DELIVERABLE D.T1.2.5

Interreg-CE CityEnGov solutions

Version 1

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D.T1.2.5: Interreg-CE CityEnGov solutions

A.T1.2 Transferability assessment of past outcomes for adaptation, extension & deployment in new Pilot Areas

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1. Introduction

The deliverable T1.2.5 belongs to the activity related to the transferability assessment of past project outcomes (A.T1.2). In particular, for each previously funded EE project/solution, a document has been created reporting the information on how the outcomes could be adapted tailored, extended, and deployed in the new pilot areas to capitalize them and widespread their impact.
In the following section, the outcomes related to **Interreg-CE CityEnGov** project are reported and future activities to be realised are described.

2. Adaptation and implementation of (technical solution) CitiEnGov D.T1.2.3 "Implementation of the Energy Dashboard"

2.1 The solution/tool and its aim

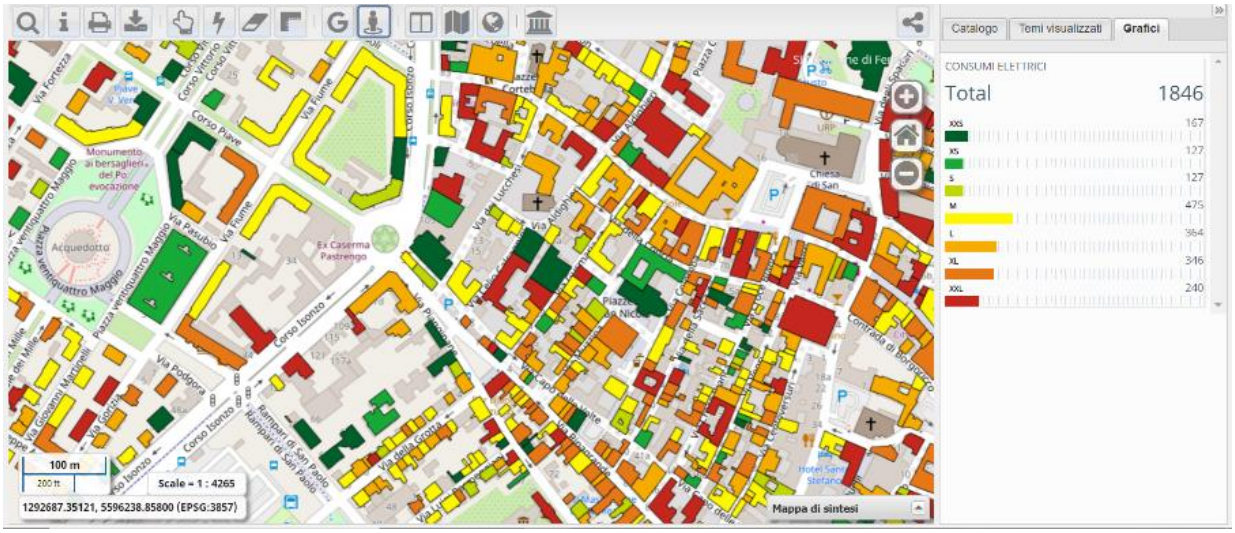
The Ferrara Energy Dashboard implemented during the CitiEnGov project is a tool useful to support the decision-making process and to define a cognitive framework of the city energy quality through data collection and georeference of:

- energy consumptions (thermal, electric and district heating)
- energy performance certificates of the building units

1) Buildings located in the municipal area

The dashboard manages and provides information about the **buildings located in the municipal area**: it is possible to create energy maps useful for comparing the different neighborhoods and graphically represent the consumption trends of buildings or building stocks, along several years.
And also:

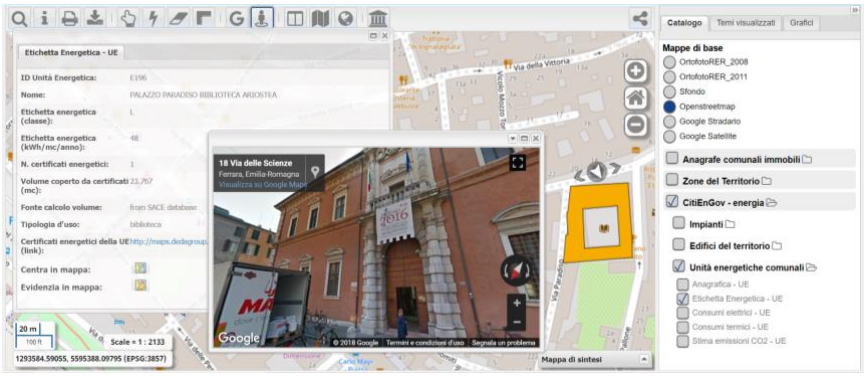
- it provides an annual estimation of CO2 emissions for each building, based on actual energy consumption data
- it defines an energy classification label for buildings located within the city having at least one energy performance certificate



2) Municipal energy units (n. 150 buildings belonging to the City Council)

For buildings belonging to the City of Ferrara, energy consumption data and energy performance certificates are more detailed than those related to the other buildings. It is possible to create consumption analysis, brakedown by year and by building use (school, offices, warehouse).
It is possible to have information about photovoltaic plants from national Gestore Servizi Energeticy (GSE) national energy incentive.
The information provided include: the type of plant, the installed power and the annual energy production.
Other functionalities are possible, also including:

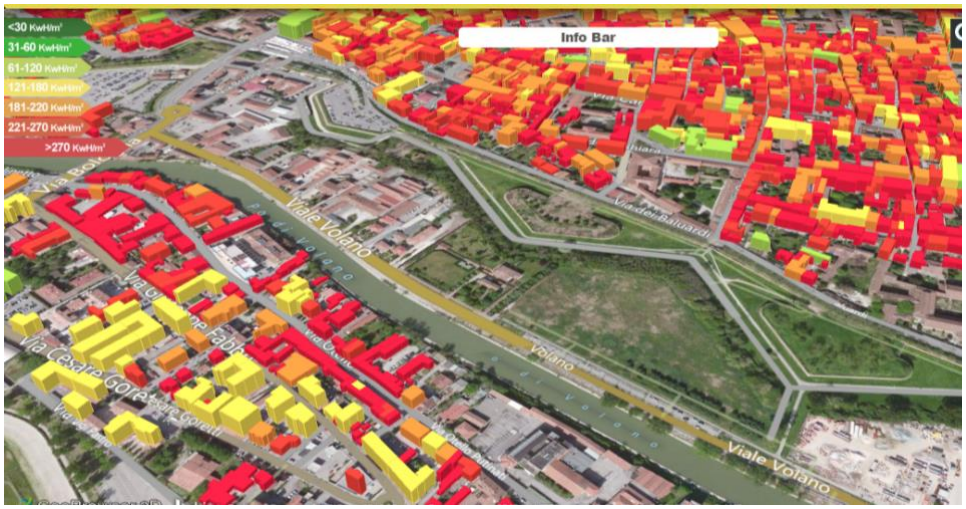
- information about energy refurbishment of private buildings (from Municipal building permits system)
- customized and dynamic geographical statistics based on map extent or objects selection
- user-driven download of data in different formats (both spatial and tabular)
- dataset download with standard data models (e.g. INSPIRE Buildings, CityGML with Energy extension)
- add-in of external spatial data from remote servers (WMS compliant)



2.2 How will the solution be used in the new pilot areas? Aim?

The Energy dashboard is a database (for both Oracle and PosgreSQL platforms) where you can easily organize geographical data about buildings with their properties and attributes
The municipal energy dashboard will be implemented in order to:

- update the energy dashboard implemented in CitiEnGov within the municipal webGIS application (based on Geonext solution) with updated flows of new data from the Region (energy certificates), Hera (consumption), GSE (photovoltaic), etc.
- configure the editing functionality in Geonext to allow the Municipality to modify online data about “municipal energy units” and/or “historical buildings”



The Energy Dashboard implemented during the Citiengov project can be also replicated by other municipalities using the model described in the Citiengov Toolkit (detailed in the following paragraph).
The CitiEnGov Wiki-Toolkit (http://toolkit.citiengov.eu/index.php?title=Main_Page), in addition to the model description, allows to download the SQL script to create the database.
The complete SQL scripts of the data loading procedures are available but will have to be adapted according to the input data of each municipality.

2.3 Main challenges

The main challenge in adapting and using the energy dashboard in other municipalities is represented by the type of input data used. The dashboard uses specific algorithms that can certainly be replicated in other cities at a national level while for locations abroad a prior check on the input data must be made.
Another challenge is represented by the use of the Geonext WebGIS application that is owned by a private service provider, so it can be used through a license in two ways:
- installed on the customer's servers
- or in the cloud on the provider's private server
As for the case study of Ferrara, the main challenge will be the possibility to integrate the OnePlace 3D viewer with the municipal Geonext webGIS application.

2.4 Pilot Action which is going to use the tool/solution

The aim of the pilot action is to support the local Municipalities of the Province of Ferrara to:

- adopt smart energy tools aim at improving the energy performance of 2 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 working at province level.

The CitiEngov Energy dashboard will be useful in implementing the pilot action in Ferrara. It will be extended to historic buildings located in Province of Ferrara and implementation of 3 training modules for local public administrators/managers and junior EGs in Province of Ferrara.

2.5 Data to be collected

Updated flows of new data from:

- Emilia Romagna Region: energy certificates;
- Hera spa (services provider): energy consumption
- GSE: photovoltaic plants

3. Adaptation and implementation of (technical solution) CitiEnGov O.T1.2 "Citiengov Toolkit"

3.1 The solution/tool and its aim

The CitiEnGov Wiki-Toolkit (http://toolkit.citiengov.eu/index.php?title=Main_Page) is open to all public and an updatable tool, addressed to technicians and decision-makers deaing with energy issue from a public authority perspective.

The idea was to build up the “transnational template” starting from initiatives already defined at European level by the data specifications related to the INSPIRE Directive.

The conceptual model starts from the Data Specifications defined by the INSPIRE Directive as baseline, and considers all requirements and characteristics of energy data that partners provided.
The implementation of INSPIRE data models will be used as a starting point and as a common approach to get a common view and common semantics about energy-data.
The objective of the model was:

1. To create 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;
2. a reference implementation, as SQL-based relational database (possibly for Oracle and PostGIS platforms)

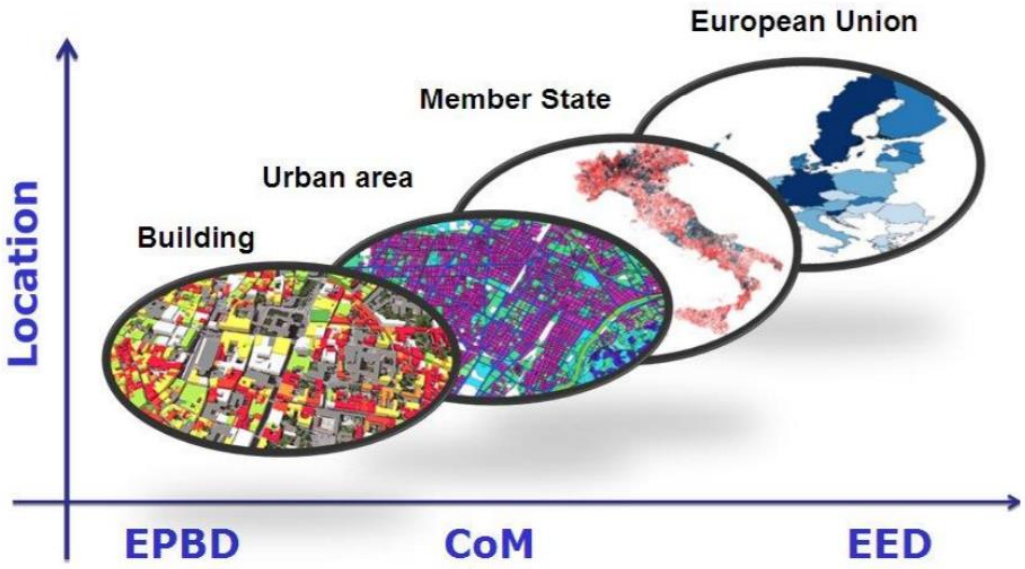


Figure 1 – Scaling and relation between EU Directives and location (EC JRC, 2015)

The wiki-toolkit contains:

- information about energy data in the different regions of the project;
- information about the role of energy topics play within Public Authorities

The Toolkit is structured in the following topics:

- Buildings
- Mobility
- Public lighting

In the CitiEnGov project, partners have been asked to describe energy-related data about buildings, transport and public lighting. The medium-term goal was to made these data available (whole datasets or subsets) based on a harmonized “energy data model” together with ICT services for sharing energy-related data.
The catalogue describes also the transnational methodology, based on one hand on the evaluation of tools implemented by CitiEnGov partners, and on the other hand on standards and technologies already available at European scale for sharing interoperable energy-related data.

3.2 How will the solution be used in the new pilot areas? Aim?

The Toolkit is a set of guidelines for (1) integrating data from different sources into the standard data model and (2) make them interoperable. The Toolkit wants to be a source of knowledge and inspiration for cities involved in energy planning. It addresses cities which are just beginning to implement energy plans as well

as cities with Sustainable Energy (and Climate) Action Plans (SEAPs/SECAPs) already defined, endeavoring for even smarter and more efficient solutions.
The idea of the Toolkit is to build up the "transnational template" starting from initiatives already defined at European level by the data specifications related to the **INSPIRE Directive**. The conceptual model starts from the Data Specifications defined by the INSPIRE Directive as baseline, and considers all requirements and characteristics of energy data provided during the Citiengov project.

The Toolkit can be used by other Municipalities to set up their energy dashboard (section 2): on this Toolkit section http://toolkit.citiengov.eu/index.php?title=Transnational_methodology are available the conceptual data model and the procedures to create the database. The SQL scripts for creating tables in both Oracle and PostGIS platform are available on the CitiEnGov online toolkit: http://toolkit.citiengov.eu/index.php?title=Transnational_methodology#Physical_implementation_of_data_model. This methodology is useful to help the Municipalities to increase the interoperability of energy-related data about the three main sectors: Buildings, Mobility, Public lighting; it's a practical "how-to" guideline for:

a) modelling energy data that are usually managed, collected and shared by local authorities to efficiently support the decision-making process about energy planning for buildings, mobility and public lighting
b) implementing ICT services to allow the sharing of energy-related data though web services through interoperable software protocols and open standards

3.3 Main challenges

The periodically update of the Toolkit.
The complete SQL scripts will need to be adapted based on the input data of each city.

3.4 Pilot Action which is going to use the tool/solution

The CitiEnGov toolkit includes methodology, guidelines, template of documents, technical solutions (e.g. software), based on an interoperability concept, thus enabling the data update and the sustainability of the proposed solutions. The Toolkit deals with energy policies, best practices at EU and local levels, and energy related data and tools already used or suggested and will be useful in different pilot actions.

3.5 Data to be collected

The Toolkit is already a transnational tool, ready to be used in different CE regions. It's an ongoing tool, it can be always updated and enriched with new and innovative solutions. The data model is harmonized according to INSPIRE directive.

4. Conclusions

The energy dashboard (Section 2) 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 public buildings.
For the CitiEnGov toolkit (Section 3), the idea is to build up the "transnational template" starting from initiatives already defined at European level by the data specifications related to the INSPIRE Directive. The conceptual model starts from the Data Specifications defined by the INSPIRE Directive as baseline, and considers all requirements and characteristics of energy data that partners provided. Even though the

implementation of INSPIRE data models is not the focus neither the goal of CitiEnGov they will be used as a starting point and as a common approach to get a common view and common semantics about energy-data. Therefore, the objective of the activity will be twofold:

- 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)