

The GeoSmartCity Hub

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Business Analyst – Public Sector & Utilities





Sinergis is one of one of the major Geo-ICT companies in Italy.

6 locations
+70 staff
+350 customers
10mIn€

Topics

- Idea
- Concept
- Design
- Components
- Specialized services



The idea

Imagine that, in few years, all European cities will share geographic information being really interoperable, with the same semantic, encoding and licenses.

We started with the idea of a “hub” where to provide data related to “energy” and “underground” being interoperable as open&harmonized data.

The Hub concept

GeoSmartCity “Hub” is a software and hardware platform to catalogue, store, and make data available through web APIs.

The server software components expose interfaces for integrating, visualizing, analyzing and processing spatial and non-spatial data sources, allowing users to upload or connect their data sources, configure map visualizations and publish data through a web based user interface.

The list of installed basic applications is:

- Apache 2.4.7 (Web server)
- Tomcat 7.0.62 (applications server that contains applications packed as war)
- PostgreSQL 9.5.2 (Database server) PostGIS 2.2.1 (Spatial and Geographic objects for PostgreSQL extension)
- pgRouting 2.1 (Routing library for Postgis)
- OpenTripPlanner (Multimodal trip planning & analysis application)
- Virtuoso 07.20.3212 (database engine for RDF)
- SOLR 5.2.1 (indexer and search engine)
- CKAN 2.4 (Open-source data portal platform)
- GeoServer 2.7.1.1 (Map Server)
- Geonetwork 3.0.3.0 (Geospatial catalog)
- Geowebcache (Geoserver extension that create cache for layers)
- Re3gistry 1.0 (INSPIRE registry of codelists, codelist values and feature concepts)
- Python 2.7.6 (Programming language)

The GeoSmartCity HUB is distributed as a SaaS service or as virtual machines based on Ubuntu Linux available for download, in order to allow the reuse of all the software components developed for the project.

The benefit of the Hub lies simultaneously in:

- its innovative approach to bridging and bringing together public sector data infrastructures
- its extensive use of well-known open standards;
- its simplicity of implementation

Design of scenario data service

using existing transformation tools, whenever applicable, existing transformation services will be applied.

Task 3.3 - Design of the scenarios data services (SINERGIS)

According to the architecture and requirements defined in WP2 and output of Task 3.1 and Task 3.2, this task goal is to design the services related to ingestion, management and access for all the types of data (open GI, not GI and/or not-open data).

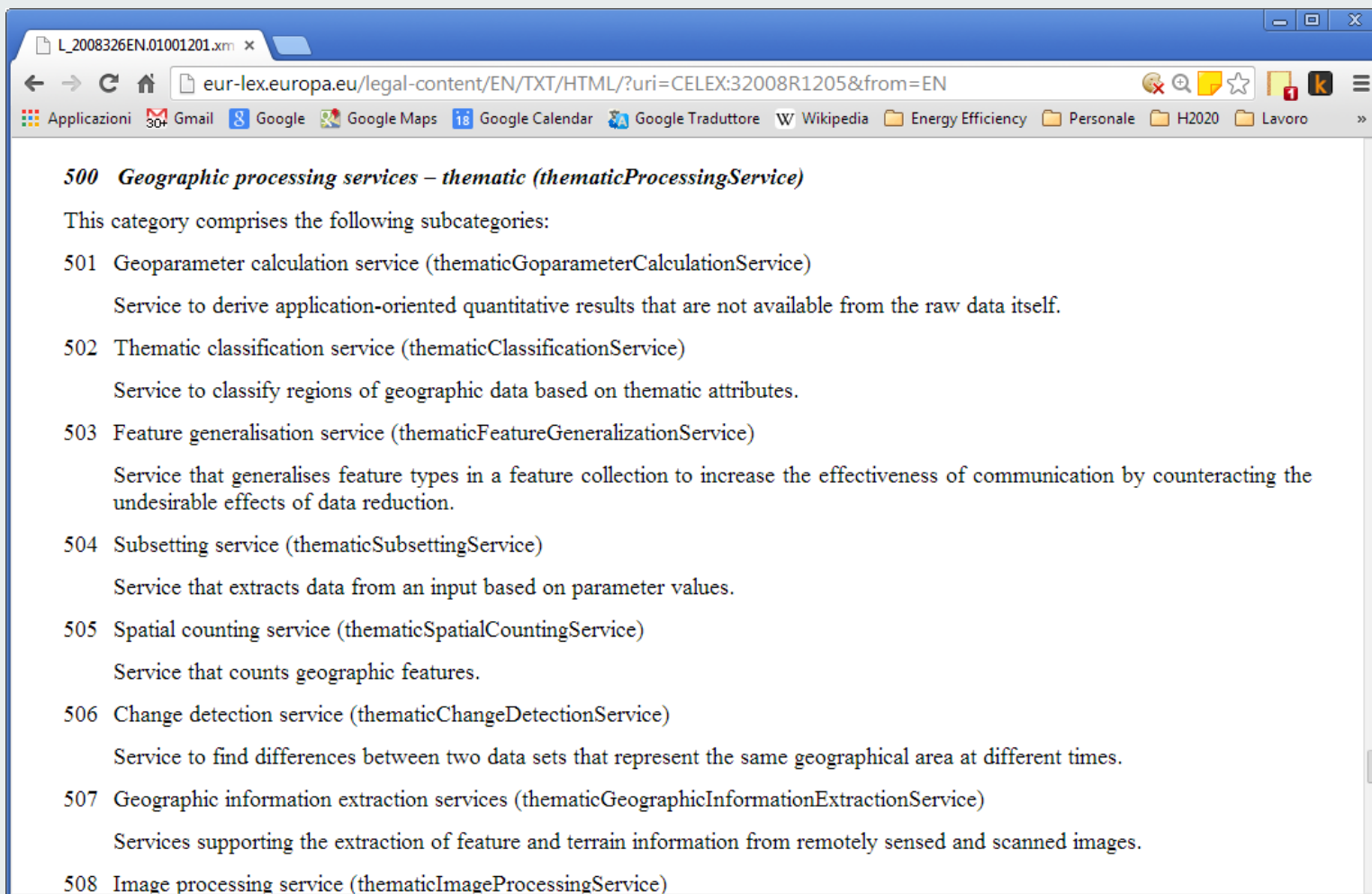
Services definition will be carried out in accordance with data models definition (T.3.1) and will be specific to the two scenarios: Underground and Green Energy.

The publishing data services will span from catalogue services (CSW) for browsing and searching data to services for data access and visualization (WMS, WFS, WCS). Sensor data will be available through some of the services of the SWE suite.

Client applications will be able to use these services directly (subject to security policies enforced by the access control components of the system) and implement some business logic locally (see WP5). On the other hand, specific business logic on the server will be implemented by specialised services (see WP4).

Ingestion services, which will take care of populating the data repository with the data harmonised in the Task 3.2, will require some development effort for adapting existing software to the project requirements or developing new ones from scratch. Publishing services will be put in place using existing open source implementation that will need only installation/configuration activities.

Design of scenario data service



500 Geographic processing services – thematic (*thematicProcessingService*)

This category comprises the following subcategories:

- 501 Geoparameter calculation service (*thematicGoparameterCalculationService*)**
Service to derive application-oriented quantitative results that are not available from the raw data itself.
- 502 Thematic classification service (*thematicClassificationService*)**
Service to classify regions of geographic data based on thematic attributes.
- 503 Feature generalisation service (*thematicFeatureGeneralizationService*)**
Service that generalises feature types in a feature collection to increase the effectiveness of communication by counteracting the undesirable effects of data reduction.
- 504 Subsetting service (*thematicSubsettingService*)**
Service that extracts data from an input based on parameter values.
- 505 Spatial counting service (*thematicSpatialCountingService*)**
Service that counts geographic features.
- 506 Change detection service (*thematicChangeDetectionService*)**
Service to find differences between two data sets that represent the same geographical area at different times.
- 507 Geographic information extraction services (*thematicGeographicInformationExtractionService*)**
Services supporting the extraction of feature and terrain information from remotely sensed and scanned images.
- 508 Image processing service (*thematicImageProcessingService*)**

Design of scenario data service

- Standard-based open services
 - OGC & INSPIRE (CSW, WMS, WFS, WCS, SOS)
 - INSPIRE Data Specifications (extended)
 - Well-documented APIs for open data and geospatial
 - ISA Core Vocabularies (RDF, SPARQL/GeoSPARQL)
- Reuse of INSPIRE reference platform
 - ARe3NA Registry
- Based on outcomes of other projects, e.g.
 - eENVplus - <http://www.eenvplus.eu/>
 - Sunshine - <http://www.sunshineproject.eu/>

Components

The **open data hub** is based on CKAN and other open source solutions, connected to **View and Download Services** provided GeoServer and enhanced by specialized pilot-driven geo-processing services.

Components

[What is the Hub?](#)[Project website](#)[Contact Us](#)[Log in](#)

Hub Core resources

GeoSmartCity Data Catalogue



An application to catalog different data sources, publish all or some of this information and produce a configuration JSON for its map display.

[Data Catalogue](#)

GeoSmartCity Data Portal



Data discovery in GeoSmartCity is managed by an instance of the **CKAN** software augmented by three extensions for custom metadata management.

[Data Portal](#)

GeoSmartCity Client Side API



A library for rapid spatial web application development. The library builds on **jQuery**, **OpenLayers3** and invokes methods from the GeoSmartCity Hub.

[Client API](#)

Hub Support resources

Components (Data Catalogue)

GSC Data Catalogue

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Menu

Data management ▾

- + Manage data sources
- + Manage data sets
- + Manage layers

Administration ▾

- + Manage users
- + Manage organizations

Manage data sources

Data source list		Create/edit data source	
ID#	Data source name	Type of data source	Actions
267	PostGIS database	PostGIS	Edit Delete
269	ESRI Shapefiles	Shape	Edit Delete
282	Review data source	Shape	Edit Delete

Components (Data Catalogue)

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Manage data sources

[Data source list](#)

[Create/edit data source](#)

Data source name*

PostGIS database

Data source description*

A PostGIS database running at SINERGIS' servers in Italy.

Organization*

AVINET - Asplan Viak Internet AS ▾

Type of data source*

PostgreSQL/PostGIS database ▾

Database host

gsm-db.nco.inet

Port number

5432

Database name

hub_reggio

Username

postgres

Password

.....

[Update](#)

Components (Data Catalogue)

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- ⊕ Manage layers

Administration ▾

- ⊕ Manage users
- ⊕ Manage organizations

Manage data sets

Data set list

[Create/edit data set](#)

[Edit data set fields](#)

Filter data sets by data source*

Please select a data source ▾

ID#	Data set name	Based on data source	Actions	
153	Luxembourg today	ESRI Shapefiles	Edit	Delete
152	New data set	Review data source	Edit	Delete
196	dataset	DSShapeTestDefault	Edit	Delete
148	DatasetPostgisGEOSERVER	DSPostgisGEOSERVER	Edit	Delete
300	name2	datasourcename	Edit	Delete
197	DST	datasourcename	Edit	Delete

Components (Data Catalogue)

GSC Data Catalogue

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- ⊕ Manage data sets
- ⊕ Manage layers

Administration ▾

- ⊕ Manage users
- ⊕ Manage organizations

Manage layers

Layer list

[Create/edit layer](#)

ID#	Layer name	Description	Actions	
153	Test layer PostGIS	Test	Edit	Delete
152	TestlayerGSC	Test	Edit	Delete
154	LayerEdifici1	Layer1	Edit	Delete
155	LayerEdifici2	Layer2	Edit	Delete
156	LayerBuildingsHUBREGGIO	Layer hub reggio	Edit	Delete
157	Layer_Andrea_test_Example	Layer Andrea test Example	Edit	Delete
158	Layer Andrea Postigs Example	Layer Andrea Postigs Example	Edit	Delete

Components

 GeoSmartCity *Hub*

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[Client API](#)


Hub Support resources



Components (Data Portal)

/ Datasets

 Filter by location [Clear](#)

 [Developers](#)
 July 11, 2016, direct tile service has been discontinued.

Please visit our blog post for more information:
<http://goo.gl/xBOxTt>
 Have questions? Contact us:
developer-services@mapquest.com
 Visit us:

Map data © [OpenStreetMap](#) contributors
 Tiles by [MapQuest](#)

Organizations

Tracasa (23)

Comune di Reggio-Em... (16)

Universitat de Girona (9)

Municipia (8)

 Add Dataset



73 datasets found

Order by: Relevance



GeoSmartCity harmonized dataset of buildings

This dataset has been generated in the context of GeoSmartCity project by the Municipality of Reggio nell'Emilia, based on different background data sources already available in...

Crowd-source events

This dataset contains events reported by users.

Thermal network in the City of Ruda, Alaska

Components (Data Portal)



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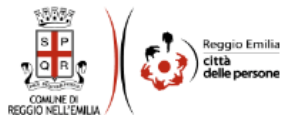
Energy certificates of buildings of Reggio Emilia territory

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Comune di Reggio-Emilia

The Municipality of Reggio Emilia, with a population of

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Energy certificates of buildings of Reggio Emilia territory

Energy certificates of real estate in the town of Reggio Emilia issued by Emilia-Romagna Region (SACE). Fields provide information on the certificate and key data relating to energy certification (eg. energy class, EP, ...)

Data and Resources



XLS

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PIAZZA DELLA VITTORIA N.5

Energy performance certificate of municipal building located in PIAZZA DELLA...

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Sample data Energy Certificate

OData endpoint <http://hub.geosmartcity.eu/catalog>

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The importance of being ... 'well described'

TO OPEN CAN

1. Place can on flat surface with tab nearest you and lift tab fully.
2. Turn can. Holding can firmly, peel lid back.
2. To fully remove, gently ease the lid off. If you prefer to use a can opener, please open the other end.

COOKING GUIDELINES

Empty contents into a saucepan and stir gently while heating. Do not boil or overcook as this will impair the flavour.

MICROWAVE (650W)

Empty contents into a suitable container. Cover and heat on full power for 2 minutes. Stir, then heat for a further 2 minutes until hot.

Empty unused contents into a suitable covered container. Keep refrigerated and use within 2 days.

INGREDIENTS

Beans (49%)
Tomatoes (27%)
Water, Sugar, Salt
Modified Cornflour
Spirit Vinegar
Spice Extracts
Herb Extract

HEINZ
ESTD 1869 ESTD

BAKED BEANS
in tomato sauce

57 VARIETIES

33p

✓ NO ARTIFICIAL COLOURS, PRESERVATIVES OR FLAVOURS

✓ SUITABLE FOR VEGETARIANS

✓ SUITABLE FOR A GLUTEN FREE DIET

Heinz
Made in England
H.J. Heinz Co. Ltd.,
Stockley Park, Uxbridge UB11 1HZ

e415a

7 0198 02019

HEINZ BEAN

HEINZ
BAKED BEANS
in tomato sauce

We are very proud of all our Heinz products which are made with secret recipes and use the finest ingredients. We're so confident that you will enjoy them, we make you this promise: if you are not delighted with this or any other Heinz product, simply write to us quoting the quality code on the can end and we will refund your money in full. Your statutory rights are not affected.

NUTRITION INFORMATION

Typical Values	Amount per 100g	Amount per Serving (207g)
Energy	312kJ/75kcal	646kJ/155kcal
Protein	4.7g	9.7g
Carbohydrate (of which sugars)	13.6g (6.0g)	28.2g (12.4g)
Fat (of which saturates)	0.2g (Trace)	0.4g (0.1g)
Fibre	3.7g	7.7g
Sodium	0.5g	1.0g

Per Serving (207g): 155 Calories 0.4g Fat

To find out more, visit our website at www.heinz.co.uk or write to the address on this can for one of our information leaflets.

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- The first data service we focused on is:
 - **metadata catalogue** (search, harvest, publish/transaction, ... of metadata), via APIs and OGC CSW standard
- All pilots are ready to provide INSPIRE-conformant metadata for geodata using:
 - EUOSME (Inspire Metadata editor)*
 - GeoSmartCity spreadsheet **
 - QGIS Qsphere 2.14 **

* already extended by eENVplus project

** implemented in GeoSmartCity with CSW-T functionality

GSC_Excel-2-CSW-T_geo [Compatibility Mode] - Microsoft Excel

	A	B	C	D	E	F
1	visibility	Show\Hide	select the pilot ---->>>	Marousi	Export XML	CSW-T
2	no	Metadata about metadata	File identifier	2016-04-19T184238		
3	no		Resource Type (M)	dataset		
4	no		Metadata point of contact (M)	Epsilon Greece		
5	no		Telephone	+39.0123.45678		
6	no		E-mail (M)	info@epsilon.gr		
7	no		Web site	http://www.epsilon.gr/		
8	no		Metadata date stamp (format YYYY-MM-DD) (M)	2016-04-19		
9	yes	General information	Coordinate Reference System (M)	http://www.opengis.net/def/crs/EPSSG/0/4936		
10	yes		Resource Title (M)	Footprint of buildings in the Municipality of Marousi		
11	yes		Temporal Reference (YYYY-MM-DD) (M)	2015-09-30		
12	no		Date Type	creation		
13	no		Unique resource identifier (M)	Footprint-of-buildings-in-the-Municipality-of-Marousi		
14	yes		Responsible organisation (M)	Epsilon Greece		
15	yes		Telephone	+39.0123.45678		
16	yes		E-mail (M)	info@epsilon.gr		
17	yes		Web site	http://www.epsilon.gr/		
18	yes		Role	owner		
19	yes		Resource abstract (M)	This dataset contains the footprint of all buildings within the Municipality of Marousi (Grece). The layer is based on topographic and cadastral maps and it is used as a reference dataset to ...		
20	no		Presentation format	mapDigital		

[GeoSmartCity spreadsheet on the Italian Metadata Catalogue portal](#)



rndt.gov.it

Repertorio Nazionale dei Dati Territoriali

Cos'è



Dati territoriali



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Reti di sottoservizi e SINFI, >
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aggiornate

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di supporto per le PA

Al via il GdL UNINFO sui >
profili dell'informazione
geografica

AdB Liri-Garigliano e >
Vulturno e Regione Umbria
nel RNDT

LandCity Revolution & >
OpenGeoData

I dati territoriali per il >
governo del territorio, un
workshop a Napoli

ITgeoConf: il punto >
sull'informazione geografica

Pubblicare metadati nel CSW attraverso un foglio di calcolo

Ultima modifica il Venerdì, 15 Aprile 2016 12:18Pubblicato Giovedì, 14 Aprile 2016 15:15



Tweet



Mi piace

2



Un po' di tempo fa, era stato reso **disponibile un foglio di calcolo** per compilare i metadati dei dati geografici e generare un file XML strutturato secondo le regole tecniche definite da INSPIRE e RNDT.

Uno strumento semplice pensato soprattutto per coloro che non hanno molta dimestichezza con complessi standard e specifiche tecniche e, soprattutto, non dispongono di piattaforme dedicate.

Quel foglio di calcolo ora è disponibile in una **nuova versione** (al momento solo in formato MS Excel) che permette di **pubblicare i metadati** creati su un catalogo online che esponga un'interfaccia **CSW**.

Così come la versione precedente, anche questo nuovo file Excel è stato elaborato nell'ambito del **progetto europeo GeoSmartCity** da **Sinergis**, partner insieme a **Epsilon Italia** (che ha contribuito alle fasi di test e revisione).

Il foglio di calcolo è disponibile in licenza CC-BY: chiunque può scaricarlo, modificarlo e usarlo autonomamente per compilare e pubblicare metadati.

Per qualsiasi informazione o chiarimento sull'uso è sufficiente inviare una mail a **info[at]sinergis.it**.

[GeoSmartCity spreadsheet on the Italian Metadata Catalogue portal](#)

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located in... read more	
Social	
Google+	
Twitter	
Facebook	
Dataset extent	
<div> <div>+</div> <div> <p>As of July 11, 2016, direct has been discontinued.</p> <p>Please visit our blog post information: http://goo.gl/xBOxXt</p> <p>Have questions? Contact us: developer-services@mapquest.com</p> <p>Visit us: developer.mapquest.com/</p> </div> <div>-</div> </div>	
Map data © OpenStreetMap contributors	
Tiles by MapQuest	
Field	Value
State	active
Last Updated	June 7, 2016, 12:21
Created	June 7, 2016, 09:10
Resource type	
Resource identifier	Reggio:Energy-certificates-of-buildings-of-Reggio-Emilia-territory
Resource language	eng
Topic category	Planning, Cadastre
Keywords	<p>Free</p> <ul style="list-style-type: none"> GeoSmartCity, Reggio, Energy certificates, background <p>GEMET - INSPIRE themes, version 1.0</p> <ul style="list-style-type: none"> Buildings
Geographic bounding box	10.49 44.62 10.77 44.78
Reference date	creation: 2015-09-30
Lineage	The data was provided periodically by Emilia-Romagna Region through extraction from SACE database and linked to topography and cadastre of the Municipality of Reggio Emilia
Spatial resolution	
Specification	Commission Regulation (EU) No 1089/2010 of 23 November 2010 implementing Directive 2007/2/EC of the European Parliament and of the Council as regards interoperability of spatial data sets and

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 Energy certificates of ...

Energy certificates of buildings of Reggio Emilia territory

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The Municipality of Reggio Emilia, with a population of

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Energy certificates of buildings of Reggio Emilia territory

Energy certificates of real estate in the town of Reggio Emilia issued by Emilia-Romagna Region (SACE). Fields provide information on the certificate and key data relating to energy certification (eg. energy class, EP, ...)

Data and Resources



XLS

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PIAZZA DELLA VITTORIA N.5

Energy performance certificate of municipal building located in PIAZZA DELLA...

[Explore](#)



Sample data Energy Certificate

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OData endpoint <http://hub.geosmartcity.eu/catalog>

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PIAZZA DELLA VITTORIA N.5

URL: <http://hub.geosmartcity.eu/catalog/dataset/80742f99-4b06-4861-bec4-32df6d7a49e1/resource/84092127-2fac-4616-849e-74037a0...>

Energy performance certificate of municipal building located in PIAZZA DELLA VITTORIA N.5

PDF

Embed

DATI DELL'IMMOBILE	DATI GENERALI
» Comune: H223 REGGIO NELL'EMILIA (RE)	» Zona Climatica: E
» Indirizzo: PIAZZA DELLA VITTORIA N.5	» Gradi Giorno: 2560,00
» Piano-Interno:	» Volume lordo riscaldato: 18303,50 m³
» Foglio-Particella-Sub: (133-124-2)	» Superficie utile riscaldata: 4101,74 m²
» Proprietario: -vedi foglio 3-	» Superficie disperdente: 6399,43 m²
» Destinazione d'uso: E4 - Edifici adibiti a mostre, musei e biblioteche, luoghi di culto e assimilabili	» Rapporto S/V: 0,35

CLASSE ENERGETICA

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Sample data Energy Certificate

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[Go to resource](#)
[Data API](#)

URL: <http://hub.geosmartcity.eu/catalog/dataset/80742f99-4b06-4861-bec4-32df6d7a49e1/resource/c93eb953-0651-4572-aba8-7820ccc...>

From the dataset abstract

Energy certificates of real estate in the town of Reggio Emilia issued by Emilia-Romagna Region (SACE). Fields provide information on the certificate and key data relating to energy...

Source: [Energy certificates of buildings of Reggio Emilia territory](#)

[Data Explorer](#)
[Embed](#)

Add Filter

Grid	Graph	Map	42 records	«	1	–	42	»	Q	Search data ...	Go »	Filters
_id	IDCertifi...	Regione	Provincia	Comune	Codice...	Indirizzo	DataRil...	Rilascia...	Unitalm...	ClasseE...		
1	277	Emilia-R...	Reggio ...	REGGIO...	00052-0...	via reiter, a	2009-01...	Marco Al...	E1 - Abit...	G		
2	590	Emilia-R...	Reggio ...	REGGIO...	00121-0...	Via Vladi...	2009-01...	linda iori	E1 - Abit...	G		
3	966	Emilia-R...	Reggio ...	REGGIO...	00346-0...	VIA OSP...	2009-01...	LUCA CI...	E1 - Abit...	E		
4	972	Emilia-R...	Reggio ...	REGGIO...	00346-0...	VIA OPE...	2009-01...	LUCA CI...	E1 - Abit...	E		
5	1005	Emilia-R...	Reggio ...	REGGIO...	00346-0...	VIA OSP...	2009-01...	LUCA CI...	E1 - Abit...	E		
6	1031	Emilia-R...	Reggio ...	REGGIO...	00346-0...	VIA OSP...	2009-01...	LUCA CI...	E1 - Abit...	E		
7	1303	Emilia-R...	Reggio ...	REGGIO...	00052-0...	Via Triss...	2009-01...	Marco Al...	E1 - Abit...	D		
8	1506	Emilia-R...	Reggio ...	REGGIO...	00145-0...	VIA SOC...	2009-01...	Gabriele...	E1 - Abit...	D		
9	1687	Emilia-R...	Reggio ...	REGGIO...	00145-0...	VIA SOC...	2009-01...	Gabriele...	E1 - Abit...	D		

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🏠 / Organizations / Comune di Reggio-Emilia / GeoSmartCity harmonized ... / WMS service

WMS service

🔧 Manage

🔗 Go to resource

URL: <http://labcatania.dedagroup.it/geoserver/MappaReggioEmilia/ows?service=wms&version=1.3.0&request=GetCapabilities>

Web Map Service for viewing energy classification of buildings ...

🗲 Map viewer

</> Embed



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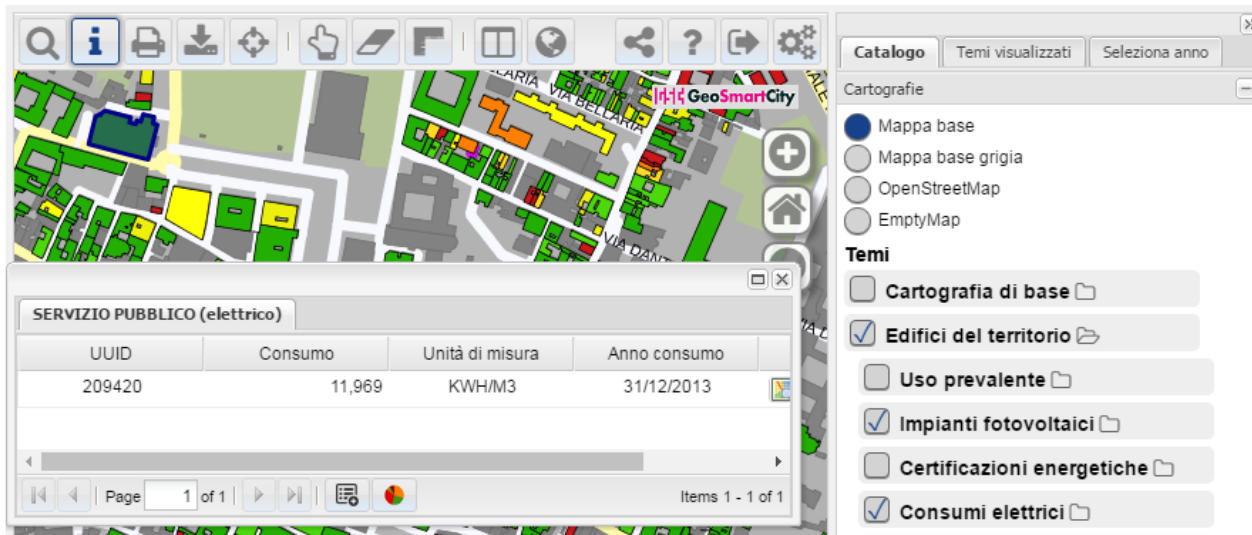
Municipality of Reggio-Emilia - GeoSmartCity ...

URL: <http://labcatania.dedagroup.it/geosmartcity-ctw/login.html>

GeoSmartCity webGIS client of the Municipality of Reggio-Emilia, with layers grouped at "building stock" and "municipal energy unit" levels showing actual energy consumption data and energy certificates.

Website

Embed



The screenshot displays the GeoSmartCity webGIS interface. At the top, there is a toolbar with various icons for map navigation and data interaction. Below the toolbar is a map showing a residential area with buildings and streets. A data table is overlaid on the map, displaying energy consumption data for a specific building. The table has columns for UUID, Consumo, Unità di misura, and Anno consumo. The data row shows a UUID of 209420, a consumption of 11,969 KWH/M3, and a consumption year of 31/12/2013. To the right of the map, there is a sidebar with a 'Catalogo' section containing a list of map layers and themes. The 'Temi visualizzati' section shows a list of themes with checkboxes, including 'Edifici del territorio', 'Impianti fotovoltaici', and 'Consumi elettrici'.

UUID	Consumo	Unità di misura	Anno consumo
209420	11,969	KWH/M3	31/12/2013

Page 1 of 1

Items 1 - 1 of 1

The importance of being ... 'harmonized'



The importance of being ... 'harmonized'

Generic
workflow to
transform
datasets
according to
selected
target schema
requirements

Import target/source schemas

Import data

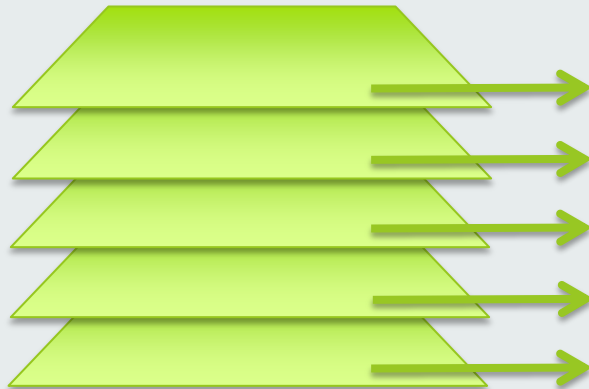
Set mapping rules

Export transformed data

Validate transformed dataset

The importance of being ... 'harmonized'

SHP, XLS, CSV,
ORACLE, POSTGIS, ...



Type New Type	Documentation	Attribute / Association role New attribute	Attribute / Association role Documentation	Values / Enumerations	Multipli city	Voidable / Non-Voidable
Building <small>Supertypes: Building BuildingAbstractBuildingAbstractConstructionBuildingInfoBuildingAndBuildingUnitInfo</small>	<p>-- Name -- Building A Building is an enclosed construction above and/or underground, used or intended for the shelter of humans, animals or things or for the production of economic goods. A building refers to any structure permanently constructed or erected on its site.</p>					
		beginLifespanVersion	-- Name -- Begin lifespan version -- Date and time at	DateTime	1	voidable
		conditionOfConstruction	-- Name -- Condition of construction -- Status of the	ConditionOfConstructionValue	1	voidable
		dateOfConstruction	-- Name -- Date of construction -- Date of	DateOfEvent	0..1	voidable
		dateOfDemolition	-- Name -- Date of demolition -- Date of demolition	DateOfEvent	0..1	voidable
		dateOfRenovation	-- Name -- Date of last major renovation -- Date of first	DateOfEvent	0..1	voidable
		RefurbishmentClass				
		elevation	-- Name -- Elevation -- Vertically constrained	Elevation	0..*	voidable
		endLifespanVersion	-- Name -- End lifespan version -- Date and time at	DateTime	0..1	voidable
		externalReference	-- Name -- External reference -- Reference to an external	ExternalReference	0..*	voidable
		heightAboveGround	-- Name -- Height above ground -- Height above	HeightAboveGround	0..*	voidable
		inspireId	-- Name -- inspire id -- External object identifier of the	Identifier	1	
		name	-- Name -- Name -- Name of the construction -- EXAMPLES:	GeographicalName	0..*	voidable
		buildingNature	-- Name -- Building nature -- Characteristic of the building that	BuildingNatureValue	0..*	voidable
		currentUse	-- Name -- Current use -- Activity hosted within the building	CurrentUse	0..*	voidable
		numberOfDwellings	-- Name -- Number of dwellings -- Number of	Integer	0..1	voidable
		numberOfBuildingUnits	-- Name -- Number of building units -- Number of building	Integer	0..1	voidable
		numberOfFloorsAboveGr	-- Name -- Number of floors above ground -- Number of	Integer	0..1	voidable
		parts	The building parts composing the	BuildingPart	0..*	voidable

The importance of being ... **'harmonized'**

- To facilitate pilots to harmonize their own data, a double-step approach has been proposed:
 - 1st transformation into a **pseudo-INSPIRE SQL database** (“Buildings” only), structured for creating target databases on pilots’ premises (Reggio, Oeiras, Marousi)
 - 2nd transformation from pseudo-INSPIRE SQL db into GSC (INSPIRE extended) **GML compliant datasets**
- SQL structures are based on extended INSPIRE data model

The importance of being ... 'harmonized'

```
CREATE TABLE conversion (
    classid varchar(70) NOT NULL,
    input varchar(80) NOT NULL,
    location varchar(80),
    output varchar(80) NOT NULL,
    value double precision NOT NULL,
    year date
);

--
-- CREATE TABLE: buildings
-- Rappresenta la classe: Buildings - BUILDINGS
--

CREATE TABLE buildings (
    classid varchar(70) NOT NULL,
    buildingtype varchar(80),
    condition varchar(80) NOT NULL,
    connection_electricity char(1) ,
    connection_gas char(1) ,
    connection_sewage char(1) ,
    connection_thermal char(1) ,
    connection_water char(1) ,
    date_c_beginning numeric(15,0) ,
    date_c_end numeric(15,0) ,
    date_r_beginning numeric(15,0) ,
    date_r_end numeric(15,0) ,
    dist_floor varchar(40) NOT NULL,
    elev_ref varchar(80),
```

The importance of being ... 'harmonized'

 **GeoSmartCity**

[Datasets](#) [Organizations](#) [About](#)


[Home](#) / [Organizations](#) / [Comune di Reggio-Emilia](#) / **GeoSmartCity harmonized ...**

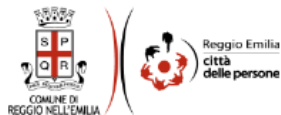
**GeoSmartCity
harmonized dataset
of buildings**

Followers

1

[Unfollow](#)


 **Organization**




**Comune di Reggio-
Emilia**

The Municipality of Reggio Emilia, with a population of

 **Dataset**

 **Groups**

 **Activity Stream**

 **Related**

 **Manage**

GeoSmartCity harmonized dataset of buildings

This dataset has been generated in the context of GeoSmartCity project by the Municipality of Reggio nell'Emilia, based on different background data sources already available in the Municipality itself or from other external authoritative sources. The full dataset contains information about buildings' characteristics (areas, volumes, uses, number of building units, ...) as well as aggregated data about energy performance derived from energy certificates, as well as annual energy consumption (gas, electricity and district heating).

Data and Resources



application/x-shapefile

[Explore](#)



Harmonized GML dataset

GML dataset harmonized and compliant to INSPIRE-GSC "Buildings" Schemas...

[Explore](#)



WMS service

Web Map Service for viewing energy classification of buildings ...

[Explore](#)

Components (Validation Service)

Hub Support resources

Validation Service



On-line validation of datasets harmonized according to the GeoSmartCity target data models.

[Validation Service](#)

Geospatial Catalogue



A cataloging application for spatially referenced resources. It provides metadata editing and search functions.

[Geospatial Catalogue](#)

Codelists Manager



The JRC's [Re3gistry](#) is reused and extended in order to manage new codelists and codelist values.

[Codelists Manager](#)

Specialised Services



Standardized and re-usable data processing services based on requirements coming from the [GeoSmartCity Pilots](#).

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User resources

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Components (Validation Service)

eENVplus Validation Service



2.0. Click [here](#) for details

The **eENVplus Validation Service** provides a process for assessing the conformance of a GML datasets to:

- INSPIRE Directive
- AQD (Air Quality Directive)
- GeoSmartCity (GSC) INSPIRE-extended data models

Click the **INSPIRE**, the **AQD** or the **GSC** icon to access the validation process relevant to your GML dataset:

INSPIRE

AQD

GSC



Click the icon and learn how to use the eENVplus Validation Service with Epsilon Italia videotutorials!

Extended from eENVplus project

The importance of being ... 'INSPIRed'

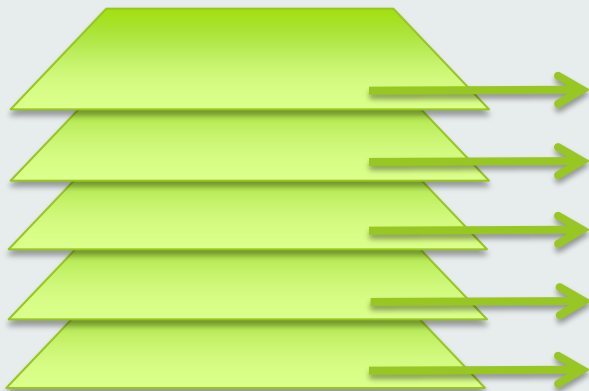
```

2391957.3672795263 4380727.127901457 2391953.270809873 4380737.147447803 2391957.351370212 4380738.699639899 2391958.3352132933 4380740.644212889 2391959.1182883
4380741.747281801 2391959.5282513057 4380740.810227597 2391961.8926024977 4380741.830739673 2391961.6155886576 4380742.488801749 2391964.4071002863
4380743.694828465 2391964.7966441354 4380742.797612881 2391971.4624258596 4380745.683653224 2391970.7651263387 4380747.308709066 2391979.3482526406
4380751.019485774 2391980.1889356934 4380749.075479373 2391983.3280967 4380750.436002399 2391987.513944158 4380740.505315433 2391982.864750689 4380738.495310412
2391982.4752066955 4380739.392525907 2391976.6239316734 4380736.8670149455 2391977.2493113033 4380735.421475205 2391967.7423371044 4380731.308766968
2391967.2911966327 4380732.355558973 2391961.9566881135 4380730.036681774 2391962.325700315 4380729.189325638 2391957.5672795265 4380727.127901457
</gml:posList>
</gml:LinearRing>
</gml:exterior>
</gml:Polygon>
</gml:surfaceMember>
</gml:MultiSurface>
</bu-base:geometry>
<bu-base:referenceGeometry/>
<bu-base:horizontalGeometryReference/>
<bu-base:horizontalGeometryEstimatedAccuracy xsi:nil="true"/>
</bu-base:BuildingGeometry2D>
</bu-core2d:geometry2D>
<gsc-bu2d-energy:buildingInfo>
  <gsc-bu2d-energy:BuildingInfo>
    <gsc-bu2d-energy:additionalInfo>
      <gsc-bu2d-energy:volume>
        <gsc-bu2d-energy:volumeType xlink:href="http://hub.geosmartcity.eu/registry/codelist/VolumeTypeValue/" />
        <gsc-bu2d-energy:value uom="mc">5385.35</gsc-bu2d-energy:value>
        <gsc-bu2d-energy:source xlink:href="http://hub.geosmartcity.eu/registry/codelist/SourceValue/" xlink:title="From Italian Cadastre database"/>
      </gsc-bu2d-energy:volume>
      <gsc-bu2d-energy:presenceOfThermalPlants>false</gsc-bu2d-energy:presenceOfThermalPlants>
      <gsc-bu2d-energy:presenceOfSolarPanels>false</gsc-bu2d-energy:presenceOfSolarPanels>
      <gsc-bu2d-energy:presenceOfPhotovoltaicPanels>false</gsc-bu2d-energy:presenceOfPhotovoltaicPanels>
      <gsc-bu2d-energy:presenceOfElectricityMeter>true</gsc-bu2d-energy:presenceOfElectricityMeter>
      <gsc-bu2d-energy:estimatedEnergyNeed uom="kWh">39218.0</gsc-bu2d-energy:estimatedEnergyNeed>
      <gsc-bu2d-energy:energyPerformanceValueSource/>
      <gsc-bu2d-energy:energyPerformanceValue xlink:href="http://hub.geosmartcity.eu/registry/codelist/EnergyPerformanceValue/G" xlink:title="G"/>
      <gsc-bu2d-energy:dateOfAssessment/>
      <gsc-bu2d-energy:assessmentMethod gml:id="EP_method_1">
        <base2:name>from SACE database</base2:name>
        <base2:date xsi:nil="true"/>
        <base2:link xsi:nil="true"/>
      </gsc-bu2d-energy:assessmentMethod>
      <gsc-bu2d-energy:energyAmount>
        <gsc-bu2d-energy:value uom="kWh">31651.0</gsc-bu2d-energy:value>
    </gsc-bu2d-energy:additionalInfo>
  </gsc-bu2d-energy:BuildingInfo>
</gsc-bu2d-energy:buildingInfo>

```


The importance of being ... 'INSPIRed'

SHP, XLS, CSV,
ORACLE, POSTGIS, ...



```
<bu-base:status xlink:href="http://inspire.ec.europa.eu/codelist/HeightStatusValue/estimated"/>
<bu-base:value uom="meter">8.0</bu-base:value>
</bu-base:HeightAboveGround>
</bu-base:heightAboveGround>
<bu-base:inspireId>
<base:Identifier>
<base:localId>6910</base:localId>
<base:namespace>http://www.municipio.re.it</base:namespace>
</base:Identifier>
</bu-base:inspireId>
<bu-base:currentUse>
<bu-base:CurrentUse>
<bu-base:currentUse xlink:href="http://inspire.ec.europa.eu/codelist/CurrentUseValue/individualResidence" in
<bu-base:percentage>100</bu-base:percentage>
</bu-base:CurrentUse>
</bu-base:currentUse>
<bu-base:numberOfDwellings>1</bu-base:numberOfDwellings>
<bu-base:numberOfFloorsAboveGround>2</bu-base:numberOfFloorsAboveGround>
<bu-core2d:geometry2D>
<bu-base:BuildingGeometry2D>
<bu-base:geometry>
<gml:Polygon gml:id="_2cb12b17-5bkd-7b57-720e-8fe04av0c931" srsName="EPSG:3044">
<gml:exterior>
<gml:LinearRing>
```

Components (Codelist Registry)

Hub Support resources

Validation Service



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[Validation Service](#)

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[Specialised Services](#)

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The importance of being ... 'Registered'



INSPIRE

Registry

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English (en) ▼

[European Commission](#) > [INSPIRE](#) > [INSPIRE registry](#) > [INSPIRE code list register](#) > [Current Use](#)

Current Use

Search...



ID:	http://inspire.ec.europa.eu/codelist/CurrentUseValue
This version:	http://inspire.ec.europa.eu/codelist/CurrentUseValue:1
Latest version:	http://inspire.ec.europa.eu/codelist/CurrentUseValue
Label:	Current Use
Definition:	Values indicating the current use.
Description:	<p>SOURCE: This code list is partly based on and adapted from the Eurostat classification of types of constructions (for the classification of residential buildings).</p> <p>NOTE: the values of this code list apply to buildings or building components where building components may be a building part (in core profiles) or a building unit (in extended profiles)</p>
Governance level:	eu-legal
Status:	Valid
Themes:	Buildings
Application schema:	Building Base
Extensibility:	Extensible with narrower values

<http://inspire.ec.europa.eu/codelist/CurrentUseValue>

The importance of being ... 'Registered'

A proposito di questo sito

italiano (it)

INSPIRE REGISTRY

Enhancing access to European spatial data

Commissione Europea > INSPIRE > Archivio INSPIRE > Registro degli elenchi di codici di INSPIRE > Current Use > publicServices

publicService

ID:

Questa version:

La version più recente:

Etichetta:

[Non disponibile in Italiano]

Definizione:

[Non disponibile in Italiano]

Descrizione:

[Non disponibile in Italiano]

Categoria tematica:

Schema di applicazione:

```
<?xml version="1.0" encoding="UTF-8"?>
<RE_RegisterItem xmlns:gmd="http://www.isotc211.org/2005/gmd"
  xmlns:gco="http://www.isotc211.org/2005/gco"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns="http://www.isotc211.org/2005/grg"
  xsi:schemaLocation="http://www.isotc211.org/2005/grg http://standards.iso.org/iso/19135/-2/register.xsd">
  <itemIdentifier gco:nilReason="inapplicable"/>
  <name>
    <gco:CharacterString>publicServices</gco:CharacterString>
  </name>
  <status>
    <RE_ItemStatus>valid</RE_ItemStatus>
  </status>
  <definition>
    <gco:CharacterString>The building (or building component) hosts public services. Public services are tertiary services provided for the benefit of the citizens.</gco:CharacterString>
  </definition>
  <description>
    <gco:CharacterString>Public services are often ruled by public governments or on behalf of them. EXAMPLES: Schools, hospitals, governmental buildings, prisons, rescue stations, transport station.NOTE: in case of a building being both office and public service (e.g. a city hall), the building should be classified preferably as public service.</gco:CharacterString>
  </description>
  <additionInformation xlink:href="http://hub.geosmartcity.eu/registry/codelist/CurrentUseValue/publicServices"/>
  <itemClass>
    <RE_ItemClass>
      <name>
        <gco:CharacterString>CodelistValue</gco:CharacterString>
      </name>
      <technicalStandard gco:nilReason="inapplicable"/>
      <alternativeNames gco:nilReason="inapplicable"/>
      <describedItem gco:nilReason="inapplicable"/>
    </RE_ItemClass>
  </itemClass>
</RE_RegisterItem>
```

<http://hub.geosmartcity.eu/registry/codelist/CurrentUseValue/publicServices/>


Components (Specialized Services)

 **GeoSmartCity** *Hub*

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[Project website](#)

[Contact Us](#)


[Log in](#) 

Hub Support resources

Validation Service



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[Specialised Services](#) 

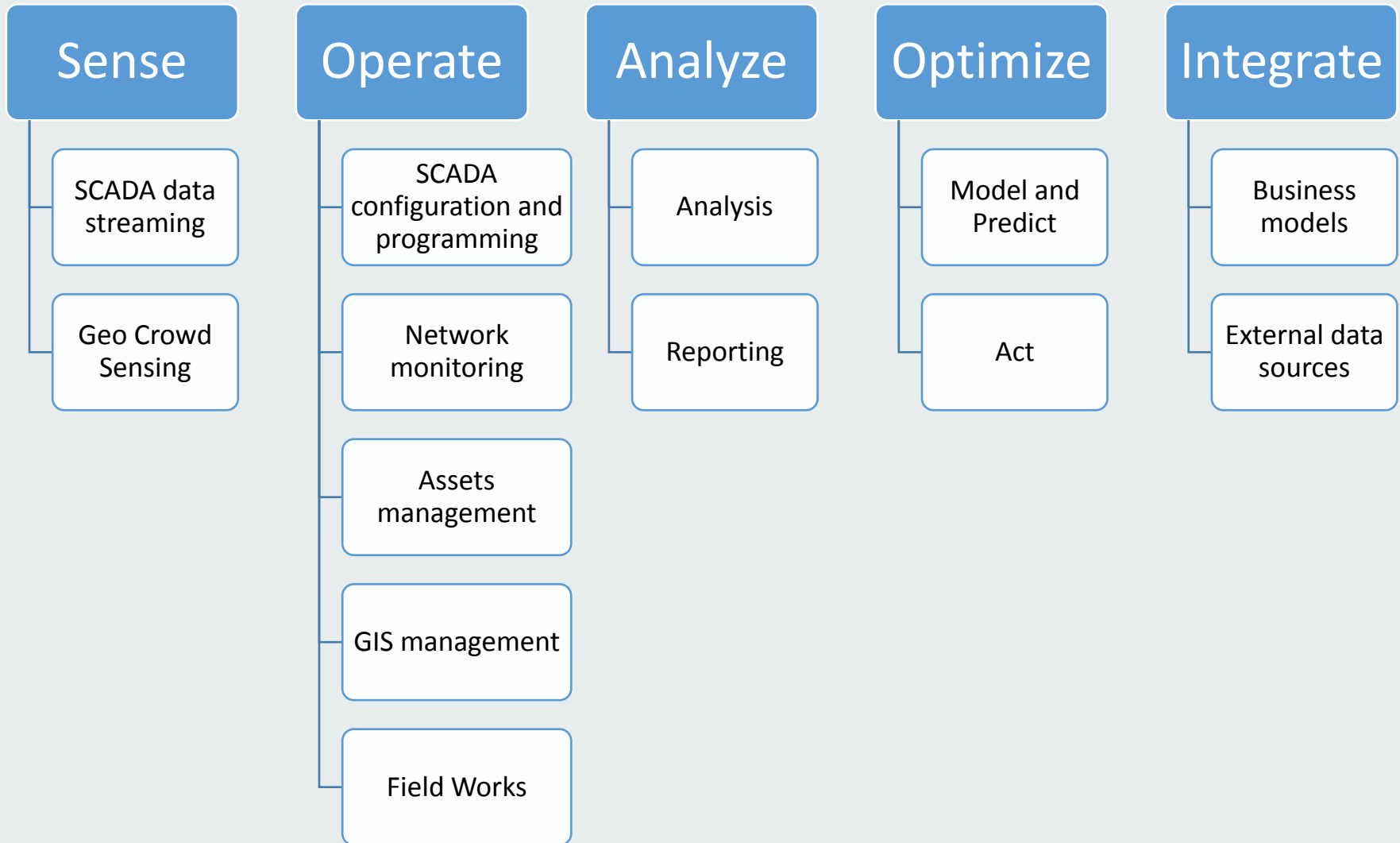
User resources

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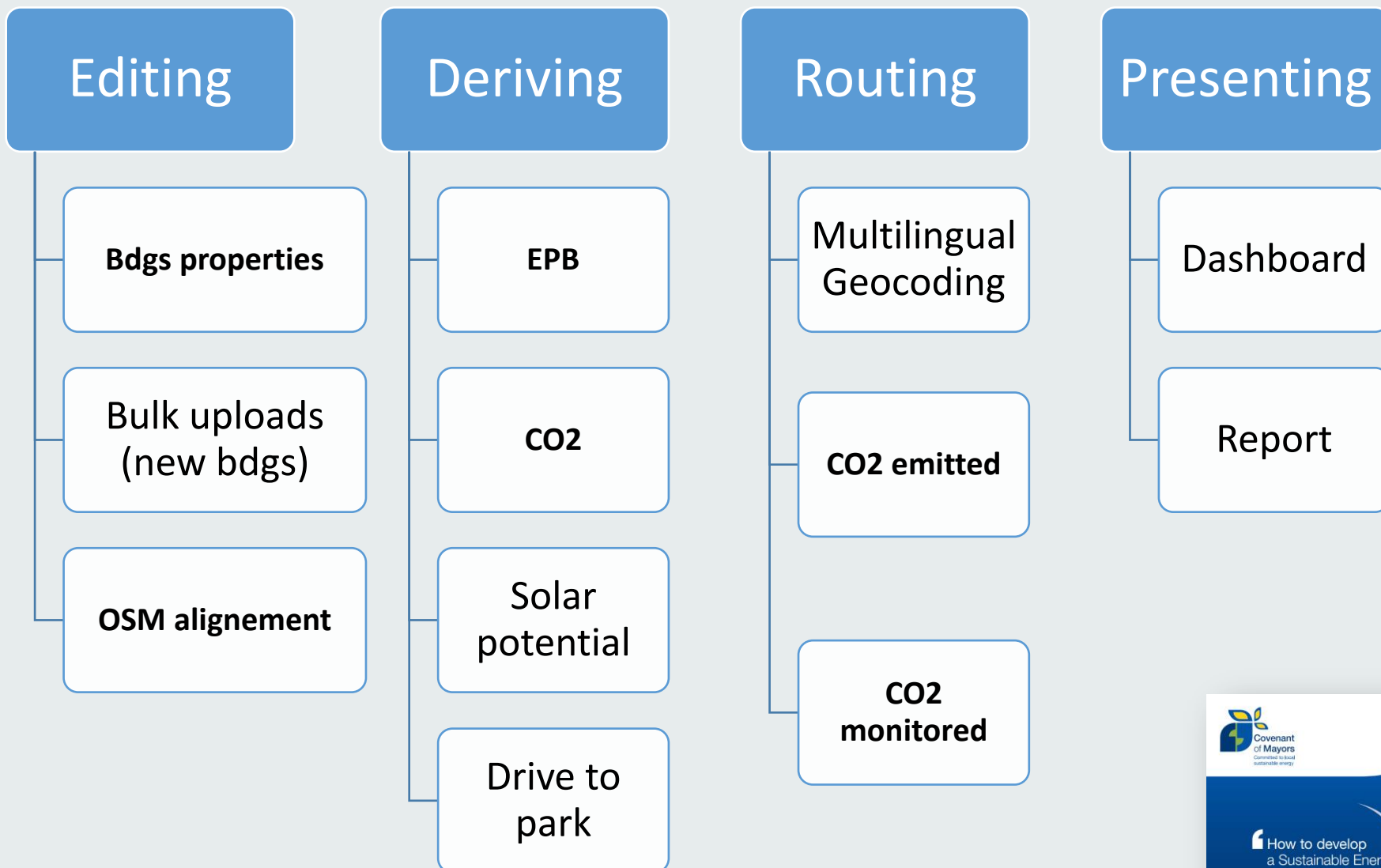


Underground specialized services / 1

- Geo crowd-sensing client
- Geo crowd-sensing mobile client
- Geo crowd-sensing platform management
- Field work verification and correction
- Creation and sharing of personalized maps
- Field work orientation through augmented-reality

Underground specialized services / 2

- Analysis of interaction between hazards and underground networks
- Tracing of sewage network
- Use of GIS and SCADA information
- GIS access to Sensor data streaming services



Green Energy specialized services / 1

- Buildings "on-site" data quality check
- Estimation of Energy Performance of buildings
- Buildings CO₂ emissions estimation
- Heat consumption dashboard
- Green Energy report
- Upload of "future "buildings datasets
- Solar potential calculation
- Zero-balance layer

Green Energy specialized services / 2

- Multi-lingual Address Geocoding
- Green preferences and routing
- Next departure time
- Drive to park

Examples of Green Energy specialized services / 1

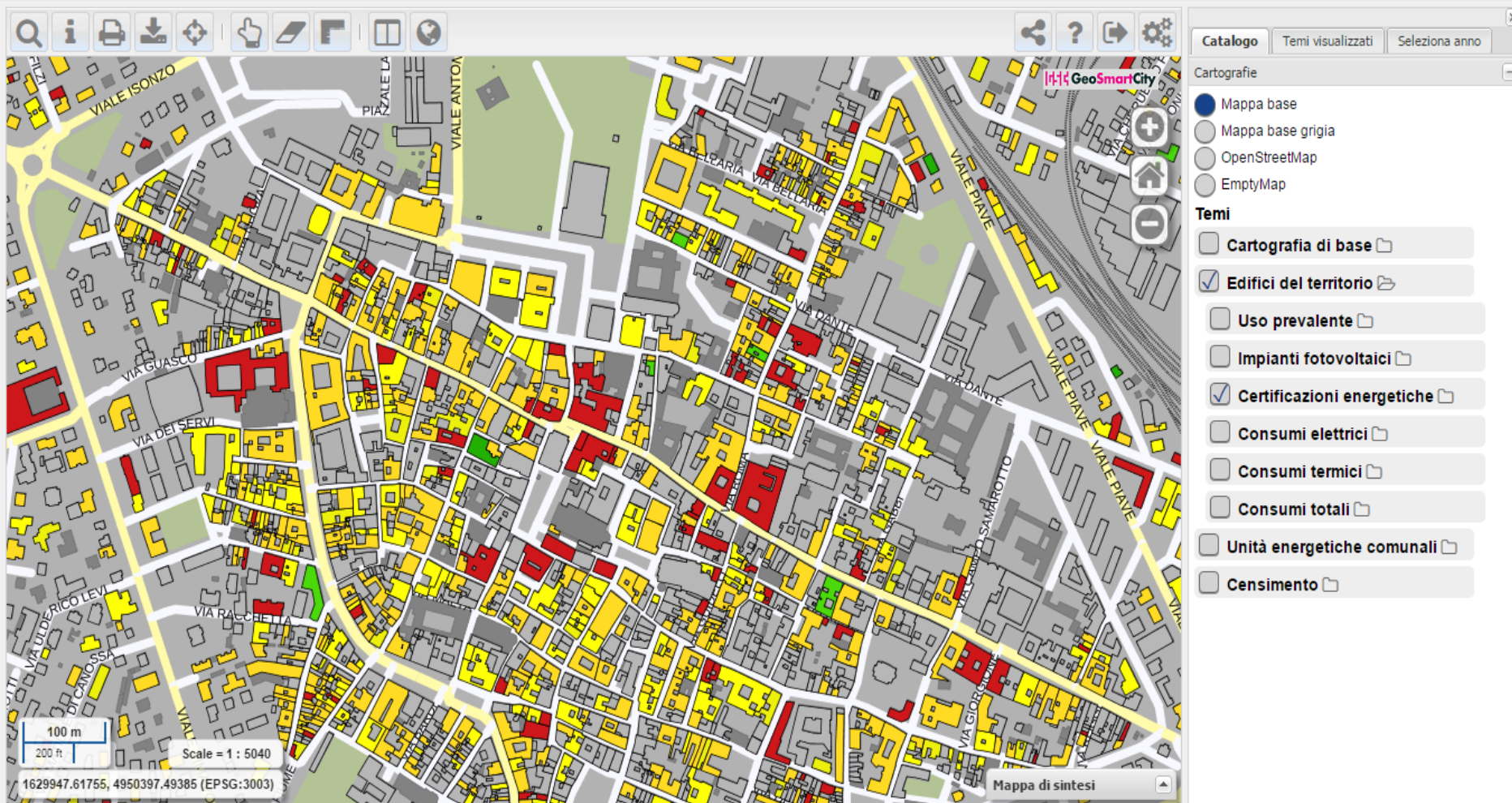
- Some pilots (e.g. Girona, Turku) are requesting customized routing services, considering the CO₂ factor as input parameter:
 - the best healthy route (less polluted), or ...
 - ... the route with less CO₂ by the traveler

Examples of Green Energy specialized services / 2

- Some other pilots (e.g. Reggio-Emilia, Maroussi, Oeiras) are requesting processing services, as the estimation at individual building level of:
 - solar potential
 - CO₂ emissions
 - energy performance

A “specialized” service in brief (as WPS):

- E.g. for the estimation of Energy Performance, this may be a (complex) process that:
 - Considers the physical properties of buildings (e.g. age of construction, size, usage, ...)
 - Calculates vertical surfaces (envelope)
 - Apply [TABULA typologies](#) for households (U-values for roof, floor, envelope, ... degree-days of the location, ...) to existing buildings
 - Generates the EP value in annual kWh (per m² or m³, according to the location and legislation)



A “specialized” service in brief (as WFS-T)

- For calculating the energy performance, or other processes, we need data (the fuel) with high level of accuracy and detail.
- If not yet available in existing datasets, or if the quality has to be validated, we need to consider the possibility to involve local communities to collect or correct data “on site”.

A “specialized” service in brief (as WFS-T)



<https://youtu.be/W5pNYAUKZI0>

Thanks ... any questions?

Piergiorgio Cipriano

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Dedagroup

Sinergis Srl – Sede di Bologna

