GeoSmartCity

The Reggio Emilia Experience

First International Conference on Smart Data and Smart Cities
Split, 8th September 2016

The GeoSmartCity Project

GeoSmartCity implements a platform for the sharing and publication of geographical open data.
The platform includes specialized web services to integrate the open geographical data with other geo-referred data (public or private) functional to the management of infrastructures and services for the citizen, in the framework with Smart City and the European Digital Agenda.

GeoSmartCity will implement with various pilot applications two very important strategic scenarios for a Smart City:
③Green-Energy
③Underground

Reggio Emilia

General Information

- Population: 172,525 in the Municipality of Reggio Emilia
- Area: 231,55 km2

Reggio Emilia is located in the Pianura Padana Valley, along the via Emilia in the heart of the historical region of Emilia, and it is crossed by the creek Crostolo. It is connected to the motorway and to the main rail network (Rome-Milan). Since 2013 Reggio Emilia is also connected to the High Speed Railway. Like all towns along the via Emilia, the urban structure is quite compact, with the residential areas in the southern side (toward the hills) and the productive areas in the northern side (along the main infrastructures).

The Reggio Emilia Munipality Role

Pilota Green Energy

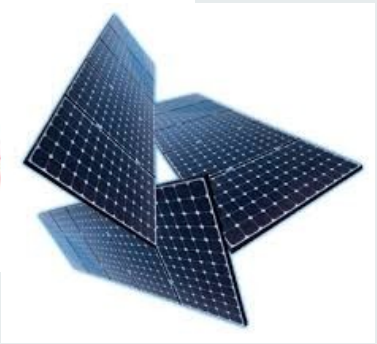
1. **Reggio nell'Emilia** (IT)
2. Maroussi (GR)
3. Oeiras (PT)
4. Turku (FI)
5. Girona (ES)

- Identyfing and collecting data to provide to GSC Platform
- Analyzing and identifing requirements and use cases
- Support to data definition and harmonization (INSPIRE)
- Test and validation

The Idea

Buildings Energy Performance:

1. Public Buildings
2. Citizen



- Control Tool
- Energy Policies definition improvement
- CO2 reduction target fixed by Municipal SEAP

Patto dei Sindaci
Un impegno per l'energia sostenibile

The Reggio Emilia Pilot

Description

The pilot will use data and results for:

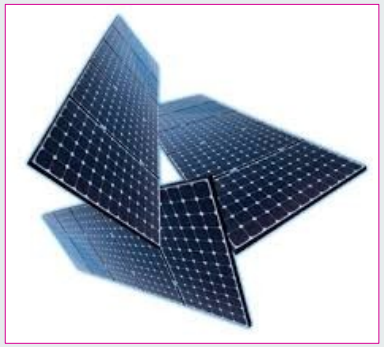
- help politicians for strategic purposes, and technicians in daily work)
- open/disseminate information about municipal buildings to the public.

Two use cases:

- Municipal Buildings
- Others Buildings

The main process

1-Data collection



2-Data normalization

3-Harmonization

Internal database

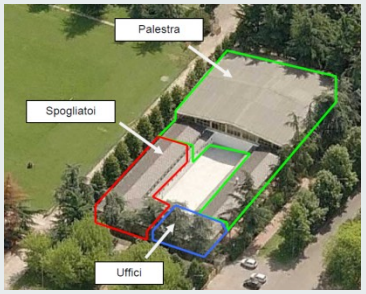
GEOSMARTCITY Platform

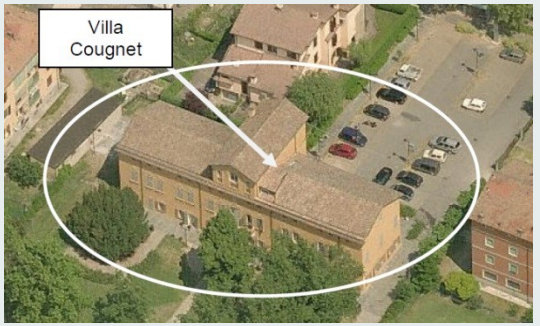
Geo Open data

Web Services

Use case 1 – Municipal Buildings

Publication of data on energy performance of municipal buildings





Use Case 1

Energy performance of municipal buildings

These use cases relate to the **buildings of the Municipality of Reggio Emilia** (owned or leased) used for various public services; about these buildings, the Municipality has the e**nergy consumption data** (heating/cooling and electricity) and any other data characterizing the building from an energy point of view (energy certificates, renewable energy, ...).

Type of Buildings:

- Offices,
- Libraries,
- Primary schools and secondary schools with associated structures (e.g. dining hall, gym, ...), Municipal Preschools,
- Sports,
- Social welfare centers,
- museums, ...

Renewable Energy Sources

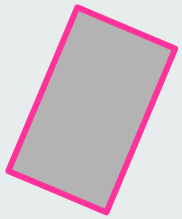
Presence of sources of renewable energy in the building/structure: photovoltaic systems and solar thermal systems

Use Case 1

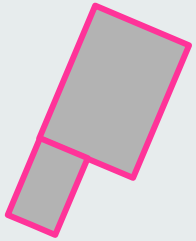
Energy Unit identification

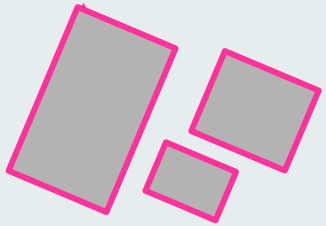
Energy Unit regard a complete buildings, a part of it or more building

Complete Building

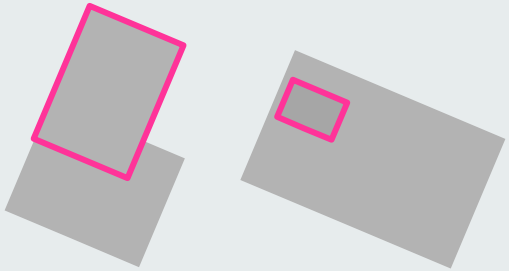


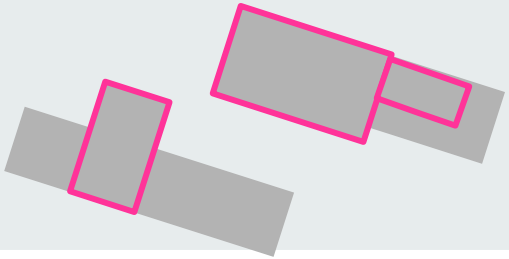
More buildings





Building part





Use Cases 1 – the data

Buildngs Energy Perfomance

Energy Unit Geolocalization

Energy Unit Data

- ③ building/structure: function, volumes, surfaces, year built, year renovation
- ③ energy certifications
- ③ Photovoltaic and solar thermal systems
- ③ Electricity and Natural Gas Counters
- ③ Thermal plants

Energy Consumption Data 2009-2013

- ③ energy consumption
- ③ consumption for heating/cooling system, divided for used fuel (natural gas, LPG, district heating, gas oil)

Renewable Energy Sources

Photovoltaic and Solar panels Geolocalization

Photovoltaic and Solar panels Data

- ③ Type of System
- ③ installed capacity, electricity generated
- ③ Square footage panels
- ③ Installation Date

Energy Production Data

User services developed for the use case:

- **Buildings Map**: kind of building, function, energy consumption, photovoltaic and solar thermal plants, ...
- **Heat consumption Map**: synthesis (per year) representing the annual heat consumption (homogenizing units) and the presence of any solar thermal plants. heat consumption map by type of fuel, heat consumption map by type of building :
- **Heat consumption Dash**: comparing for the buildings in possession of energy certification, the actual situation of the annual heat consumption with the theoretical consumption by certification
- **Electricity consumption Map** – municipal buildings: synthesis map (per year) representing the annual electricity consumption and identifying the presence of any photovoltaic plants
- **CO2 map** – municipal buildings: displaying a summary map, which, by bringing together the energy consumption (heating/cooling, electricity, ...), shows an estimate of the CO2 produced by the individual buildings

Energy performance of municipal buildings

- **Photovoltaic and solar thermal plants map**: location of photovoltaic and solar thermal plants in present year, fact sheets, descriptions of the plant and data on production of actual or estimated renewable energy

Renewable Energy Sources

- **Summary Report** : reports with summary data and summary maps for dissemination purposes

Use Case1

Objectives

OPEN DATA

CONSUMPTION MONITOR

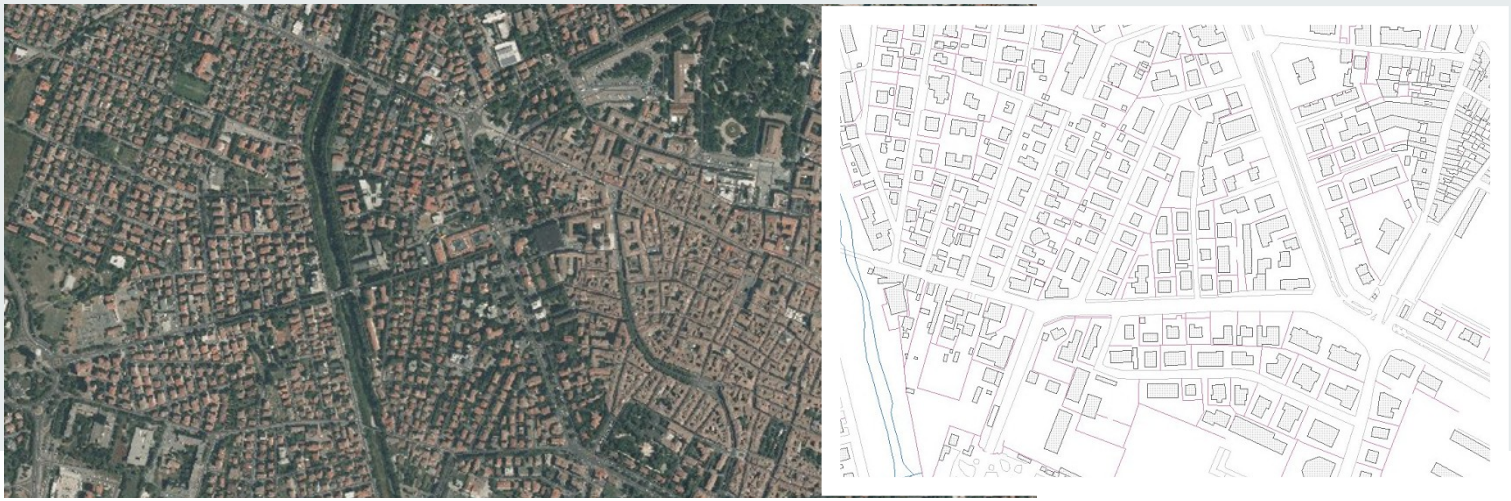
STRATEGIC CONTROL

- data for citizens (complying with legal obligations relating to transparency of public data)
- data for other external users even for commercial purposes or research.

- Strategic control of consumption by policy-makers and technicians
- Sustainable Energy Action Plan (SEAP) updating and monitoring
- Identification of any critical issues on which to perform detailed analyses and tests in order to determinate action priorities by policy-makers and technicians

Use Case 2: Other Buildings

Energy performance of other buildings



Caso uso 2 – TERRITORIO

The Scope:

Energy performance of other buildings

Other buildings (different from municipal ones) in the area

Renewable Energy Sources of other buildings

Presence of sources of renewable energy in other buildings: GSE

Use Cases 2 – the data

Buildngs Energy Perfomance of other buildings

Other buildings geolocalization

Other Buildings Data

- ③ energy certifications
- ③ Photovoltaic systems GSE

Energy Consumption Data 2009-2013

- ③ energy consumption (SIATEL)
- ③ consumption for natural gas system(SIATEL)

Renewable Energy Sources of other buildings

Photovoltaic System Geolocalization

Photovoltaic System Data

- ③ Type of System
- ③ installed capacity, electricity estimation
- ③ Installation Date

Energy Production Estimation

Use Cases 2

Servizi web per gli utenti:

- **Other Buildings Map:** main data regardings other buildings (type,
- **Natural gas consumption Map:** synthesis (by year and macro-category) of building's total natural gas consumption per occupied volume unit
- **Electricity consumption Map:** synthesis (by year and macro-category) of total electricity consumption of the building and the presence of any photovoltaic plants that accede to "energy bill"
- **CO_2 Map:** maps of synthesis, putting together the energy consumption (heating/cooling, electricity, ...), show the estimate of the CO2 produced by the individual buildings

Buildngs Energy Perfomance of other buildings

- **Photovoltaic and solar thermal plants map**: location of photovoltaic plants that accede to "energy bill" in the present year, descriptive system datasheets and energy production estimation

Renewable Energy Sources of other buildings

- **Summary Report** : reports with summary data and summary maps for dissemination purposes

Use Case 2

The objectives

Strategic control analysis

- Strategic control of energy consumption of the territory and analysis of the energy status of the various types of buildings and neighbourhoods in the city
- Updating and monitoring of the Sustainable Energy Action Plan (SEAP)
- Identification of any critical in order determine policy guidelines or intervention

Open Data

Research

Business purposes

Citizens

- Displaying summary data by external users to make comparisons between their individual situation and other similar and possible interventions to stimulate private interventions (renovations, installation of photovoltaic plants, energy certificates, ...)
- The display of summary data from other external users even for commercial purposes (installers of photovoltaic systems, companies that implement energy efficiency measures, ...)
- Update/correction by external users of the published data.

Issues and troubles

Municipal buildings UC data:

- Data building/structure: function, volumes, surfaces, year built, year renovation, ...
- Energy certifications
- Renewable energy Sources: photovoltaic systems (installation year, installed capacity, electricity generated), solar thermal systems (installation year, square footage panel)
- Annual energy consumption: consumption for heating/cooling system, divided for used fuel (natural gas, LPG, district heating, gas oil), electricity consumption

Different sources, actors and data fragmentation

Bad quality and inhomogeneity

Internal software lack and integration

Other Buildings UC data:

- Buildings in the area
- Surfaces or occupied volumes
- Data relating to the total annual energy consumption
- Natural gas consumption Electricity consumption
- Photovoltaic plants that accede to the “energy bill”: installation year, installed capacity, electricity estimation
- Energy certificates

Cartography not updated

External data sources not always available, missing data

Privacy Laws

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