The Urban Energy workshop

"GeoSmartCity Hub: a data platform for supporting the Covenant of Mayors initiative"
"Development of the CityGML Application Domain Extension Energy for Urban Energy Simulation"
Lisbon, 25 May 2015, INSPIRE + Geospatial World Forum conference

The workshop was proposed by Piergiorgio Cipriano and Luca Giovannini (Sinergis), both involved in different projects at national and European levels related with the use of urban geodata for municipal energy planning.
Sinergis is one of the partners of the GeoSmartCity project, and also actively participates to the activities of the SIG3D working group on CityGML Energy.

The workshop announcement and the agenda can be found here:
http://geospatialworldforum.org/workshop.asp?Sp_Department=Urban%20Energy

Workshop presentations are available via the conference website at the links provided at the end of this document.

Workshop Announcement

The objective of the workshop is twofold:

- to discussing about the need for open and harmonized spatial data to support energy policies and local energy plans (e.g. Covenant of Mayors): the GeoSmartCity "hub" represents a set of services to publish, discovery and access detailed information about spatial data related to energy action plans at local scale
- to present the OGC CityGML Energy Application Domain Extension (ADE) developed by an international and interdisciplinary working group, aiming to facilitate and promote urban energy modelling

TARGET AUDIENCE

- Urban and building energy experts
- Standardization Bodies Organizations
- INSPIRE National Contact Points
- ISA WG "Spatial Information and Services" Contact Points
- Covenant of Mayors signatories (municipalities and local authorities)
- Energy suppliers and Energy Saving Companies (ESCO)

Agenda

- Welcome and introduction to the workshop (Piergiorgio Cipriano and Luca Giovannini)
- The GeoSmartCity project (Giorgio Saio)
- European Union Location Framework (Francesco Pignatelli)
- Importance of location information for energy policies (Maria Teresa Borzachiello)
- The need for open and harmonized spatial data (Giacomo Martirano)
- The "hub" to support the monitoring of local energy plans (Stein Runar Bergheim)

  Short break (5 minutes)

- Introduction to CityGML Energy ADE (Volker Coors and Athina Trakas)
- OGC and the BIM-vs-CityGML (Bart de Lathouwer)
- Development of the CityGML Energy ADE – part 1 (Jean-Marie Bahu)
- Development of the CityGML Energy ADE – part 2 (Romain Nouvel)
- Application of CityGML Energy ADE in the Sunshine project (Umberto Di Staso)
- Round table and conclusions (facilitator: Ray Boguslawski)

GeoSmartCity Hub

The first part of the workshop has been dedicated to the GeoSmartCity project (www.geosmartcity.eu/), with the proposal for a reusable platform where to collect and share detailed and harmonised data, with spatial components related to specific themes like buildings, road networks and underground utility networks.

The GeoSmartCity project (Giorgio Saio)

Giorgio Saio (GISIG, Italy - coordinator) introduced GeoSmartCity [1], a R&D project co-funded by EU in the CIP-PSP programme. One of the two scenarios of the project is related to "Green Energy", and it involves 5 pilot cities that already signed the Covenant of Mayors (Girona, Maroussi, Oeiras, Reggio-Emilia, Turku).
One of the goals of GeoSmartCity is to provide a robust and open source service platform to facilitate the collection, integration, harmonization and delivery of urban geodata useful to monitor the performance and/or the real consumption of energy at urban level, with geodata based on buildings and transport network.

European Union Location Framework (Francesco Pignatelli)

One of the members of the Advisory Board of the GeoSmartCity project is the Institute for Environment and Sustainability (IES) of Joint Research Centre (European Commission), represented by Francesco Pignatelli. He briefly presented [2, first part] the European Union Location Framework (EULF), one of

the main actions of the ISA Programme[1]. EULF will complement existing INSPIRE Technical Guidance documents to facilitate the introduction and use of the infrastructure in new thematic sectors.

Importance of location information for energy policies (Maria Teresa Borzachiello)

One of the first sectors considered by EULF is energy: the importance of location information for energy policies was presented by Maria Teresa Borzachiello (JRC-IES), with a presentation [2, second part] on a feasibility study report implemented by the JRC (yet to be published). The main findings of the study (slide 8) are:

- Public authorities can rely only on basic reporting tools and aggregated data to perform their monitoring obligations related to energy efficiency
- There is a general need for a more harmonised approach to ease the burden for public authorities and to support the needs of policy makers
- The requirements from EPBD and EED are semantically richer than INSPIRE requirements (Buildings data theme): therefore there is the need for extension of INSPIRE data models
- Geospatial technologies can support energy efficiency policy, increasing the efficiency of data collection, elaboration and sharing, and the effectiveness of stakeholders' decision
- A future EULF pilot project is planned to address these points

The need for open and harmonized spatial data (Giacomo Martirano)

Giacomo Martirano (Epsilon Italia, Italy) explained the need for open and harmonized spatial data in the context of the GeoSmartCity project [3]: a first example of extension of INSPIRE "Buildings" data models has already been defined in the project for three different pilot cities (Reggio-Emilia, Maroussi and Oeiras) with new properties, codelists and values defined to fulfil energy-related use cases like the estimation of the energy performance or CO2 at building level, or the calculation of a "zero-balance energy" layer.

The "hub" to support the monitoring of local energy plans (Stein Runar Bergheim)

Stein Runar Bergheim (Asplan Viak Internet, Norway) concluded the presentation of GeoSmartCity project introducing the idea of a "hub" to support the monitoring of local energy plans [4], with a special focus on technological issues and open source for collecting, harmonizing, processing, describing and publishing geodata for "urban energy" policies.

The "hub" is seen as "a manageable geospatial platform", with all geospatial modules based on Free Open Source Software (FLOSS) components, with the support of multiple data infrastructures, scalable

[1] http://ec.europa.eu/isa/actions/02-interoperability-architecture/2-13action_en.htm

and extensible to support larger volumes of data, easy to update and maintain, and with a clear separation of applications from data.

CityGML Application Domain Extension Energy

The second part has been focused on the presentation of the CityGML Energy Application Domain Extension (ADE), by introducing its main objectives and processes and presenting first results and tests performed by the consortium (http://en.wiki.energy.sig3d.org/index.php/Main_Page). The aim of this slot has been to collect feedback from the participant, in order to finalize the ADE and involve new projects to test the proposed model, in different scenarios.

Introduction to CityGML Energy ADE (Volker Coors and Athina Trakas)

Volker Coors (HFT Stuttgart, Germany) and Athina Trakas (OGC Europe) provided a very interesting introduction to CityGML, with a first explanation of the overall objectives of the Energy ADE [5].

OGC is a well-known International voluntary consensus standards organization leading development of geospatial standards and best practices, with a portfolio of more than 40 different standards.

One of the OGC standards is the CityGML: the more and more complex and heterogeneous geodata model needed for land and urban management to face challenges such as demography and urban growth, climate change and energy efficiency.

The goal of the Energy ADE is to extend CityGML for energy simulations on district and urban scale, for district heating networks planning and refurbishment scenarios.

OGC and the BIM-vs-CityGML (Bart de Lathouwer)

Bart de Lathouwer (OGC) explained the relationships (and differences) between Building Information Modelling (BIM) and CityGML [6]. Different building models serve different purposes at different level of detail, the daily modelling needs of a building manager or those of an engineer constructing the building itself are in general different from the modelling needs of a city planner. Up until recently the gap within these different models was not at all a standardized operation.

Bart's presentation explores the current efforts of OGC to support bridging this gap, describing working groups' activities to develop a joint conceptual model and achieve semantic interoperability between models covering different levels of detail.

Development of the CityGML Energy ADE (Jean-Marie Bahu and Romain Nouvel)

Jean-Marie Bahu (European Institute for Energy Research, Germany) and Romain Nouvel (HFT Stuttgart, Germany) presented the development of the CityGML Energy ADE [7]. Energy ADE stemmed out as a collaborative process from the need of having an open data model to store energy simulation

data, a model that could be used also as a mean of data exchange and interoperability and that could be also integrated with data from other field of studies on building, like acoustics and statics.
A CityGML application domain extension proved to be the best choice for these aims, providing the necessary capabilities of flexibility, compatibility and modularity. It is the output of a participative development in an international expert group from 12 organizations, representing the development of 6 urban energy modelling and simulation tools.

Application of CityGML Energy ADE in the Sunshine project (Umberto Di Staso)

Umberto Di Staso (Fondazione Graphitech, Italy) closed the workshop with the presentation of application of CityGML Energy ADE in the Sunshine project [8]. The aim is to show how the Energy ADE is implemented in the project and what benefits it brings. Sunshine project has the purpose to develop tools and services to support the energy efficiency policies, and specifically it allows the large-scale estimation of heating needs for residential buildings as part of the energy map service.
CityGML Energy ADE is the data model chosen for the exchange of building geometry and energy data stored in project Sunshine's energy maps.

Conclusions

The workshop proved to be a valuable moment for sharing the results of different activities in the field of standardization of building-related data. During the talks and extensively after the workshop speakers and audience were able to establish valuable contacts and put the basis for further collaboration.
Moreover, the setting of the workshop in the GWF-INSPIRE conference allowed reaching and informing a very wide audience on the outcomes of EU project GeoSmartCity and on the activities of the CityGML Energy ADE workgroup.

Links

[1] http://geospatialworldforum.org/speaker/SpeakersImages/Giorgio%20Saio.pdf

[2] http://geospatialworldforum.org/speaker/SpeakersImages/Maria%20Teresa%20Borzacchiello.pdf

[3] http://geospatialworldforum.org/speaker/SpeakersImages/Giacomo%20Martirano.pdf

[4] http://geospatialworldforum.org/speaker/SpeakersImages/Stein%20Runar%20Bergheim.pdf

[5] http://geospatialworldforum.org/speaker/SpeakersImages/Athina%20Trakas.pdf

[6] http://geospatialworldforum.org/speaker/SpeakersImages/Bart%20de%20Lathouwer.pdf

[7] http://geospatialworldforum.org/speaker/SpeakersImages/Romain%20Nouvel.pdf

[8] http://geospatialworldforum.org/speaker/SpeakersImages/Umberto%20Di%20Staso.pdf