

lifeSMART

Ref. Ares(2025)7830047 - 18/09/2025



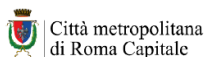
Support small Municipalities towARds energy Transition

Reporting database construction

Task 3.1 "Database construction"

Date: 28/02/2025

Lead beneficiary: U-SPACE





CONTENT

Introduction	4
1. Guidelines for database construction	5
1.1. Section 1: from actions to datasets	6
1.1.1. Energy renovation.....	6
1.1.2. RES development.....	8
1.1.3. Transport	14
1.1.4. Intangible measures.....	16
1.2. Section 2: from datasets to actions.....	17
1.3. Section 3. Indications for data collection.....	20
1.3.1. Data quality.....	20
1.3.2. Data formats	20
1.4. Section 4. Indications for the database design.....	21
2. Reporting of the activity	24
2.1. Report structure.....	24
3. Database report in Portugal – AREANATEjo	26
3.1 Introduction.....	26
3.2. Geodatabase structure	27
3.3 Datasets	27
3.4 Annexes database report in Portugal – AREANATEjo	29
4. Database report in Spain – FAMP	33
4.1 Introduction.....	33
4.2 Geodatabase structure	34
4.3 Datasets.....	34
4.4 Annexes database report in Spain – FAMP	39



Co-funded by
the European Union

Life SMART
Support small Municipalities towArds Energy Transition
(LIFE22-CET-SMART)



5. Database report in Greece – ANATOLIKI.....	41
5.1 Introduction.....	41
5.2 Geodatabase structure	41
5.3 Datasets	41
5.4 Annexes database report in Greece – ANATOLIKI	48
6. Database report in France – CCI NCA	51
6.1 Introduction.....	51
6.2. Geodatabase structure	51
6.3. Datasets	54
6.4. Annexes database report in France - CCI NCA	56
7. Database report in Italy – CMRC	62
7.1 Introduction.....	62
7.2 Geodatabase structure	63
7.3 Datasets	64
7.4 Annexes database report in Italy – CMRC	68



Co-funded by
the European Union

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or CINEA. Neither the European Union nor the granting authority can be held responsible for them.



Introduction

This report documents the process of constructing local geodatabases as part of the LIFE SMART project, specifically within Task 3.1 of Work Package 3 (WP3). The objective of this initiative is to develop a geo-database that support municipalities in making informed decisions during their transition toward more sustainable energy sources.

At the outset of the task, a guideline was developed to align the objectives, structure, and expected outcomes of the geodatabase. This document served as a reference framework, ensuring consistency while allowing each participating country to adapt the database to its specific territorial and regulatory context. By defining minimum criteria and essential datasets, the guideline facilitated the harmonization of data collection and processing across all project partners.

Originally planned for completion by December 2024, the execution of this deliverable was delayed until March 2025 due to unforeseen challenges encountered by some partners in the geodatabase development process. These delays stemmed from difficulties in data acquisition, technical implementation, and validation procedures, highlighting the complexity of integrating diverse data sources at a municipal level.

This document consolidates both the guideline and the results provided by the project partners regarding the development of their respective geodatabases. It details the methodology followed, the datasets compiled, and the specific geospatial tools employed, offering a comprehensive overview of the efforts undertaken in each participating country. By providing access to structured and validated data, the geodatabases developed under this task will serve as valuable resources for Inter-Municipal Technical Structures (IMTSs) to plan, implement, and monitor clean energy transition strategies at the local level.



1. Guidelines for database construction

Task 3.1 began with the preparation of a guideline document, developed by the task leader U-Space to ensure a standardized approach to geodatabase construction across all participating countries. This guideline served as a foundational reference, aligning the methodologies and criteria used by each partner while allowing for flexibility to accommodate country-specific needs.

The primary objective of the guideline was to unify criteria for database development, offering a structured list of datasets that could be valuable for the Inter-Municipal Technical Structures (IMTSs) in their decision-making processes. Additionally, the document provided indications for data collection and recommendations for database design, ensuring consistency in both the structure and the types of information included.

The content of the guideline was divided into 4 sections, which are as follows:

The first one identifies a series of possible actions to contribute to clean energy transition, grouped into four macro-actions: energy renovation, RES development, transport, and intangible measures. Actions are listed in the table below.

Macro-actions	Actions
Energy renovation	Energy renovation of public buildings Energy renovation of private buildings Energy efficient public lighting Energy efficient water supply services
RES development	Photovoltaic Biomass Wind energy Hydroelectric Geothermal District heating and co-generation
Transport	Electrification of public transportation Electrification of private mobility Support to modal shift (from private car to public transport or soft mobility)
Intangible measures	Support to the establishment of REC (Renewable Energy Communities)

For each action, this section points out: i) the main objective to achieve in order to enable its implementation; ii) the basic datasets needed to reach this objective in the most complete manner possible, as well as their main characteristics: type (vector or raster), useful data embedded, and possible data sources.



The second section, instead, reverses the approach, starting from the datasets (in alphabetical order) and putting them into connection with the relevant macro-actions and actions.

In this way, IMTSs can use the guidelines in two ways:

- 1) to find out what data they need to effectively plan and implement a certain action (or sets of actions) in order to achieve clean energy transition;
- 2) given a certain datum or dataset, to understand what it can be used for clean energy transition purposes, i.e. which actions it can support.

The third section provides some indications on data collection, while Section 4 gives indications on how to organize the database.

1.1. Section 1: from actions to datasets

1.1.1. Energy renovation

Energy renovation of public buildings

Rationale and objective: Getting to know the technical and architectural characteristics of the existing public buildings that are relevant to energy consumption (i.e. the technology and materials used for their construction) and to the design, implementation and management of energy renovation actions (property, end use...), as well as their present energy consumption (in kWh/year).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Public buildings	Vector polygons	Age of construction Building technology No. of storeys No. of dwellings End use Installed systems (for lighting, heating, etc.) Features of lease contracts (for residential buildings such as public housing) Current energy consumption (electricity, heat) Property	Local public authorities (i.e. Municipalities, Provinces, Regions) Cadastral data managing bodies Energy services managing bodies Statistic services managing bodies



Energy renovation of private buildings

Rationale and objective: Getting to know the technical and architectural characteristics of the existing private buildings (both residential and non residential) that are relevant to energy consumption (i.e. the technology and materials used for their construction) and to the design, implementation and management of energy renovation actions (property, end use...), as well as their present energy consumption (in kWh/year).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Private building s	Vector polygons	Age of construction Building technology No. of storeys No. of dwellings End use Installed systems (for lighting, heating, etc.) Features of lease contracts Current energy consumption (electricity, heat) Property	Local public authorities (i.e. Municipalities, Provinces, Regions) Cadastral data managing bodies Energy services managing bodies Statistic services managing bodies

Energy efficient public lighting

Rationale and objective: Getting to know the present characteristics of public lighting installations that are relevant to their energy efficiency (i.e. the type of lamps used) and to the implementation of energy efficiency actions (i.e. the entity in charge of their management).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Public lighting	Vector points	Type of lamps Energy consumption Managing body	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies

Water supply services

Rationale and objective: Getting to know the present characteristics of the municipal water supply network that are relevant to understand the current energy consumption and to carry out energy efficiency actions (i.e. the entity in charge of their management). Therefore, essential information



mainly regards plants (or part of plants) that consume energy, for instance water purification facilities and pumping stations.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Water supply plants	Vector points	Type of plant Energy consumption Managing body	Local public authorities (i.e. Municipalities, Provinces, Regions...) Water supply services managing bodies Water plants managing entities

1.1.2. RES development

Photovoltaic

Rationale and objective: Getting to know the number and features of installed PV systems (size, energy production, property and entity in charge of their management) as a starting point to define future targets and identify opportunities for future developments; gathering all territorial information needed to detect the suitable areas for the installation of new PV systems, taking to account the existing orientations, restrictions and land use provisions (coming from spatial planning instruments and related by-laws), as well as the availability of grid connection.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Ground-mounted PV systems	Vector polygons Vector points	Type of installation Size of the system Energy production Managing entity Property of installation area	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Roof-mounted PV systems	Vector polygons Vector points	Type of installation Size of the system Energy production Managing entity Property of the building	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Building integrated PV systems	Vector points	Type of installation Size of the system Energy production Managing body	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies



Plan for the positioning of RES plants	Vector polygons Raster images	Competent authority Legal provisions Zoning (if any)	Local public authorities (i.e. Municipalities, Provinces, Regions...)
City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. environmental, archaeological...) Restricted areas Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)
Solar irradiation map	Raster images	Solar irradiation	National public authorities (i.e. Ministry for the environment) National research centres Research centres for climate
Cadastr	Vector polygons	Available publicly owned areas (location and size)	Cadastral data managing bodies Municipalities
Power supply network	Vector points	Primary and secondary power substations	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies

Solar thermal

Rationale and objective: Getting to know the number and features of installed solar thermal systems (size, production, property) as a starting point to define future targets and identify opportunities for future developments; gathering all territorial information needed to detect the suitable buildings for the installation of new systems, taking to account their end use (that influences domestic hot water consumption) and the existing orientations, provisions and restrictions (i.e. regarding buildings or areas of historical, architectural or artistic value).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Solar thermal systems	Vector polygons Vector points	Type of installation Size of the system Production Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Buildings (public and private)	Vector polygons Vector points	Property End use Domestic hot water consumption	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies



			National energy control bodies
City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. classified historical buildings) Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)
Solar irradiation map	Raster images	Solar irradiation	National public authorities (i.e. Ministry for the environment) National research centres Research centres for climate
Cadastral	Vector polygons	Available publicly owned buildings (location and size)	Cadastral data managing bodies Municipalities

Biomass

Rationale and objective: Getting to know the number and features of installed biomass plants, in order to size future targets and identify opportunities for future developments; gathering all territorial information needed to detect and identify the suitable areas for the installation of new plants, taking to account the existing orientations, provisions and restrictions (i.e. from the city plan) and the presence of companies whose production activities generate types of waste suitable for energy use, and can be therefore potentially interested in installing a biomass plant.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Biomass plants	Vector points	Type of plant Energy production Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Companies	Vector points Vector polygons	Type of company (legal status) Type of production Type of waste produced Size of production site Suitability for biomass production	Local public authorities (i.e. Municipalities, Provinces, Regions...) Business support organizations (i.e. Chambers of commerce, Farmers associations, etc.) Competent ministries (for industry, agriculture, etc.)
Plan for the positioning of RES plants	Vector polygons Raster images	Competent authority Legal provisions Zoning (if any)	Local public authorities (i.e. Municipalities, Provinces, Regions...)



City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. environmental, archaeological...) Restricted areas Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)

Wind energy

Rationale and objective: Getting to know the number and features of installed systems and gathering all information needed to identify the suitable areas for the installation of new systems, taking into account wind energy potential, characteristics of the terrain, possible restrictions, and availability of grid connection.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Wind energy installations	Vector points	Type of plant Energy production Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Plan for the positioning of RES plants	Vector polygons Raster images	Competent authority Legal provisions Zoning (if any)	Local public authorities (i.e. Municipalities, Provinces, Regions...)
City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. environmental, archaeological...) Restricted areas Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)
DEM (Digital Elevation Model)	Raster dataset	Topographic maps (elevation contours, etc.)	National public authorities (i.e. Ministry for the environment)
Wind map	Raster dataset	Wind speed Wind energy potential	National public authorities (i.e. Ministry for the environment) National research centres Research centres for climate
Cadastral	Vector polygons	Available publicly owned areas (location and size)	Cadastral data managing bodies Municipalities



Power supply network	Vector points	Primary and secondary power substations	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
-----------------------------	---------------	---	--

Hydroelectric

Rationale and objective: Getting to know the number and features of installed systems and gathering all information needed to identify the suitable areas for the installation of new systems, taking into account terrain characteristics, possible restrictions, and availability of the main energy source (hydrographic network and flow capacity of watercourses).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Hydroelectric plants	Vector points	Type of plant Energy production Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Plan for the positioning of RES plants	Vector polygons Raster images	Competent authority Legal provisions Zoning (if any)	Local public authorities (i.e. Municipalities, Provinces, Regions...)
City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. environmental, archaeological...) Restricted areas Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)
DEM (Digital Elevation Model)	Raster dataset	Acclivity map	National public authorities (i.e. Ministry for the environment)
Hydrographic network	Vector lines	Flow capacity of water courses	Local public authorities (i.e. Municipalities, Provinces, Regions...) National public authorities (i.e. Ministry for the environment)
Power supply network	Vector points	Primary and secondary power substations	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies



			National energy control bodies
--	--	--	--------------------------------

Geothermal

Rationale and objective: Getting to know the number and features of installed systems and gathering all information needed to identify the suitable areas for the installation of new systems, taking into account geological characteristics and possible restrictions.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Geothermal plants	Vector points	Type of plant Energy production Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
Plan for the positioning of RES plants	Vector polygons Raster images	Competent authority Legal provisions Zoning (if any)	Local public authorities (i.e. Municipalities, Provinces, Regions...)
City plan	Vector polygons Raster images	Zoning Legal provisions (Technical Implementation Rules)	Municipalities (offices in charge of urban planning)
Restrictions	Vector polygons Raster images	Type of restriction (i.e. environmental, archaeological...) Restricted areas Competent authorities	Local public authorities (i.e. Municipalities, Provinces, Regions...)
Hydrographic network	Vector lines	Underground waters	Local public authorities (i.e. Municipalities, Provinces, Regions...) National public authorities (i.e. Ministry for the environment)
Geological map	Vector polygons Raster images	Type of soil	Public research centres Local public authorities (i.e. Regions)

District heating and co-generation

Rationale and objective: Getting to know the number and features of installed systems and gathering all information needed to identify the suitable areas for the installation of new systems, taking into account the presence of industrial activities whose production processes are suitable for the purposes of heat production.



Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Companies	Vector points	Type of company (legal status) Type of production Type of waste produced Size of production site Suitability for heat production within district heating/co - generation plants	Local public authorities (i.e. Municipalities, Provinces, Regions...) Business support organizations (i.e. Chambers of commerce, Farmers associations, etc.) Competent ministries

1.1.3. Transport

Electrification of public transportation

Rationale and objective: Getting to know the characteristics of the public transport service currently provided, which are relevant to clean energy transition, and gathering all information needed to identify opportunities for the installation of e-charging stations and RES systems.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Local public transportation lines	Vector lines	Type of vehicles used Type of fuels used Energy and fuel consumption	Public transportation managing entity Local public authority (i.e. Municipality)
Local public transportation garages	Vector points	No. of vehicles stored Energy consumption	Public transportation managing entity Local public authority (i.e. Municipality)
Road network	Vector lines	Width of roads Speed limits Time limits Use limits (pedestrian areas...)	Local public authority (i.e. Municipality, Province, Region...) Digital maps providers (i.e. Openstreetmap, Google Maps...)

Electrification of private mobility

Rationale and objective: Getting to know the characteristics of the private mobility system, which are relevant to clean energy transition, and gathering all information needed to identify opportunities for the installation of e-charging stations and RES systems.



Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Public parking lots	Vector polygons	Area of parking lots	Local public authority (i.e. Municipality, Province, Region...) Digital maps providers (i.e. Openstreetmap, Google Maps...)
Buildings (public and private)	Vector polygons	End use of the buildings	Local public authority (i.e. Municipality, Province, Region...) Cadastral data managing bodies
City plan	Vector polygons Raster images	Zoning	Municipalities (offices in charge of urban planning)
Cadastrre	Vector polygons	Available publicly owned areas (location and size)	Cadastral data managing bodies Municipalities
Census divisions	Vector polygons	No. of residents Population density	Statistic services managing bodies

Support to modal shift (from private car to public transport or soft mobility)

Rationale and objective: getting to know the residents' mobility habits and the characteristics of the present sustainable mobility system (via train, bus and bicycle), along with the opportunities for the activation or extension of public transportation services or soft mobility infrastructure (i.e. cycle paths).

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Cycling network	Vector lines	Length of cycling paths	Local public authority (i.e. Municipality, Province, Region...) Digital maps providers (i.e. Openstreetmap, Google Maps...)
Rail network	Vector lines	Destinations and origins of trains	Local public authority (i.e. Municipality, Province, Region...) Rail service providers Rail network managing bodies Digital maps providers (i.e. Openstreetmap, Google Maps...)
Railway stations	Vector points	Services provided	Local public authority (i.e. Municipality, Province, Region...) Rail service providers Digital maps providers (i.e. Openstreetmap, Google Maps...)



Bus network	Vector lines	Destinations and origins of bus lines	Local public authority (i.e. Municipality, Province, Region...) Bus service providers Digital maps providers (i.e. Openstreetmap, Google Maps...)
Bus stations	Vector points	Services provided	Local public authority (i.e. Municipality, Province, Region...) Bus service providers Digital maps providers (i.e. Openstreetmap, Google Maps...)
Census divisions	Vector polygons	Mobility flows	Statistical services managing bodies
Interchange parking lots	Vector polygons	Area of parking lots	Local public authority (i.e. Municipality, Province, Region...) Bodies in charge of parking service management Digital maps providers (i.e. Openstreetmap, Google Maps...)
Cadastral	Vector polygons	Available publicly owned areas (location and size)	Cadastral data managing bodies Municipalities

1.1.4. Intangible measures

Support to the establishment of REC (Renewable Energy Communities)

Rationale and objective: getting to know the characteristics of the local energy demand and identifying the more suitable areas for the activation of the service, taking into account the characteristics of the buildings and of the grid, the presence of RES plants, the properties regime, and the planned land use.

Dataset	Type (for georeferenced databases)	Useful information	Possible data sources
Power supply network	Vector points Vector lines	Capacity Power stations	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies



Buildings (public and private)	Vector polygons	Age of construction Building technology No. of storeys No. of dwellings End use Installed systems (for lighting, heating, etc.) Features of lease contracts (for residential buildings) Current energy consumption (electricity, heat) Property (public or private)	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies Cadastral data managing bodies Statistic services managing bodies
RES plants	Vector points	Type of plant (energy source) Energy produced Managing entity	Local public authorities (i.e. Municipalities, Provinces, Regions...) Energy services managing bodies National energy control bodies
City plan	Vector polygons	Zoning	Local public authorities (i.e. Municipalities, Provinces, Regions...)
Census divisions	Vector polygons	No. of residents Population density	Statistic services managing bodies
Cadastre	Vector polygons	Available publicly owned areas (location and size)	Cadastral data managing bodies Municipalities

1.2. Section 2: from datasets to actions

Dataset ¹	Macro-actions and actions			
	Energy renovation	RES development	Transport	Intangible measures
Biomass plants		<i>Biomass</i>		
Building integrated PV systems		<i>Photovoltaic</i>		
Buildings (public and private)	<i>Energy renovation of public buildings Energy renovation of private buildings</i>		<i>Electrification of private mobility</i>	<i>Support to the establishment of REC</i>
Bus network			<i>Support to modal shift</i>	
Bus stations			<i>Support to modal shift</i>	
Cadastre		<i>Wind energy</i>	<i>Support to modal shift Electrification of private mobility</i>	<i>Support to the establishment of REC</i>

¹ In alphabetical order.



Dataset ¹	Macro-actions and actions			
	Energy renovation	RES development	Transport	Intangible measures
Census divisions			<i>Support to modal shift Electrification of private mobility</i>	<i>Support to the establishment of REC</i>
City plan		<i>Photovoltaic Biomass Wind energy Hydroelectric Geothermal</i>	<i>Electrification of private mobility</i>	<i>Support to the establishment of REC</i>
Companies		<i>District heating and co-generation Biomass</i>		
Cycling network			<i>Support to modal shift</i>	
DEM (Digital Elevation Model)		<i>Wind energy Hydroelectric</i>		
Geological map		<i>Geothermal</i>		
Geothermal plants		<i>Geothermal</i>		
Ground-mounted PV systems		<i>Photovoltaic</i>		
Hydroelectric plants		<i>Hydroelectric</i>		
Hydrographic network		<i>Hydroelectric Geothermal</i>		
Interchange parking lots			<i>Support to modal shift</i>	
Local public transportation lines			<i>Electrification of public transport</i>	
Local public transport garages			<i>Electrification of public transport</i>	
Parking lots			<i>Electrification of private mobility</i>	
Plan for the positioning of RES plants		<i>Photovoltaic Biomass Wind energy Hydroelectric Geothermal</i>		
Power supply network				<i>Photovoltaic Wind energy</i>



Dataset ¹	Macro-actions and actions			
	Energy renovation	RES development	Transport	Intangible measures
				<i>Support to the establishment of REC</i>
Public lighting	<i>Energy efficient public lighting</i>			
Rail network			<i>Support to modal shift</i>	
Railway stations			<i>Support to modal shift</i>	
RES plants				<i>Support to the establishment of REC</i>
Restrictions		<i>Photovoltaic Biomass Wind energy Hydroelectric Geothermal</i>		
Road network			<i>Electrification of public transport</i>	
Roof-mounted PV systems		<i>Photovoltaic</i>		
Solar irradiation map		<i>Photovoltaic</i>		
Water supply plants	<i>Energy efficient water supply services</i>			
Wind energy plants		<i>Wind energy</i>		
Wind map		<i>Wind energy</i>		



1.3. Section 3. Indications for data collection

1.3.1. Data quality

In order to be relevant to effective inter-municipal energy planning, data should be at a spatial resolution that is as near as possible to the municipal scale. They should also be as updated as possible, and come from official sources that properly check and validate their data, such as public authorities, national research centres, international organizations (i.e. EU agencies), etc. Moreover, for each dataset, the metadata should be available, complete and accessible as well, and should be made available for consultation by end-users, to ensure transparency.

1.3.2. Data formats

Data can be included in the database under different types of formats:

- **Vector formats.** The vector data (i.e. shapefiles) is represented by a shape (for example the municipal boundaries) and by a table that contains various information regarding the shape (for example, the population and surface area of the municipality). Common formats are: *.gpkg (Geopackage); *.shp (Esri Shapefile); *.geojson (Javascript Object Notation); *.kml (Keyhole Markup Language); *.sqlite (Spatialite); *.mif (Mapinfo).
- **Raster formats.** Raster data consist of data divided into pixels that contains visual information (i.e. a map) and/or data associated with a pixel (i.e. altitude, temperature, etc.). Common formats are: *.tiff, *.jpg, *.pdf.

Geodatabases can also make use of WMS data (acronym for Web Map Service), e.g. the remote visualization of raster data made available by the service provider (often on institutional websites), which can be viewed and consulted but not downloaded or kept on one's device, as happens with fully available raster and vector data.



1.4. Section 4. Indications for the database design

The database may collect, organize and display three categories of available data:

- 1) **Territorial data:** they help understand where the actions for clean energy transition can be implemented, providing information on land use (normally contained in spatial planning instruments), restrictions (protected areas, Natura2000 sites, areas of historical and archaeological interest...) and property that also serve to identify the actors to involve in the design, permitting and implementation process, and consequently the procedures to follow. Datasets within this category include the main networks, infrastructure and services relevant to mobility. They also include basic cartography and satellite images (i.e. Google Maps) that serve as a canvas to display the other relevant data.
- 2) **Environmental data:** they include all sets of data that contribute to define the energy potential of RES systems, i.e. the solar irradiation (to properly position and size solar systems), the wind speed (for wind turbines), the flow capacity of watercourses (for hydroelectric plants), etc.
- 3) **Energy data:** data related to the energy consumption of buildings and transportation, which serve to define energy needs and to identify the most energy intensive buildings and services that have to be prioritized for energy efficiency actions.

Each category includes different datasets (that can have diverse sources, formats and spatial resolution), as summarized in the table below.

Category	Dataset	Data
Territorial data	Basic cartography	-
	Satellite images	-
	City plan	Zoning Legal provisions (Technical Implementation Rules)
	Restrictions	Type of restriction Restricted areas Competent authorities
	Cadastre	Available publicly owned areas (location and size)



Category	Dataset	Data
	Plan for the positioning of RES plants	Competent authority Legal provisions Zoning (if any)
	DEM (Digital Elevation Model)	Topographic maps Acclivity map
	Census divisions	No. of residents Population density
	Road network	Width of roads Speed limits Time limits Use limits (i.e. pedestrian areas)
	Public parking lots	Area of parking lots
	Cycling network	Length of cycling paths
	Rail network	Destinations and origins of trains
	Railway stations	Services provided
	Bus network	Destinations and origins of bus lines
	Bus stations	Services provided
	Interchange parking lots	Area of parking lots

Category	Dataset	Data
Environmental data	Solar radiation map	Solar irradiation
	Wind map	Wind speed Wind energy potential
	Hydrographic network	Flow capacity of the water course Underground waters
	Geological map	Type of soil
	Companies	Type of company (legal status) Type of production Type of waste produced Size of production site Suitability for biomass production Suitability for heat production from district heating/co - generation
Energy data	Buildings (public and private)	Age of construction Building technology No. of storeys No. of dwellings End use Installed systems Features of lease contracts



Category	Dataset	Data
		Current energy consumption Domestic hot water consumption Property
	Public lighting	Type of lamps Energy consumption Managing body
	Water supply plants	Type of plant Energy consumption Managing body
	RES plants	Type of plant (energy source) Size of the plant Energy produced Managing entity
	Power supply network	Capacity Power substations
	Local public transportation lines	Type of vehicles used Type of fuels used Energy and fuel consumption
	Local public transportation garages	No. of vehicles stored Energy consumption



2. Reporting of the activity

The construction of local geodatabases is a key aspect of the LIFE SMART project, as outlined in Work Package 3 (WP3), specifically in Task 3.1. This task focuses on the implementation of information systems aimed at raising awareness about local needs and opportunities to support decision-making on the energy transition. The timeframe for executing these activities is set from **April 2024 to December 2024**.

The outcome of this activity will be the deliverable (D1.3) "Collection of Country Reports on T.3.1", which will be an electronic document of approximately 60 pages. It will detail the structure of the geodatabases created in each target area, including a list of datasets and their sources, while highlighting the common requirements.

To ensure the success of this task, SMART teams—comprising experts and representatives from the involved municipalities, supported by project partners—will work together to construct these geodatabases. The databases will cover several critical categories, including basic territorial data (e.g., census data, land cover, public properties), land use restrictions (e.g., urban zoning, heritage sites, protected areas), and energy/emissions data (e.g., specific emission sources, existing renewable energy plants, results from energy audits). These validated datasets will be accessible to all stakeholders and will serve as a valuable resource for the Inter-Municipal Technical Structures (IMTSs) to plan, implement, and monitor clean energy transition strategies at the territorial level.

2.1. Report structure

Each partner involved in the LIFE SMART project was required to prepare detailed reports for each activity conducted under the project's umbrella. The purpose of these reports is to provide a comprehensive account of the activity, assess its impact, and learn from its execution. Here is the specified structure for these reports.

U-Space, as task leader, prepared a template to standardize the report structure once the databases were built in each country. Each report submitted by the partners followed the structure described below, ensuring that all partners provide consistent and complete information on their activities, which is essential for the development of deliverable D3.1: Compilation of national reports on database construction.



1. Introduction

- **Objectives of the database:** Explanation of the main purpose of the geodatabase and how it supports the energy transition in the target areas.
- **Context and Scope:** Explanation about the geodatabase and the scope of the information it provides.
- **Link to Geodatabase.**

2. Geodatabase structure

- Brief explanation of the geolocation tools and software used to build the database and brief explanation of the structure of the database, how it is used and how it has been developed (software, GIS, etc.).

3. Datasets

- **Data sources:** List the main sources used to collect the data in your region (census, territorial data, data sets, etc.)
- **Description of datasets:** Detailed list of datasets included in the geographic database, their type, origin and relevance for decision-making on the energy transition. Add the tables with the data listings that appear in the geo database.

4. Annexes

- Provide the most relevant materials in the local language (If any exists), as well as photos of the geodatabase.



3. Database report in Portugal – AREANATejo

3.1 Introduction

Objectives of the database

The main objective of the geodatabase is to serve as a centralized repository of energy-related data for the municipalities involved in the project. By consolidating and organizing this information, the geodatabase facilitates informed decision-making and strategic planning for the energy transition in the target areas.

Specifically, the geodatabase supports:

1. **Analysis and Planning:** Provides detailed information on energy consumption, infrastructures and policies, enabling effective planning to improve energy efficiency and adopt renewable energies.
2. **Monitoring and Communication:** Provides an organized structure for tracking progress on energy transition goals and sharing reports with stakeholders.
3. **Policy Development:** Acts as a reference for municipal and regional policymakers, ensuring alignment with broader sustainability and energy transition goals.
4. **Stakeholder Engagement:** Simplifies access to relevant data for stakeholders, promoting collaboration and shared responsibility in achieving energy transition goals.

This tool plays a crucial role in supporting municipalities to achieve their energy transition goals, promoting sustainable practices and strengthening regional energy resilience.

Context and Scope

The IEMSY platform provides a georeferenced database that enables the collection, organization and visualization of data on energy infrastructure in municipal buildings. The database includes information on the geographical location of installations, facilitating monitoring and integrated data analysis. The platform supports the management and optimization of energy solutions, promoting energy efficiency and sustainability. This database also proves useful for monitoring energy



Co-funded by
the European Union

Life SMART
Support small Municipalities towArds Energy Transition
(LIFE22-CET-SMART)



consumption patterns and assessing the environmental impact of the solutions implemented in communities.

Link to Geodatabase

IEMSY - Intelligent Management Energy System: <https://areanatejo.iemtsy.net/>

3.2. Geodatabase structure

The geodatabase of the IEMSY platform was developed with the technical support of Irradiare, which provides support in making the platform operational. It uses GIS tools to store and organize geospatial data on the location of energy infrastructure in municipal buildings. The platform remotely reads energy consumption by allowing the network distributor to consult it, and regularly uploads the energy consumption reports provided by the energy supplier. The structure allows for efficient consultation and analysis of this data, making it easier to visualize and integrate new information as the platform evolves.

3.3 Datasets

Data sources:

- **Energy Consumption Reports:** Data from energy suppliers and the grid distributor, including regular reports on energy consumption.
- **Remote Consumption Reading:** Information obtained through authorized remote consultations with the network distributor, relating to the energy consumption of municipal buildings.
- **Survey of Municipal Building Registers:** Data obtained through field surveys to identify and register all municipal buildings and their characteristics relevant to energy management.



Description of datasets:

	Description	Source	Type of data	Relevance
Municipal Buildings	Geospatial data and physical characteristics of municipal buildings (location, area, use, type of construction)	On-site inspections	Geospatial, Qualitative	Allows buildings to be identified for energy efficiency and consumption optimization actions.
Buildings characteristics	Detailed information on the area, type of construction, age and use of municipal buildings.	Field surveys, Municipal registers	Qualitative	Supports the definition of specific energy efficiency solutions for each type of building.
Energy billing	Monthly and annual energy consumption and cost data for municipal buildings.	Energy suppliers	Quantitative	Crucial for monitoring consumption patterns and identifying opportunities for reduction.
Remote Consumption Reading	Real-time energy consumption data, obtained by allowing the network distributor to consult it.	Network distributor	Quantitative	Allows continuous, real-time monitoring, facilitating efficient energy management.



3.4 Annexes database report in Portugal – AREANATEjo

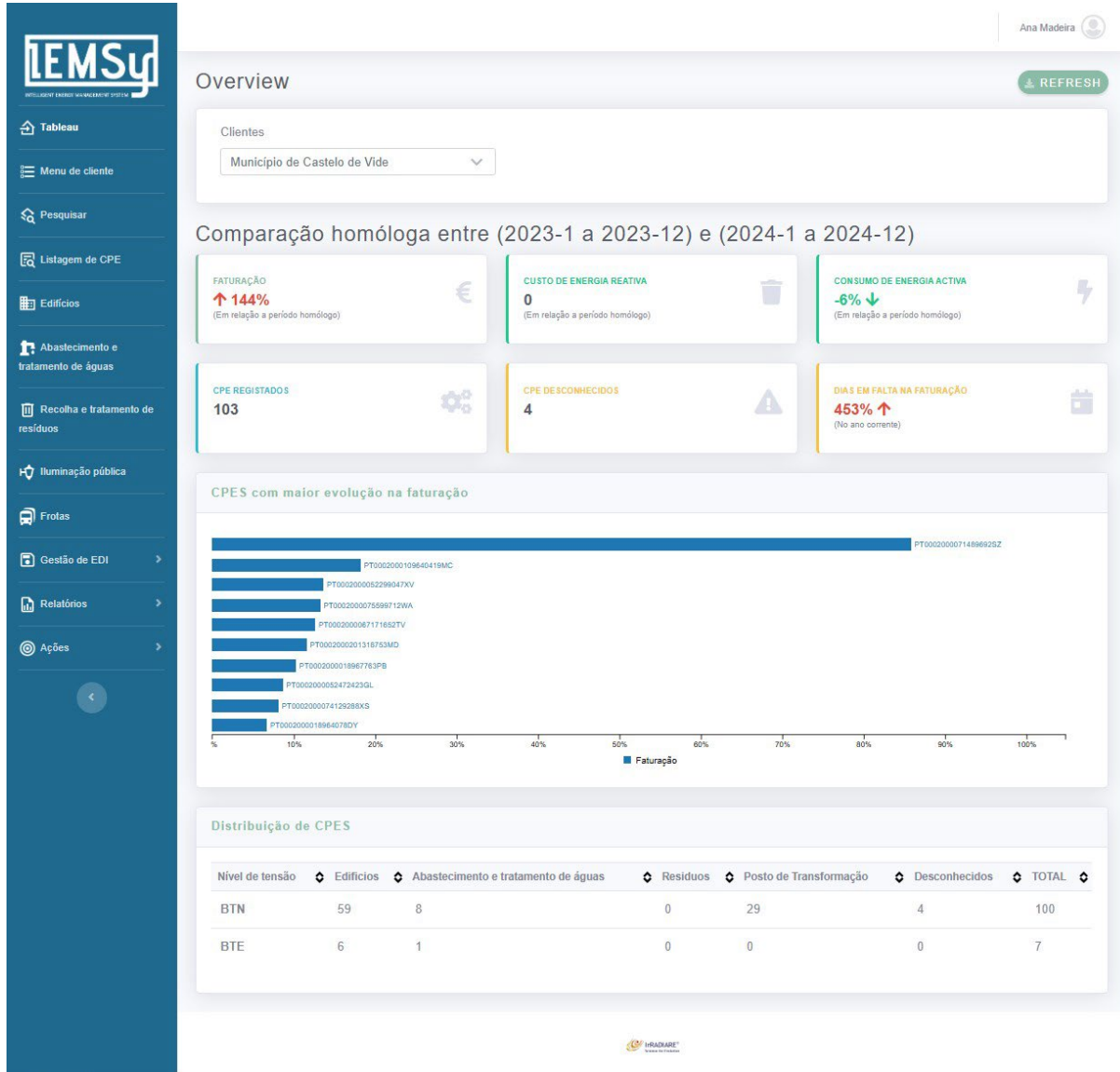


Fig. 1 – Dashboard overview



Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



Overview

Cientes
Câmara Municipal de Alter do Chão

Distribuição de CPES

CPE	Instalação	Tipo	Classe	Concelho	Morada	Primeira data telecontagem	Última data telecontagem	Cobertura telecontagem	Primeira data erodes	Última data erodes
PT0002000018830043TS	Coreto de Alter do Chão	Edifícios	Espaços de lazer	Alter Do Chão (Continente)	LARGO BARRETO CALDEIRA, 9004, 7440-022, -, 7440, 022, ALTER DO CHAO			NaN		
PT0002000018832288YY	Parque de Máquinas - 01	Edifícios	Serviços	Alter Do Chão (Continente)	TAPADA CEMITERIO, 9008, 7440-046, -, 7440, 046, ALTER DO CHAO	2023-10-23 00:15:00	2024-12-28 23:45:00	99.72		
PT0002000018832539VG	Igreja de Santo António	Edifícios	Equipamentos religiosos	Alter Do Chão (Continente)	RUA CONVENTO, 9002, 7440-021, 0-, 7440, 021, ALTER DO CHAO	2023-10-23 00:15:00	2024-12-28 23:45:00	98.1		
PT0002000018836511MC	Paços do Concelho	Edifícios	Administrativo	Alter Do Chão (Continente)	LARGO DO MUNICIPIO, 9001, 7440-026, -, 7440, 026, ALTER DO CHAO			NaN		
PT0002000018836544FF	Serviços Técnicos da	Edifícios	Serviços	Alter Do Chão	LARGO DO MUNICIPIO, 8,	2023-10-23	2024-12-28	100		

Fig.2 - List of consumption points being monitored.



Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)

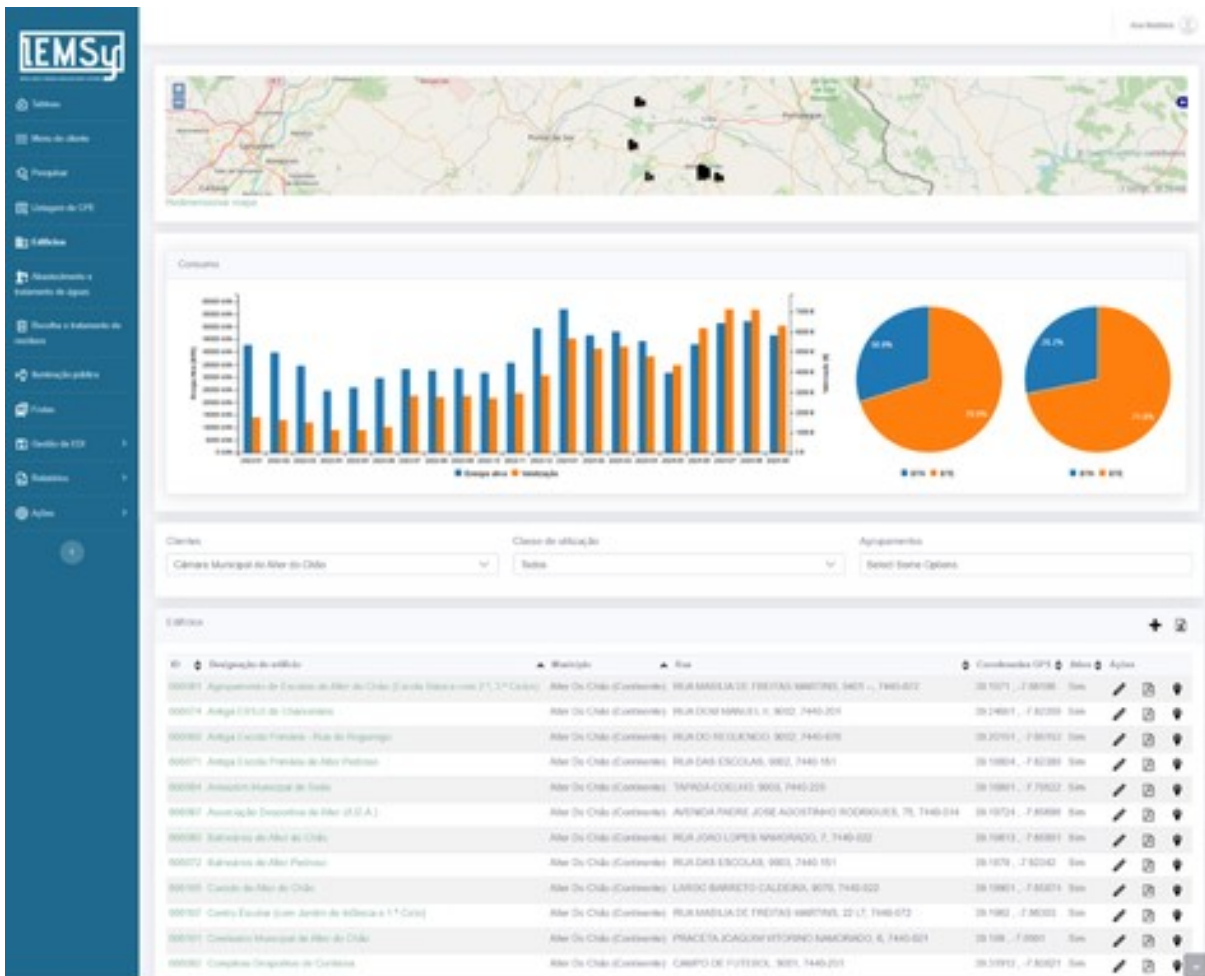


Fig. 3 – List of buildings under analysis

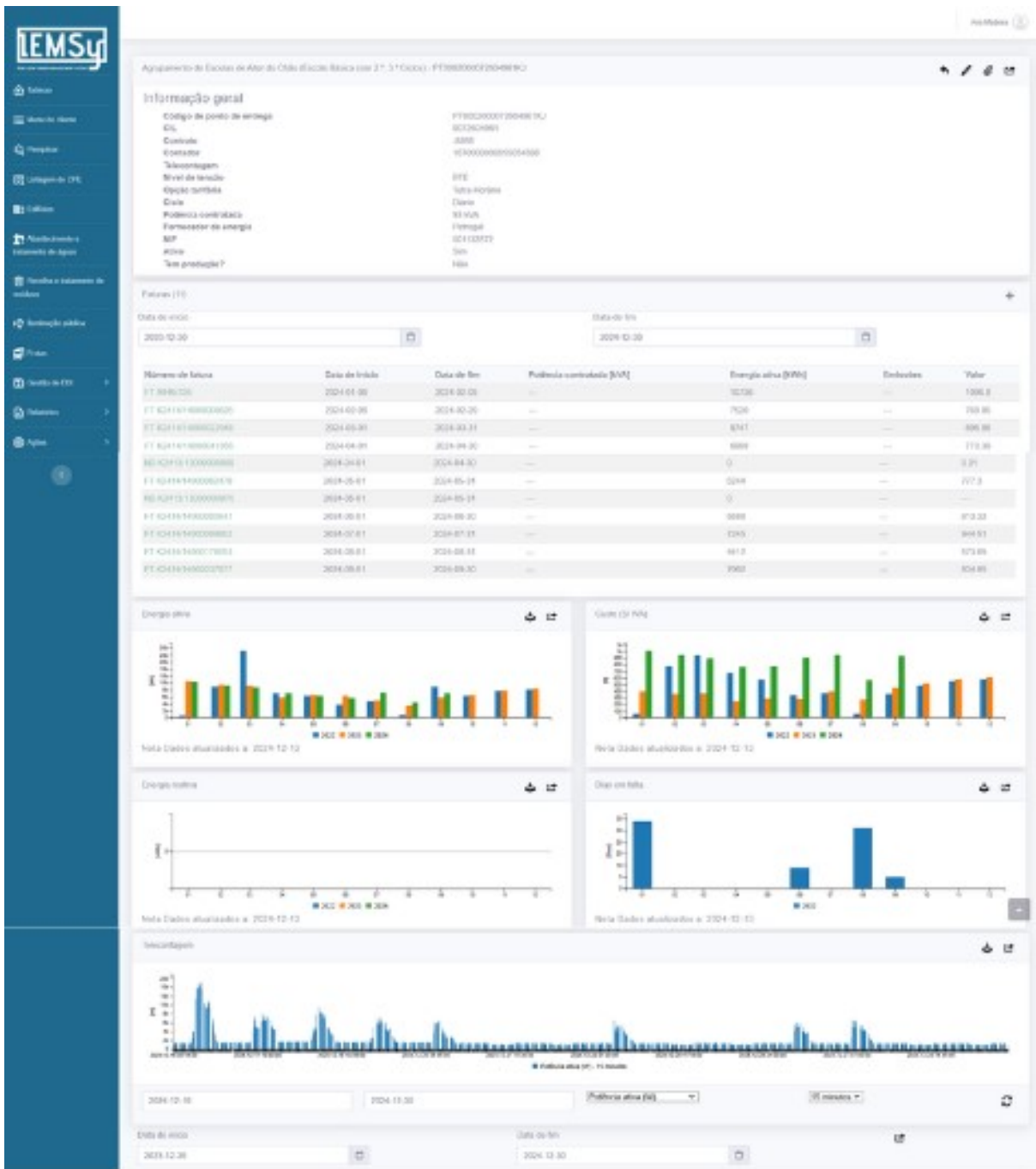


Fig. 4 - General energy characterization of the building



4. Database report in Spain – FAMP

4.1 Introduction

Objectives of the database

The main objective of this database is to facilitate decision-making in the identification, definition and implementation of measures that can contribute to the clean energy transition. These measures have been pre-identified and classified into four groups, according to the following table.

Group	Actions
Energy renovation	Energy refurbishment of public buildings Energy refurbishment of private buildings Renovation of street lighting Improving efficiency in water supply services
Renewable energy development	Photovoltaic Biomass Wind Hydraulics Geothermal Centralised heating and cooling systems and cogeneration
Mobility	Electrification of public transport Electrification of private mobility Support for modal shift (from private vehicle to public transport or soft modes)
Intangible measures	Support in the creation of Renewable Energy Communities

This proposal includes information on the content, structure and format of the database to be developed to be able to make decisions and plan the types of actions previously identified.



Context and Scope

The content of this database will refer to the municipalities involved in Spain: Baeza, Begíjar, Canena, Ibros, Lupion, Rus, Torreblascopedro and Villatorres, all belonging to the province of Jaén. It will contain data on land take, urban restrictions, public properties, emissions, energy sources and mobility, among others. The information collected will allow better analysis and strategic decision-making in the process of transition to clean energy in the territory. The ultimate objective is to create a database adapted and meaningful for the territory, which can be effectively used by the IMTS to design, plan, implement and monitor clean energy transition strategies at territorial level.

Link to Geodatabase

Geographical information platform on energy consumption in the municipalities of the western hill of Jaén: <https://lifesmartgeodatabase.famp.es/lalomaoccidental/>

4.2 Geodatabase structure

The data shall be added to the database in different types of formats:

- Data tables in Microsoft Excel with data structured by categories.
- Georeferenced points for each municipality.

4.3 Datasets

4.3.1 Buildings

A minimum of useful information available will be identified in order to be able to characterize in some way the building(s) on which it is decided to act.

It is divided into:

- Residential buildings.

Set	Type of Reference	Minimum information	Sources of information



Residential buildings	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Source of energy used • Energy consumption • CO2 emissions • Number of dwellings 	<ul style="list-style-type: none"> • Regional Government of Andalusia • Jaén Provincial Council • National Institute of Statistics
Tertiary sector buildings or services	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Source of energy used • Energy consumption • CO2 emissions 	<ul style="list-style-type: none"> • Regional Government of Andalusia • Municipalities
Municipal facilities buildings	Referenced in the location of the municipality	<ul style="list-style-type: none"> • Energy consumed by type of installation and total • Emissions by type of installation and totals 	<ul style="list-style-type: none"> • Municipalities

Information on the use of buildings (residential, educational, hotel, other services, etc.) and the type of property (public or private) must be provided by each City Council, in database or table format. Information concerning buildings of municipal facilities must also be provided by each City Council.

Regarding energy consumption:

The information on energy consumption by sector provided by the 'Carbon Footprint of the Municipalities of Andalusia' tool (Climate Change Office of Andalucía) will be used. Obtain information on the type of energy source used and together with the consumption of each, obtain CO2 emissions corresponding to each type of source and its consumption.



4.3.2. Street lighting

It will be necessary to have information regarding the street lighting of each municipality, such as total energy produced and emissions, as indicated below.

Set	Type of Reference	Minimum information	Sources of information
Street lighting	Referenced in the location of the municipality.	<ul style="list-style-type: none"> Total energy Total emissions 	<ul style="list-style-type: none"> Municipalities Concessionaires

The information will be provided by the municipalities or the companies concessionaires of the public lighting service.

4.3.3. Renewable energy

Photovoltaic

Photovoltaic installations, their installed capacity, generated energy and reduction of CO2 emissions will be registered in each municipality. The data will come from the Junta de Andalucía, the Andalusian Energy Agency and maps of renewable resources.

Set	Type of georeferencing	Minimum information	Sources of information
Photovoltaic systems	Referenced in the location of the municipality.	<ul style="list-style-type: none"> Power Generated energy Emissions 	<ul style="list-style-type: none"> Regional Government of Andalusia PRETOR. Government Electronic Headquarters

Solar Thermal

Solar thermal energy installations, installed area and generation capacity will be identified. The City Councils and the Junta de Andalucía will provide this information.



Set	Type of georeferencing	Minimum information	Sources of information
Solar thermal systems	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Surface area • Generated energy • CO2 emissions 	<ul style="list-style-type: none"> • Municipalities • Junta de Andalucía. https://www.juntadeandalucia.es/environment/portal/access-rediam • Miteco

Biomass

Information on biomass plants, fuel generated and annual production will be collected. The information will come from the Andalusian Energy Agency and business organizations in the sector.

Set	Type of georeferencing	Minimum information	Sources of information
Biomass installations	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Generated energy • CO2 emissions • Installed equipment and units in residential sector and services 	<ul style="list-style-type: none"> • Municipalities • Regional Government of Andalusia • Andalusian Energy Agency. Potential biomass map of Andalusia



4.3.4. Mobility

Mobility in private vehicle

Data on the number of vehicles, energy consumption and CO2 emissions will be included, as well as the charging points available to each municipality, with their corresponding information, obtained from the Junta de Andalucía and the Municipalities.

Set	Type of georeferencing	Minimum information	Sources of information
Vehicles	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Number of vehicles • Energy consumption • CO2 emissions 	<ul style="list-style-type: none"> • Regional Government of Andalusia
EV charging points	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Load type (AC/DC) • Number of charging points • Power • Manager 	<ul style="list-style-type: none"> • Municipalities
Bike lanes	Referenced in the location of the municipality.	<ul style="list-style-type: none"> • Extension of the bike lane network (km) 	<ul style="list-style-type: none"> • Municipalities

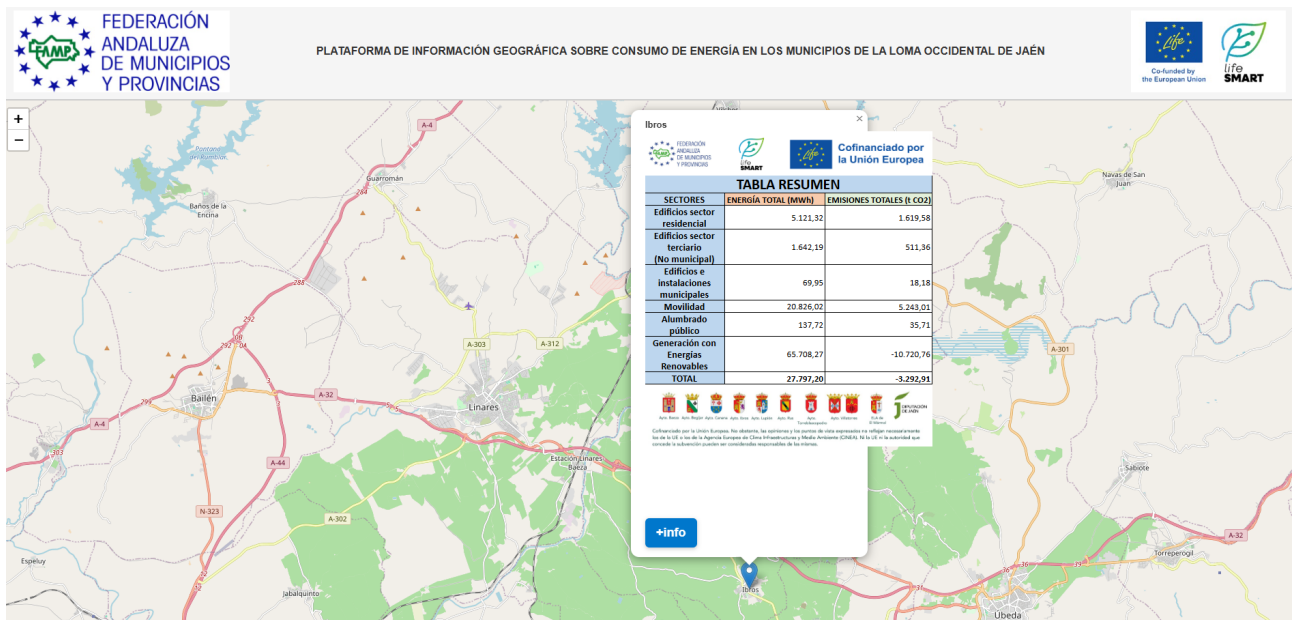
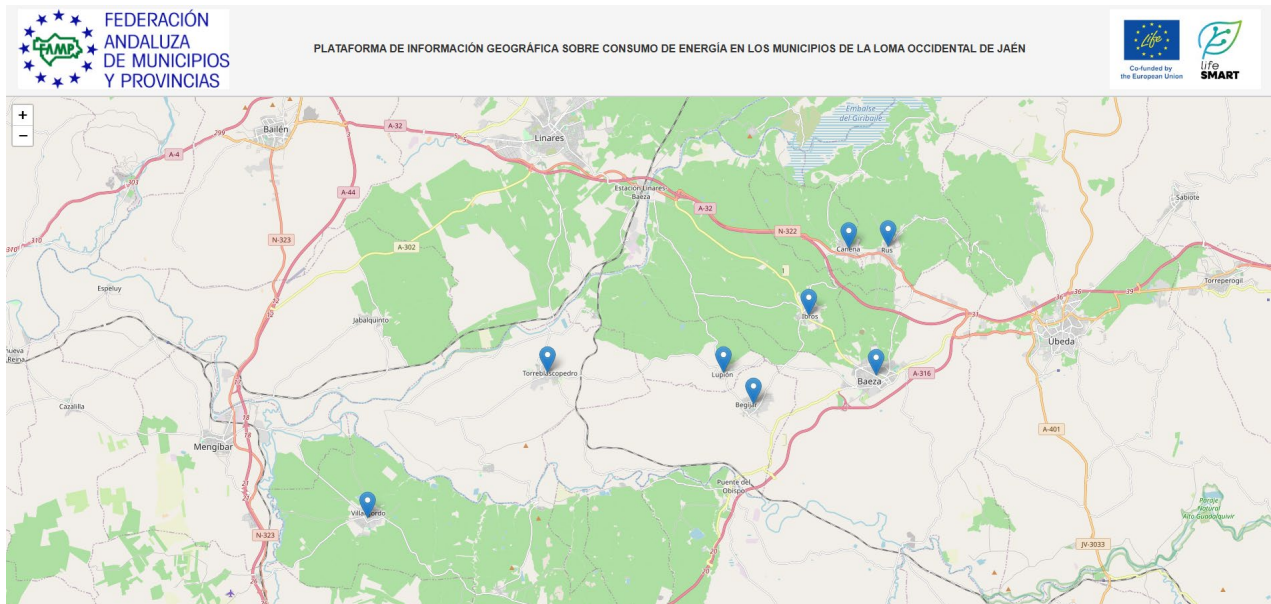


Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



4.4 Annexes database report in Spain – FAMP





Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



			Cofinanciado por la Unión Europea	
SECTOR		Energías Renovables		
Fuente de los datos obtenidos		 Agencia Andaluza de la Energía Consejería de Industria, Energía y Minas		
		 Junta de Andalucía Consejería de Sostenibilidad y Medio Ambiente		
		 Junta de Andalucía Consejería de Sostenibilidad y Medio Ambiente		
CONSUMO TOTAL DE ENERGÍA		EMISIONES TOTALES	FACTORES DE EMISIÓN	
Tecnología	MWh	t CO2	t CO2/MWh	
Fotovoltaica vertida a red	34.104,00	-11.288,42	0,331	
Solar térmica	67,47	0,00	-	
Biomasa	31.536,80	567,66	0,018	

NOTA: Los factores de emisión de los combustibles de la tabla son estimados, calculados según los datos aportados por la fuente indicada. El factor de emisión del consumo eléctrico es un dato oficial que proviene del documento "Factores de emisión de CO2 y coeficientes de paso a energía primaria del sector de edificios en España", reconocido por el Reglamento de Instalaciones Térmicas en los Edificios (RITE).

Biomasa por sectores			
RESIDENCIAL - Uso térmico			
Equipos instalados	Unidades	kW	
Calderas	5	161,4	
Chimeneas y estufas	6	67,9	
SERVICIOS - Uso térmico			
Equipos instalados	Unidades	kW	
Calderas	1	130	



			Cofinanciado por la Unión Europea	
SECTOR		Terciario. Edificios no municipales		
Fuente de los datos obtenidos		 Junta de Andalucía Consejería de Sostenibilidad y Medio Ambiente		
CONSUMO TOTAL DE ENERGÍA		EMISIONES TOTALES	FACTORES DE EMISIÓN	
Fuente de energía	MWh	t CO2	t CO2/MWh	
Gasóleo C	41,67	12,47	0,299	
GLP	47,22	11,75	0,249	
Fuente de los datos obtenidos				
CONSUMO TOTAL DE ENERGÍA		EMISIONES TOTALES	FACTORES DE EMISIÓN	
Fuente de energía	MWh	t CO2	t CO2/MWh	
Electricidad	1.178,25	390,00	0,331	
SECTOR		Otras administraciones públicas		
Fuente de los datos obtenidos		 Junta de Andalucía Consejería de Sostenibilidad y Medio Ambiente		
CONSUMO TOTAL DE ENERGÍA		EMISIONES TOTALES	FACTORES DE EMISIÓN	
Fuente de energía	MWh	t CO2	t CO2/MWh	
Electricidad	375,05	97,14	-	





5. Database report in Greece – ANATOLIKI

5.1 Introduction

Objectives of the database

The website depicts the overall area of interest of the project (municipalities: Aristotle & Volvis). It depicts on an interactive map the geographical administrative boundaries of the municipalities of the intervention area, other basic information about the area, as described below, and, mainly, the public/municipal buildings selected by the project partners and other interested parties, for which energy upgrade and energy saving plans and actions have been (or are to be) prepared.

Context and Scope

It incorporates the studies that have been prepared for this purpose. It will depict in the future the progress of the projects that have been designed for the buildings of interest as well as their result in terms of energy transition and energy saving and pollutant emissions.

Link to Geodatabase

Energy consumption of municipal buildings in the municipalities of Volve and Aristotelis:
<https://experience.arcgis.com/experience/38a0e89b471e4ca084a4636511140fd7>

5.2 Geodatabase structure

The geodatabase is structured in information levels (layers), each of which includes a similar set of geometric elements (points, lines, polygons). Each layer of information has been extracted from an appropriate, official website or repository of the Greek public administration, with all the information available for each feature.

5.3 Datasets

Data sources

The municipal or public buildings depicted have been selected in collaboration with the relevant municipalities, with the main criterion being the existence of an energy upgrade plan and the



existence of detailed data on their current condition (heating/cooling method, energy consumption, greenhouse gas emissions, etc.). They have been identified in Google Maps and placed on the ESRI background.

Each layer of information has been created/structured in ArcGis Pro, ver. 3.0, and then exported as a web layer in Arc Gis Online, where it has been configured as a free public access layer. The Database software used is Microsoft Access.

Description of datasets

- 1. Background map.** It is provided by ESRI under the name *OPENSTREET MAP* and is automatically adapted to the local language of the PC on which the software license is installed.
- 2. Municipalities of interest.** Administrative boundaries of the two First-degree Local Government Organizations. The information layer was extracted from the Greek government's geospatial data repository. From the information layer (which includes all the country's first-degree local government organizations), only the two cooperating municipalities were selected, using an appropriate filter, within whose boundaries the selected buildings of interest are located.

The address of the source data: <http://geodata.gov.gr/dataset/oria-demon-kallikrates>.

Its geometry is polygonal, and includes the fields:

FID (Feature Identity): a non-editable field representing a unique integral number as “identity” of each feature.

Shape: automatic filled by ArcGis Pro s/w, representing the type of geometry (polygon, in this case)

NAME: character string field (59 digits long) containing the name of each polygon (municipality) in Greek

KWD_YPES: a text (numeric) field (4 digits long) containing integral numbers, which are the code number addressed to each feature (municipality) by the Greek Ministry of Interior Affairs



3. **Corine Land Cover 2018 AOI.** It includes the land cover polygons of the Greek territory. It is part of the European project Copernicus (more info: <https://land.copernicus.eu/en>). “In its current form, the CORINE Land Cover (CLC) product offers a pan-European land cover and land use inventory with 44 thematic classes, ranging from broad forested areas to individual vineyards. The product is updated with new status and change layers every six years—with the most recent update made in 2018. CLC serves a multitude of users and has nearly limitless potential and actual applications, including environmental monitoring, land use planning, climate change assessments, and emergency management.” (source: <https://land.copernicus.eu/en/products/corine-land-cover>).

The layer downloaded from: <http://gis.ktimanet.gr/cachenascommon/> as file: clc2018_gr.zip and extracted in a local hard disk.

Then was clipped, using corresponding tool of GIS s/w, at the outer extents of the two *municipalities of interest*. Its geometry is polygonal and includes the fields:

OBJECTID: a non-editable field representing a unique integral number as “identity” of each object (feature).

Shape: a non-editable field, automatic filled by ArcGis Pro s/w, representing the type of geometry (polygon, in this case).

ID: an editable field, filled with an alphanumeric code, beginning with GR_, 18 digits long, special for each object (feature).

Area_Ha: a double precision, editable numeric field, expressing the feature area in Ha.

Remark: an editable, text string field, 20 digits long, containing any remarks about each feature.

Shape_Length: a non-editable, field, automatic filled by ArcGis Pro s/w, representing the whole length of each feature outline, expressed in local units (used also in the projection used for mapping data).



Shape_Area: a double precision, non-editable numeric field, automatic filled by ArcGis Pro s/w, representing the whole area of each feature, expressed in local units (used also in the projection used for mapping data).

CODE_18: an editable field, filled with an alphanumeric code, 3 digits long, expressing the code used in 2018 project's dataset for characteristic of each different land cover. (Full explanation of codes used by Corine project, both in English and Greek language, attached in the Annex – «Updated CLC illustrated nomenclature guidelines»).

level_1 (alias: **1st level code**): an editable field, created and filled by ANATOLIKI SA, filled with an alphanumeric code, 3 digits long. The field uses the 1st digit of the previous CODE_18 field. This code expresses the most generalized classification of land cover (values from 1 to 5). For more explanation on the significance of these codes, review the Annex – «Updated CLC illustrated nomenclature guidelines».

descr_1 (alias: **class 1 nomeclature**): an editable field, created and filled by ANATOLIKI SA, 128-digit long. It offers the nomenclature in English of most generalized classes of land cover. For more explanation on the names used, review the Annex – «Updated CLC illustrated nomenclature guidelines».

level_2 (alias: **2nd level code**): an editable field, created and filled by ANATOLIKI SA, filled with an alphanumeric code, 3 digits long. The field uses the first 2 digits of the previous CODE_18 field. This code expresses the 2-level generalized classification of land cover. For more explanation on the significance of these codes, review the Annex – «Updated CLC illustrated nomenclature guidelines».

descr_2 (alias: **class 2 nomeclature**): an editable field, created and filled by ANATOLIKI SA, 128-digit long. It offers the nomenclature in English of 2-level generalized classification of land cover. For more explanation on the names used, review the Annex – «Updated CLC illustrated nomenclature guidelines».

nomenclature (alias: **class 3 nomeclature engl**): an editable field, created and filled by ANATOLIKI SA, 255-digit long. It offers the full nomenclature in English of all classes of land cover. For more explanation on the names and methodology used, review the Annex – «Updated CLC illustrated nomenclature guidelines».



descr_1_el (alias: **class 1 nomenclature greek**): an editable field, created and filled by ANATOLIKI SA, 128-digit long. It offers the nomenclature in Greek of most generalized classes of land cover. For more explanation on the names used, review the Annex “corine_nomenclature_el.pdf”

descr_2_el (alias: **class 2 nomenclature greek**): an editable field, created and filled by ANATOLIKI SA, 128-digit long. It offers the nomenclature in Greek of 2-level generalized classification of land cover. For more explanation on the names used, review the Annex “corine_nomenclature_el.pdf”.

nomen_gr (alias: **class 3 nomenclature el**): an editable field, created and filled by ANATOLIKI SA, 255-digit long. It offers the full nomenclature in Greek of all classes of land cover. For more explanation on the names and methodology used, review the Annex “corine_nomenclature_el.pdf”

4. **gr_natura_v31_union_fin_Clip** (alias: **Natura areas in AOI Natura 2000 Network and protected areas**). The layer downloaded from: <http://geodata.gov.gr/en/dataset/to-diktuo-natura-2000-kai-prostateuomenes-periokhes>.

It includes all protected areas in Greece, according to European legislation. Then was clipped, using corresponding tool of GIS s/w, at the outer extents of the two *municipalities of interest*. The geometry is polygons and includes the fields:

FID: (Feature Identity): a non-editable field representing a unique integral number as “identity” of each feature.

Shape: automatic filled by ArcGis Pro s/w, representing the type of geometry (polygon, in this case) and including the geometry of each feature (polygon) described in internal s/w language

OBJECTID: a non-editable field representing a unique integral number as “identity” of each object (feature).

OBJECTID_1: an editable field representing a unique integral number as “identity” of each object (feature).

SITECODE: an editable field, 9-digits long, representing an alphanumeric code, starting with “GR” as characteristic of each object (feature).



SITETYPE: an editable field, 6-digits long, representing an alphanumeric code, starting with “GR” as characteristic of each object (feature).

SITECODE_1: an editable field, 9-digits long, representing an alphanumeric code, starting with “GR” as characteristic of each object (feature).

SITETYPE_1: an editable field, 6-digits long, representing an alphanumeric code, starting with “GR” as characteristic of each object (feature).

Shape_Length: a non-editable, field, automatic filled by ArcGis Pro s/w, representing the whole length of each feature outline, expressed in local units (used also in the projection used for mapping data)

Shape_Area: a double precision, non-editable numeric field, automatic filled by ArcGis Pro s/w, representing the whole area of each feature, expressed in local units (used also in the projection used for mapping data).

SITE_NAME_: a 255-digit long text string field, containing the official name of the site in Greek language

SITE_NAME1: a 255-digit long text string field, containing a name of the site.

- 5. Buildings of interest:** A layer containing point-type features, representing the buildings for case study. Created by ANATOLIKI SA, in collaboration with local municipal authorities, and containing the fields:

OBJECTID: a non-editable field representing a unique integral number as “identity” of each object (feature).

usage: a text-string, 64-digits long field reporting the current usage of the building (reported by municipal authority)

municipality: a text-string, 32-digits long field reporting the current name of the municipal competent authority



year_of_construction: a numeric field for the year of construction of the building, reported by competent authority

address: a 64-digits long text string field, containing the address for the building, reported by competent authority

Total_surf (alias: **Total Surface (m²)**): a double-precision numeric field containing the total surface of the building, expressed in sq.m., reported by competent authority.

Roof_surf (alias: **Roof surface (m²)**): a double-precision numeric field containing the total roof surface of the building, expressed in sq.m., reported by competent authority.

floors (alias: **Floors**): a numeric field containing the number of floors of the building, reported by competent authority.

use: a 32-digits long text string field, containing the category of usage of the building (offices, educational etc).

building_technology: a 255-digits long text string field, containing information about the technology used for the construction of the building, as reported by competent authority.

technical_specifications: a 56-digits long text string field, containing information about specific technical specifications (Renewable Energy solutions) for each building, as reported by competent authority.

heating_system: a 56-digits long text string field, containing information about current heating system for each building, as reported by competent authority.

cooling_system: a 56-digits long text string field, containing information about current cooling system for each building, as reported by competent authority.

consumption (alias: **consumption (kWh/m²)**): a double-precision numeric field, containing information about the annual energy consumption of each building, expressed in kWh/m², as reported by competent authority.



annual_emissions (alias: **annual CO2 emissions (Kg/m²)**): a double-precision numeric field, containing information about the annual CO₂ emissions of each building, expressed in kg/m², as reported by competent authority.

energy_efficiency_class: a 4-digits long text string field, containing information about current energy efficiency class for each building, as reported by competent authority.

Primary consumption (alias: **Primary Consumption (kWh/m²)**): a numeric field, representing the energy use from primary energy sources (like natural gas, coal, or renewable energy) before any conversion, considering the area of the space being evaluated.

Primary savings (alias: **Primary energy savings (kWh/m²)**): A numeric field representing the percentage of primary energy saved when switching to a more efficient system or upgrading a building's energy efficiency class. This value is calculated by comparing the primary energy consumption of the reference system/building with that of the new, improved system/building.

Energy consumption target (alias: **Primary energy consumption TARGET**): a double-precision numeric field, with predefined goal to limit or reduce energy use within a specific timeframe. It is typically set based on past consumption and aims to improve efficiency, lower costs, and reduce environmental impact.

Total_annual_difference (alias: **Total annual Difference kWh**): a double-precision numeric field, containing information about the annual changes in energy usage, typically comparing the energy consumed before and after an energy efficiency improvement or system upgrade.

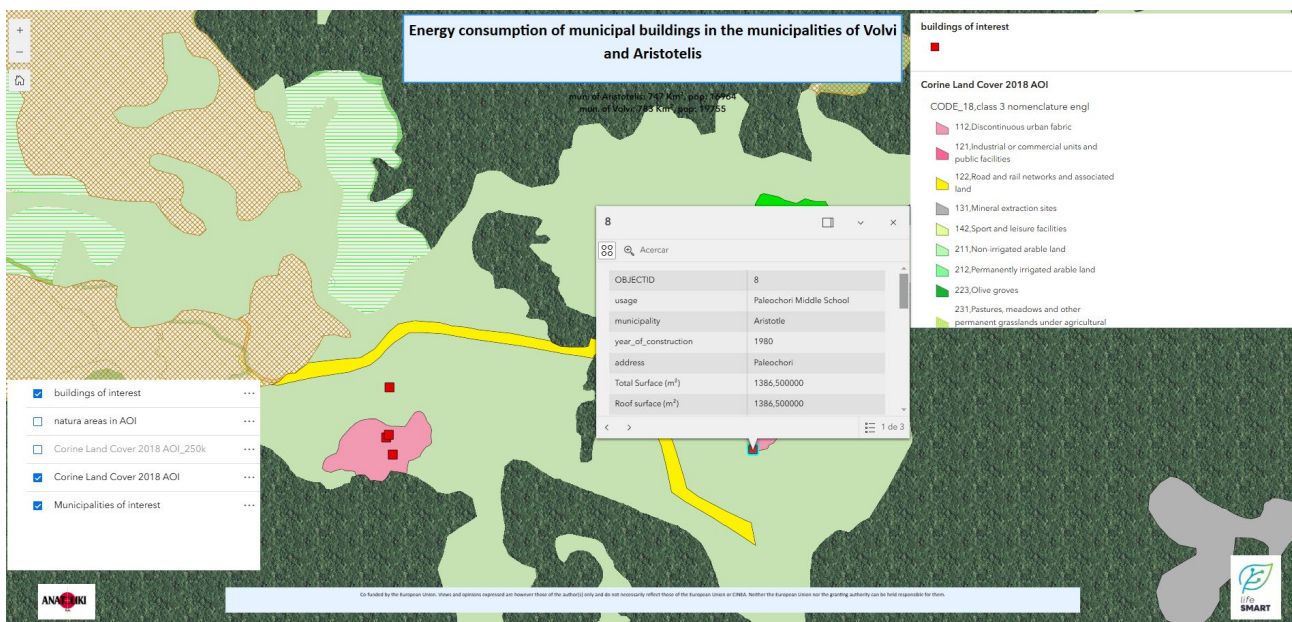
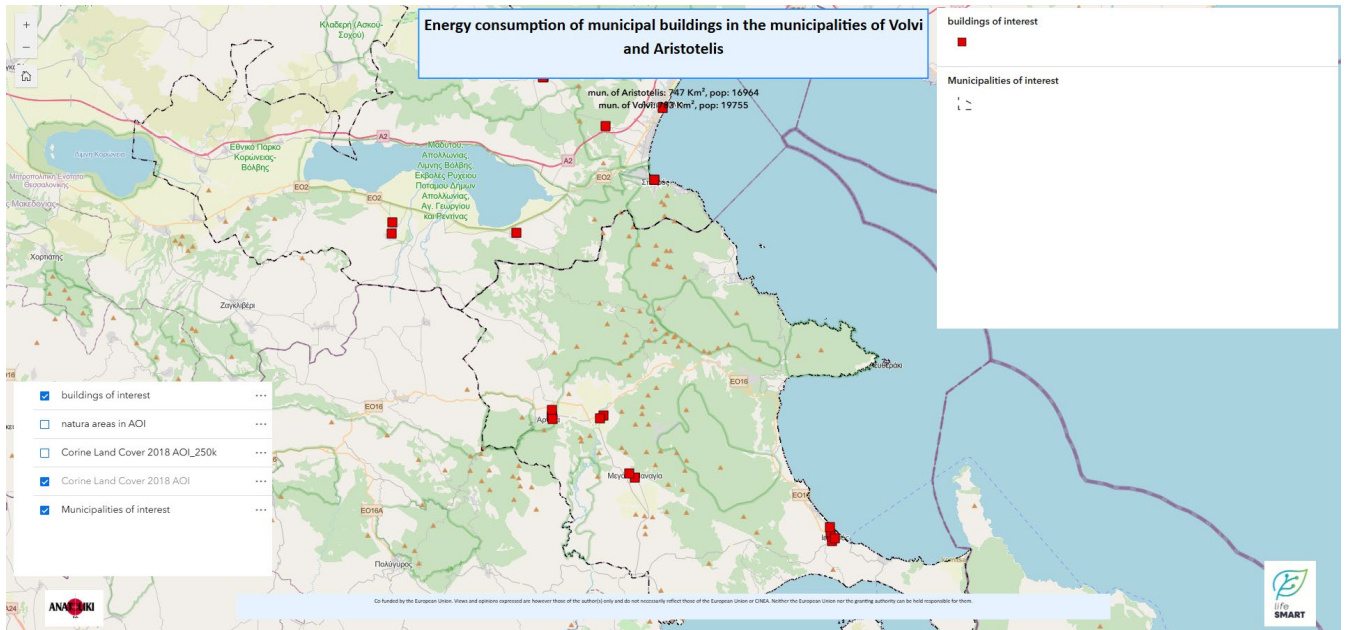
Population and total surface of the two municipalities of interest are reported from Greek Population Census 2021 (competent authority: *Hellenic Statistical Authority*, www.statistics.gr) and Greek Ministry of Interior Affairs respectively.

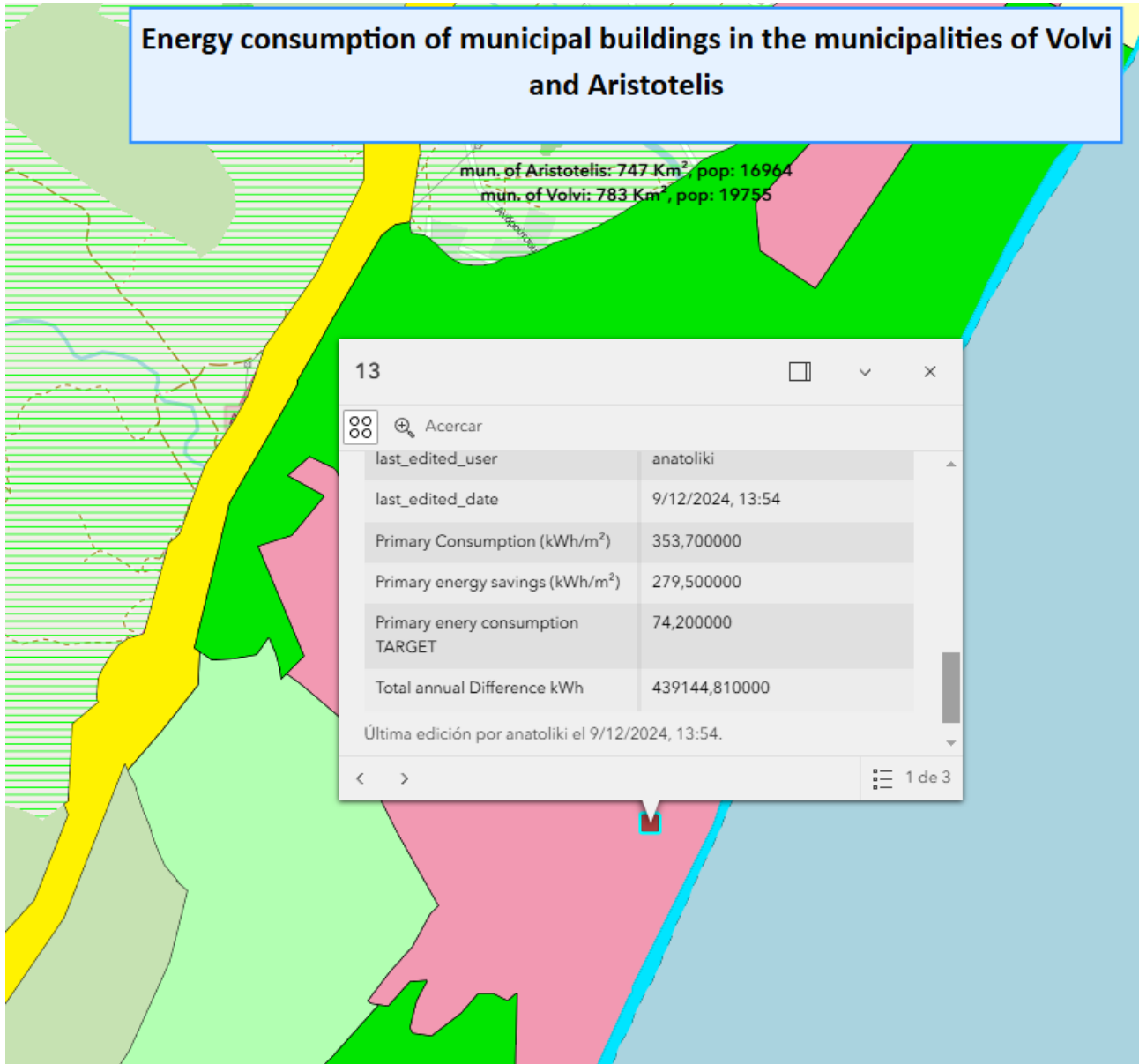
5.4 Annexes database report in Greece – ANATOLIKI

Updated CLC illustrated nomenclature guidelines.pdf



1. corine land cover project greek.pdf
2. corine_nomenclature_el.pdf
3. <https://www.ktimatologio.gr/pliroforiako-yliko/dasi-kalypsi-prostasia/40>







6. Database report in France – CCI NCA

6.1 Introduction

Objectives of the Database

The primary objective of the geographic database is to support the energy transition in the targeted areas by providing municipalities with a structured and comprehensive dataset. This database enables decision-makers to analyze energy consumption trends, identify opportunities for improving energy efficiency, and monitor the impact of implemented actions. By centralizing relevant data, it facilitates data-driven planning and helps local authorities optimize their energy strategies.

Context and Scope

The database gathers various information related to energy consumption in the municipalities involved in the project: Biot, Saint-Martin-Vésubie, Saint-Vallier-de-Thiery, and Tende. It includes data on energy consumption for public buildings and municipal assets. The data is sourced from energy providers, municipal records, and consumption reports, ensuring accuracy and relevance for decision-making. The platform integrates interactive visualization tools, allowing municipalities to monitor their energy consumption and support the implementation of their energy transition objectives.

Link to the Database :

<https://maps.paca.cci.fr/portal/apps/experiencebuilder/experience/?id=b811dcf68a92469a86185e45e6796aed>

6.2. Geodatabase structure

The development of the database and visualization tools relies on several technologies:

- **ArcGIS Enterprise:** GIS platform for managing, analyzing, and visualizing spatial data.
- **Enedis API:** Integration of energy consumption data provided by Enedis.
- **QGIS:** Open-source GIS software used for processing and analyzing geographic data.



Co-funded by
the European Union

Life SMART
Support small Municipalities towArds Energy Transition
(LIFE22-CET-SMART)



- **Python programming tools:** Scripts and libraries for advanced data analysis, structuring, and quality control.

These tools optimize data collection, processing, and utilization to improve the management of energy transition plans.

Using ArcGIS Enterprise for Energy Data Management and Visualization



ArcGIS Enterprise

Development of the Geodatabase

As part of the geodatabase development, we have implemented a solution based on ArcGIS Enterprise to structure, analyze, and visualize spatial data for local authorities. This approach allows municipalities to leverage their data intuitively and efficiently, using interactive maps, dynamic dashboards, and dedicated web applications.

Architecture and Deployment

We have structured the platform around several key components of ArcGIS Enterprise. Portal for ArcGIS serves as the centralized access point, where users can find and manipulate maps and applications. ArcGIS Server ensures the storage and sharing of GIS web services, while the Data Store optimizes the performance of hosted data layers.

With this architecture developed by the IT department of the Nice Côte d'Azur Chamber of Commerce and Industry (CCI NCA), we have deployed a secure and scalable infrastructure tailored to the needs of local authorities. Hosted on an internal server located in Nice, the platform ensures smooth data access while guaranteeing protection.

Creating Interactive Maps for Energy Transition

To provide a detailed visualization of municipal energy consumption, we have designed interactive maps accessible through the ArcGIS Enterprise Map Viewer. We first integrated various data sources, including Enedis, GRDF, IGN, and INSEE. After importing these as shapefiles, GeoJSON, or CSV files, we created and published Feature Services on ArcGIS Server, ensuring quick access to updated data.



We then configured the maps to enable an in-depth analysis of energy trends. By applying appropriate representation styles, we highlighted energy consumption by sector, using color gradients to differentiate consumption levels (Energy Performance Diagnosis – DPE). The integration of dynamic pop-ups displays key indicators for each building or area, such as annual consumption, multi-year trends, and the distribution of energy sources.

To enhance data exploration, we added interactive filters that allow users to select specific municipalities, building types, or analysis periods. Thanks to these functionalities, local authorities can quickly identify high-consumption areas and target improvement actions.



Implementing Dynamic Dashboards with ArcGIS Dashboards

ArcGIS Dashboards

To facilitate the monitoring of energy indicators, we have developed dynamic dashboards with ArcGIS Dashboards. These dashboards provide a synthetic and up-to-date overview of municipal energy consumption.

We have integrated multiple visual elements for intuitive data interpretation. Bar and pie charts compare consumption levels across activity sectors, while numerical indicators highlight essential data such as total annual consumption and multi-year reductions.

All these tools have been designed to offer a quick reading of trends and support decision-making.



Integrating Maps and Dashboards into ArcGIS Experience Builder

ArcGIS Experience Builder

To offer a comprehensive and user-friendly interface, we have integrated our maps and dashboards into an application developed with ArcGIS Experience Builder. This environment has enabled us to create a customized interactive experience, combining multiple visualization tools within a single workspace.

We have developed a layout model aligned with the project's graphic identity, structuring the application into several sections:

- **"Home" menu:** Provides an overview of the project, methodology, and details on the tools available on the platform.



- **"Municipalities" menu:** Displays key figures, an energy report, and an interactive consumption map for each municipality, highlighting key indicators and advanced filters to refine results based on user needs.

Utilization and Benefits for Local Authorities

With this platform, we have provided local authorities with a powerful tool to manage their energy transition. By leveraging data-driven insights and interactive visualization, municipalities can now:

- Monitor their energy consumption trends and identify patterns.
- Compare different areas to pinpoint high-energy-consuming buildings and target specific actions.
- Centralize their data in a secure and structured environment, facilitating collaboration between departments.
- Use the platform to generate reports and visual summaries, enhancing communication with decision-makers and citizens.
- Over time, assess the impact of implemented measures and adjust their strategy based on results.

6.3. Datasets

Data Sources

The data integrated into the geographic database comes from multiple sources, combining open data and specific partnerships:

- **Geographic data:** IGN (municipal boundaries, buildings, road networks, land use).
- **Demographic and territorial data:** INSEE (census, key socio-demographic indicators).
- **Infrastructure and facilities data:** INSEE - Base Permanente des Équipements (BPE).
- **Economic data:** INSEE - Information on businesses and economic activity in the municipalities.
- **Energy data:**
 - Open Data: Municipal energy consumption dashboard (Enedis, GRDF).



- Partnerships: Access to detailed energy consumption and production data via Enedis and GRDF APIs.
- **Field reports:** Interviews with technical advisors from the concerned municipalities to refine the accuracy and relevance of the data.

Description of Datasets

The database includes various datasets essential for decision-making in the energy transition process. These include:

- **Geographic data:** Mapping of public infrastructure, urban zoning, and land use.

Format: Shapefile, GeoJSON

- **Energy consumption:** Data on energy consumption and production (electricity, gas) by sector and use.

Format: PDF, Excel, CSV

- **Socio-economic indicators:** Demographic data, public facilities, and economic activities.

Format: Excel, CSV

- **Municipal-specific data:** Inventory of local initiatives in energy efficiency and renewable energy.

Format: Various

These datasets are structured into tables to feed the project's data mart. They are then made accessible through the developed platform, providing visualization and analysis tools to support local energy transition strategies.



Co-funded by
the European Union

Life SMART
Support small Municipalities towArds Energy Transition
(LIFE22-CET-SMART)



6.4. Annexes database report in France - CCI NCA

Links to the identified sources:

Enedis

[Accueil — Open Data d'Enedis](#)

GRDF

[Accueil — Open Data GRDF](#)

IGN

[IGN : produire et diffuser les données géographiques et forestières en France - Portail IGN - IGN](#)

INSEE

[Données locales | Insee](#)

[Dénombrement et géolocalisation des équipements en 2023 \(commerce, services, sport, santé...\) |](#)

[Insee](#)



Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



GeoDatabase Preview:

Tool features

The tool features several key functions tailored to the specific needs of the municipality.

Key figures

Dashboards for in-depth analysis of key indicators, including spatial aggregation and temporal analysis.

Global energy balance

Detailed monitoring of the municipality's energy consumption by sector, enabling more effective management and informed decisions on energy efficiency.

Interactive map

Instant visualization and monitoring over time of energy expenditure on municipal assets and main public infrastructures.

Interactive mapping provides a visual representation of **municipal infrastructures**, enabling the various sources of energy expenditure to be identified at the click of a button.

Integrated spatial analysis helps to identify areas of high and low energy efficiency, facilitating the prioritization of interventions. Finally, **time tracking and impact assessment of measures taken** are made possible thanks to dynamic analysis functionalities, supporting proactive and informed energy management.

[See municipalities](#)



Co-funded by
the European Union

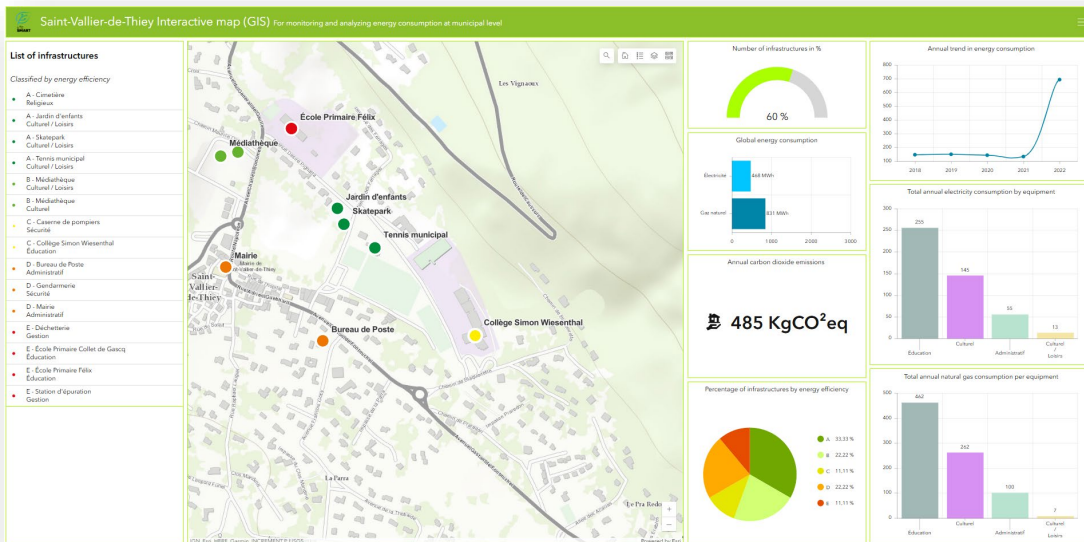
Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



Saint-Vallier-de-Thiey

Saint-Vallier-de-Thiey is a charming commune nestled in the hills of Grasse's hinterland, renowned for its unspoilt natural setting, medieval remains and Provençal tranquility.

Access to tools





Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



IGN website:



INSEE:





PRÉSENTATION DOCUMENTATION

Sommaire

Grille d'analyse

Les gammes d'équipements issues de la Base permanente des équipements

Téléchargement

Équipements géolocalisés 2023
Dénombrement des équipements 2023
Évolution des équipements 2018-2023

 Le **dossier complet** est composé d'un ensemble d'indicateurs sur une zone sélectionnée à partir de la commune. Il se présente sous forme d'un ensemble de graphiques et de tableaux sur un territoire et classé par thème (évolution et structure de la population, caractéristiques de l'emploi...).
Le **portrait de territoire** permet d'éditer les mêmes indicateurs sur une zone d'étude composée sur mesure (voir [documentation des portraits et autres rapports](#)).

 Le **comparateur de territoires** met à disposition une trentaine d'indicateurs synthétiques sur la population, le logement, les revenus, l'emploi-chômage et les établissements, avec la possibilité de comparer plusieurs territoires entre eux.

 Les **chiffres clés régionaux et départementaux** offrent des comparaisons sur ces territoires. Ils sont présentés sous forme de tableaux et de cartes et portent sur des thématiques variées.
Pour naviguer facilement au sein de l'offre d'une centaine de tableaux, il est vivement recommandé de sélectionner votre thème d'intérêt.

 L'**essentiel sur... une région** propose un panorama de la région de son choix à travers cinq thèmes (démographie, niveau de vie médian et pauvreté, produit intérieur brut, niveau d'éducation et marché du travail).
Ce produit interactif contient également un jeu de questions-réponses apportant des éclairages plus spécifiques.

 Le site **Statistiques locales** propose un outil cartographique permettant de représenter des indicateurs et de visualiser les données locales sous forme de cartes interactives, tableaux, graphiques, fiches de synthèse.
Il permet d'importer ses propres données pour les cartographier et les travailler avec celles de l'Insee (voir les modes d'emploi **simplifié** et **détaillé** de l'outil).

 L'**outil de cartographie interactive des données infracomunales** permet de visualiser et télécharger pour vos territoires les statistiques de l'Insee au niveau du carreau (200 mètres et un kilomètre de côté).
Il permet également d'exporter les données carroyées de la zone de son choix.
L'ensemble des fonctionnalités de l'outil est décrit dans la rubrique Aide accessible depuis le site.

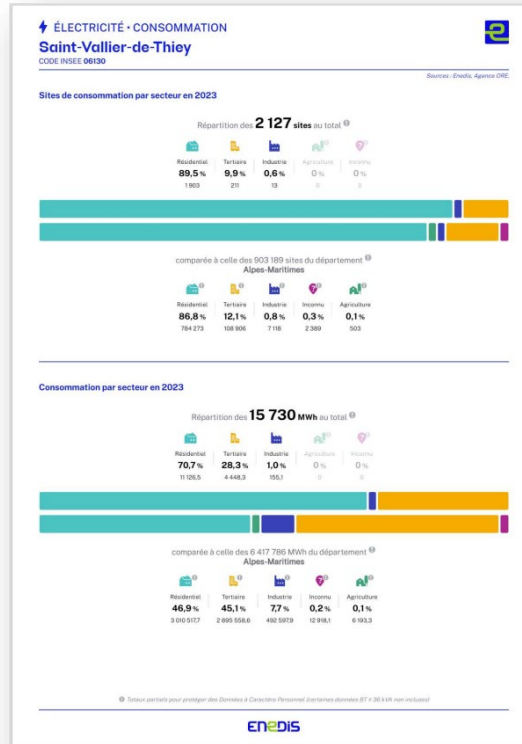


Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



Enedis and GRDF:





7. Database report in Italy – CMRC

7.1 Introduction

Objectives of the database

The primary objective of the geodatabase in Italy is to serve as a comprehensive and structured repository of energy-related data for the municipalities of the Valle Ustica. By consolidating and organizing geospatial and statistical information, the geodatabase provides valuable insights that support local decision-making in the energy transition process.

Specifically, the database aims to:

- Facilitate **analysis and strategic planning**, offering a centralized source of information on energy consumption, infrastructure, policies, and territorial constraints.
- **Support municipal decision-makers** by providing accurate and accessible data, enabling the development of energy efficiency and renewable energy initiatives.
- **Enhance monitoring and reporting**, allowing stakeholders to track progress in achieving clean energy goals.
- **Promote collaboration** among municipalities, policymakers, researchers, and the public by ensuring data transparency and accessibility.

Context and Scope

The geodatabase realized within the Italian target area aims to give to local actors a better overview about local needs and opportunities, to support the decision-making on the energy transition. It has been decided to insert the database on the Metropolitan City of Rome's GIS portal, so that data is available and visible to all, policy-makers, administration staff and citizens.

The database contains data at Municipal level, for the five Municipalities involved in the project (Licenza, Mandela, Percile, Roccagiovine and Vicovaro). Therefore, the data may be analysed and used both at municipal level and at Union level.



Link to Geodatabase

The GIS project entitled 'LIFESMART_ValleUstica' can be consulted on a web platform here:

https://q3w-suite2023.cittametropolitanaroma.it/it/map/life_smart/

7.2 Geodatabase structure

The infrastructure used is a modular client-server application, which makes it possible to directly publish cartographic projects, created with the Open Source software QGIS, while maintaining the associated graphic and information features. Other functionalities are: creation and management of search methods, online editing, activation of specific functional modules, management of users and user groups by defining different functional roles for each of them.

The development of the geodatabase was divided in three steps:

- 1- Research and data acquisition from already available statistical sources/databases: initial recognition of available and usable resources that could usefully be made available immediately to IMTS and the community;
- 2- Research and data acquisition from the territory - ad hoc for the project and specific to SMART energy issues: in addition to the first survey on the online geodatabases already available and directly usable by IMTS, it was decided to also construct a further georeferenced database to make available the data collected directly by the municipalities of the Ustica Valley and referring to the buildings and infrastructures of the municipalities, with the relevant energy utilities and consumption.
- 3- Collecting and systematising the database so that it is searchable (in a form that is not exclusively geographical): all collected and systematised datasets were incorporated into a Qgis project described in the next chapter. In addition to directly visualisable and interoperable data, external links to further usable databases were also made available.



7.3 Datasets

Starting from the guidelines provided on the construction of the database, a facilitation path was created by using and systematising on the one hand what was already available for use and on the other hand by pushing the various actors to find additional datasets useful for the purpose of the project.

Supra-local source datasets:

The information sets and georeferenced databases available and used in the initial survey refer to this preliminary list, borrowed from the guidelines provided by Uspace, and were then reorganised on the basis of the datasets actually available.

- Socio-economic aspects;
- Data useful for the economic characterisation of the territory and type of productive activities present
- Environmental reference framework (territorial framework, protected areas, hydrogeomorphological framework, superordinate constraints, etc.)
- As complete a statistical picture as possible of the territory's electrical and thermal consumption, aggregated by type of user (citizens or businesses);
- Description of the public transport system (consumption and mileage of the municipal fleet, school buses, etc);
- Water management system and if necessary data on water consumption;
- Waste management system and if necessary data on waste collection (in particular of the organic fraction);
- Census of RES plants of companies and private individuals as resulting from the GSE atlas.

Recognized available Datasets:

The main database is the GIS (Territorial Information System of the Metropolitan City of Rome <https://geoportale.cittametropolitanaroma.it/>), which constitutes an organisational tool for the various spatial data. Basic cartography is associated with data of various types: cadastral, environmental, statistical, geological, hydrographic, orographic, in the ownership of the Metropolitan City and other



Co-funded by
the European Union

Life SMART
Support small Municipalities towards Energy Transition
(LIFE22-CET-SMART)



territorial administrations. All data can also be downloaded by the **Metropolitan City's Open data portal** (<https://opendata.cittametropolitanaroma.it/>), divided into the different datasets.

The basic georeferenced information referring to the target area can be found on the **National Geodatabase** made available by the Italian Ministry for the Environment (<http://www.pcn.minambiente.it/viewer/>). This GIS tool is a package of maps with, among others, administrative boundaries, protected areas, primary and secondary schools, hydrogeological risk, grains and geological map.

Other similar tool is the **Open Data Lazio** (<https://dati.lazio.it/home>). The Open Data portal of the Lazio Region is the online platform for the publication in open format of data relating to all regional sectors of activity (health, budget, environment, etc.) and is also intended as a place of collection for the data of other territorial administrations, enterprises and other public and private entities, in order to create a shared regional information heritage. There are 402 datasets in this platform at this moment.

Even if the last update was in July 2021 a useful tool to recognize the presence of renewable plants is the **Atlaimpianti** (https://atla.gse.it/atlaimpianti/project/Atlaimpianti_Internet.html), provided by national energy agency GSE. Atlaimpianti is an interactive geographical atlas that allows you to consult the main data on the electricity and heat production plants that GSE incentivise and check their location throughout the country. Plant information is organised and subdivided by type, source used or incentive mechanism.

In order to evaluate the potential production of photovoltaic plants in a specific territory it is also available the European tool **PVGIS** (https://joint-research-centre.ec.europa.eu/photovoltaic-geographical-information-system-pvgis_en). PVGIS provides information on solar radiation and the performance of photovoltaic systems for any location in the world, with the exception of the north and south poles. Other similar tool, useful to evaluate the potential development of other renewable energies, are the **Atlante Biomasse** and **Atlante Eolico** (<http://atlantebiomasse.brindisi.enea.it/atlantebiomasse/mappe.html> and <https://atlanteolico.rse-web.it/>), developed by other national energy agencies.

Considering that an initial topic of great interest to the municipal administrations of the Ustica Valley and the communities themselves was the development of RECs, Renewable Energy Communities,



a further georeferenced tool useful for the development of RECs projects is once again made available by the national agency GSE. This is the section of the GSE portal (<https://www.gse.it/servizi-per-te/autoconsumo>) specifically dedicated to energy communities, including the useful map of primary substations, which is necessary to define the boundaries within which energy communities can be developed and benefit from the economic incentives that the national law has made available from January 2024.

National Portal of Electric Charging Stations: <https://www.piattaformaunicanazionale.it/idr>

ESPA (<https://www.espa.enea.it/>): Software tool for municipalities intending to implement climate mitigation actions. It contains the entire database of information managed by the national energy agency ENEA (including tax deductions for energy efficiency measures in buildings).

RSE (<https://www.rse-web.it/>): Ricerca sul Sistema Energetico, RSE S.p.A., is a company indirectly controlled by the Ministry of Economy and Finance through its sole shareholder GSE S.p.A. and has always been engaged in analysis, study and applied research in the entire energy sector. Its website contains publications and in-depth technical reports.

CATASTO RIFIUTI URBANO (<https://www.catasto-rifiuti.isprambiente.it/>): Database with official data at municipal level on waste production, waste management (with data on the various fractions collected and sent for recovery/recycling) and their unit costs.

DEMO ISTAT (<https://demo.istat.it/>): The national statistics institute Istat makes available the most recent official data on the population in Italian municipalities from the surveys carried out at the Registry and Civil Status Offices of the municipalities and from the Population Census. Customised queries (by year, territory, citizenship, etc.) make it possible to construct the tables of interest and download the data in a reprocessable format. It is also possible to find information on the main demographic phenomena, such as birth and death rates, resident population forecasts, the old-age index and average age.

ACI (<https://www.aci.it/laci/studi-e-ricerche/dati-e-statistiche/open-data.html>): the Italian automobile club provides an annual database, also at municipal level, of all motorised vehicles registered in Italy, broken down by vehicle category.



Additional Locally Produced Datasets

The information that the municipalities have collected in their territory refers to this preliminary list, then when the list of actual data was available it has been analysed and reorganised.

In this preliminary list the essential information to be collected from the Union and the Union's municipalities was primarily an inventory of the building stock, complete with the characteristics of each property and its electrical and thermal consumption, including areas potentially able to accommodate photovoltaic systems:

- List of Union and Municipal properties (type of assets and management models)
- Collection of electricity and heat consumption years 2021-22-23 (offices, schools, sports facilities, infrastructure, etc);
- List and characteristics of public buildings that have undergone energy efficiency measures in the last 5 years
- Collection of energy diagnoses of municipal buildings available to administrations
- Existing supply contracts and their expiry dates

Therefore, an inventory of infrastructural assets (lighting systems, pumping systems, charging stations, etc.), complete with a survey of the technological status and electrical and thermal consumption, and an annual and three-year OO.PP. plans of the Union's municipalities;

An overview of municipal-owned **renewable energy production** plants and any other plants present in the territory, with their type and power, which can also be deduced from participation in energy authorisation activities and building permit management.

- an overview of potentially 'suitable' areas for the installation of renewables in the territory, consistent with current national and regional regulations:
- solar sheets, roofs and land in the availability of municipal authorities and not potentially usable for the installation of RES plants



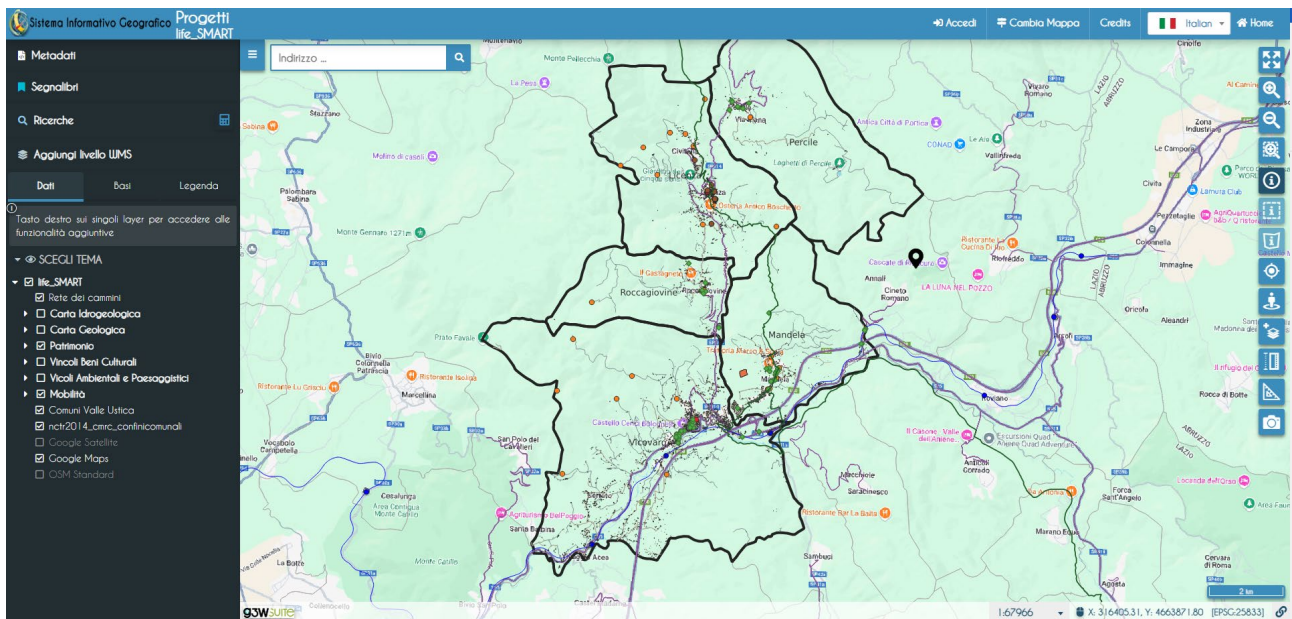
- a framework of development programmes for grid, electricity and gas infrastructures, for which municipalities have authorisation tasks.

Mapping of possible stakeholders:

- List of Civil Society Organisations, Companies, Public Sector, Schools, Universities that could be involved in the energy transition process.

Although an intensive data collection effort was made, the result achieved was, however, not fully satisfactory with respect to the indications contained in the preliminary list. In any case, a considerable amount of data and information was acquired that can certainly be useful in setting up some local energy transition actions, first and foremost the creation of a renewable energy community.

7.4 Annexes database report in Italy – CMRC





Indirizzo ...

Risultati
325623.68, 4653726.19

Edifici rilevanti PC (1)

id	592
fid	2332
cod_prov	058
cod_com	112
denomin	Palazzo Cenci Bolognetti
note	Piazza San Pietro
codprvcom	58112
legorig	edificio rilevante
classenom	EDIFICIO RILEVANTE
vigenza	NULL
filedelib	NULL
comune	Vicovaro
municipio	0
solopunti	NULL

Edificio (2)

id	objectid	edific_uso
424576	424576	95-altro

Accedi Cambia Mappa Credits Italian Home

Indirizzo ...

Risultati
326437.40, 4660144.32

Edifici rilevanti (1)

id	11
comune	Licenza
nome	Via Don Minzoni, 12
pod	IT001E65161031
indirizzo	Via Don Minzoni, 12
proprietà	Comunale
c_elettric	7.819
c_fornitur	30 kW
usi	Altri usi

Edificio (1)

id	476749
objectid	476749
edific_uso	0201-municipio
edific_ty	01-generica
edific_sot	01-non sotterraneo
classid	1318d035-85fe-45ad-a175-207755bbc7fe
edific_nome	MUNICIPIO DI LICENZA
edific_stat	03-costruito