

CityGML ADE for energy performance and energy measured

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About

SUNSHINE – “Smart Urban Services for Higher eEnergy Efficiency” 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 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 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

Project Summary

- **Project Type**
CIP-Pilot Actions
- **Project Number**
325161
- **Project Acronym**
SUNSHINE
- **Project Full Title**
Smart Urban Services for Higher eEnergy Efficiency
- **Starting Date**
1st February 2013
- **Duration**
36 months
- **Call Identifier**
CIP-ICT-PSP-2012-6
- **Project Coordination**
Fondazione Graphitech

Scenario 1: Energy Density Mapping

SUNSHINE Web Portal

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Building Energy Efficiency

Building Properties Chart

Building Overview

Construction Year: 2007
Height: 10m
Floors: 4
Volume: 4000m³
Typology: Residential
Bounding Box: [0, 0, 0, 0, 0, 0]
Bounding Estimated Energy Class: G

Project Funding

SUNSHINE is supported by the Competitiveness and Innovation Framework Programme (CIP) 2007 - 2013
Call Identifier: CIP-ICT-PSP-2012-8

Project Coordinator

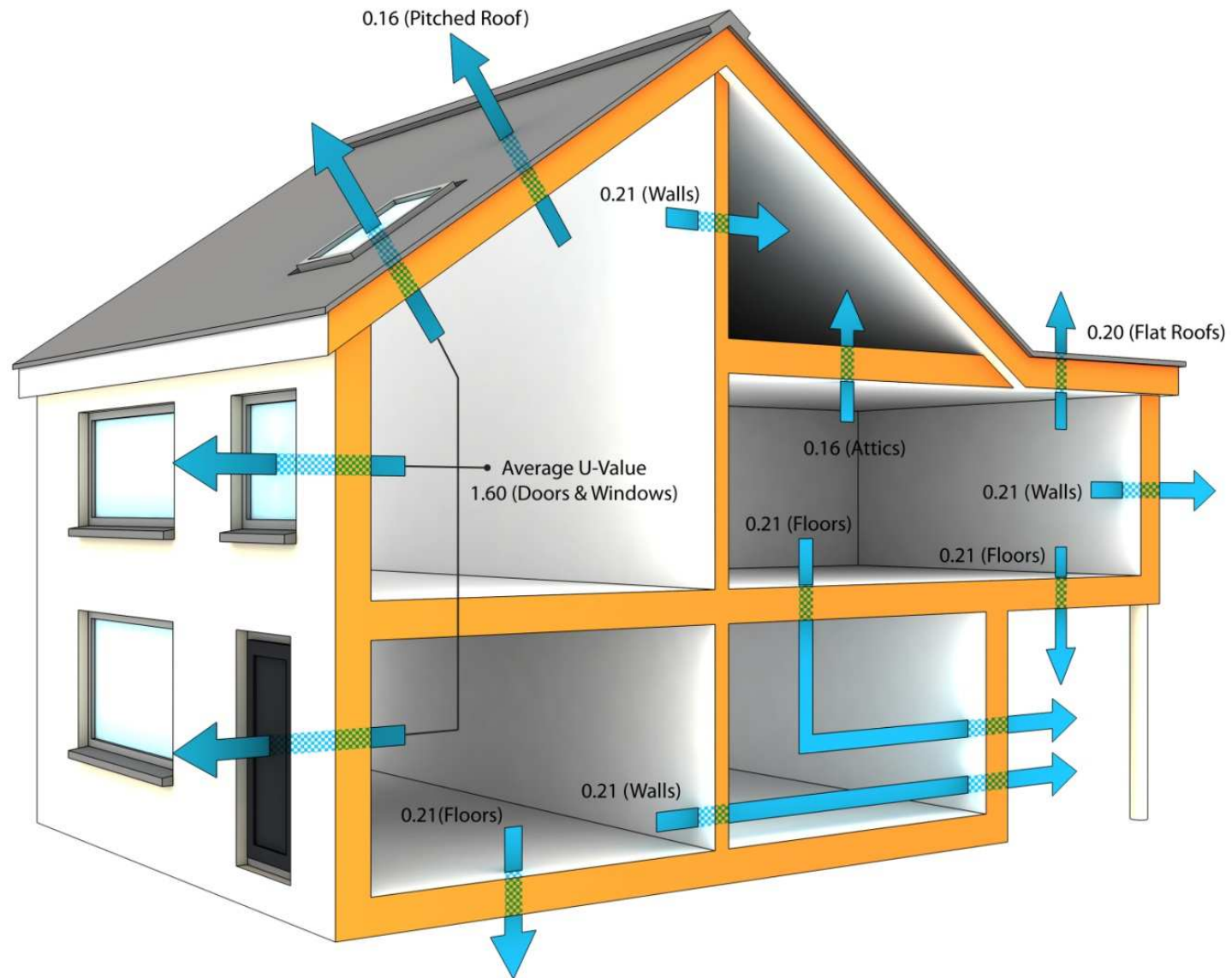
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Social Networks

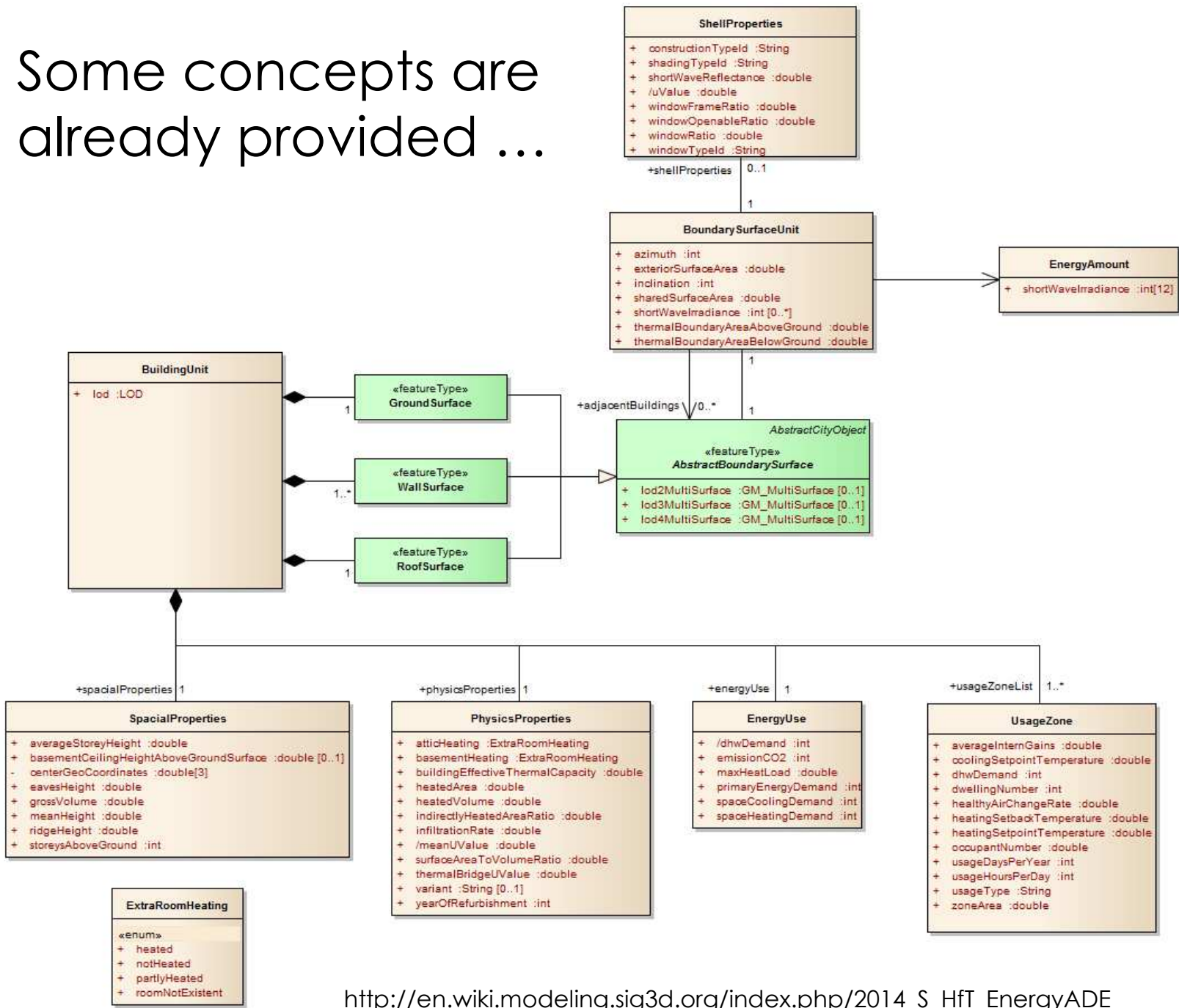
You can stay connected and updated on the SUNSHINE project developments even through the most popular social network.

f t in YouTube

Building Details



Some concepts are already provided ...



Possible mappings

Properties derived from project Use Cases (also based on TABULA project, now available on http://episcopes.eu/welcome/)		CityGML Building	INSPIRE Building	Proposal for an EnergyADE of the HfT Stuttgart (v0.2)
Cadastral reference	In INSPIRE BU: Reference to cadastral or dwelling register	?	externalReference	
Address	In INSPIRE BU: This attribute provides the current address(es) of the building or building component in the structured data type defined in theme Address.		address	
Construction period	note: difficulties in collecting detailed information about the Year of construction	yearOfConstruction	dateOfConstruction	
Building main use		class, function, usage	currentUse	
Building size type (residential only)	Tabula project (now EPISCOPE) is mainly focused on residential stereotypes: 4 different values have been defined:	(class = habitation)	(currentUse = residential)	
Refurbishment level	Again, from TABULA project: - 0: no refurbishment - 1: standard (low level)		(only yearOfRenovation is defined)	(only yearOfRefurbishment is defined)
Building height		measuredHeigh	heightAboveGround	
Mean storey height		storeyHeightsAboveGround (list of)	heightAboveGround (total)	storeysHeighAboveGround
Number of floors		storeysAboveGround	numberOfFloorsAboveGround	
Number of sub-units				numberOfDwellings (residential units) numberOfBuildingUnits (all)
Assignable area	http://www.cp.uci.edu/Instructions4MeasuringSpace.pdf			
Floor area	net area			
Compactness factor	surface-to-volume ratio (EN 15217)			

General Info

[...]



Properties derived from project Use Cases (also based on TABULA project, now available on http://episcope.eu/welcome/)		CityGML Building	INSPIRE Building	Proposal for an EnergyADE of the HfT Stuttgart (v0.2)
U-Values	Walls U-Value			
	Roof U-value			
	Floor U-value			
	Openings U-value			
Climate	Heating season - start			
	Heating season - end			
	Number of heating degree days	kelvin days per annum (http://en.wikipedia.org/wiki/Heating_degree_day)		
	Average outside temperature for heating season			



Properties derived from project Use Cases (also based on TABULA project, now available on http://episcoope.eu/welcome/)		CityGML Building	INSPIRE Building	Proposal for an EnergyADE of the HFT Stuttgart (v0.2)
[. . .] Energy for heating, hot water, cooling, ventilation, lighting	Heated surface	surface of the heated part of the building		heatedArea
	Heated volume			heatedVolume
	Mean envelope heat transmission coefficient			meanUValue
	Set-point temperature for heating			heatingSetpointTemperature heatingSetbackTemperature
	Inside design temperature			
	Heating system type		heatingSystem	
	Heating system energyware		heatingSource	
	Main heating controls			
	Hot water system type			
	Hot water fuel		heatingSource	
	Ventilation system type			
	Energy need for space heating			spaceHeatingDemand
	Energy need for hot water			dhwDemand
	Energy need for space cooling			spaceCoolingDemand
	Energy need for space lighting			
	Energy need for space ventilation			
	Delivered energy for space heating			
	Delivered energy for hot water			
	Delivered energy for space cooling			
Delivered energy for space cooling				
Delivered energy for space lighting				
Auxiliary energy				

Thank for your attention

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Annexes

INSPIRE and “Energy” in buildings

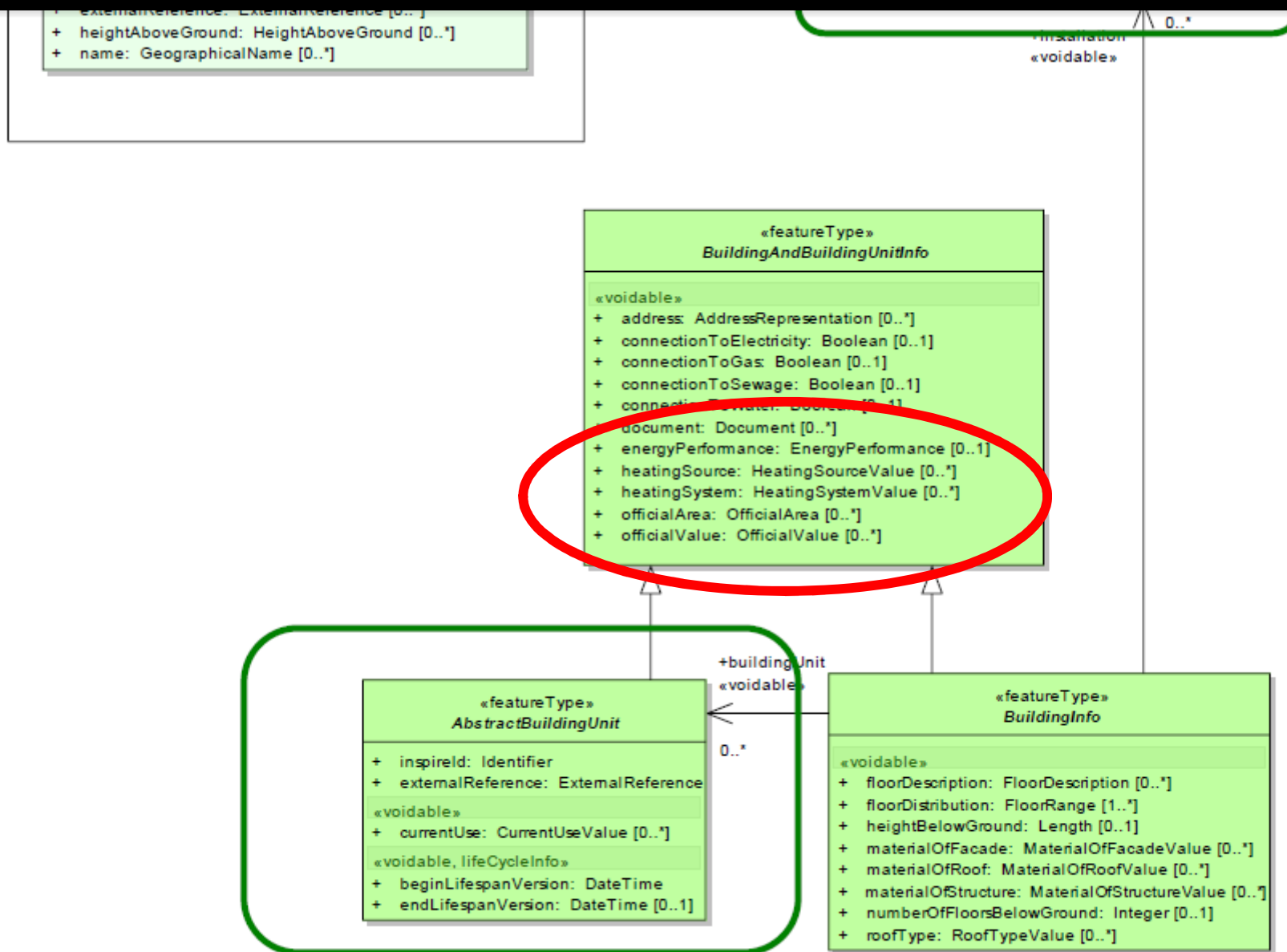


Figure 37: Main feature types of Buildings Base Extended

ETSI-GreenButton by NAESD (North American Energy Standards Board) was identified as the preferred implementation option for the meter data exchange protocol to be used in Sunshine.

IEC 61968-9 was judged to be much more complicated and less supported in terms of practical examples and software tools.



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every day, utilities and
developers are joining us

An open standard for sharing electricity data, Green Button has made it possible for utilities and software developers to put that data easily into the hands of utility customers via their phone, computer and tablet. Green Button helps homeowners and businesses take action, understand their usage and make better-informed decisions.

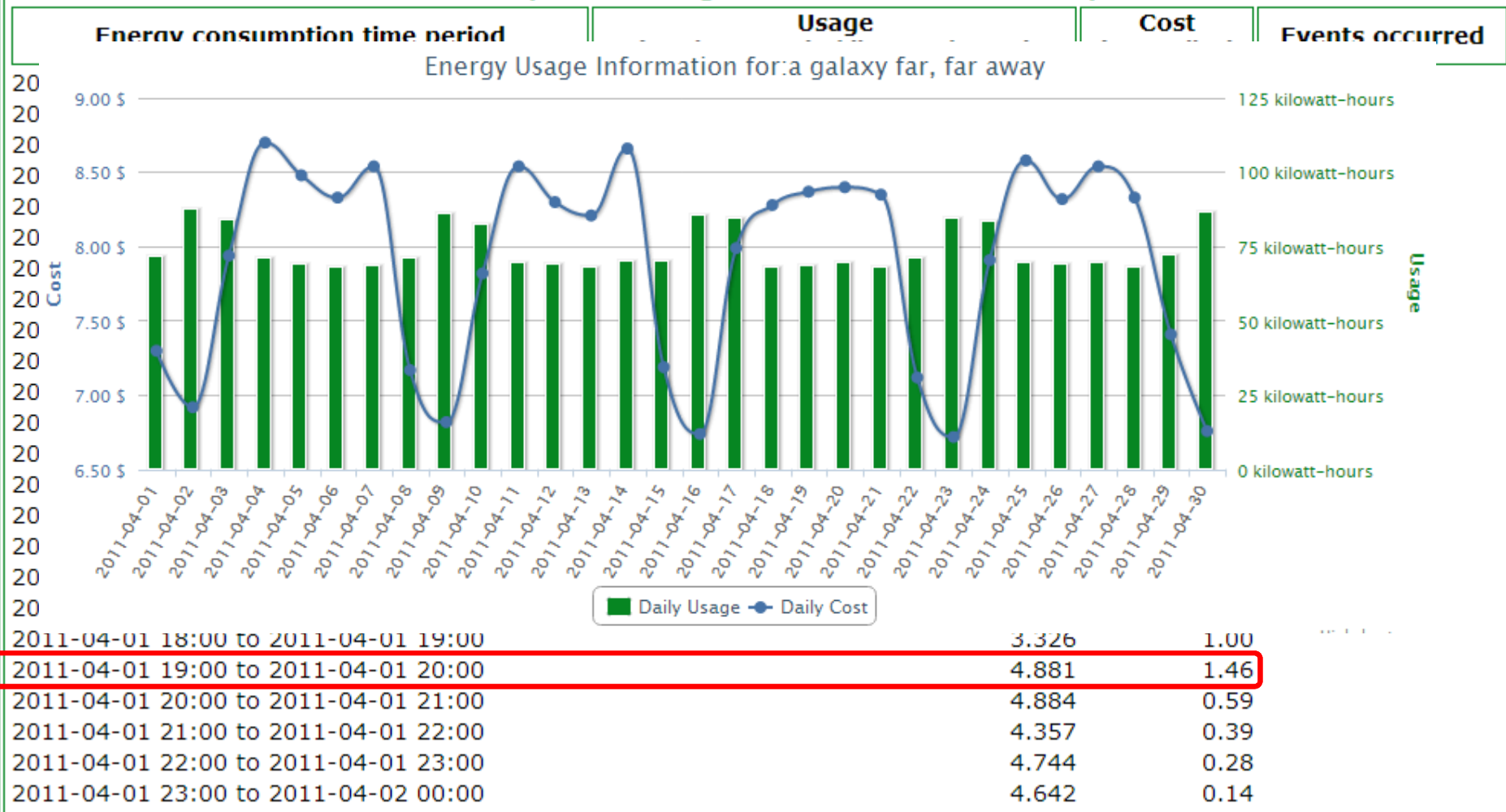


source: <http://greenbuttondata.org/>

Example of GreenButton data

Start date: 2011-04-01 00:00 for 30 days

Data for period starting: 2011-04-01 00:00 for 1 day



source: <http://greenbuttondata.org/>



Green Button is not only a schema for encoding data about meters reading (ESPI), it also identifies a layered stack of open standards on which to build a practical way to publish the data:

- the encoding of the meter readings is the payload of an open protocol for creating and consuming open data: the OData protocol (OASIS)
- it is based on an HTTP and REST paradigm
- it supports different formats and specifically Atom, the one that is relevant for Green Button
- Atom is a IETF standards, well understood and wide spread use
- ESPI standard can be considered a profile and extension of the IEC 61968 standard (akas NAESB REQ.21) standard internationalization is actively pursued



XEMTECH optical meter reading system
(<http://www.xemtec.com/9-0-AMR-Retrofit.html>)