

# SUNSHINE



D3.2

## Liaison Agreements and Process Documents

WP 3 – Standardisation, interoperability and methodologies for energy  
saving

Task 3.1 – Harmonisation of pilot-relevant cross-domain standards

**Revision:** [v1.1]

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Dissemination level	PU (public)
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Due date	31/10/2013
Submission Date	31/10/2013

## REVISION HISTORY AND STATEMENT OF ORIGINALITY

Revision	Date	Author	Organization	Description
V.0.1	23/10/2013	Contributors	GIST	First Draft
V1.0	31/10/2013	Contributors	GIST	Submitted Version
V1.0	31/10/2013	Review	FG	Submitted Version
V1.1	27/11/2013	Contributors	GIST	Processing of review comments

### Statement of originality:

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*"This project is partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Framework Programme by the European Community"*  
([http://ec.europa.eu/ict\\_psp](http://ec.europa.eu/ict_psp)).

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## Acronyms

<b>CA</b>	Consortium Agreement
<b>SUNSHINE</b>	Smart Urban Services for Higher eEnergy Efficiency
<b>SDO</b>	Standards Development Organization
<b>SDI</b>	Spatial Data Infrastructure
<b>GIS</b>	Geographic Information System
<b>GI</b>	Geospatial Information

## 1 Introduction

SUNSHINE – “Smart Urban Services for Higher eEnergy Efficiency” – delivers innovative digital services, interoperable with existing geographic web-service infrastructures, thus 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 is structured into **three main scenarios**:

**[SCENARIO 1] Building Energy Performance Maps:** 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.

**[SCENARIO 2] Building Energy Performance Management:** The previous assessment will then be 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.

**[SCENARIO 3] Remote Public Lighting Management:** 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<sup>1</sup>, i-SCOPE<sup>2</sup>, and i-Tour<sup>3</sup>.

### 1.1 Purpose and Scope

Within SUNSHINE, this document comprises deliverable **D3.2** of the Task 3.1: *Harmonisation of pilot-relevant cross domain standards* of Work Package 3: *Standardisation, interoperability and methodologies for energy saving*, according to the full reference information present in [DOW].

<sup>1</sup> <http://www.briseide.eu>

<sup>2</sup> <http://www.iscopeproject.net>

<sup>3</sup> <http://www.itourproject.com/web/>

The scope of deliverable D3.2 is to document the liaison agreements established between those Standards Development Organisations (SDOs) that support standards in the domain of Geographic Information Systems and the Smart-Grid, and to specify the processes leading to exchange of information, standards harmonisation and not excluding the further development of standards applicable to the Smart-Grid through the creation of new work item proposals.

While this deliverable is defined as strictly limited to the liaison agreements and process documents, the scope of T3.1 is broader and includes the survey, review and analysis of the relevant standards for the SUNSHINE Pilots. This task is on-going and the studies undertaken, preliminary findings and further approach are included in this document to set the context for D3.2 and the standard development activities.

The development of Smart Grid standards is a focus for many SDOs and the opportunity exists to coordinate development and facilitate harmonisation. The feedback from Smart Grid pilot projects that select standards and apply them to actual problems is an effective means to test the standards in place or development and provide valuable feedback to the respective SDO technical committees.

## 1.2 Document structure

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<b>Section 1</b>	This introduction including purpose, scope and reference documents.
<b>Section 2</b>	Presentation of the liaisons established for SUNSHINE and the applicable working processes.
<b>Section 3</b>	An overview of the standards in the context of SUNSHINE for Smart-Grid, Geographic Information System and cross-domain applications
<b>Section 4</b>	Executive Summary
<b>ANNEX A</b>	CEN TC/287 N 1566 - SUNSHINE Liaison Status Confirmation
<b>ANNEX B</b>	Preliminary concept for the SUNSHINE Standards Library

## 1.3 Reference Documents

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<b>[DOW]</b>	SUNSHINE Annex 1 – Description of Work
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## 2 Liaison Agreements

### 2.1 Motivation

Meeting European energy and climate change targets for 2020 requires a comprehensive program to make the electric power grid more reliable, flexible, secure, efficient and environmentally sustainable through the use of digital technologies. Communicating geospatial information related to the grid must become much easier if Europe is to meet those targets. Every smart grid component - transformer, meter, air conditioner, power plant, electric car, solar panel, etc. - has a location on Earth. Every grid event or phenomenon - brown-out, demand variability, power surge, regulation, transmission loss, etc. - occurs within some time interval and at some location in space along the grid's physical network. The same is true for every external event or phenomenon that affects the grid, such as weather alerts. Spatial parameters thus have a significant impact in every scenario affecting the grid. Furthermore, spatial information must pass easily between smart grid systems and systems in use in neighbouring domains such as emergency response, disaster management, transportation, facilities energy management, surveying, civil engineering, hydrology and meteorology.

Development of the Smart Grid domain is in full progress. New technology is being rapidly developed, new market models introduced and the social support for decentralized generation of sustainable energy and energy saving has increased. In such an innovative market, information-interoperability for technological solutions plays a vital and enabling role for both automated systems and those mediated by user interaction. There are nevertheless many issues to tackle both independently and in the domain of interoperability between the Smart Grid and Geospatial Information.

For example, in both the energy domain and the geo-information domain, there are generally accepted and available standards. All these sources of information and standards are relevant to Smart Grids but are themselves insufficiently coordinated and also lack well-defined methods for combination. The necessary requirements for information-exchange within the context of Smart Grids differ from the requirements in the more traditional energy domain. The Smart Grid will be characterized by greater volumes of data (sensors and smart meters), partnerships will be more dynamic (a consumer is able to also act as a producer of energy) and information must be unrestricted and accessible, while the security of individuals and corporate entities must also be respected. Innovative methods and models in the field of semantics and ontology are available to support the development work, but they are far from fully exploited.

The Pilots that comprise SUNSHINE present an opportunity to tackle these problems, apply the relevant Smart Grid and Geospatial Information Standards and derive lessons learned to be fed back to the SDOs. A specific SUNSHINE milestone (MS11) has been put in place to forward "Submission Packages" to standardization bodies. The submission packages include the details and justification for proposed changes to Standards applicable to the SUNSHINE Scenarios. Deliverable D3.2 establishes the connections to allow the exchange of information between SUNSHINE and the SDOs.

## 2.2 Implementation

The exchange of information between SUNSHINE and SDOs is achieved through Project and SDO liaisons. All participants in standards development activities and all processes followed by SDOs are subject to rules and procedures defined by the SDO regularity bodies. When approval of a liaison member to an SDO Technical Committee is achieved the liaison member becomes subject to the applicable regulations of the SDO Technical Committee. This is of great benefit for the definition of a working practice for the exchange of information since the liaison is required to adopt the regulations of the Technical Committee that they become a member and, on the other hand, also follow the procedures of the SDO or Project represented.

The liaisons of SUNSHINE have been secured through the CEN/Technical Committee 287.

CEN/TC 287 provides the formal means to exchange technical documents between SUNSHINE and the SDOs.

### 2.2.1 CEN/Technical Committee 287

CEN/TC 287 is the CEN Technical Committee with the responsibility to coordinate the standardisation of digital geographic information through a structured framework of standards and guidelines. CEN/TC 287 specifies the methodology to define, describe and transfer geographic data and services. Close cooperation is entertained with ISO/TC 211 to avoid conflict and duplication and to promote harmonisation leading to a consistent use of geographic information to support national and international spatial data infrastructures. The mandate of CEN/TC 287 includes the opening up of new spatial data resources, the increase of the availability and usability of data, the re-use of data in multiple applications and to enable system interoperability. The very same concepts are essential for the development of the SMART GRID.

CEN/TC 287 provides a level of inter-disciplinary expertise that is equally aposite for the solution of SDI and Smart Grid problems and is a natural choice for connecting the standards analysis and harmonisation initiatives of SUNSHINE with the SDOs. CEN/TC 287 works to develop harmonization in general by strengthening existing liaisons and building

new relationships. Analysis is also performed of all the member SDO policies and procedures to reveal routes for effective cooperation.

### 2.2.2 Liaison Members of CEN/TC 287

The liaisons established in CEN/TC 287 Geographic Information that represent SDOs and other interested parties connected to the applicable set of Smart Grid and Geospatial Information standards are documented hereafter:

Liaison	Type	Point of contact (Direct Liaisons or Prime Contact)	Resource
CEN/CENELEC	[M] Membership	Martin Ford GiST	<a href="http://www.centc287.eu/">http://www.centc287.eu/</a>
ETSI	[C] Courtesy of CEN/CENELEC	Martin Ford GiST	<a href="http://www.centc287.eu/">http://www.centc287.eu/</a>
ISO/TC 211 Geographic Information/Geomatics	[M] Membership	Ms. Bjørnhild Sæterøy Standards Norway	<a href="http://www.isotc211.org/">http://www.isotc211.org/</a>
Open Geospatial Consortium, Inc. (OGC)	[M] Membership	Bart De Lathouwer OGC	<a href="http://www.opengeospatial.org">http://www.opengeospatial.org</a>
IEEE-SA	[M] Membership	Paul Eglitis IEEE SA SCC40	<a href="http://grouper.ieee.org/groups/earthobservationsSCC/">http://grouper.ieee.org/groups/earthobservationsSCC/</a>
IEC	[C] Courtesy of CEN/CENELEC[C] through coordination with IEC for CIM, and ENTSO-E	Martin Ford GiST	<a href="http://www.centc287.eu/">http://www.centc287.eu/</a>

\*[M] Membership: The Liaison is an active member of the CEN/TC 287.

\*[C] Committee Construct: The Liaison is established through a Committee relationship

The CEN/TC 287 also includes liaisons with other project and institutes in the Smart Grid and GIS/SDI domain. Members of these organisations are directly involved with standards



development (e.g. through other work with the SDOs) and exchange of information with these liaisons is as equally important as those with the traditional SDOs. The liaisons with Smart Grid interest are listed below. This is a significant advantage of setting up the liaison agreements through CEN/TC 287.

Liaison	Resources
Smart Grid Coordination Group (SGCG)	<a href="http://www.cen.eu/cen/Sectors/Sectors/UtilitiesAndEnergy/SmartGrids/Pages/default.aspx">http://www.cen.eu/cen/Sectors/Sectors/UtilitiesAndEnergy/SmartGrids/Pages/default.aspx</a>
Smart Islands	<a href="http://www.smart-islands.eu/">http://www.smart-islands.eu/</a>
EC DG Joint Research Centre (JRC)	<a href="http://inspire.jrc.ec.europa.eu/">http://inspire.jrc.ec.europa.eu/</a>
i-SCOPE	<a href="http://www.iscopeproject.net/">http://www.iscopeproject.net/</a>
smeSpire	<a href="http://www.smespire.eu/">http://www.smespire.eu/</a>
CEN/TC 278 Road transport and traffic telematics	<a href="http://www.cen.eu/cen/Sectors/Sectors/TransportAndPackaging/Roadtransport/Pages/RTTT.aspx">http://www.cen.eu/cen/Sectors/Sectors/TransportAndPackaging/Roadtransport/Pages/RTTT.aspx</a>
Geographic Information System International Group (GISIG)	<a href="http://www.gisig.it/">http://www.gisig.it/</a>

CEN and CEN/TC 287 document all liaisons at the following locations:

- <http://www.cen.eu/cen/AboutUs/CENnetwork/EurIntOrg/Liaison/Pages/List.aspx>
- <http://www.cenct287.eu/index.php/liaisons>

CEN/TC 287 further makes possible the constitution of working groups for the discharge of dedicated tasks and it is envisaged that a specific working group to handle standards harmonisation as a result of SUNSHINE can be set up. One immediate step underway is a new working with OGC to tackle Smart and GI Standards issues, that is expected to be in place in March 2014.

### 2.2.3 SUNSHINE Status as Liaison

The Liaison status of SUNSHINE was established at the 32nd Plenary of CEN/TC 287 in Oslo, Norway on April 11-12, 2013. The liaison status is affirmed by Decision 276 in Document CEN/TC 287 N 1565. The substance of Decision 276 was thereafter confirmed in the minutes of the Oslo Meeting, see item 6.1 of CEN/TC 287 N1566 (copy of document

included in Annex A), the said minutes which were later agreed in the 33rd CEN/TC 287 in Frascati, Italy on October 2-3, 2013.



## 2.3 Process Documents

A CEN TC Liaison is defined as any European or International organisation that follows the work programme of a Technical Committee in order to support its completion, where necessary, through representative input on behalf of the organisation being represented. For CEN TC/287 in accordance with the CEN internal regulations<sup>4</sup> the liaison has the following responsibilities and rights:

### Responsibilities

- To contribute actively to the work of the technical committee with which it is in liaison
- To attend meetings and exchange technical information with the committee in order to support the development of European Standards and other deliverables.

### Rights

- To receive all the relevant technical documents and invitations and to attend technical committee meetings as observer.
- To provide input to the work of the committee with which it is in liaison when necessary but without the right to vote
- To propose in conjunction with new work items their technical documents as a basis for TC work, if agreed by the CEN TC members.
- To comment on the Technical Committee Business Plan.
- To nominate experts to Working Groups in line with the Internal Regulations.

## 2.4 Standards for SUNSHINE and Feedback Processes

Deliverable D3.2 includes a first step in the survey and review of existing standards available in the Smart Grid (SG) and Geographic Information Systems (GIS) domains to

<sup>4</sup> <http://www.cen.eu/boss/supporting/Reference%20documents/Internalregulations/Pages/default.aspx>

determine the base set for application in the SUNSHINE pilots. Through CEN/TC 287 the SDOs will be contacted to obtain the relevant standards, especially those in development, for use by the modelling teams. Analysis is conducted with a view to harmonise the individual standards of relevance to the SUNSHINE as defined in the Use Cases of SUNSHINE WP01.

An understanding of the policies and procedures of each SDO that are to be observed is important and serves to guide the process of interacting with each organisation. Procedural information is published by each SDO, here is a selection:

Example directives and policies for the development of standards	
<b>CEN</b>	<a href="http://www.cen.eu/boss/Production/Pages/default.aspx">http://www.cen.eu/boss/Production/Pages/default.aspx</a>
<b>IEC</b>	<a href="http://www.iec.ch/standardsdev/?ref=menu">http://www.iec.ch/standardsdev/?ref=menu</a>
<b>IEEE</b>	<a href="http://standards.ieee.org/develop/policies/sa_opman/sect6.html">http://standards.ieee.org/develop/policies/sa_opman/sect6.html</a>
<b>ISO</b>	<a href="http://www.iso.org/iso/home/standards_development/resources-for-technical-work/iso_iec_directives_and_iso_supplement.htm">http://www.iso.org/iso/home/standards_development/resources-for-technical-work/iso_iec_directives_and_iso_supplement.htm</a>
<b>OGC</b>	<a href="http://portal.opengeospatial.org/files/?artifact_id=23325">http://portal.opengeospatial.org/files/?artifact_id=23325</a>

Guidance is also available on how to promote change to existing standards, especially important with respect to harmonisation goals. For example, the IEEE includes the following statements<sup>5</sup>:

*“IEEE welcomes input from all interested stakeholders in the development of IEEE standards. The technical integrity of IEEE standards is ensured through a robust standards development process, and is overseen by the technical Sponsor. If a stakeholder seeks to modify an IEEE standard (beyond country-specific changes made under a national adoption), it shall submit the requested modifications to the IEEE technical Sponsor for consideration under IEEE procedures.*

*All changes are subject to approval by IEEE’s established consensus-based balloting process. IEEE does not guarantee in advance the outcome of any proposed modifications”*

<sup>5</sup> <http://standards.ieee.org/ipr/revisestds.pdf>

### 3 Standards Landscape

*Note: the information in this section is not part of the requirement for D3.2 but is part of other on-going tasks and is included here for reference.*

The SUNSHINE Pilots engage specific scenarios that are candidates for one of the many components to be included in future Smart cities. There are a large number of standards published and under development that address all aspects of the Smart Grid and Smart Cities. A review and analysis of these standards and an appreciation of trends in development is required to select and support the use of standards in the SUNSHINE pilots. While SUNSHINE presents a number of localised scenarios, the context of the Standards selected for the Pilots must also be viewed in the context of the larger scale systems that the SUNSHINE pilots will be part of.

Smart Grids place high demands on the power infrastructure for the regulation and balancing of energy supply and demand. In a traditional network, energy is transported from a small-set of fixed locations and distributed to individual customers. In a Smart Grid, the traditional customer can also act as a supplier making use of sustainable energy resources such as local wind and solar plants, the supply of spare battery capacity from an electric vehicle, or the braking energy from electric trains. This leads to a network of decentralized suppliers where the generation of the capacity of such sources is difficult to forecast. In such a complex landscape it is a prerequisite, for a stable energy network, to be able to efficiently combine and interpret production and consumption data. The SUNSHINE pilots focus on introducing Smart Systems for the efficient management of resources and energy saving, the same technology is applicable to wider scale Smart Grid problems and it is important to choose standards fit for purpose but also ones that do not limit interoperability and scalability to other applications.

The principal object in the urban environment itself, the house, uses about 40%<sup>6</sup> of total energy resources. Energy savings are important and also energy storage, as the house is one of the potential drivers of the Smart Grid and Smart Cities.

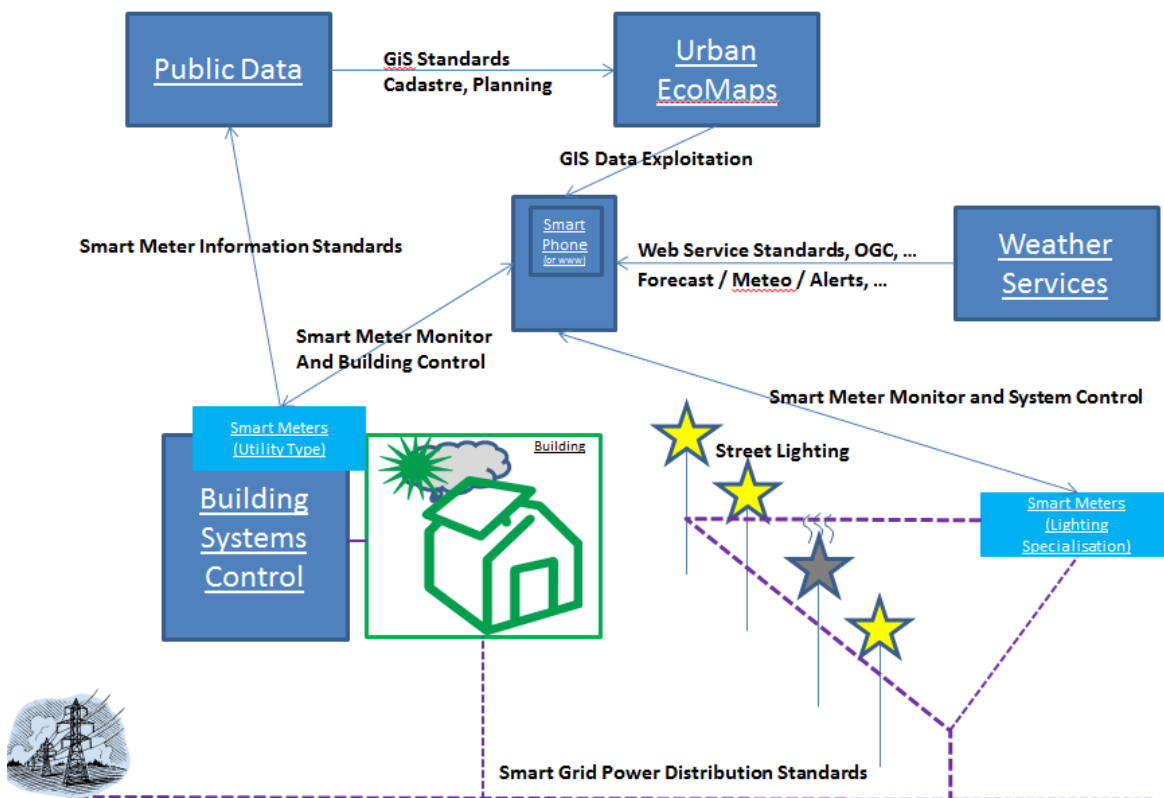
The following sections discuss the 3 main SUNSHINE scenarios further from a standards viewpoint.

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<sup>6</sup> International Energy Association, auf weltweiter Basis, im Jahr 2002

### 3.1 Scenario analysis form a standards viewpoint

An integrated overview of the three main scenarios, and extensions to these scenarios, is depicted below that illustrates the key interfaces between the components that make up the SUNSHINE Pilots indicating where standards are applicable to each interface.



Sunshine Scenarios from a Standards perspective.

#### [SCENARIO 1] Building Energy Performance Maps:

The key to scenario 1 is the identification of existing and applicable data, the access to this data and its layering into common formats to generate the ECOMAPS. Standards are important for the following, amongst other, aspects:

- Generation of ECOMAPS – assimilation of data and placing in GI context, for initial analysis and real-time exploitation.
- Syntax and semantics of the data and metadata stored in public service databases for energy parameters and Geospatial Information.
- Interfaces for access to the data and for the input of new data.
- Formats and linking of data in eco urban maps; interoperability capabilities so that diverse data can be merged and compared in the same framework (utility network quality, usage statistics, costs, variation of usage with external and time-varying

- temporal factors (season), combination with demographic data, including pedestrian and traffic information.
- 3D building information.

**[SCENARIO 2] Building Energy Performance Management:**

Scenario 2 is characterised by the Monitoring of Smart Meters, Remote Control of the heating systems through the use of mobile platforms and web clients and the inputs of additional information such as weather information to support informed decision making. Standards are important for:

- Smart Metering.
- Weather Alerts.
- Localized weather forecasts.
- Web services and smart phone protocols.
- Standards for home automation; N.B. as well as the heating system, other components play a role e.g.: windows, blinds, shutters.
- Interface standards for the original collection of data, access to the data for exploitation, delivery of new data.

This is a precursor to a full expert system where many diverse parameters are assimilated to guide the operation of control functions.

**[SCENARIO 3] Remote Public Lighting Management:**

Scenario 3 extends the standards landscape applicable in Scenario 2 to additional sensor information and the control of larger scale municipal systems. Additional standards to consider:

- Interoperable control of public lighting systems: AMR systems and their interoperation with web services.
- Interaction with the power grid and set of applicable Smart Grid standards.
- Scaling of solutions to the Smart City.

### 3.2 Standards Development

SDOs are making concerted efforts to coordinate standards development usually *separately* in the areas of Smart Grid and Geospatial Information. SUNSHINE presents an opportunity to perform an inter disciplinary coordination across both domains.

Three Geospatial Information (GI) Standards-making organizations – ISO, CEN and the OGC – each have specific roles to play in advancing technical interoperability to serve institutional coordination in Europe. ISO/TC 211 produces International Standards, OGC

manages an industry consensus process to develop interoperability standards and CEN/TC 287 deals with European-specific interoperability issues. Through their efforts, geospatial interoperability has advanced greatly in the last 20 years, and yet there are gaps in the standards portfolio, which European initiatives such as INSPIRE fill by producing their own specifications, which may be different from the ISO, CEN and OGC standards. To optimize the standards making process, ISO, CEN and OGC are proposing a workflow and mechanism for European Initiatives (like INSPIRE) to make it easier for these initiatives to bring their findings and observations regarding GI back into ISO, CEN and the OGC.

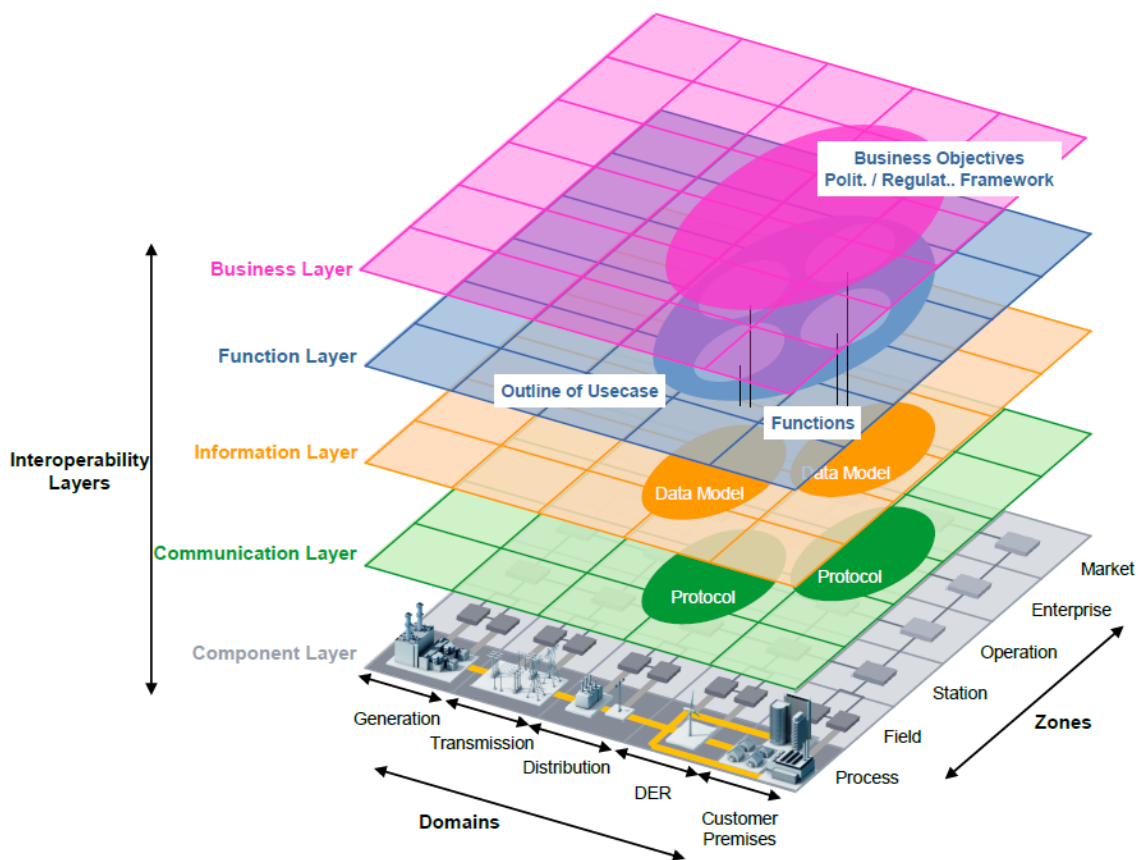
European SDOs have also launched initiatives to coordinate the development of Smart Grid standards in response to the European Commission standardization mandate M/490 (published on 1 March 2011 and accepted in June 2011) to deliver a technical reference architecture, a set of consistent standards and sustainable standardization processes. Furthermore, the European SDOs have also been asked to investigate standards for information security and data privacy encompassing harmonised high level requirements.

The European Commission's Smart Grid Task Force have provided a Smart Grid Architecture Model (SGAM)<sup>7</sup> where "consisting of the five interoperability layers the SGAM framework allows the representation of entities and their relationships in the context of smart grid domains, information management hierarchies and in consideration of interoperability aspects." The SGAM figure is reproduced here for reference. The reference architecture terminology provided is a tool to index standards in the library of resources compiled for SUNSHINE in the ongoing tasks and such an approach is demonstrated in the *CEN-CENELEC-ETSI Smart Grid Coordination Group First Set of Standards*.<sup>8</sup>

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<sup>7</sup> [http://ec.europa.eu/energy/gas\\_electricity/smartgrids/doc/xpert\\_group1\\_reference\\_architecture.pdf](http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_reference_architecture.pdf)

<sup>8</sup> <ftp://ftp.cen.eu/EN/EuropeanStandardization/HotTopics/SmartGrids/FirstSetofStandards.pdf>



### SGAM Framework as provided by SGTF

Standards related to the Smart Grid, Spatial Data Infrastructures and Geospatial Information can all be addressed in the context of the SGAM Framework.

The European Commission’s overall policy in this area is set out in the communication ‘Smart Grids: from innovation to deployment’ [1]. According to the Commission, smart electricity grids should reduce CO2 emissions by 9% and household energy consumption by 10%. They will also facilitate the expansion of renewable energy including de-centralised micro-generation of electricity using solar panels (photovoltaic) and wind turbines. Smart grids therefore have a crucial role to play in enabling the EU to reach the targets of its integrated energy and climate change policy (as adopted in December 2008).

### 3.3 STANDARDS FOR SUNSHINE

The Standards for SUNSHINE are based on a preliminary set identified in the DOW and then analysis performed in task T3.1 leading to the construction of a Standards Reference Library that points to recommended Standards exercised in the SUNSHINE Pilots. A preliminary version of the Standards Reference Library is included in Annex B of this report.

*"This project is partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Framework Programme by the European Community"*  
([http://ec.europa.eu/ict\\_psp](http://ec.europa.eu/ict_psp)).



**Annex B is illustrative** and does not constitute the final recommendation. The eventual standards reference library is to be provided as an on-line resource.

The Tasks defined in the SUNSHINE [DOW] identify a preliminary set of standards applicable to the SUNSHINE scenarios. These standards are initial candidates set for which feedback from the SUNSHINE pilots is to be provided. The following analysis will be updated as the project progresses as part of the proposed set of standards.

STANDARD or STANDARDS APPLICABLE AREA	Related Tasks / Scenario / (non-exhaustive)	LIAISON IN PLACE
ISO 19119 taxonomy framework	T1.3	ISO::CEN/TC 287
OGC Sensor Observation Service (SOS) Sensor Alter Service (SAS) Sensor Event Service (SES) Sensor Web Enablement (SWE)	T1.3, T4.4, T4.5 Scenario 2	OGC::CEN/TC 287
OGC Web Services  (see also BRISEIDE, and OGC standards for 3D client)	Scenario 1	OGC::CEN/TC 287
IEC 61968-3 Interface for Network Operations (NO)	T1.3 T4.3	CEN/TC 287
IEC 61968-9 Interface Standard for Meter Reading & Control	T1.3 T4.2	CEN/TC 287
Metadata, geographical information, sensor information, billing information, user profile information, building reference information	T1.5, T4.1 Scenario 1 ECOMAPS, DBs	Diverse standards to be identified.
CityGML  Application Domain Extension for CitGML to measure energy loss in buildings	T3.2, T4.1, T5.3	OGC::CEN/TC 287
Privacy Impact Assessment (PIA) Threat Vulnerability and Risk Analysis (TVRA)	T1.6  All	ETSI, ISO via CEN/TC 287

STANDARD or STANDARDS APPLICABLE AREA	Related Tasks / Scenario / (non-exhaustive)	LIAISON IN PLACE
Extensions of design for privacy and security: via OASIS (SAML and XACML); ETSI (Tplan and its update to ExTRA (ES 202 553) and CEN TC287; Including, but not limited to: TS 102 165-1; ETSI TS 102 165-2; ISO/IEC 9798; ETR 332, ISO/IEC 15408; ETSI TS 102 165-1, ETSI TS 187 011 and ETSI ES 202 567.	Scenarios	
Standardisation of guidelines on processes and methodologies for evaluation of energy saving policies.	T3.3	Diverse standards to be identified.
Standards for weather data : semantics, syntax.	T4.4, T4.5	Diverse standards to be identified.
ECOMAPS access with OGC Web Map Service and Web Feature Service	T5.1, T5.7	OGC::CEN/TC 287
CityGML: Cadastral Maps, Urban Plan, Land Use, Development, demographic, image data, admin boundaries	T3.2, T4.1, T5.3	OGC::CEN/TC 287

### 3.3.1 SMART GRID

“Smart Grid” is essentially an umbrella term that can be interpreted in many different ways. The essence is, however, that networks are made 'smart' in order to facilitate the decentralized generation and distribution of (sustainable) energy.

Energy networks have traditionally been established on a one-way basis from producer to consumer. Decentralized generation introduces the concept of two-way traffic, in which the parties at both ends of the network can produce, supply and trade energy. This offers significant opportunities in the area of sustainability and transparency of the energy system. However, an increase in the number of active participants in the network who both consume energy and produce energy (“prosumers”) and an increase in energy generation from sustainable/renewable sources (solar, wind) also means more dynamism and volatility in the existing infrastructure.

Key to enabling all of the smart grid functionality described above is to ensure that efficient use of resources and control and user ownership in the process is achieved.

The introduction of Smart Meters, Home Energy Systems, Building Energy Systems and Smart Appliances produce data that contribute to the stabilization of supply and demand in the regional energy network. However, they do more than that. Smart systems and devices provide current insight into supply and demand at the level of an individual household or building. That insight :

- Enables energy users to trade energy,
- It opens up for the possibility to establish new service models.

Intelligent networks, like Smart Grids, make the energy system transparent. Where parties connected to the grid before had a passive role of mere receivers, now they are an active informed participant.

Digitization of networks allows us to keep in balance the energy supply and demand. It makes the energy management transparent and thus creating support for sustainable energy and energy efficiency. However digitization also means that many (sensor) data with different objectives, must be shared with the various stakeholders. Smart Grid standards are important for the development of the smart grid technologies, the effective management of resources in a smart enabled energy infrastructure, and the management of all the different and new types of data.

### **3.3.2 GEOSPATIAL INFORMATION**

The full realisation and exploitation of SMART GRID technologies will be achieved through the support of geospatial information that adds value to the Smart Grid through location and other SDI services.

There are a number of interoperability challenges to be solved. The analysis and standards coordination work carried out in the SUNSHINE project includes an investigation of new methodologies to bring together different standards development programmes in order to fill the gaps identified in available standards to meet new requirements only realised now with the advent and development of the Smart Grid and Smart Cities.

An interesting case is the synergy to be developed between CityGML and building energy efficiency. CityGML provides an open encoding for representation, storage, and exchange of virtual 3D city and landscape models. Modeling of different scales is supported in CityGML including individual buildings, whole sites, districts, cities, and meso- and macro-scale regions. It allows users to share virtual 3D city and landscape models for sophisticated analysis and display tasks. Standards such as CityGML provide new capabilities for the modeling of the energy infrastructure and energy sources and sinks in a Smart City. For example, the efficiency of solar panels is strongly influenced by the position of the solar panel relative to the sun and the climatic conditions. With the aid of CityGML

and 3D modeling, it becomes possible to gain better insight into the potential energy production of buildings.

A SUNSHINE objective is to formalise an extension to the OGC standard CityGML on building energy efficiency and to propose it to the OGC standardisation committee. This will be achieved through the definition of an Application Domain Extension (ADE) on building energy efficiency that will account for the concept of “reference building” and for the parameters required for comprehensive energy assessments of building.

### 3.4 Forward look

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The Standards coordination performed for the SUNSHINE Pilots is a part of the bigger picture of putting in place Smart Grid and Smart City solutions. In selecting standards for the SUNSHINE pilots the need to develop scalable and interoperable systems is imperative and the following points are to be borne in mind:

- Standards adopted shall also be consistent with the overall SMART GRID, SMART CITIES and eMobility Developments. SUNSHINE Pilots must be able to plug into the Smart Grid.
- Buildings use 40% of world energy consumption and can also power the Smart Grid.
- Consumers modeled in the SUNSHINE pilots will in the future be also producers of energy (solar power, wind energy, car batteries). Concept of “prosumers”
- Need for analysis on both local and regional scales.

## 4 Executive Summary

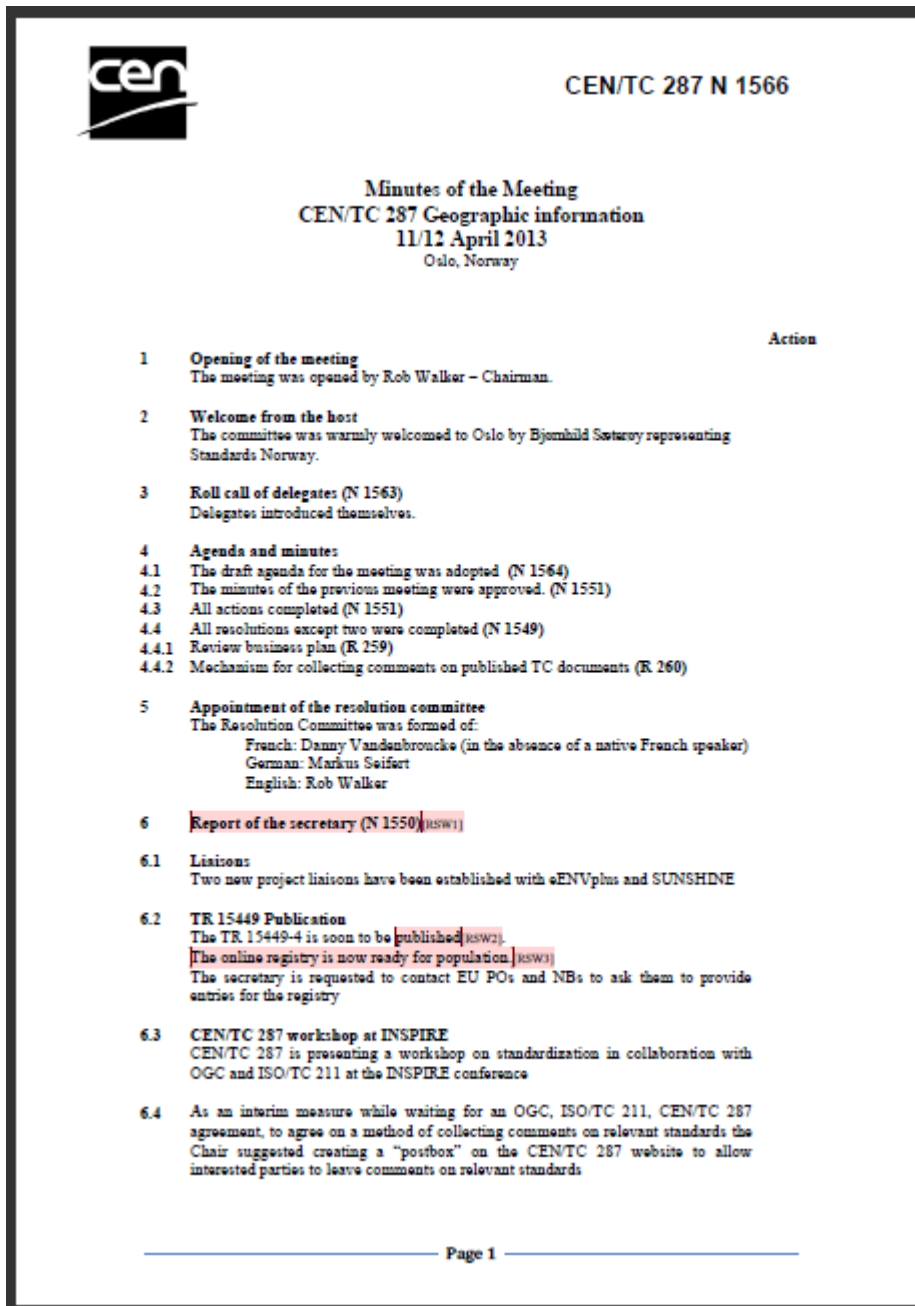
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Through CEN/TC 287, liaison status for SUNSHINE between the SDOs responsible for publishing and developing the Smart Grid and Geospatial Information Standards has been secured and thereby the administrative mechanism to achieve the objectives of WP 3 to promote standardisation, interoperability and methodologies for energy saving is in place. The state-of-the-art of standards development in the fields relevant to SUNSHINE is dynamic and evolving and the need to combine cross-domain standards is apparent in order to meet the new design and operational requirements of Smart Grid solutions in Smart Cities where traditional energy sector technologies have to become aware of location and sensitive to environmental factors and open for user interaction. The analysis of standards is to be pursued with an initial broad survey before converging on the solution set applicable to the SUNSHINE Use Cases and Scenarios.


## References

ID	Document
[1]	COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Smart Grids: from innovation to deployment; <a href="http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0202:EN:HTML:NOT">http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:52011DC0202:EN:HTML:NOT</a>

## ANNEX Accession of the SUNSHINE to full Liaison with CEN/TC 287 confirmed in N1566



	<b>CEN/TC 287 N 1566</b>
<b>7 Report of the Group Chairs and Convenors</b>	
<b>7.1 WG 5 Spatial data infrastructure</b>	
<b>7.1.1 Appointment of WG5 Convenor</b>	
Danny Vandenbroucke was appointed as convenor.	
<b>7.1.2 Maintenance of TR 15449<sup>[RSWG]</sup></b>	
Now that parts 1,2,3 and 4 are published it was decided to instruct WG 5 to review them and propose a programme of work. In particular the recording of the outcomes of projects stored in the registry.	<b>32.01</b>
Write briefing paper on TR 15449	
<b>7.1.3 Part 5 Testing and validation</b>	
Giacomo Martirano, the Project Leader, reported on the project team's progress. He outlined the method of working by meeting online on a regular basis. He presented a new draft of the contents. In conjunction with Paul Smits the Project Leader should identify an editor at the earliest convenience soon as possible including possible funding from DG-JRC <sup>[RSWG]</sup> . A tolerance request will be made <sup>[RSWG]</sup> for 9 months. Decision number 279	<b>32.02</b>
<b>7.2 Education and Training<sup>[RSWT]</sup></b>	
Danny Vandenbroucke presented the outcome of the work of the Ad Hoc Group on Education and Training. The draft terms of reference for an Advisory Group on Education and Training were accepted.	<b>32.03</b>
The CEN/TC 287 Award for Excellence in INSPIRE. The Secretary has received several suitable submissions and the Chair has suggested that, for transparency reasons, that the selection panel is made up of the Chair, Vice Chair, Secretary and the Chair of Education and Training.	<b>32.04</b>
The Chairman of this group also said he would propose a replacement in due course.	
<b>7.3 7th interoperability workshop</b>	
Rob Walker reported on the workshop held on Wednesday 10 <sup>th</sup> April 2013. This had a good range of presentations. The presentations will be made available on the CEN/TC 287 website.	
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**CEN/TC 287 N 1566**

**8 Work programme**

**8.1 CEN/TC 287 Work items**  
Publications and work under development can be seen at  
<http://www.cen287.eu/index.php/standards>

**8.2 Parallel voting of ISO/TC 211 standards** **32.05**  
All parallel voting is at <http://www.cen287.eu/index.php/standards>  
There appears to be a problem with online parallel voting. This is being investigated by the secretary

**9 Reports from liaison organizations**  
ISO/TC 211 - Bjornhild Sæterøy  
DG-JRC - Paul Smits (GEM)  
AGILE - Danny Vandembroucke  
smeSpire - Giacomo Martirano  
i-SCOPE - Federico Prandi  
eENVplus - Giacomo Martirano

**10 Preparation for the next meeting** **32.06**  
The TC agreed to accept the offer of the national body of Slovenia to host the 33rd plenary meeting in Autumn 2013. This acceptance is dependent on logistical issues.  
The TC agreed to accept the offer of the national body of Spain to host the 34th plenary meeting in Spring 2014.

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## ANNEX Standards Library Proposal and Development

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The following is a sample of the contents (including resources to research further) to be included in a Standards Library for SUNSHINE. The information presented is not final and is to be interpreted as a working draft for illustrative purposes and comment. This information is in addition to the required deliverable components documented in Section 2.

### European Commission Smart Grid Task Force

Recommendations from the European Commission Smart Grids Task Force (SGTF) – Expert Group 1 on Smart Grid Standards

[http://ec.europa.eu/energy/gas\\_electricity/smartgrids/doc/xpert\\_group1\\_reference\\_architecture.pdf](http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_reference_architecture.pdf)

[http://ec.europa.eu/energy/gas\\_electricity/smartgrids/doc/xpert\\_group1\\_first\\_set\\_of\\_standards.pdf](http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_first_set_of_standards.pdf)

[http://ec.europa.eu/energy/gas\\_electricity/smartgrids/doc/xpert\\_group1\\_sustainable\\_processes.pdf](http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_sustainable_processes.pdf)

[http://ec.europa.eu/energy/gas\\_electricity/smartgrids/doc/xpert\\_group1\\_security.pdf](http://ec.europa.eu/energy/gas_electricity/smartgrids/doc/xpert_group1_security.pdf)

### Thematic Area: Information Models

#### Reference Material

- <http://www.iec.ch/smartgrid/downloads/smartgridpubs.xls>
-

Standards	References and Links	Summary
Common Information Model	IEC 61970 Series	Application Program interfaces for energy management systems
Common Information Model	IEC 61970-1; <a href="http://webstore.iec.ch/webstore/webstore.nsf/ArtNum_PK/35316?OpenDocument">http://webstore.iec.ch/webstore/webstore.nsf/ArtNum_PK/35316?OpenDocument</a> <a href="http://webstore.iec.ch/preview/info_iec61970-1%7Bed1.0%7Db.pdf">http://webstore.iec.ch/preview/info_iec61970-1%7Bed1.0%7Db.pdf</a>	Energy management system application program interface (EMS-API) - Part 1: Guidelines and general requirements
Common Information Model	IEC 61970-2	Energy management system application program interface (EMS-API) - Part 2: Glossary
Common Information Model	IEC 61970-301	Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base
Common Information Model	IEC 61970-401	Energy management system application program interface (EMS-API) - Part 401: Component interface specification (CIS) framework
Common Information Model	IEC 61970-402	Energy management system application program interface (EMS-API) - Part 402: Common services
Common Information Model	IEC 61970-403	Energy management system application program interface (EMS-API) - Part 403: Generic data access
Common Information Model	IEC 61970-404	Energy management system application program interface (EMS-API) - Part 404: High Speed Data Access (HSDA)
Common Information Model	IEC 61970-405	Energy management system application program interface (EMS-API) - Part 405: Generic Eventing and Subscription (GES)
Common Information Model	IEC 61970-407	Energy management system application program interface (EMS-API) - Part 407: Time Series Data Access (TSDA)
Common	IEC 61970-453	Energy management system application program interface (EMS-

Standards	References and Links	Summary
Information Model		API - Part 453: CIM based graphics exchange
Common Information Model	IEC 61970-501	Energy management system application program interface (EMS-API) - Part 501: Common Information Model Resource Description Framework (CIM RDF) schema
Common Information Model	IEC 61970-405	Energy management system application program interface (EMS-API) - Part 405: Generic Eventing and Subscription (GES)
Common Information Model	IEC 61968 Series	Information exchanges between electrical distribution systems
IEC 61968-3	<a href="http://webstore.iec.ch/webstore/webstore.nsf/myse/archajax?Openform&amp;key=61968-3&amp;sorting=&amp;start=1&amp;onglet=1">http://webstore.iec.ch/webstore/webstore.nsf/myse/archajax?Openform&amp;key=61968-3&amp;sorting=&amp;start=1&amp;onglet=1</a>	Application integration at electric utilities - System interfaces for distribution management - Part 3: Interface for network operations
IEC 61968-9	<a href="http://webstore.iec.ch/webstore/webstore.nsf/myse/archajax?Openform&amp;key=61968-9&amp;sorting=&amp;start=1&amp;onglet=1">http://webstore.iec.ch/webstore/webstore.nsf/myse/archajax?Openform&amp;key=61968-9&amp;sorting=&amp;start=1&amp;onglet=1</a>	Application integration at electric utilities - System interfaces for distribution management - Part 9: Interfaces for meter reading and control
	IEC 61850 Series	Electric substation automations

Thematic Area: Geospatial Standards

Reference Material

- [GML - Geography Markup Language \(ISO 19136\)](#)

*"This project is partially funded under the ICT Policy Support Programme (ICT PSP) as part of the Competitiveness and Innovation Framework Programme by the European Community"*  
([http://ec.europa.eu/ict\\_psp](http://ec.europa.eu/ict_psp)).



- [O&M - Observations and Measurements \(ISO 19156\)](#)
- [SOS - Sensor Observation Service](#)
- [Use of Observations & Measurements and Sensor Web Enablement-related standards in INSPIRE](#)
- Use of O&M (ISO 19156) in INSPIRE
- GEOSS Standards Registry: <http://seabass.ieee.org/groups/geoss/>

Standards	References and Links	Summary
OGC WMS	<a href="http://www.opengeospatial.org/standards/wms">http://www.opengeospatial.org/standards/wms</a>	
OGC Web 3D Service	<a href="http://www.w3ds.org/">http://www.w3ds.org/</a>	
OGC WFS	<a href="http://www.opengeospatial.org/standards/wfs">http://www.opengeospatial.org/standards/wfs</a>	
...		

## SMART METERS

### Reference Material

CEN, CENELEC and ETSI activity for Smart Metering Systems (CEN/CLC/ETSI/TR 50572) Addresses smart metering in the context of smart grid and home automation

Standards	References and Links	Summary
IEC 61968-3	<a href="http://webstore.iec.ch/webstore/webstore.nsf/mysearchaja?Openform&amp;key=61968-3&amp;sorting=&amp;start=1&amp;onglet=1">http://webstore.iec.ch/webstore/webstore.nsf/mysearchaja?Openform&amp;key=61968-3&amp;sorting=&amp;start=1&amp;onglet=1</a>	Application integration at electric utilities - System interfaces for distribution management - Part 3: Interface for network operations
IEC	<a href="http://webstore.iec.ch/webstore/webstore.nsf/mysearchaja">http://webstore.iec.ch/webstore/webstore.nsf/mysearchaja</a>	Application integration at electric utilities - System interfaces for distribution management - Part 9: Interfaces for meter reading and

Standards	References and Links	Summary
61968-9	<a href="x?Openform&amp;key=61968-9&amp;sorting=&amp;start=1&amp;onglet=1">x?Openform&amp;key=61968-9&amp;sorting=&amp;start=1&amp;onglet=1</a>	control
	...	

### SMART METER communication Standards.

- [IEEE 1701™-2011](#) - IEEE Standard for Optical Port Communication Protocol to Complement the Utility Industry End Device Data Tables ANSI Type 2 optical port interface
- [IEEE 1702™-2011](#) - IEEE Standard for Telephone Modem Communication Protocol to Complement the Utility Industry End Device Data Tables telephone modem communication interface
- [IEEE P1377™](#) - IEEE Draft Standard for Utility Industry Metering Communication Protocol Application Layer (End Device Data Tables - US/CANDAND ... standard for encoding data in communication between End Devices (meters, home appliances, IEEE 1703 Nodes)
- [IEEE P1703™](#) - IEEE Draft Standard for Local Area Network/Wide Area Network (LAN/WAN) Node Communication Protocol to complement the Utility Industry End Device Data Tables - Local Area Network/Wide Area Network (LAN/WAN) Node Communication Protocol

## HOME AUTOMATION

### Reference Material

- Smart Grid Standards for Home Building Automation, M. Tariq, Z. Zhou, J. Wu, M. Macuha, T. Sato, DOI 10.1109/PowerCon.2012.6401448, Print ISBN 978-1-4673-2868-5

The latest standards that support IP addressable components are a viable choice for pilot activities but this must be weighed against availability of solution for all other components that contribute to a smart home, i.e. individual pioneers building smart home today still adopt the older standards such as X10 due to the availability of hardware that satisfies this protocol.

Standards	References and Links	Summary
Standards	References and Links	Summary
ZIGBEE	<a href="http://www.zigbee.org/Standards/Downloads.aspx">http://www.zigbee.org/Standards/Downloads.aspx</a>	
LonWorks® Standards	<p><a href="http://www.echelon.com/technology/lonworks/standards-applications.htm">http://www.echelon.com/technology/lonworks/standards-applications.htm</a></p> <p>LonWorks is an ISO/IEC standard consisting of the following parts:</p> <ul style="list-style-type: none"> <li>• <b>ISO/IEC 14908-1.</b> Communication protocol</li> <li>• <b>ISO/IEC 14908-2.</b> Twisted-pair wire signaling technology</li> <li>• <b>ISO/IEC 14908-3.</b> Power line signaling technology</li> <li>• <b>ISO/IEC 14908-4.</b> IP compatibility (tunneling) technology</li> </ul> <p>In addition, other standards bodies have formalized LonWorks:</p> <ul style="list-style-type: none"> <li>• <b>ANSI/CEA 709.1-B-2002.</b> Control networking and home control (ANSI specification EIA/CEA 709.1 available through <a href="#">Global Engineering Documents</a>).</li> <li>• <b>ANSI/ASHRAE 135-1995.</b> MAC layer for the Building Automation and Control Networking standard</li> <li>• <b>IEEE 1473-L.</b> Intra-car and inter-car communications for rail vehicle (passenger trains)</li> <li>• <b>AAR ECP.</b> American Association of Railroads electronically controlled pneumatic braking systems</li> <li>• <b>EN14908-1.</b> European Union intelligent buildings</li> <li>• <b>GB/Z 20177.1-2006.</b> Standardization Administration</li> </ul>	

Standards	References and Links	Summary
	<p>of China control networking</p> <ul style="list-style-type: none"> <li>• <b>GB/T 20299.4-2006.</b> Standardization Administration of China Digital Technique Application of Building and Residence Community</li> <li>• <b>SEMI E54.16.</b> Semiconductor equipment manufacturers standard for sensor-actuator networks</li> </ul>	
X10		
INSTEON		
KNX		
OneNet		
BACnet		

SMART GRID

Reference Material

- <http://www.iec.ch/smartgrid/standards/>
- <http://smartgrid.ieee.org/standards>
- [http://www.isorto.org/site/c.jhKQIZPBIImE/b.6368657/k.CCDF/Smart\\_Grid\\_Project\\_Standards.htm](http://www.isorto.org/site/c.jhKQIZPBIImE/b.6368657/k.CCDF/Smart_Grid_Project_Standards.htm)
- D1.3.1 Smart Grid Standardization Analysis Version 2.0
- <http://www.iec.ch/smartgrid/downloads/smartgridpubs.xls>
- <http://smartgrid.ieee.org/standards/ieee-approved-proposed-standards-related-to-smart-grid>
- <ftp://ftp.cencenelec.eu/EN/EuropeanStandardization/HotTopics/SmartMeters/CEN-CLC-ETSI-TR50572%7B2011%7De.pdf>

Standards	References and Links	Summary

SECURITY

Reference Material

**WP.1 T1.6 D1.3 TVRA Analysis [Scott W CADZOW (C3L)]**

Standards	References and Links	Summary
ETSI TS 102 165-1	"Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Methods and protocols; Part 1: Method and proforma for Threat, Risk, Vulnerability Analysis"	
ETSI TS 187 020	"Radio Frequency Identification (RFID); Coordinated ESO response to Phase 1 of EU Mandate M436"	
ETSI TR 187 011	"Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Security; Application of ISO-15408-2 requirements to ETSI standards - guide, method and application with examples"	
ISO/IEC 15408-2	: "Information technology - Security techniques - Evaluation criteria for IT security - Part 2: Security functional"	



Standards	References and Links	Summary
	requirements"	
ETSI EG 202 387:	"Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Security Design Guide; Method for application of Common Criteria to ETSI deliverables"	
ISO/IEC 15408-1	: "Information technology - Security techniques - Evaluation criteria for IT security - Part 1: Introduction and general model"	
XACML	eXtensible Access Control Markup Language (XACML) v3.0  From: <a href="http://docs.oasis-open.org/xacml/3.0/xacml-3.0-core-spec-os-en.pdf">http://docs.oasis-open.org/xacml/3.0/xacml-3.0-core-spec-os-en.pdf</a>	
SAML	Security Assertion Markup Language (SAML)  From: <a href="http://docs.oasis-open.org/security/saml/v2.0/saml-2.0-os.zip">http://docs.oasis-open.org/security/saml/v2.0/saml-2.0-os.zip</a>	
ITU-T X.509	"Information technology - Open systems interconnection - The Directory: Public-key and attribute certificate frameworks"	
ISO/IEC 27001:2005	: "Information technology -- Security techniques -- Information security management systems – Requirements"	

TR 187 002 *TISPAN NGN Security (NGN\_SEC);Threat, Vulnerability and Risk Analysis*

TS 187 001 *TISPAN NGN Security (NGN Sec): Security Requirements*

TS 187 003 *TISPAN NGN Security (NGN Sec): Security Architecture*

ACCESS

EN 14908 series: *Open Data Communication in Building Automation, Controls and Building Management – Control Network Protocol*

Public Cellular Mobile Network (GSM/GPRS/EDGE/UMTS) Smart Card Platform for mobile communication systems of 2G, 3G and beyond ... TS 102 221 ... TS 102 223 ... TS 102 671 .... TS 102 225 ... TS 102 484:

3GPP All the technologies currently specified by 3GPP (GERAN, UTRAN, LTE, LTE Advanced Access Networks, CS, GPRS and EPC Core Networks, IMS Subsystem) are relevant in the context of the M2M services, including specifically the SM services. These technologies can be referenced by means of the following “umbrella” specifications: - TS 41.101- TS 21.101- TS 21.201 - TS 21.202

Customer Networks Architecture and connection to the NGN Customer IMS endpoints are connected to the NGN according to ETSI TS 122 228

(see below) or customer networks can be connected as in the following references: - TS 185 005 *Services requirements and capabilities for customer networks connected to TISPAN NGN* - Draft TS 185 003 *TISPAN Customer Network Gateway (CNG) Architecture and Reference Points* - TS 185 006 *Customer Devices architecture and Reference Points*

EN 13757-5: *Communication systems for and remote reading of meters - Part 5: Wireless relaying*

Standards	References and Links	Summary