source | Types of data | Owner | Access | |
|---|---|---|---|---|---|
| | | | | Public | For PA |
| | **Ferrara (PA5)** | | | | |
| **Italy** | Footprint of buildings (2D) / Municipal Register of Buildings | Geodata (in SHP format) with attributes regarding height, age of construction, connection to networks, ... | **Municipality of Ferrara** | no | yes |

## 4. TARGET-CE tools planned to be used in buildings

| No. | Name of building | Type of building (school, public utility ect.) | Tools used in PA | Scope of tool usage *(what will be done by using the tool (trainings, visualizations, behavior change ect.)* |
|---|---|---|---|---|
| 45 | Buildings located in a portion of the district "Giardino" in Ferrara (no specific name) | Residential | -CitiEnGov Energy Dashboard | - Extension of the CitiEngov Energy dashboard to buildings located in Ferrara. The Energy dashboard is a database (for both Oracle and PosgreSQL platforms) useful to easily organize geographical data about buildings with their properties and attributes. |
| | | | - BOOSTEE-CE | - Experimentation of integration of the OnePlace 3D viewer with the municipal Geonext webGIS application (with 3D model of pilot buildings) |

## 5. PA implementation schedule

| EE actions related to historical buildings in Ferrara – Italy (PA5) | | | | | |
|---|---|---|---|---|---|
| No. | Phase | Phase description | Start of phase | End of phase | Resources needed |
| 1. | Municipal webgis updating | Updating of the municipal webGIS application with the new Geonext solution | June 2020 | September 2020 | External expert |

| | | | | | |
|---|---|---|---|---|---|
| | | implemented in CitiEnGov (already configured with energy dashboard plugin) | | | |
| 2. | Integration of Citiengov energy dashboard | Porting of CitiEnGov Ferrara energy database into Municipal database together with automated ETL procedures to update data processes | September 2020 | November 2020 | External expert |
| 3. | Editing functionality in Geonext | Configuration of the editing functionality in Geonext to allow the Municipality to modify online data about "municipal energy units" and/or "historical buildings" | October 2020 | December 2020 | External expert |
| 4. | Onplace and Geonext integration | Integration of the OnePlace 3D viewer with the municipal Geonext webGIS application with 3D model of pilot buildings | January 2021 | ongoing | External expert/FBK teams (One Place) |

## 6. Collaboration with stakeholders

*How target groups/stakeholders will be engaged in actions/phases mentioned above?*

| Stakeholder groups | Role and responsibility | Involvement |
|---|---|---|
| *Municipality of Ferrara (Urban and ICT sector)* | *Data management and access* | *Data management, collection, and analysis.* |
| *Dedagroup Public Services* | *Integration between Citiengov energy dashboard and OnePlace* | *Integration of Citiengov energy dashboard into Municipal database and OnePlace* |

## 7. Foreseen problems and possibility of mitigation actions implementation

In Ferrara, for the pilot action implementation, 45 residential buildings have been chosen. They are all private buildings for which it is difficult to obtain specific details about the occupancy and data on thermal systems. We are trying to integrate data from different database in order to have a complete overview about the energy data of the buildings.

As for the integration of the of the OnePlace 3D viewer with the municipal Geonext webGIS application there were some difficulties in identifying the correct format of the georefenced 3D files to be transmitted.

## 8. Monitoring strategy

Once the data integration process of the 45 pilot buildings in One place has been completed, it will be possible to evaluate in the future a series of strategies to be adopted to obtain energy savings for these buildings and make citizens more aware of these issues.

## 9. Conclusion

The energy dashboard is a very useful tool for local authorities and various municipal sectors to define new urban and energy policies for cities. The possibility of integrating the dashboard with different types of data (energy, urban planning, tourism, mobility) allows all sectors of public offices to obtain information and develop studies and strategies to improve the use of renewable energy and the energy performance of cities and specifically of buildings.
The pilot action developed during the Target project helped the Municipality of Ferrara to define:

- a common conceptual data model, to be considered as a possible target schema for exporting and sharing data outside the local context and outside the organization;
- a reference implementation, as SQL-based relational database (possibly for Oracle and PostGIS platforms)