



SMART URBAN SERVICES FOR HIGHER ENERGY EFFICIENCY

SUNSHINE



Overview

SUNSHINE delivers **innovative digital services**, interoperable with existing geographic web-service infrastructures, supporting improved energy efficiency at the urban and building level.

Specifically, SUNSHINE delivers a **smart service platform** accessible from both a web-based client and from an App for smartphones and tablets.

In particular, the SUNSHINE platform will allow:

- 1) Automatic large-scale assessment of building energy behaviour based on data available from public services (e.g. cadastre, planning data etc.). The information on energy performances will be used to automatically create urban-scale “ecomaps” to be used for planning activities and large-scale energy pre-certification purposes.
- 2) The previous assessment will be then used, together with localised weather forecasts available through interoperable web-services, to ensure optimisation of energy consumption of heating/cooling systems through automatic alerts that will be sent to the SUNSHINE App installed on the smartphone of the final users.
- 3) Lastly, SUNSHINE will ensure interoperable control of public illumination systems based on Automatic Meter Reading (AMR) facilities remotely accessible, via interoperable standards, from a web-based client as well as from an App for smartphones or tablets.

The **SUNSHINE technology** will be the result of the customisation and integration of existing software components developed by other EC-funded projects focusing on smart-city technologies, including BRISEIDE, i-SCOPE and i-Tour.

Type of project

Competitiveness and Innovation Framework Programme

ICT Policy Support Programme

Objective identifier: 6

Pilot Type B

Project coordinator

Fondazione Graphitech

Contact person

Raffaele de Amicis

Fondazione Graphitech

Via alla Cascata, 56/C

38123 Trento – Italy

Office: +39 0461 283395

Fax: +39 0461 283398

Mobile +39 331 610 45 69

+39 347 038 97 64

coordinator@sunshineproject.eu

Project website

www.sunshineproject.eu

Community contribution to the project

2,314,000,00 € (euro)

Project start date

01 February 2013

Duration

36 months

The SUNSHINE technology will be eventually piloted in the context of **9 sites across 5 countries**, specifically:



Italy: 20 public buildings in Ferrara; 60 technical buildings across the Trentino Province; 4 public illumination lines in the centre of Bassano del Grappa (Italy) (total of 200 illumination units), 5 public illumination lines in the city of Rovereto (Italy) (total of 80 illumination units); 3 building complexes in the area of Val di Non (Italy) and their outdoor public illumination systems.



Austria: 1 public multipurpose building in Schwechat and the public illumination systems in its surroundings.



Croatia: 10 buildings owned by HEP ESCO in Zagreb and Split and the illumination systems in the surroundings of one of HEP ESCO's power plant (50 illumination units).



Greece: five buildings in Lamia owned by Technological Educational Institute di Lamia.



Malta: 2 buildings owned by Malta College of Arts, Science and Technology in Paola.

SUNSHINE will be piloted for a duration of 12 months and it will target at energy and emission savings ranging, within the various pilots, from 10% to 30%, with higher savings being foreseen for pilots relying on older buildings, or equipped with older heating, cooling or lighting technologies. Energy savings will be compared to a one-year baseline data acquired, during the first stages of the project prior to the deployment of the pilots.

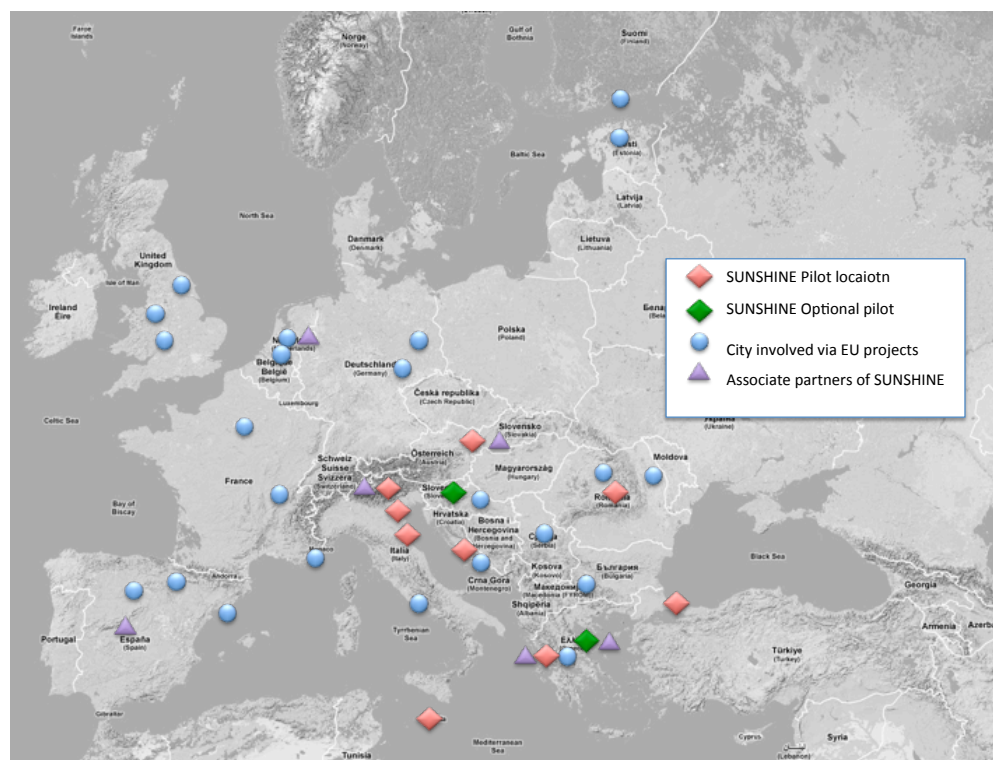


Figure 1 the locations of the various pilots planned within SUNSHINE

Consortium

Participant no.*	Participant organisation name	Participant short name	Country
1 (Coord.)	Fondazione Graphitech	GRAPHITECH	Italy
2	Gistandards LTD.	GIST	UK
3	SinerGIS SRL	SGIS	Italy
4	Cadzow Communications Consulting Ltd	C3L	UK
5	Grafica Light di Zancarli ing. Ivo	GL	Italy
6	Informatica Trentina SpA	INFOTN	Italy
7	Epsilon Internasional Anonymi Etaireia Meleton Kai Symvoulon (Epsilon International SA)	EPS	Greece
8	CARTONET SAS (Esri)	ESRI	France
9	Fundación ESADE	ESADE	Spain
10	CEIT Alanova Gemeinnutzige GMBH	CEIT	Austria
11	Beylikdüzü Belediyesi (Municipality of Beylikdüzü - Istanbul)	BEY	Turkey
12	Trentino Network Srl	TNET	Italy
13	HEP ESCO d.o.o.	HEPESCO	Croatia
14	Farisa Asesores Y Consultores S.L	METGRID	Spain
15	Urbasofia SRL	URBA	Romania
16	UAT Baia Sprie (Municipality of Baia Sprie)	BAIAS	Romania
17	Urbanisticni inštitut Republike Slovenije (Urban Planning Institute of the Republic of Slovenia)	UIRS	Slovenia
18	S.C. Fida Solutions S.R.L.	FIDA	Romania
19	GeoSYS Limited	GSYS	Malta

Associated partners

Participant no.*	Participant organisation name	Participant short name	Country
AS1	Provincia Autonoma di Trento	PAT	Italy
AS2	DEDDHE of Lamia (Administration of Greek electricity network distribution for the region of Lamia)	DEDDHE	Greece
AS3	Technologiko Ekpaideftiko Idryma Mesologgiou (Technological Education Institute Of Messolongi)	TEIM	Greece
AS4	Municipality of Schwechat	SCHWE	Austria
AS5	International Society of City and Regional Planners (ISOCARP)	ISO	The Netherlands
AS6	Telvent Environment SA	TELVENT	Spain
AS7	Technological Educational Institute of Lamia	TEIL	Greece
AS8	ilMeteo.it	ILMETEO	Italy
AS9	Municipality of Bassano del Grappa	BASSANO	Italy
AS10	Municipality of Ferrara, Italy	FERRARA	Italy
AS11	Zadar County, Croatia	ZADAR	Croatia

Technical approach

Scenario 1: Assessment of energy performances and electronic energy pre-certification

Target users and their needs

This pilot targets building managers, planners, public administrators, and citizens. All these target users have their specific needs, namely:

- **Building managers**, who need to analytically identify building stocks that need improvement of energy performances; to define “cost-optimal levels” (refer to B1.2 EU and national dimension for more details), according to “Reference Building” as defined by EPBD Directive and as proposed by the TABULA project; to accelerate energy certification process through a pre-certification based on theoretical building performances compared against “reference buildings” which can be used to show efficiency levels; to be able to access tools to analytically define “cost-optimal levels” (refer to B1.2 EU and national dimension; and to publicly show building energy behaviour of building stocks based on analytical models.
- **Planners**, who need to rapidly estimate energy performances of buildings at urban scale; and to retrieve analytical indicators that can be used to define energy saving policies targeted to specific portions of the city.
- **Public administrators**, who need to define energy-saving policies based on true requirement of public building stock.
- **Citizens**, who need to be informed about energy efficiency of public buildings and consequent energy costs; and, in case of dwellers of public housing, to be aware of energy performances of the building they live in.

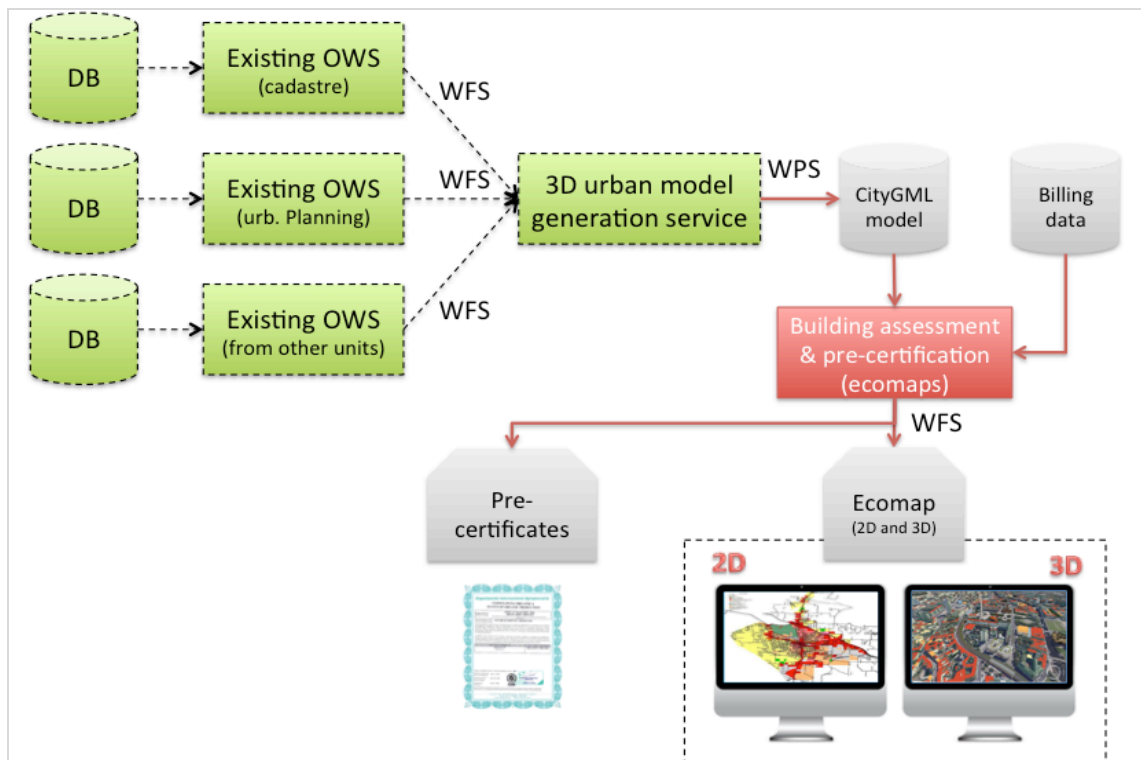
Innovative aspects

The definition of a service that can provide assessment of energy behaviour of building from existing information would provide a first operational solution to the EPBD. Similarly the operational definition of the concept of “reference building” through a standardised protocol specifically engineered for urban information models in certainly of significant innovative value. By providing a reference line for the average consumption of similar buildings it will be possible for a Facility Manager to spot and correct anomalies in Energy usage.

A further innovation is the possibility to define pre-certification of buildings. This information could be then use to create online catalogues of pre-certification information on predicted environmental performances of public buildings.

The project aims at providing a real control over consumption at managed facilities. The situational awareness provided by “current” meter data and weather context will allow for a “real” energy management and performance improvement.

- From a data security standpoint, in SUNSHINE data is accumulated from a large number of sources and each data source may contain a level of PII. When combining such data even if each source removes PII it is possible to generate new simulated PII by correlation of the datasets. The project shall introduce means to ensure that even if multiple data sets exist that the likelihood of retrieving PII is minimised. This shall be achieved by introducing new techniques of k-anonymity to minimise PII exposure risks across disparate data sets.



Scenario 2: Heating/cooling forecast and alerts

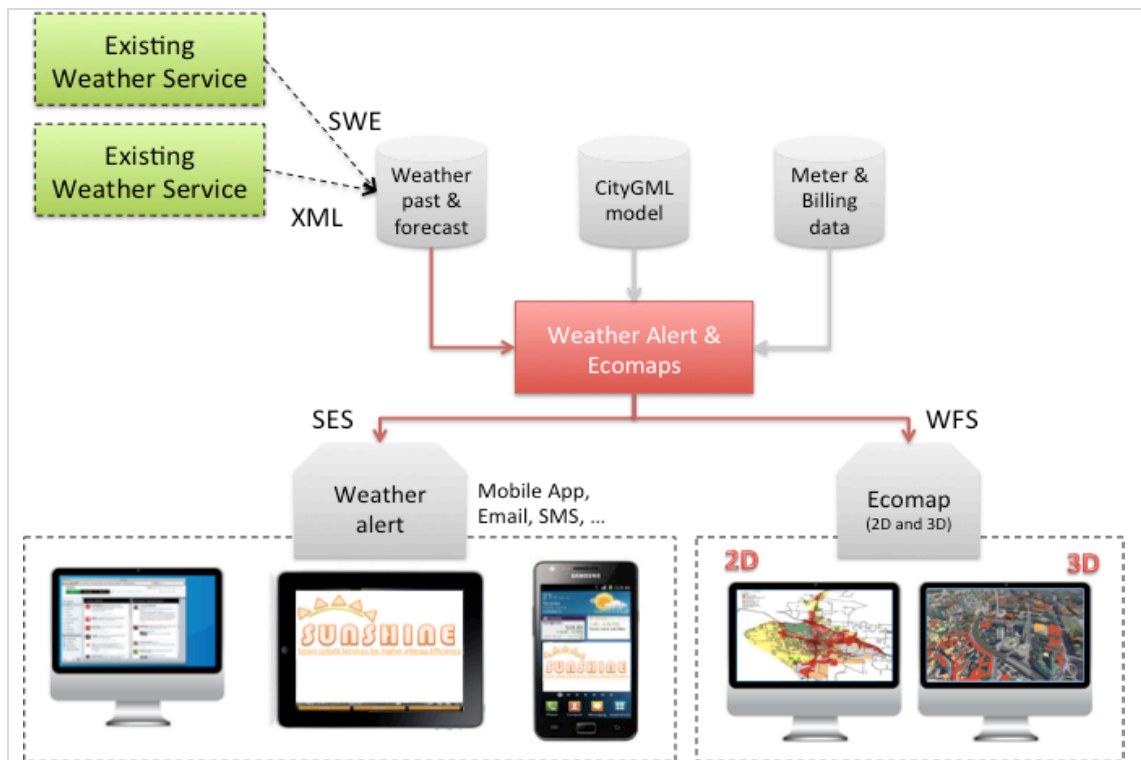
Target users and their needs

- **Building managers**, who need to manage the existing public (and private) building stock to the highest possible level of energy performance (with best cost/performance ratio).
- **Public administrations**, that need to be able to clearly define energy-saving policies based on appropriate management of current public and private building stock.
- **Citizens**, who need to be informed about energy preservation practices of public buildings and consequent energy savings; and to receive automatic alerts notifying on changing weather conditions that require change to settings of cooling of heating systems, personalised for a specific building, for optimal energy-use/comfort ratio.
- **ESCOs**, that need to create more sophisticate billing mechanisms based on real-time consumption level and communication/notification of users.

Innovative aspects

The most important aspect of this scenario regards the possibility to improve energy performances and, above all, inappropriate use of energy within old buildings or within buildings with heating/cooling systems with no automatic control. These represent a major source of inefficiency due to their poor performances. The approach proposed leverage on ICT technology to facilitate behavioural changes through improved awareness of building manager and dwellers.

The project aims at integrating building characteristics with weather and meter data to gain a better understanding of the energy consumption baseline for each building and to monitor the actual performance determined by the management and usage behaviours.



Scenario 3: Optimisation of power consumption of public lighting systems

Target users and their needs

- **Building managers**, who need to optimise lighting levels of buildings within outdoor spaces minimising or cutting use of illumination whenever not required.
- **Officers at municipal administration**, who need to optimise running and maintenance costs at city level through large-scale optimisation of public illumination network according to real requirement (reducing or cutting unnecessary illumination); access information on status of the illumination network (incl. consumption, failures, specifications etc.) through a standardised protocol; and to create of “ecomaps” which show dimmering level of illumination systems at different times of day/night and consequent savings.
- **ESCOs**, that need to interface to existing public illumination networks through standardised interface via interoperable protocols consistently over the city.
- **Planners**, who need to define planning strategies and priorities regarding public lighting based on precise information on public illumination networks.
- **Professionals**, who need to access a platform from where to access information on public illumination network and where to update georeferenced information on new/updated lighting systems.

Innovative aspects

The approach proposed fosters a more optimised use of public illumination according to real (variable) requirements and from a user-friendly centralised point of access, based on extended use of interoperable standards.

The use of this approach allows integration of all illumination units with the wide ecosystem of sensors available within the area and which can be assessed and controlled via the web. The use of these protocols (specifically SAS and SES) also allows configuration of alerts that can be dispatched to the operators in case of particular conditions, which extend beyond the public lighting systems. In fact,

through this approach, it becomes possible to configure very complex alerts that involve a variety of sensors beyond the energy management domain. For instance an alert could be configured to inform the operator whenever environmental sensors detect, within a given geographical area (e.g. the aforementioned areas surrounding the stadium), poor visibility (e.g. due to fog) when illumination system is dimmed, thus creating potential dangerous situations that would instead require setting lighting units to their full power.

