READY4SmartCities - ICT Roadmap and Data Interoperability for Energy Systems in Smart Cities

Deliverable D1.4: Community Description – rev3

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Glossary:

EC	European Commission
Datathon	Intense 24-hour workshop that asks researchers to do their best to turn information into knowledge
FP7	Frame work programme 7 of the EC
GIS	Geographical Information System
Hackathon	Event in which computer programmers and others involved in software development collaborate intensively on software projects
ICT	Information and communication technology
KPI	Key Perfomance Indicator
NGO	Non-governmental Organisation
OWL	Web Ontology Language
R4SC	Ready4SmartCities project
RDF	Resource Description Framework
SAB	Stakeholder Advisory Board
SG	Stakeholder group
SPARQL	SPARQL Protocol And RDF Query Language
VoCamp	A series of informal events where people can spend some dedicated time creating lightweight vocabularies/ontologies for the Semantic Web/Web of Data
W3C	World Wide Web Consortium
WP	Work package
WS	Workshop
XML	Extended Markup-up Language

Table 0-1: Glossary

Executive Summary

This document constitutes the 3rd revision of Ready4SmartCities' Community Description on the *plan on how to build a community for the Ready4SmartCities roadmap, vision and outcome*, also in the light of the targeted data interoperability proposals work packages 2, 3 and 4 dealt with. It intends to depict the project's **community of communities** at the end of the project's lifetime, the different means the project used to get in touch with it and the view of building a "data community" via semantic web technologies. It recapitulates and critically assesses the problems encountered during the execution of the project concerning interactions and a channel used, and discusses issues arising in the work to fully reach the targeted audience(s).

1 Introduction

1.1 Purpose of this Document

The three iterations of this document were supposed to document and describe Ready4SmartCities (R4SC) discussions, findings and steps to facilitate the building of a R4SC community. The preceding versions of this document discussed enhancements in the communication with the potential audiences being interested in the topics R4SC had been dealing with in order to help future projects to avoid certain pitfalls and to spark a discussion to enhance the community building process in future projects. This last iteration of the deliverable (rev3) will summarize the project's undertakings concerning its community and highlight the results.

The two tasks of R4SC's "Community Creation and Dissemination" part have to be clearly distinguished from another: While the task described here (Task 1.1: "Community Engagement") is dealing with the **description of R4SC's potential community and appropriate channels to communicate with it**, the second task (Task 1.2 "Dissemination") is dealing with the **actual contents for the dissemination** to the community(ies) defined in this document.

As general comment, in order to avoid verbosity this document will only contain the status at the end of the project, for further information on the iterative steps please refer to the preceding documents D1.2 and D1.3. Since it is considered that interested parties will likely read only this last iteration of this document we kept the most important text passages from the previous iterations to give the reader the whole picture of the community building process of R4SC.

1.2 Goals

In order to fulfil its task R4SC had to identify possible stakeholders and already existing communities who, on the one hand, might have been interested in the outcomes of the project and, on the other hand, would be a valuable source of information for the identification of already existing data sources – which would lead to a definition of the current state-of-the art situation. The knowledge about the stakeholders' possible needs to link their data and/or the analysis of why they should be linked in the future would then enable the project to create an ICT research and innovation roadmap on best practices for system interoperability and Open and Linked Data in the context of energy and Smart Cities. Towards the last third of the project the findings of the project regarding the ICT roadmap as well as the semantic technologies and ontologies that have been screened and consolidated had to be published and disseminated to the corresponding audiences via various activities.

2 Methodology

2.1 Introduction

Ready4SmartCities' aim was to develop an ICT roadmap and deliver guidelines for data interoperability for energy systems in Smart Cities, which is now available (see e.g D5.3, D5.6). It was important to find and involve relevant parties that will be delivering input for the development of this roadmap but in the other hand disseminate the findings and the roadmap to the corresponding audience as well during the last third of the project. Ideally this audience should have been stakeholders who would be benefitting from the outcomes of the project, so it was also important to keep them informed about the projects forthcomings during the projects' life time and to trigger a lively community that would exist on its own and (hopefully) even grow after the end of the project (since the Linked Data approach seemed neither to be well understood nor widely used in the energy field within the Smart City context, it was even more important to build such a community –or better: a **community of communities**- and to spread word about the project's proceedings). The project tried its best to fulfil this task, yet, there is still work to be done in the future to raise awareness of how data interoperability lets stakeholders tackle their future problems more efficiently.

2.2 Levels of communities

Although the Ready4SmartCities consortium had contacts with a vast number of potential stakeholders based on their previous experience in relevant European projects (see also chapter 4.1.1) and the partners involved (i.e. researchers, cities, energy providers etc.), the project needed to tackle the problem of identifying the most appropriate way of reaching these communities with feasible effort to be able to build the R4SC community of communities. This was a permanent process during the whole lifetime of the project.

To better identify stakeholders (and their needs) and to engage the relevant ones these steps have been undertaken by the project:

- We identified the relationships among the construction sector, the energy supply companies and consumers of energy
- We identified innovation challenges for integrated ICT applications, which support sustainable and efficient use of energy in future Smart Cities, in order to widen current perspectives towards a cleaner, safer and healthier environment and to contribute to the EU Sustainable Development Strategy;
- The project partners investigated thoroughly the different ontologies, data models, and standards currently used for energy data modelling (according to the different models, representation formalisms, and viewpoints) in order to identify the set of ontologies that enable the easy modelling and interchange of energy efficiency data in Smart Cities;
- We identified possible supporting stakeholders in the establishment of European-scale actions for incentivizing energy-related ICT research, the adoption of innovative solutions, applicability of standards setting and deployment of ICT solutions for energy systems for Smart Cities;
- R4SC identified possible supporting stakeholders in the development and delivery of an innovation roadmap on ICT for energy systems that would guide and support technical experts and consequently cities' decision makers towards their smart energy city development.

The identified contacts were collected in a centralised repository and were grouped by sectors (i.e. topics) rather than project types (Table 2-1).

Table 2-1: Sectors identified by the consortium

Category	Examples/Profiles	Criteria
Citizens	Organisation for Economic Co-operation & Development / Social housing / UK community energy. Citizens communities (e.g. in the city of Riihimäki, Finland)	Experts in communities, social networks; communities which commit to energy saving
Municipalities	E.g. Manchester City Council / Smart City Amsterdam / Genova Smart City / Torino Action Plan for Energy / SmartCity Vienna, City of Tampere (Finland)	Experts need to have some familiarity with the complex, technical issues, discussed at Smart City level.
Building Sector	Energy Efficient Buildings Association, building service companies and industry (e.g. Uponor)	R4SC needed to cover three aspects: 1. building data users and developers 2. ESCOs and SMEs and 3. Home Automation (e.g. SHBA - Smart Homes and Building Association http://www.shaba.eu/) + BEMS providers and other building service provides
Energy Sector	Corporate members knowing about LCA. / European Energy Research Alliance. Energy companies.	ESCO or Lifecycle assessment, Energy systems and supply, possibly related to Green ICT
Smart Grid	Future Internet for Smart Energy (FINSENY Partners) / Grid providers / Renewable Industry providers	An expert coming from the Grid, less focused at grid management, more on regional and micro-grid; universal interoperability.
ICT Sector	Internet of Things, energy management and operation, building and energy data models.	Two main strands to have a real strategic perspective: Internet of Things and Semantic Web

The above topic categorisation enabled better communication as certain events -where stakeholders were involved- comprised a specific group, normally well known to a specific partner from the consortium (see e.g. Table 2-3). Personalised invitations originating from this partner therefore should have had a higher success rate than a generalised invitation sent out by a partner with no expertise or established presence in the specific domain, which turned out to be only partially true, since the response was (still) generally low (see also conclusions in chapter 7). For other events, however, where more than one group was approached, the dissemination and communication responsible (AIT) and the respective partners dealing with ontologies (UPM, INRIA etc.) distributed invitations. A grouping discussed by the consortium included a grouping by expertise (i.e. citizens, city authorities, buildings, energy, smart grid, ICT, see above and Table 2-2).

Table 2-2: Part of the stakeholder contact list compiled by R4SC (personal information has been blackened)

Organisation Name	Organisation contact	Website	Sector	Country	Please, justify why the indicated contact	Partner who added the organisation and contact
Association of Greater Manchester Authorities	[redacted]			UK		AIT
FIT4SET	office@klimafonds.gv.at	http://smartcities.at/		Austria		AIT
ICLEI	[redacted]		CITIES / SUSTAINABILITY	EU		AIT
German Energy Agency		http://www.energieeffiziente-kommune.de/		Germany		
Birmingham City Council	[redacted]		City	UK		
Eurocities - Networking intelligent Cities for Energy efficiency		http://www.eurocities.eu/	City	EU		

Since the project was facing low responses in some of its community engagement activities mostly concerning the mass e-mailing procedure, the consortium decided to go for a more targeted approach and created a list of related and relevant projects from the CORDIS database in which each partner should indicate his or her personal contact(s) with the projects' consortia. The list consisted of a list of projects compiled by key word searches that matched our targeted content (queries used: "Smart + Cities + Data", "neighbourhood + data" and "smart + building + linked +data") (Table 2-3).

Table 2-3: R4SC personalized project list

Acronym	Short description	Title	Start date	End date	Programme	Energy Relevant	Responsible Partner	Status	Domain	Acronym	DAPP	DAPP contact address
3e-HOUSES						Relevant	UPM	Not yet contacted		3e-HOUSES		
ACOMIN	The Inst	Advance	01.10.2012	31.03.2016	FP7-REGPOT					ACOMIN		
Adapt4EE						Relevant	CERTH/ITI	Not yet		Adapt4EE		
AIM						Relevant	UPM	Not yet contacted		AIM		
ALMANAC	ALMANA	ALMANA	01.09.2013	31.08.2016	FP7-ICT					ALMANAC		
AMBASSADOR						Relevant	UPM	No response yet		AMBASSADOR	yes	We are partne
AMIGO						Relevant	UPM	Not yet contacted		AMIGO		
AR3WS		Acquirin	01.11.2012	31.10.2016	FP7-PEOPLE					AR3WS		
AUDRAGA						Relevant	UPM	Not yet contacted		AUDRAGA		
AUTEG						Relevant	UPM	Not yet contacted		AUTEG		
BARENERGY						Relevant	UPM	Not yet contacted		BARENERGY		
BE WISER	Be Wise	Building	01.07.2013	30.06.2016	FP7-REGIONS					BE WISER		
BEAMS						Relevant	UPM	Not yet contacted		BEAMS		
BECA						Relevant	EMP	Not yet contacted	WP3	BECA		
BEMO-COFRA						Relevant	UPM	Not yet contacted		BEMO-COFRA		
BESOS	The stra	Building	01.10.2013	30.09.2016	FP7-ICT	Relevant	CERTH/ITI	Not yet contacted		BESOS		
BEST Energy						Relevant	UPM	Not yet contacted		BEST Energy		
BETAAS	The Inte	Building	01.10.2012	31.03.2015	FP7-ICT	Relevant	UPM	Not yet contacted		BETAAS		
BeyWatch						Relevant	UPM	Not yet contacted		BeyWatch		
BIOMED		New Hor	01.10.2012	31.03.2017						BIOMED		
Bologna [City]						Relevant	AIT	No response yet		Bologna [City]		
BuildWise						Relevant	UPM	Not yet contacted		BuildWise		
BUTLER	Recent I	uBiquitc	01.10.2011	30.09.2014	FP7-ICT					BUTLER		

In this way R4SC tried to get in a more direct contact with the consortia. Furthermore there was the possibility that the personal contact could reply with another contact that is more feasible to our requested information. This led, e.g. to the participation of colleagues of other projects (e.g. CASCADE during the VoCamp in Vienna, see chapter 6.7.1.1) to the dissemination events R4SC organised (see also Tasks Fulfilled, chapter 6.6).

AEC3 and CERTH-ITI project partners are in close contact with the CSA project “SWIMing", which started beginning of 2015 and is reviewing EU projects dealing with energy-efficiency of buildings. A lot of synergies are used to support the building domain and to promote the use of Semantic Web technology. Activities of both projects were leading to the foundation of the buildingSMART task group that is dealing with standardization efforts and the W3C community group that is dealing with the identification of use cases.

A lot of experts from other projects are meanwhile members of these groups and took over organization and development tasks very actively. There is biweekly telco of both groups discussing status and next steps.

Table 2-1 shows the sectors that had been identified at the beginning of the project. During months 2 to 24 of the project the project partners had established contacts with representatives of the proposed sectors (Table 2-4).

Table 2-4: Contacted sectors

Sector	Contact established	Contact in progress
Building sector	buildingSMART organization (AEC3) W3C community group about Linked Building Data (AEC3) Construction companies. Related EU projects (VTT) The contact for the Building Sector was established by AEC3 on the buildingSMART summit in Toronto/Canada where AEC3 presented ongoing efforts in ifcOWL, in particular to standardize ifcOWL as agreed in the VoCamp held in Espoo (Annex 8.3) (and within the W3C group about use cases). AEC3's presentation was well received and at the next meeting in London this lead to the foundation of the buildingSMART task group which R4SC already supported with valuable inputs	Face-to-face discussions with Finnish construction companies by VTT. Roadmap sharing and further development e.g. with Design4Energy[1] project (VTT).
Citizens	Citizens involvement: possible ideas shared with Finnish municipalities (VTT)	VTT presented suggestions to a project about Citizens involvement in increasing energy efficiency and sustainability of residential areas in Riihimäki (Finland) and Botkyrka (Sweden) [2] (VTT)
Energy Sector	Hamburg Energie (AIT), Uponor (VTT), Municipal Finnish energy companies, e.g. Helen and Tampereen energia (VTT). EU projects collaboration (VTT) For the Energy Sector a representative of Hamburg Energy (one of Hamburg's energy providers) had been contacted. He expressed great interest in the	Ilari Aho from Uponor has participated to R4SC workshop in January 2015, gave an interview about R4SC vision and roadmap and gave ideas and feedback to them. Face-to-face discussions with other energy companies, e.g. in Finland with Helen Ltd, and Tampereen energia Ltd. (VTT) VTT: Collaboration and discussions about roadmap ideas with

[1] Design4Energy project: Building life-cycle evolutionary Design methodology able to create Energy-efficient Buildings flexibly connected with the neighborhood energy system. http://www.design4energy.eu/

[2] Ideas and suggestions given to an on-going JPI Urban project called SubUrbanLab, which is studying and testing renovating and upgrading activities for improving sustainability of urban residential areas in collaboration with citizens. Project website: http://www.suburbanlab.eu/

	outcomes (and ongoing discussions) of the project and was already of great value to the project via giving his opinion in an interview about the roadmapping vision of R4SC but also on data publishing in the energy sector. VTT contacted a representative of Uponor (a supplier of heating and cooling infrastructure and services in the Nordic countries) and he also participated e.g. to a R4SC roadmapping workshop in January 2015 in Helsinki..	researchers working e.g. in CITYOPT[3], IDEAS[4], EEPOS[5], and DoF[6] projects.(VTT)
ICT Sector	International Semantic Web Conference (INRIA) R4SC established contacts via organising and participating in several VoCamps (see also Table 6-3) R4SC organised a Summer School (see chapter 6.7.2) The ICT sector had also been contacted via getting in contact with the experts on the International Semantic Web Conference (ISWC 2014 in Riva del Garda, Italy) and there was collaboration taking place with researchers and experts working in ICT for eeb clustering projects, e.g. EEBERS and SWIMing projects.	Collaboration and information sharing with researchers working e.g. in EEBERS[7] and SWIMing[8] projects (VTT, AEC3).
Mobility	Municipal transport planning and urban planning (VTT)	VTT: e.g. discussions and roadmap ideas sharing with city of Tampere about urban transport planning. (VTT)
Municipalities	City of Vienna, City of Bologna, City of Hamburg (AIT) Bristol City Council, Leicester City Council, Birmingham City Council	City of Amsterdam, City of Genoa, City of Copenhagen (AIT) Discussions and ideas sharing e.g. with cities of Helsinki, Tampere,

[3] CITYOPT: Holistic simulation and optimization of energy systems in Smart Cities. http://cityopt.eu/
[4] IDEAS: Intelligent Neighbourhood Energy Allocation & Supervision. http://www.ideasproject.eu/wordpress/home-2/
[5] EEPOS: Energy management and decision support systems for Energy POSitive neighbourhoods. http://eepos-project.eu/
[6] DoF: District of Future. http://www.districtoffuture.eu/
[7] EEBERS: EeB ICT Clusters. http://eebers.eu/
[8] SWIMing: Semantic Web for Information Management in Energy Efficient Buildings.

	(EMP) The municipalities contacted were: Bologna, Hamburg and Vienna. The cities reported on ongoing activities in publishing energy related data which seems still to be in its infancy in the contacted cities, so R4SC had the opportunity to discuss further steps with them and help them in their efforts to publish their data (taking into account privacy issues and barriers etc. Furthermore, VTT has been sharing ideas through face-to-face discussions and meetings from the R4SC roadmap and project e.g. with following municipalities: Cities of Helsinki, Tampere, Riihimäki, and Turku (Finland), and their (municipally owned) energy companies; as well as contacts and results sharing e.g. with cities of Botkyrka (Sweden).	Riihimäki (VTT) Discussions with researchers working in CITYkeys[9] project (VTT).
Smart Grid	Energy companies (VTT) Contact established: Project SEAS (http://the-smart-energy.com/) Guilllaume Lefrançois. Invitation for a keynote at their next VoCamp.	Discussions about potential innovation ideas for increasing the use of local multi energy sources and their optimal use e.g. with Helen (Energy company of city of Helsinki, Finland), and Tampere Energia. (VTT)
Standardisation / Smart Appliances	TC SmartM2M ETSI (Chairman: Marylin Arndt)	Companies members of the TC group and interested by R4SC outcomes (methodology, linked data, alignment and roadmap). 2 presentations have already been held

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2.3 Community value proposition (“impact”)

R4SC was aiming to deliver outcomes in the field of Linked Data and energy system interoperability beyond state of the art, so the community of communities should have been able to gain added value from the project. The matrix in Table 2-5 depicts the specific proposed value for 4 communities (KPIs, Open Data, Semantics and interoperability, Innovation and implementation) with respect to the six targeted sectors depicted in Table 2-1.

[9] CITYkeys: key performance indicators for smart city initiatives. http://www.citykeys-project.eu/

Table 2-5: Ready4SmartCities' Community Value Proposition Matrix

	Citizens	Building Sector	Energy Sector - Smart Grid	Municipalities	ICT Sector	Mobility
Value Proposition	Smart city data interchange support and future vision					
KPI's input	Ontologies and datasets, validation of catalogues					
Energy data management input	Requirements for energy data management, validation of guidelines					
Semantics and Interoperability input	Ontologies and datasets, validation of catalogues					
Innovation and implementation input	Vision and priorities, validation of the roadmap					

R4SC carried out the following work for the impact on the communities:

- For the collection on datasets and ontologies see D2.2 *Ontologies and datasets for Energy Management System interoperability v1.*
- Regarding the Energy data management input the project conducted interviews with two stakeholders, one from Uponor, one from Hamburg Energie. It was planned to have at least five stakeholders interviewed but only two of the SAB members have been available.
- Regarding the Innovation and Implementation see D5.6 *Innovation and Research Roadmap*

2.4 Dissemination

In order to create the R4SC community of communities the project needed to disseminate its outputs and deliveries to the respective audiences. During the dissemination process experts of the targeted audiences were also asked to give feedback to the different outcomes of the project (described in the next chapter “Validation”). This has been done via different interaction channels (see chapters 5.1 and 5.4 in D1.3). For detailed information on the projects dissemination refer to D1.7 *Communication and Dissemination Report Year 2.*

2.5 Validation

R4SC have had constantly verified its findings in order to create output that was valuable for its community. Table 2-6 shows VTT’s road mapping methodology which was also used as a validation exercise via getting feedback from the stakeholders.

Table 2-6: Proposed road mapping methodology step-by-step (used abbreviations: WS = Workshop, ON = online discussions, FF = Face-to-face interviews) (Deliverable 5.6: Hukkalainen et al, 2015[10]) (Source: VTT)

Step	Action	Stakeholders' role
1	Identification and defining of different energy systems in smart cities.	Feedback from expert for term definitions, further development and validation
2	Identifying links and integration possibilities between different energy systems in smart cities. This will be presented as a matrix showing linked energy systems, and it will visualise, which energy systems need to be integrated or which systems are interoperable.	FF/ON: identify and validate the links
3	Identify and develop future envisioned scenarios for smart energy systems based on the identified links between the different systems. The scenarios are developed based on a top-down (vision based) approach and they are reported in Deliverable 5.2: Vision of Energy Systems for Smart Cities [Cavallaro et al., 2014].	Develop and validate scenarios: WS (preliminary) and FF (mature)
4	Roadmap to present: how ICT can support and enable future scenarios for linked energy systems. A draft roadmap [D 5.3, Sepponen et al., 2014a] is done for experts' feedback. The roadmap topics visualize the development path towards the vision. The goal is to set the structure and topics of the roadmap, and to make a first version of it.	FF, WS: to give feedback and inputs
5	Finalising the roadmap by taking different viewpoints into account: the impacts of the roadmap content for ICT and energy system experts, end users, etc. The aim is to tell what is important or essential for ICT/buildings/ municipality/energy companies.	VoCamp and FF discussions for feedback and validation of the roadmap
6	Implementation recommendations based on the roadmap [D5.4, Sepponen et al., 2015].	Input and validation
7	Impact assessment [D5.5, Peters-Anders et al., 2015]. Enhance impact assessment from REVISITE. Consider rebound effects and cause-consequence interdependencies.	Input and validation

UPM has been using the following validation plan: A survey (running in the first third of the project) was used to provide the project with a first set of available ontologies in the field of energy and Smart Cities. This set was then presented to an audience of ontology and energy experts during VoCamps whose feedback has been integrated into the work of UPM/the projects (see also Figure 6-4)

[10] Hukkalainen Mari, et al, 2015: Deliverable 5.6 Innovation and research roadmap. Ready4SmartCities project deliverable.

The project conducted interviews about the vision and the roadmap (VTT: Ilari Aho) and D'Appolonia as well as CSTB discussed the projects findings with Marilyn Arndt (Orange Telecommunication Company) several times and Mrs. Arndt presented also her work in SAREF.

Since the communication with the SAB members and the organisation of meetings and interviews was extremely difficult due to unforeseen circumstances like e.g. parental leaves, changing of personnel and bad technical communication channels during teleconferences, the validation activities could not be conducted as planned. Due to these circumstances the focus during the second half of the project lay more on contacting and discussing with other experts and stakeholders, than just focusing merely with the SAB, e.g. though contacting other EU projects and organising and participating in the VoCamps, and the Summer School (see also chapter 3.2)

VTT on the other hand got improvement ideas to the roadmap when results where shared with other EU projects, e.g. EEPOS and Design4Energy.

3 Targeted Networks

In this section we describe the networks that have been targeted during the life time of the project.

3.1 Specific channels per partner

Each of the project partners was (and is) in contact with specific projects and networks dealing with aspects of R4SC's contents. These were constantly contacted throughout the project. Table 3-1 depicts each of the partners' R4SC related specific networks and projects they have already been involved in /collaborated/communicated with.

Table 3-1: Partner specific networks

Partner	Previous ee-projects	Field of expertise	Networks	Identification of stakeholders
AEC3	**HESMOS** (http://www.hesmos.eu/)	Buildings, Infrastructure, Urban planning	buildingSMART, ISO, contacts in Germany and UK	Contact to project partners (HESMOS, STREAMER (http://www.streamer-project.eu/), buildingSMART organisation, contacts to AEC/FM software companies, building owners, design companies.
DAPP	**ICT4E2B Forum** **SportE2** **S4ECoB** **CASCADE** **IREEN** **EPIC-HUB** **INDICATE** **DIMMER** **AMBASSADOR** **RESILIENT**	Knowledge Management, Semantic Roadmapping Buildings		Partners focused on defining projects objectives and requisites (usually S&T coordinators and WP1 leaders)
CSTB	REEB REVISITE IREEN ODYSSEUS PERFORMER IDEAS RESILIENT	Building Information Modelling, Semantic Roadmapping Energy Efficiency	ECTP buildingSmart eeSemantic EIP SCC	
UPM	**Ciudad2020** (http://www.innpronta ciudad2020.es/)	Mostly non energy related: Time, space, geography, context, sensor networks, etc.	W3C, Spain	No contacts in the energy sector but in other sectors (e.g., open data)
AIT	**IREEN** (www.ireen-project.eu) **S4ecob** (www.s4ecob.eu/) **e4** (e4-portal.com/) **EEPOS** (eepos-project.eu/)	Smart Cities, Energy, Urban Planning	EERA, contacts in Austria and different European countries	List of former and current Smart City project partners, contacts in ministries and energy companies

Partner	Previous ee-projects	Field of expertise	Networks	Identification of stakeholders
	TRANSFORM (http://urbantransform.eu/) **SCIS Smart City Information System**			
EMP	**eSESH** (http://esesh.eu/home/) **BECA** (www.beca-project.eu/) **SMARTSPACES** (http://smartspaces.eu/S/home/) **eeMeasure** (http://eemeasure.smartspaces.eu/eemeasure/generalUser/)	Saving energy in Social housing, public buildings using ICT	Contacts in municipalities, social housing, IT and Measurement providers across Europe	List of former and current related project partners (CIP projects)
VTT	**CITYOPT** **DoF** **EEPOS** **EEBERS** **Design4Energy** **CITYkeys** **IDEAS** **IREEN** **ICT4E2B** Forum **REEB** **REVISITE** **SubUrbanLab**	Smart cities, energy systems, ICT for EE solutions, energy management, urban planning, urban area renovations, citizens involvement, energy trade, RES, energy positive neighbourhoods, EE buildings, building design,	Standardisation organisations, clustering projects, collaboration with municipalities and companies in Finland and abroad,	Contacts to project and network partners in the relevant sectors related to R4SC, such as: citizens, buildings, mobility, municipality, ICT, and smart grid.

As mentioned above the approach of contacting the communities via mass mailing was not as successful as it was anticipated. So the consortium defined new strategies to better target the networks and their nodes in order to gain the information needed to fulfil its tasks. The following two refinements have been implemented.

3.1.1 List of Project Contacts and Responsibilities

A list of preselected projects (done through searches on the CORDIS FP7 projects database through UPM and CSTB) had been compiled and all partners have been asked to indicate affiliations (personally or of their institutions) with the projects on this list. The final project responsibility list looked as follows:

Table 3-2: Projects responsibilities list

How many partners have contacts?	Acronym	Responsible Partner	Status
4	HOLISTEEC	AEC3	Reviewed by AEC3 in the frames of SWIMing -> use case reported in the W3C use case page
4	IREEN	VTT	IREEN roadmap was one of the founding elements for R4SC roadmapping work.
3	SWIMing	CSTB	SWIMing will continue to organise VoCamps and we have had good collaboration between us especially during the VoCamp in Genoa. The project is also very close to the activities of the W3C linked building data community group which is composed among others of experts from UPM, AEC3 and TCD (coordinator of SWIMing).
2	AMBASSADOR	DAPP	Ontology in development. Modeling. Simulation.
2	DIMMER	DAPP	Ontology in development
2	EAR-IT	DAPP	Discussions with participating researchers
2	EEPOS	VTT	Discussions among participating researchers, ideas and feedback to the roadmap
2	IDEAS	UPM, VTT	Ontology in development. KPI's developed for energy positive neighbourhood. Collaboration and communication related to the energy system roadmap among participating researchers.
2	KnoholEM	DAPP	Ontology in development
2	RESILIENT	DAPP	Partners have been contacted. Active collaboration and exchange have taken place through various shared workshops organised in the frame of sustainable places 2014 and Sustainable places 2015 conferences.
2	STREAMER	AEC3	Ontology in development. Still in development – IFC provides the basis to specify a submodel and exchange requirements. (should be compatible with ifcOWL)
1	Adapt4EE	CERTH/ITI	Close collaboration on organisation of VoCamps, which were initially organised under the auspices of Adapt4EE project. The remaining VoCamps, organised by R4SC, were started in cooperation with Adapt4EE team.Contacted but no links established.
1	BESOS	CERTH/ITI	Contacted but no links established.

How many partners have contacts?	Acronym	Responsible Partner	Status
1	Bologna [City]	AIT	Contacted but not interested at the moment.
1	CASCADE	DAPP	Ontology in development
1	DESIGN4ENERGY	UPM	Reviewed by AEC3 in the frames of SWIMing -> use case reported in the W3C use case page
1	DESIGN4ENERGY	VTT	R4SC roadmap and vision gave a base ground for developing their future visionary scenarios for EE building design and its development needs. Continued developing further R4SC roadmap topics related e.g. to energy brokering.
1	DoF	VTT	Discussions with participating researchers.
1	EEEMBEDDED	AEC3	Ontology in development. Reviewed by AEC3 in the frames of SWIMing -> use case reported in the W3C use case page.
1	EnergyWarden	DAPP	Not yet contacted. Project already ended 2 years ago.
1	EPIC-HUB	DAPP	Ontology in development. Participation to SP2015
1	FIEMSER	CSTB	Partners have been contacted. Indeed, the Fiemser ontology has been taken into account during the elaboration process of SAREF. But the web site seems no available anymore.
1	GE2O	DAPP	Contacted
1	Hamburg [City]	AIT	Hamburg Energie was very interested in the outcomes of the project.
1	HESMOS	AEC3	Finished, main source of information is IFC (partial model according to exchange requirements) – data is combined with light weight ontologies for sensors, material, construction details.
1	INERTIA	CERTH/ITI	Close collaboration in WP4 efforts. R4SC used parts of the INERTIA ontology developed to address aspects of sensors monitoring and control, occupancy extraction at building level as an example, to validate the defined process for requirements and guidelines on publishing and exploiting these data as linked open data.
1	NEWBEE	VTT	Discussions with participating researchers
1	SEAS	CSTB	Contact made via VoCamp
1	SEMANCO	UPM	Contacted
1	SportE2	DAPP	Discussions among participating researchers, ideas and feedback to the

How many partners have contacts?	Acronym	Responsible Partner	Status
			roadmap
1	TRANSFORM	AIT	Contacted but not interested at the moment. Project has ended already by July 2015.
1	Vienna [City]	AIT	Talks with MA20 spatial energy planning. They were very interested in the outcomes of the project and even participated in the VoCamp in Vienna.
1	ODYSSEUS	CSTB	Contacted. Odysseus partners have followed the 4th VoCamp (Barcelona 2014). There is a wish to find links inks between the Odysseus ontology developed by this project and SAREF. Ontology matching techniques will be considered with a great interest.
1	CityOpt	CSTB	Partners have been contacted. The work achieved in R4SC (ontology collection, guidelines to publish linked data, roadmap) will be considered.

3.1.2 Network Analysis on FP7 Projects relevant to R4SC

In order to analyse the FP7 projects related to R4SC AIT executed a network analysis targeting the projects and their consortia (Figure 4-1) in order to gain insights into the hotspots of the energy and smart city domain from the EU research side and to identify the "big players" and their partners to target them in the validation and data set gathering procedure of R4SC. The following figures show some results from the analyses:

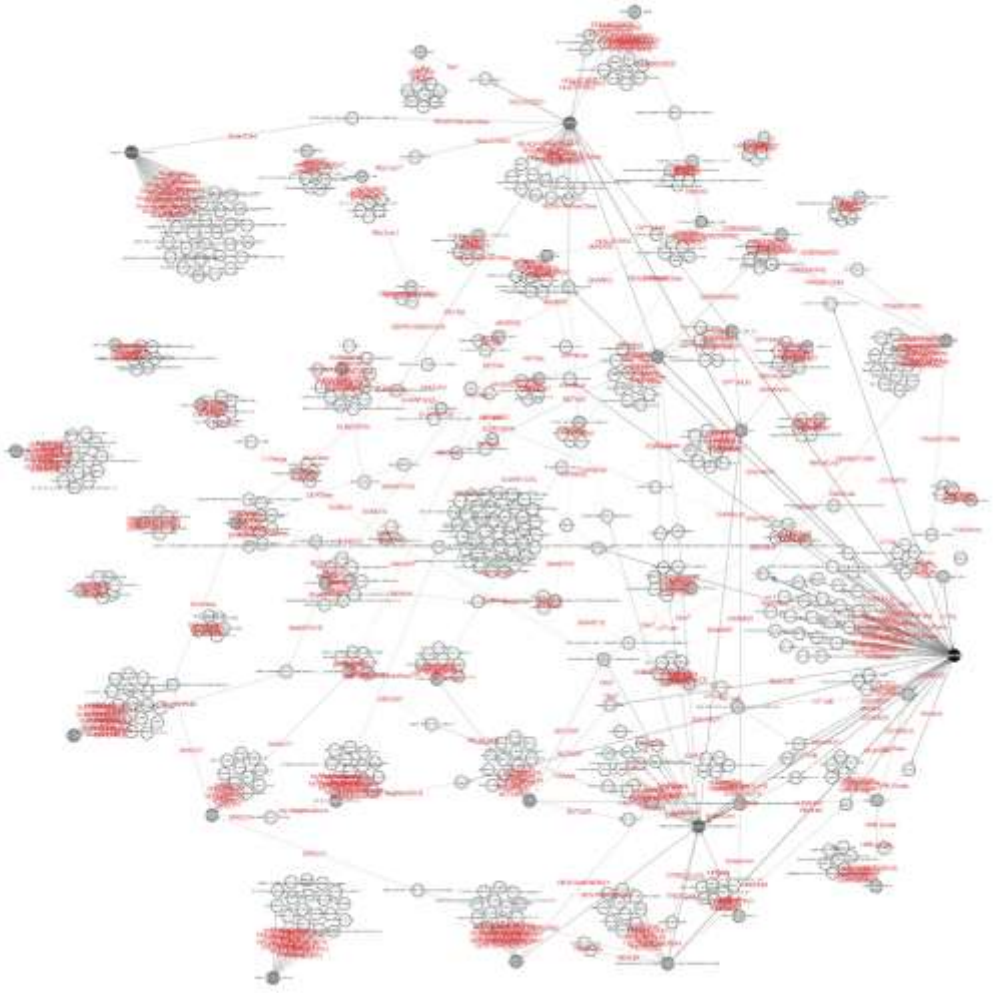

Figure 3-1: Network of FP7 projects affiliated to energy, data and smart city topics (overview)

The analysis showed at least 5 big players in the field of smart cities and energy data for the database searches conducted:

Hotspot 1 (Figure 4-2) is ATOS which has a lot of affiliations with different partners all over Europe (ATOS was also involved e.g. in IREEN project, which was one of the main starting points of the roadmap work) but R4SC attempts to involve one of ATOS' experts as SAB member using already established links in other projects (e.g. AIT's TaToo) and UPMs contacts within the company were not successful.

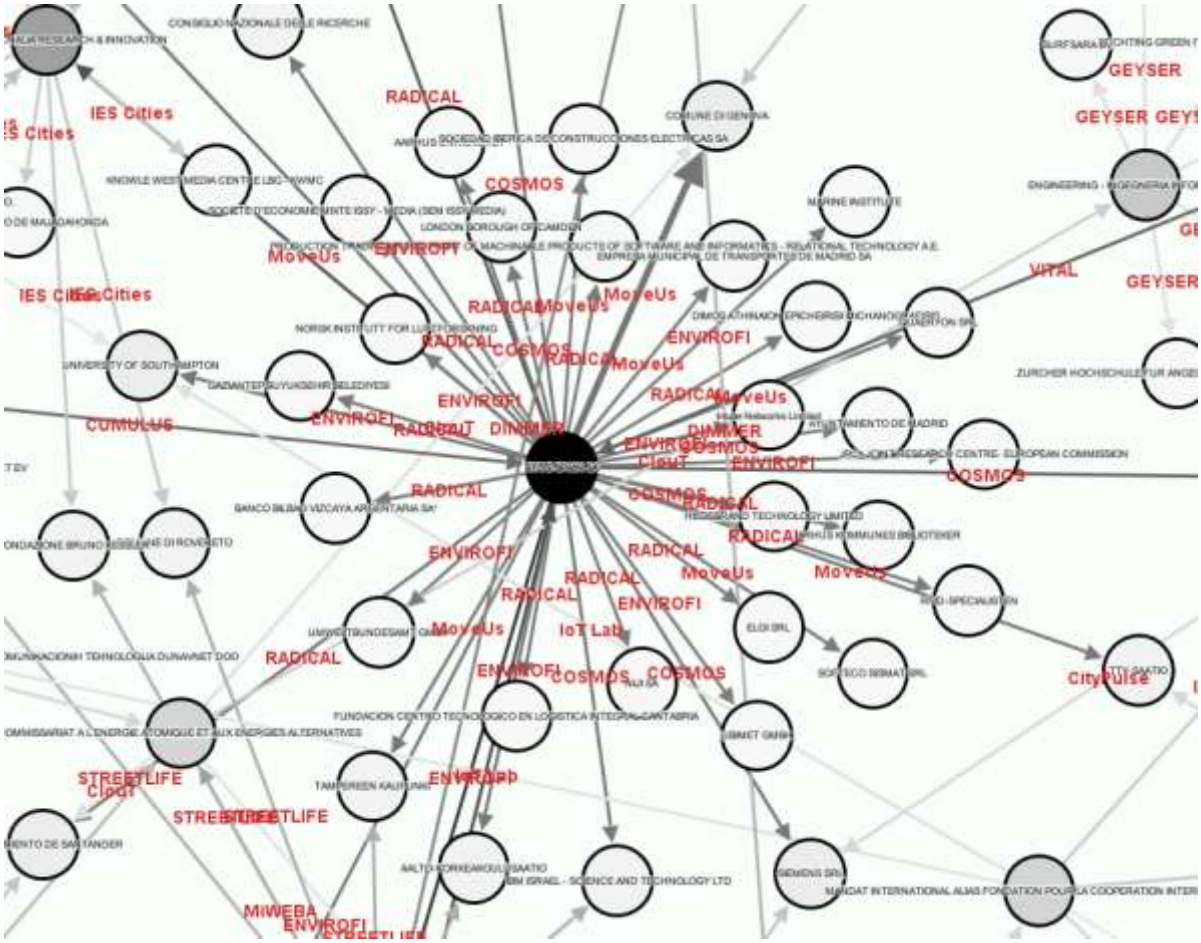

Figure 3-2: Hotspot 1: ATOS

Hotspot 2 (Figure 4-3): The project leader of R4SC D'Appolonia has a lot of affiliations and plays a big role in the field of Smart Cities as a whole. D'Appolonia got feedback e.g. from partners in former project, SportE2, dealing with the development of energy efficient products and services dedicated to needs and unique characteristics of sport facilities.

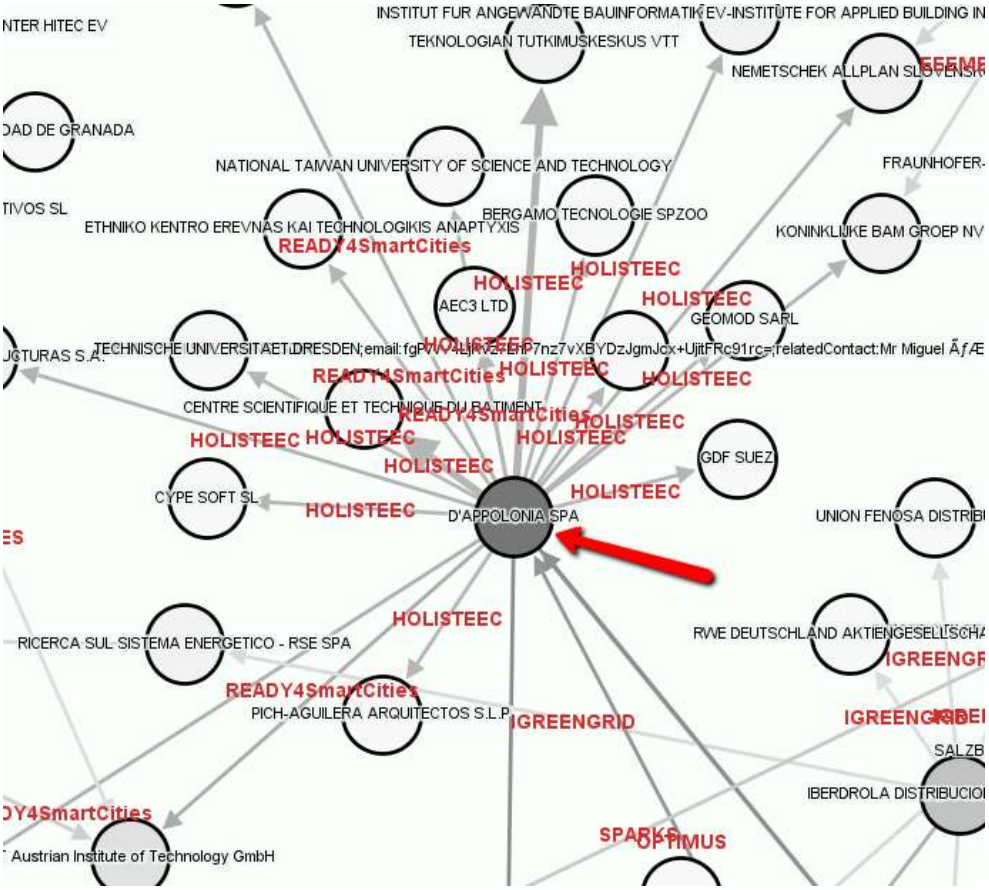

Figure 3-3: Hotspot 2: D'Appolonia

3.2 Stakeholder Advisory Board (SAB)

During the two years of the projects' lifetime the SAB (which initial purpose is described in detail in D1.2 and D1.3) should have been a supporting group of experts coming from different fields of the industry dealing with R4SC's key theme of data interoperability in the field of Smart Cities and energy. Unfortunately not all of the chosen experts were available for in depth discussions and the nomination of new ones was quite unsuccessful, so during the second half the project concentrated its work on the discussion with and the dissemination to its intended audience via VoCamps, the Summer School, conference talks and inter-project discussions to also get feedback on the findings of R4SC (which was also proposed in the intermediate review of the project see also chapter 4.4.).

The work with the SAB might not seem to be very successful concerning the amount of people R4SC could gather but it was a success considering the fact that Mrs. Arndt has been R4SC's ambassador (talking about linked data, ontologies, roadmaps, etc.) to all partners involved in theOneM2M standardisation definition in the frame of the Smart M2M working group at ETSI. Based on this communication CSTB has been invited two times (and has received an additional invitation) to present R4SC for another meeting and lots of people

have been interested at these meetings. Through this, R4SC has now contacts with other projects dealing with similar issues from e.g. the grid point of view.

3.3 Standardization bodies

One of the main challenges of the R4SC project was to enable data sharing and semantic interoperability. The Linked Open Data approach had been chosen as a technology to publish and combine energy related data in a W3C conformal way in order to foster development of new smart services that help to reduce energy consumption and the CO2 footprint. The Linked Open Data approach is based on a set of standards as described in the Semantic Web language stack by Tim Berners Lee. It proposes a hierarchy of languages like XML, RDF, OWL or SPARQL to enable the Semantic Web. While this approach provides a sound basis for semantic interoperability it is not a new topic and a lot of standardization work has already been done, in particular in reaching consensus about how to properly represent (semantic) information about buildings, equipment, technical systems and other industry products. Therefore, it was seen as important to reuse already achieved agreements and to get in contact with standardization bodies.

Besides raising awareness of the Linked Open Data approach within standardization bodies it was of general interest to discuss mapping approaches from existing database schemata and databases to OWL and RDF representations. But discussion should not only take place on a technical level. It was also of interest to discuss new opportunities for business models that are closely related to topics like ownership of information, security and privacy issues, reliability and trustworthiness of information and services etc.

The strategy for getting in contact with standardization bodies was planned as follows:

- Review of the current situation of using ontologies within standardization bodies. Do we already have standardized ontologies and available datasets?
  Work was mainly done in WP2 (“Energy Efficiency Data Interoperability “) and WP3 (“Interoperability of Energy Measurement and Validation“)
- Review of approaches and existing solutions to bridge the gap between existing standards and Linked Open Data technology.
  This used examples discussed in WP4 (“Requirements and guidelines for energy data management“)
- R4SC tried to identify use cases for Linked Open Data approaches to show advantages and to raise awareness of the industry.
  This was part of WP5 (“Framework and Vision of ICT for Energy Systems in Smart Cities”)

As there are many standardization bodies and working groups being active in many different areas at the end of the project it is still an issue how to build up a community for not just technical but also use case related discussions. Ideally, a standardization body is already tackling those new developments and has a group of responsible persons that could be contacted. The work in the W3C linked building data community group already led to a first step in creating a standard.

3.4 Network targeting in the second half of the project

R4SC intermediate review stated the following:

Stakeholders should be teased to understand that there is added value for them, by making the project advancements more readable for their way of thinking and operation of their daily business. It is an activity of translation and communicating what the project brings beyond the present state of their normal thinking, in order to get more involvement from them so they do not reject the project as a "strange" thing, or approach your requirements just as a courtesy activity without deep and real engagement.

According to this advice R4SC started different activities to get closer to its stakeholders and convince them about the relevance of its findings:

- R4SC produced a leaflet to let stakeholders better understand the contents of the project and its intentions
- The project organised a joint booth at the Smart City Expo 2014 in Barcelona where people were quite interested in the results of the project
- The project got in contact with city stakeholders responsible for energy data publication, e.g. MA20 (Energy Planning Department) in Vienna and the ICT department of Hamburg Energie where R4SC outcomes were discussed
- Work started within buildingSMART
- A W3C group has been established where R4SC contents already got some awareness and the project communicated use cases (instead of pure technology discussions)

4 Community building procedure and status at the end of the project

4.1 Overview

R4SC constantly scanned possible events and actively organising e.g. so called VoCamp in order to get in contact with stakeholders who might be interested in the outcomes of the project and who might be valuable sources of input to the project as well. Figure 6-1 depicts an overview of the R4SC's community building plan throughout the project (note that there are constant activities (like Twitter announcements etc.) and punctual ones like conference participations).

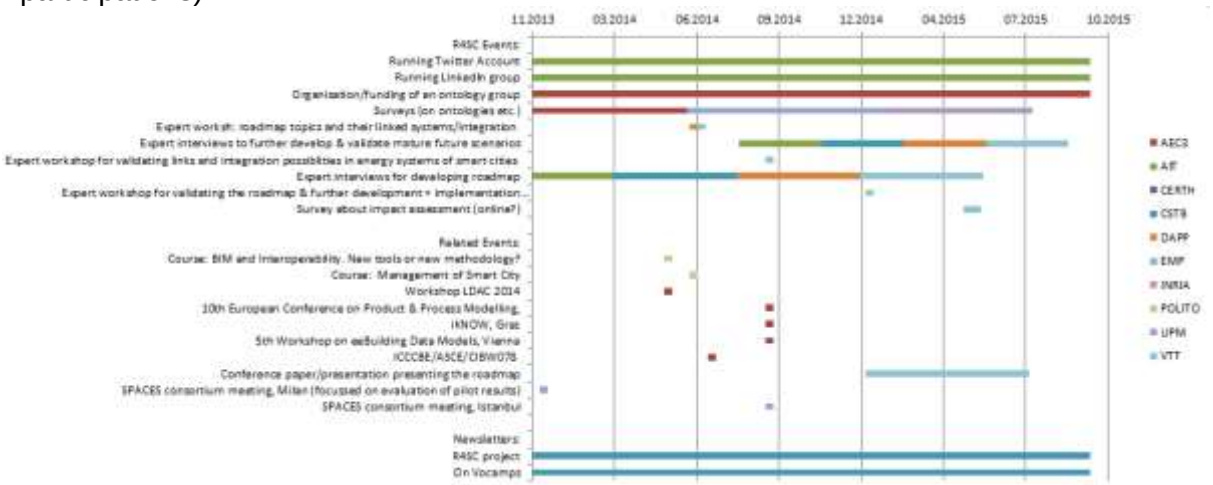

Figure 4-1: GANTT chart of community building events

4.2 Engagement of identified stakeholders

4.2.1 Previously established links and existing contacts of consortium partners

R4SCs consortium partners have been involved in numerous previous projects covering some of the content R4SC is dealing with. During the work on these projects contacts and links have been established. Following is a description of some of these relevant links and contacts:

4.2.1.1 AEC3

AEC3 is a leading BIM expert and is actively involved in various BIM developments and standardization efforts. Its portfolio spans from research activities in cooperation with universities to consultancy services for the building industry. Their personnel is holding important positions in the buildingSMART organisation[11], in particular in the Modelling Support Group that is responsible for extending the IFC standard and to deal with new technologies. Through their work in numerous European projects including ISTforCE, ICCI,

11 buildingSMART is a non-profit organisation established and funded by the AEC industry aiming at developing open standards for data sharing within the building industry.

prodAEC, SWOP, InPro, STAND-INN and HESMOS the company AEC3 has gathered a lot of contacts to leading people in the area of BIM developments.
Besides the Ready4SmartCities project AEC3 is currently involved in three other national and international research projects, all related to BIM developments. The STREAMER[12] project is an integrated project supported by the European Union and is aiming at improving energy efficiency of healthcare-related buildings. There are 20 partners: 13 industrial partners (7 large companies + 5 SMEs + 1 non-profit private hospital), 4 research organisations, and 3 public bodies (hospital institutions). Another project dealing with energy-efficiency is the EneffBIM project, which is linked to the international Annex[13] project and is looking for solutions to connect BIM to Modelica simulation tools. Whereas this project is mainly driven by research organisation, the BIMiD[14] project is working on showcases and best practices for using BIM in typical building projects.
This network of people helped R4SC in particular by providing feedback to energy-related use cases and the application of new technologies.

4.2.1.2 AIT

AIT has been and is involved in various road mapping activities in the Smart City context. Like VTT (see 6.1.2.5) AIT has been working e.g. in the IREEN project (“The ICT Roadmap for Energy-Efficient Neighbourhoods“) which tried to develop a roadmap for ICT supporting Energy-Efficient neighbourhoods with a focus on the complete innovation life-cycle of the domain. Furthermore AIT participates in the European Energy Research Alliance (EERA) and chairs the EERA’s Joint Programme on Smart Cities which is a joint effort of leading European research institutes which have taken up the challenge of accelerating the development of new energy technologies to pave the way towards a low-carbon Europe. The alliance tries to develop new scientific methods and tools to support European cities in their transformation into smart cities. One focus being smart energy management based on innovative design and operation of the entire urban energy system which fitted well with R4SCs goal of providing a road map for data interoperability for Energy Systems in Smart Cities.

4.2.1.3 CERTH/ITI

CERTH/ITI, being the project coordinator of the currently running FP7 project Adapt4EE, brings to the R4SC consortium access to the well-established eeSemantics platform and its more than 500 registered stakeholders, coming from diverse fields in the Smart City context topics. In order to foster awareness and to establish common knowledge and collaboration spaces for relevant topics, CERTH/ITI has undertaken the commitment to support common repositories and related Fora (especially the eeSemantics platform), sponsored by the European Commission.
The eeSemantics is a follow-up of the eeBuildings Data Models platform that started on January 2011 as a preliminary harmonization step in the way towards standardisation of the semantics of ICT for EE in buildings. That platform was originally run by the ICT4E2B project platform but meanwhile it has evolved; its scope was enlarged, it was transferred to EC hosting services, and it was renamed to eeSemantics. CERTH/ITI, being the Adapt4EE project coordinator, has undertaken the role of the coordinator and key animator of the data models collaboration site and initiative through a joint effort with the Commission, to ensure

12 http://www.streamer-project.eu/
13 IEA ECBCS Annex 60 "New generation computational tools for building and community energy systems based on the Modelica and Functional Mockup Unit standards", http://www.iea-annex60.org/
14 http://www.bimid.de/

the active engagement of all stakeholders, as well as the viability of the collaboration site. In the context of this effort, the eeSemantics Data Models Wiki has been established, identifying relevant content provided by the ICT for Sustainable Growth EU funded projects, and animating them to jointly agree on Wiki pages according to the editorial rules of the site, towards building a knowledge base. In a common approach, the established eeSemantics Data Models Library aims to identify relevant content provided by the ICT for sustainable Growth EU funded projects, and to animate them to submit their Data Models in any of the most widely used semantic formalizations, with the corresponding documentation.

Another set of relevant actions originally started in the auspices of the Adapt4EE projects (planned to be undertaken by the R4SC project) is the organization and participation in a series of VoCamps (Vocabulary Camps - informal events where people can spend some dedicated time creating lightweight vocabularies/ontologies for the Semantic Web/Web of Data), originally dedicated to topics in the scope of Adapt4EE but planned to widen their focus in order to address more Smart City topics in general.

Finally, CERTH/ITI has a long established network with research and industry partners through its participation to more than 60 European research projects in the last fifteen years, in many of which it had the leading technical and/or coordination role. CERTH/ITI is the project coordinator of two currently running FP7 projects (Adapt4EE and INERTIA) on the context of Energy Efficiency in Buildings and active Demand Response in the Smart Grid context respectively. Extended ontologies were created in both projects to foster vertical interoperability of system's components, as identified and analysed by responsible ontology partners in the project, to be further involved in the context of Ready4SmartCities.

4.2.1.4 CSTB

CSTB has been and is involved in various road mapping activities in the Smart City context. Like VTT and AIT, CSTB has been working e.g. in the IREEN project ("The ICT Roadmap for Energy-Efficient Neighbourhoods"). In addition to these roadmapping project (REEB, REViSITE, etc..) CSTB is also deeply involved in the ECTP (European Construction Technology Platform) which also has issued different documents and which is following and supporting various initiatives in the Smart Cities domain.

4.2.1.5 Empirica

In the ICT PSP project SMARTSPACES[15] empirica coordinates the joint activities of 26 partners with 11 pilots in 11 cities and 8 countries. The partners represent local municipalities, public authorities, IT companies, service providers, etc., some of which empirica has worked with in previous energy-related projects. The participation of empirica as coordinator of ICT PSP projects BECA[16] and eSESH[17] provides access to even more IT companies and municipalities all over Europe, but also to utilities. Through a constant presence in the domain of energy saving using ICT over the last five years, empirica has been creating partnerships and continues to manage these relationships, e.g. by setting up a user-friendly portal for information exchange that makes for a seamless participation process in proposals and projects. As a coordinator in these large European projects, empirica's

[15] http://smartspaces.eu/home/

[16] http://beca-project.eu/home/

[17] http://www.esesh.eu/home/

name and reputation are well known among the project participants and the likelihood of positive engagement in the form of community contribution is very high.

In R4SC, the experience and input by these partners was of help when dealing with the topics of piloting of new, innovative solutions, and validating the results of these pilots. The participants of the three projects mentioned above were also part of the eeMeasure community, i.e. they provided the data of their pilots in order for the resulting savings to be evaluated. The eeMeasure[18] service has been created and is being maintained by empirica as well.

4.2.1.6 VTT

VTT is working actively in various European and national level projects, and from these have direct existing links to various representatives from energy companies, building and ICT sectors, and municipalities. VTT therefore had strong connections to all the big Finnish municipalities, as well as to other European cities, among others via recent IREEN (ICT Roadmap for Energy Efficient Neighbourhoods) project. IREEN project provided also already established links to experts from other relevant sectors (ICT, construction and energy).

4.3 Identification and collection of ontologies

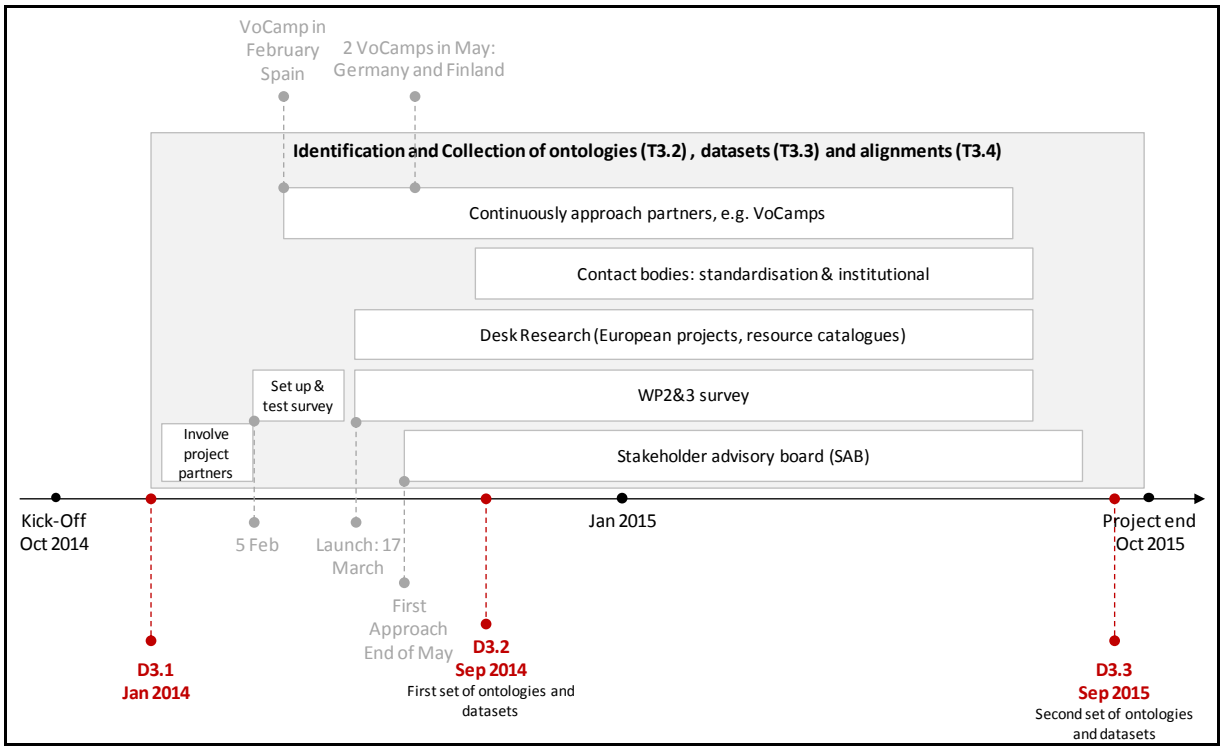

Figure 4-2: Empiricas's plan for the identification and collection of ontologies (Source: Empirica)

[18] http://eemeasure.smartspaces.eu/eemeasure/generalUser/

Involving the above mentioned communities (Fig. 6-2) was crucial for the successful work in e.g. WP3 (“Interoperability of Energy Measurement and Validation“). The main areas where the communities could actively contribute to the objectives of the work package were:

4.3.1 Provision of information

The survey Empirica launched jointly with WP2 (dealing with “Energy Efficiency Data Interoperability“) aimed to gather information on available ontologies and datasets in the relevant domains explored in both packages. Apart from the survey, various other channels were used, such as social media (Twitter, LinkedIn), mailing lists, Wikis (eeSemantics, ValMet), the project website, as well as relevant events (e.g. VoCamps, workshops, etc.)

4.3.2 Validation of collection results

The gathered resources were presented to the community by involving also the SAB in order to validate the approach and identify potential gaps and areas of improvement. The SAB was to be approached by the end of May 2014 with a first summary of the work carried out in WP 2 and 3 so far, in order to introduce the experts to the project’s technical aspect (Figure 6-2). This goal could only be partially reached due to the unavailability of the SAB members.

4.4 Ontology catalogue

Figure 6-3 shows the community-building procedure for the work in the ontology catalogue, carried out by UPM. As presented in the figure, the community building activities for the ontology catalogue (green) have been planned according to the overall project planning (white).

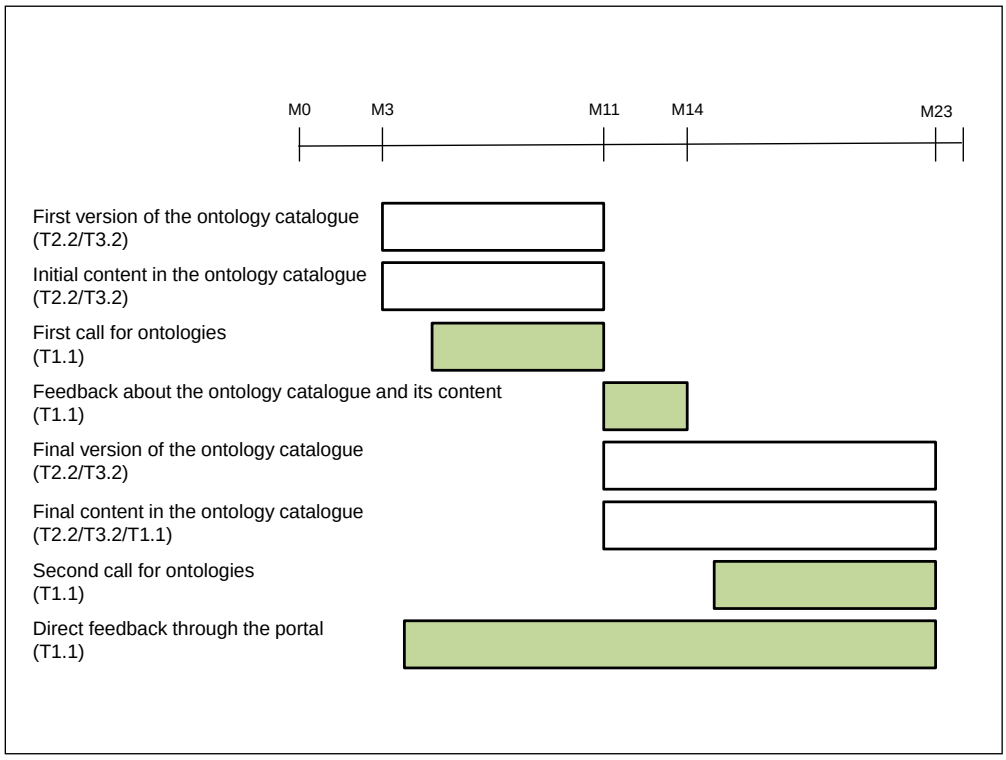

Figure 4-3: UPM’s Ontology catalogue planning (Source: UPM)

The ontology catalogue was developed and populated with relevant ontologies in two stages: a first one from month 3 to month 11 and a second one from month 11 to month 23.

The planned activities for engaging the community with the development and population of the catalogue were the following:

- In both stages R4SC actively asked the members of the community for relevant ontologies to be included in the catalogue through public calls for ontologies.
- At the end of the first stage, R4SC engaged the community in order to gather feedback regarding both the development of the ontology catalogue and its content (i.e., the ontologies contained in it); this feedback guided the development and collection of ontologies in the second stage. In order to gather feedback, R4SC organised activities co-located with some relevant event during the first months of the second stage.
- Since the initial launch of the ontology catalogue by January 2014, the catalogue web page contains different means that allow the community to give feedback: the catalogue contains a contact email address that can be used to give any type of feedback about the catalogue and also two forms (one short and another one more detailed) that can be used to propose new ontologies to be included in the catalogue.

4.5 Guidelines for energy data generation, publication and exploitation

Figure 6-4 shows the community-building planning for the work in the guidelines for energy data generation, publication and exploitation. As presented in the figure, the community building activities for the guidelines (green) had been planned according to the overall project planning (white).

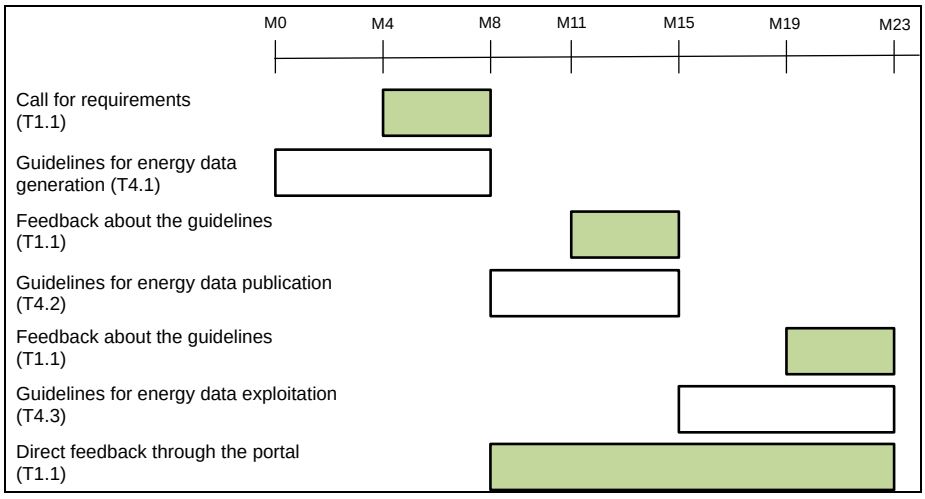

Figure 4-4: UPM's community-building activities related to the guidelines

The guidelines were defined in three stages: a first one from month 1 to month 8 covering energy data generation, a second one from month 9 to month 15 covering energy data publication, and a third one from month 16 to month 23 covering energy data exploitation.

The activities for engaging the community with the definition of the guidelines were the following:

- In the beginning of the project, R4SC actively asked the members of the community for their requirements for managing energy data through a public call for requirements. These requirements were an input to the definition of the guidelines.

- During the second and third stages of the guidelines definition, once the first set of guidelines had been published, R4SC engaged the community in order to gather feedback regarding them; this feedback will guide the posterior definition of the guidelines and the update of the published guidelines. In order to gather feedback, R4SC organized activities co-located with relevant events.

- From the publication of the first set of guidelines (by June 2014) onwards, the project web page contains a web page devoted to the guidelines with a contact email that can be used by the community to give any type of feedback about the guidelines.

4.6 Tasks fulfilled during the project

Following is a list of specific tasks fulfilled by the project partners during the projects lifetime.

Three communication channels have been established by the project which was permanently fed by news about the project's proceedings in order to raise awareness of its contents within the future Linked Data for Smart Cities (LD4SC) community:

1. R4SC has created a Twitter Account to announce its outcomes. This account was managed by AIT
2. R4SC had jointly taken over the former IREEN LinkedIn group "ICT for Energy Efficient Communities" which is from now on moderated by DAPP and AIT (and will be until managed by them even after the end of the project until the next project will take over)
3. CSTB had set up a mass mailing system and imported 1600 already existing e-mail addresses provided by DAPP. During the projects lifetime CSTB published regular newsletters each 1 or 2 months.

For the stakeholders and groups contacted the following activities and fitting types of interaction were implemented by R4SC:

4.6.1 Concerning the project's vision:

- R4SC managed the LinkedIn group inherited from the IREEN project ICT for Energy Efficient Communities"
- R4SC managed the "LD4SC" Twitter account

4.6.2 Concerning KPIs:

Convering KPIs the project discussed KPI development inputs with projects, like e.g. CITYkeys.

4.6.3 Concerning Open Data:

Open Data issues were discussed with cities and stakeholders during e.g. VoCamp

4.6.4 Concerning semantics and interoperability:

- R4SC established an alignment server and enhanced it to cover 42 ontologies for more than 4000 correspondences (for more information see e.g. D2.2, D2.3, D3.1, D3.2)
- The server was also used in the VoCamp to help improve alignments between IFC4 and SAREF

4.6.5 Concerning innovation and implementation:

R4SC discussed ideas with cities and projects (see e.g. Table 4-1)

4.7 Events the consortium participated in

Additionally to the activities mentioned above the consortium members participated in the following events:

Table 4-1: Events R4SC participated in

Timline	Partner	Event	Place
March 2014	VTT	**EU-CELAC ICT** VTT participated in the EU-CELAC ICT in smart city workshop in Santiago, Chile on March 19th-20th 2014 which was was organized by Scientific and Technological Research, CONICYT. VTT presented IREEN and R4SC road maps in a group work session. There were participants from Latin America and the Caribbean as well as from Europe. There had been large interest in the road maps.	Santiago, Chile
May 2014	POLITO	Politecnico di Torino, *BIM and Interoperability. New tools or new methodology?*, lecture in PhD course "Technology Innovation"	Torino, Italy
May 2014	AEC3	**2nd Workshop on Linked Data in Architecture and Construction (LDAC 2014), Aalto University, Espoo, Finland** AEC3 participated in the organisation of the workshop	Espoo, Finland
June 2014	POLITO	**City of Torino and Politecnico di Torino, *Management of Smart City*,** Master Postgraduate. The course included 60 managers (under the age of 35) of municipalities from all over Italy and aimed to increase their skills and their project management on the theme of Smart City so that they can contribute effectively to the development of livable cities, smart, sustainable and inclusive	Torino, Italy
September 2014	UPM, AEC3	**Linked Building Data workshop (iKNOW).** UPM and AEC3 participated in the event.	Graz, Austria

Timline	Partner	Event	Place
September 2014	UPM	**5th Workshop on EeB Data Models.** UPM participated in the event and presented a paper.	Vienna, Austria
September 2014	CSTB	**10th European Conference on Product & Process Modelling** CSTB particapated	Vienna, Austria
October 2014	UPM	**2nd EeB KPIs Workshop.** UPM participated in the event and presented a paper.	Nice, France
October 2014	UPM	**2nd EeB KPIs Workshop. Energy positive districts / smart cities workshop**. UPM participated in the event.	Nice, France
October 2014	UPM	**Generating Linked Data in the Energy Domain tutorial.** UPM organized and gave the tutorial.	Nice, France
October/ November 2014	AEC3	**buildingSMART summit** At the buildingSMART summit in Toronto/Canada AEC3 presented ongoing efforts in the area of ifcOWL, in particular the efforts to standardize ifcOWL as agreed in the VoCamp in Espoo and the W3C group about use cases	Toronto, Canada
December 2014	VTT	**IAHS 2014 conference** VTT, CSTB and UPM presented the R4SC roadmap paper in December 2014 at the IAHS 2014 conference	Funchal, Portugal
January 2015	VTT	**R4SC roadmapping workshop**	Helsinki, Finland
February 2015	CSTB	**CSTB - SmartM2M TC meeting N°33** - Presentation of the first result of R4SC - Sophia Antipolis, France Sept 2015 - CSTB - SmartM2M TC meeting N°35 - Presentation of the Roadmap & final result of R4SC	Sophia Antipolis, France
March 2015	AEC3	**buildingSMART International Summit in Watford/London** Sessions on BIM Semantic Web/Linked Data, Foundation of the buildingSMART task group on Semantic Web topics.	London, UK
April 22nd - 23rd, 2015	UPM, AIT, DAPP	**VoCamp Vienna,** Participants obtained a common ontology that can be used by municipalities to represent their energy measurement data in order to publish such data online as Linked Data	Vienna, Austria

Timline	Partner	Event	Place
June 2015	EMP	**ecee Summer Study on energy efficiency** The ecee Summer Study on energy efficiency brings together over 400 participants from industry, energy suppliers, government, research and consulting, and the NGO sector. Evidence-based results are presented in various sessions and informal meetings allowed for disseminating the R4SC results and bringing more attention to data interoperability in Smart Cities, Linking data, and agreeing on a common vision.	Toulon/Hyeres, France
June 7th - 12th, 2015	UPM, INRIA, CERTH, AEC3	**1st Summer School on Smart Cities and Linked Open Data (LD4SC-15), Cercedilla** The Summer School was designed to be an intense, focused, week-long learning experience for students (and tutors) with formal, theoretical sessions followed by hands-on practical sessions.	Cercedilla Spain
July 2015	AEC3	**LDAC Workshop, Eindhoven** Discussion of use cases and technical details towards a standardized ifcOWL representation	The Netherlands
September 2015	INRIA, DAPP, UPM, VTT, CSTB, CERTH	**VoCamp, Genoa** Use cases and alignments for SAREF, IFC and other ontologies	Genoa, Italy
September 2015	CSTB VTT	**Final Event: Sustainable Places Conference 2015, Savona** An annual conference focusing on energy efficiency at building, district and city levels	Savona, Italy

Additionally INRIA got in contact with the SmartAppliances project to discuss their approach of trying to build reference ontology in the smart appliances domain.

4.7.1 VoCamp organised by R4SC

4.7.1.1 VoCamp on Energy measurement data in municipalities (Vienna, April 2015)

The VoCamp on Energy measurement data in municipalities was focused on how municipalities can represent their data about energy measurement in order to publish it online (e.g., as open data). The interest in this question arises from the expected benefits such as the ability to easily reuse these data by third parties or to link them to other relevant data for further processing (e.g., building information models, climate, and occupancy).
The goal of the VoCamp was to obtain a common ontology that can be used by municipalities to represent their energy measurement data in order to publish such data online as Linked Data. A set of energy measurement datasets was selected and, dividing participants into groups, vocabularies were defined that can be used to represent such

datasets. Work started from a seed vocabulary and at the end of the VoCamp a common vocabulary was created that can be used by the different datasets. Apart from defining this common vocabulary, the VoCamp aimed to analyse potential use cases for these datasets and vocabularies as well as to work on the localization of these vocabularies.
VoCamp participants were encouraged to bring their own datasets to the VoCamp; this way after the event they would have a vocabulary that can be used with their data.

Figure 4-5: VoCamp Vienna, April 2015

4.7.1.2 VoCamp on interoperability for efficient energy systems in smart cities (Genoa, September 2015)

The wide umbrella under which this VoCamp took place was at the crossing of the Smart City domain and the ICT domain which encompasses also the Building sector, Software, Hardware and Data issues for the ICT domains, the Grid, the urban mobility, etc. The VoCamp concentrated on the alignments of sectorial ontologies to a specific ontology which is also candidate for standardisation (The SAREF ontology – Smart Appliance Reference ontology – that is now in the hands of the ETSI to become THE standard for smart appliances).

Those alignments were searched/established by the participants within the frame of the predefined scenarios proposed in the Roadmap established by R4SC and could be related to selected use cases already formalised/described under the W3C Linked Building Data Community Group Activities.

Figure 4-6 : VoCamp Genoa, September 2015

4.7.2 LD4SC Summer School 2015

The 1st Summer School on Smart Cities and Linked Open Data[19] (LD4SC 2015) was held in an excellent conference facility belonging to the Universidad Politécnica de Madrid[20], in the Sierra de Guadarrama Mountains about 50 km from Madrid. While the school was fully organized by R4SC, there was another H2020 European project (SWIMing[21]) that sponsored the school.

These were the five topic areas:

- Linked Open Data in Smart cities
- Linked Data generation and publication
- Vocabularies for Linked Data
- Open data portals
- Linked Data exploitation

The school had been designed to be an intense, focused, week-long learning experience for students (and tutors) with formal, theoretical sessions followed by hands-on practical sessions. These sessions were conducted by active researchers and gave students an opportunity to become acquainted with state of the art ideas and tools. In addition, as a means of integrating the work on the five topic areas, students had to work in groups of 3 or 4 and followed the whole process of generating and publishing Open Linked Data with some existing data set by using the methods and technologies presented in the theoretical lessons. The students presented their work on the last day of the school and two prizes were given for the 1st and 2nd best groups.

The talks by invited speakers gave additional perspectives to the tutorial material and were unanimously welcomed by all the students at the school. All the presentations given during the summer school are publicly available online[22].

[19] http://smartcity.linkeddata.es/LD4SC/
[20] http://residencialucasolazabal.es/?lang=en
[21] http://swiming-project.eu/
[22] http://www.slideshare.net/ld4sc/

Of the 27 students at the summer school, 25 returned completed questionnaires on the summer school and on the guidelines, a 92% return rate. In general, staff and students expressed satisfaction both with the summer school organization and content, even if, as expected, there are always points for improvement. (See also the document *LD4SC Summer School: Final report*)

Figure 4-7 :LD4SC Summer School, 2015

5 Conclusion

This deliverable provides the revision 3 of the community that was the main reference for Ready4SmartCities activities and should therefore reflect the status at the end of the projects' lifetime.

In order to properly depict community involvement it was fundamental to consider 2 important aspects:

- In the R4SC project the community was not only an "audience" for project results' dissemination but should have been actively involved in project activities as main "input provider".
- R4SC brought together different stakeholders representing different sectors already separately active on smart city innovation activities, therefore more than a single community R4SC was aiming to create a "community of communities".

This document introduced the reader to the tasks fulfilled in order to facilitate the building of a R4SC community and the steps that needed to be undertaken to interact with this community, with particular reference to the Stakeholder Advisory Board (SAB) as its relevant member (although the SAB could not be used as the instrument foreseen in the planned activities).

A methodology for R4SC's community building and management has been depicted, in particular taking into account main project topics and their related communities to be addressed, defining per each of them a "Value Proposition" and Validation means.

The different targeted networks were specified, taking in particular into account relevant active EU project and SAB members as main network representatives, but also others were considered like for instance standardization bodies.

Different instruments that must be used by the project are described in order to reach the different networks/communities with different type of interactions.

As main result a specific community building plan had been developed considering the different aspects of the project and the involvement of the different partners, providing also an update of the already performed activities. This document resembles now the overall procedure of the community building process and its result.

An effective community building plan should be "dynamic" in its nature, meaning that it is subject to changes based on newly available data. In this respect, further opportunities needed to be explored and measures needed to be taken by all consortium members to collaborate in other activities and disseminate know-how. Via this constantly evolving process which comprises the update of the project's activities, the gathering of communities from the rest of the partners, and any other important activities reinforcing the efforts to disseminate the project's outcomes and gather new inputs was accomplished.

During its first year the project consortium encountered several problems though with their proposed community engagement approach and their tools chosen to interact with these communities. First, the responses to the undertaken dissemination and validation activities were very few and people seemed to be reluctant to respond at all in some cases. Some activities seemed to be too vague or too broadly addressed (such as some Twitter announcements). Secondly, even the SAB seemed not to be concerned with the project

proceeding, since 2/3 of the 5 SAB members did not even respond to mails sent to them. The conclusion for the consortium was to focus more on direct personal contacts and to think about “real” use cases which can be shown to a broader public. This has been done via direct contacts with stakeholders during the VoCamps and the Summer School were R4SC gather valuable information about stakeholder’s different kinds of use cases and data.

Concerning the data communities the consortium figured that R4SC had to stimulate/force the communities much more to share and publish their Open Data (starting from municipality Zaragoza, Madrid, Barcelona, Helsinki, Tampere, Vienna and also Amsterdam e.g). For this, R4SC was developing use cases too, since the general impression on the events the project participated in was that people were very interested if real examples could be shown, so the idea is to develop also webinars and other events where the potential publishers are given some help or at least guidance how to do these themselves.

At the end of the project R4SC had got in contact with numerous stakeholders and projects, had in depth discussions and created a lively Twitter communication which brought interested parties closer to the topic of data interoperability. There is still a lot of work to do but the topic seems to gain speed from the point of view of R4SC. With the project SWIMing R4SC found a partnering project that will continue the series of VoCamp in the next future.

6 Annex

6.1 Stakeholder Advisory Board (SAB)

Citizens - Stephane Pouffary – Energies 2050 - Contacted by **CSTB**
~~**Energy** – Onnen Heitmann – Hamburg Energie~~ – rejected
Mobility - Maria Gemou – Centre for Research and Technology Hellas - Contacted by **CERTH/ITI**
Smart Grid - Yves Dherbécourt – Electricité de France - Contacted by **CSTB**
ICT - Marylin Arndt – Orange / ETSI – Contacted by **DAPP**

6.2 Smart City related ontologies identified by UPM

Table 6-1 : Smart City related ontologies identified by R4SC

Project name	Project URL	Uses/develops ontologies (Y/N)
BESOS	http://besos-project.eu/	
DIMMER		
e-balance	http://www.e-balance-project.eu/	*In their plans*
OrPHEuS	http://www.orpheus-project.eu/	NO
CITYOPT		NO
DAREED	http://www.dareed.eu/	*In progress*
CIVIS	http://www.civisproject.eu/	*In the future*
DoF		
INDICATE	http://www.indicate-smartcities.eu/	
OPTIMUS	http://optimusfp7.eu/	
CoSSMic		
iURBAN	http://www.iurban-project.eu/	NO
ORIGIN	http://origin-energy.eu/	
SmartKYE - Smart grid KeY nEighbourhood indicaTor cockpit	http://smartkye.eu/	
EEPOS	http://eepos-project.eu/	
EPIC-HUB		*In progress*
IDEAS	www.ideasproject.eu	
NRG4Cast	http://www.nrg4cast.org/	
URB-Grade		
COOPERaTE	http://www.cooperate-fp7.eu/	NO
INERTIA		*In progress*
ODYSSEUS		
S4ECoB		NO
CASCADE		
SEEDS	http://www.seeds-fp7.com/	NO

Project name	Project URL	Uses/develops ontologies (Y/N)
BEAMS		
KnoholEM	http://www.knoholem.eu	
CitInES	http://www.citines.com/	YES
ISES	http://ises.eu-project.info/	
NICE		
SCUBA	http://www.aws.cit.ie/scuba/	*In progress*
SEAM4US	http://www.seam4us.eu/	NO
Campus21	www.campus21-project.eu	NO
Semanco	http://www.semanco-project.eu/	YES
Adapt4EE		
IREEN		
DESIGN4ENERGY		
RESILIENT		*In progress*
AMBASSADOR		
EE-WISE		
ENBUS		
GE2O	www.geoclusters.eu	
NEWBEE		
PROFICIENT		
UMBRELLA		
Smart Build		
SmartSpaces		
SHOWE-IT		
E3SOHO		NO
EDISON		
GREEN@HOSPITAL		NO
VERYSchool		NO
ICE-WISH		
eSESH		
BECA		
BEST Energy		
LITES		
SAVE ENERGY	http://www.ict4saveenergy.eu/	NO
HosPilot		
BARENERGY	barenergy.eu <http://www.barenergy.eu/>	
GAD: Gestión Activa de la Demanda	gad.ite.es > Index es <http://gad.ite.es/index_es.html>	
FIEMSER	fiemser.eu <http://www.fiemser.eu/>	
DEHEMS	dehems.eu <http://www.dehems.eu/>	
AIM: A novel architecture for modelling, virtualising and managing the	ict-aim.eu <http://www.ict-aim.eu/>	

Project name	Project URL	Uses/develops ontologies (Y/N)
energy consumption of household appliances		
ReActivHome	<https://reactivhome.rd.francetelecom.com/>	
AMIGO: Ambient Intelligence for the Networked Home Environment	hitech-projects.com > Euprojects > Amigo <http://www.hitech-projects.com/euprojects/amigo/>	
BEMO-COFRA	bemo-cofra.eu <http://www.bemo-cofra.eu/>	
EnergyWarden	energywarden.net <http://www.energywarden.net/>	
ITOBO: Information and Communication Technology for Sustainable and Optimised Building Operation	zuse.ucc.ie > Itobo <http://zuse.ucc.ie/itobo/>	
eDIANA: Embedded Systems for Energy Efficient Buildings	artemis-ediana.eu <http://www.artemis-ediana.eu/>	YES
ME3Gas: Smart Gas Meters and Middleware for Energy Efficient Embedded Services	me3gas.eu <http://www.me3gas.eu/>	
ENERsip: ENERgy Saving Information Platform for generation and consumption networks	enersip-project.eu <http://www.enersip-project.eu/>	
PEBBLE: Positive Energy Buildings thru Better Control Decisions	pebble-fp7.eu <http://www.pebble-fp7.eu/>	
EnPROVE: Energy Consumption Prediction with Building Usage Measurements for Software-based Decision Support	enprove.eu <http://www.enprove.eu/>	

Project name	Project URL	Uses/develops ontologies (Y/N)
MESSIB: Multi-source energy storage system integrated in buildings	messib.eu <http://www.messib.eu/>	
GreenerBuildings	greenerbuildings.eu <http://www.greenerbuildings.eu/>	
BuildWise – Building a Sustainable Future: Wireless Sensor Networks for Energy and Environment Management in Buildings	zuse.ucc.ie > Buildwise <http://zuse.ucc.ie/buildwise/>	
RÉPENER: Control y Mejora de la Eficiencia Energética en la Edificación Mediate el Uso de Repositorios		
AUTEG	iis807.inf.tu-dresden.de > Auteg > En > Index <http://iis807.inf.tu-dresden.de/~auteg/en/index.html>	
AUDRAGA	iis807.inf.tu-dresden.de > Auteg > En > Audraga project <http://iis807.inf.tu-dresden.de/~auteg/en/audraga_project.html>	
H-KNOW: Advanced Infrastructure for Knowledge Based Services for Building Restoring	h-know.eu <http://www.h-know.eu/>	
PicoDiCon	picodicon.com <http://www.picodicon.com/>	
IntUBE: Intelligent Use of Buildings' Energy Information	ftp://ftp.cordis.europa.eu/pub/fp7/ict/docs/sustainable-growth/fp7-intube_en.pdf	
BeyWatch	beywatch.eu <http://www.beywatch.eu/>	
SmartCoDe: Smart Control of Demand for Consumption and Supply	<https://www.fp7-smartcode.eu/>	
EnRiMa: Energy Efficiency and Risk Management in Public Buildings	enrima-project.eu <http://enrima-project.eu/>	

Project name	Project URL	Uses/develops ontologies (Y/N)
SEEMPUBS : Smart Energy Efficient Middleware for Public Spaces	seempubs.polito.it <http://seempubs.polito.it/>	
HESMOS	hesmos.eu <http://hesmos.eu/>	
HOMES: Homes and buildings Optimised for Mastery of Energy and Services	homesprogramme.com > Www-accueil-MACCUE-108-UK-ACCUEIL <http://www.homesprogramme.com/www-accueil-MACCUE-108-UK-ACCUEIL.html>	
3e-HOUSES: Saving Energy and the Environment Across Europe	3ehouses.eu <http://www.3ehouses.eu/>	
EnergyTIC: Technology, Information and Communication services for engaging social housing residents in energy and water efficiency	ec.europa.eu > Information society > Apps > Projects > Factsheet > Index ? ... <http://ec.europa.eu/information_society/apps/projects/factsheet/index.cfm?project_ref=270947>	
THOFU	thofu.es > Inicio <http://www.thofu.es/inicio>	
SportE2 – Energy Efficiency for Sport Facilities	sporte2.eu <http://www.sporte2.eu/>	
E4U: Electronics Enabling Efficient Energy Usage	e4efficiency.eu <http://www.e4efficiency.eu/>	
FINSENY: Future INternet for Smart ENergY	fi-ppp-finseny.eu <http://www.fi-ppp-finseny.eu/>	
MIRABEL: Micro-Request-Based Aggregation, Forecasting and Scheduling of Energy Demand, Supply and Distribution	mirabel-project.eu <http://www.mirabel-project.eu/>	
NOBEL: Neighbourhood Oriented	ict-nobel.eu <http://www.ict-nobel.eu/>	

Project name	Project URL	Uses/develops ontologies (Y/N)
Brokerage Electricity and monitoring system		
OPEN Meter: Open Public Extended Network Metering	openmeter.com <http://www.openmeter.com/>	
E-HUB: Energy-Hub for residential and commercial districts and transport	e-hub.org <http://www.e-hub.org/>	NO
H2SusBuild	h2susbuild.ntua.gr <http://www.h2susbuild.ntua.gr/>	
SmartHouse/SmartGrid	smarthouse-smartgrid.eu <http://www.smarthouse-smartgrid.eu/>	NO
SEESGEN-ICT: a Thematic Network to encourage energy efficiency in Smartgrids	seesgen-ict.rse-web.it <http://seesgen-ict.rse-web.it/>	
ENERGOS: technologies for the automatic and intelligent management of future distribution networks		
BeAware: Boosting Energy Awareness	energyawareness <http://www.energyawareness.eu>	NO
energyXchange	energyxchange <http://www.energyxchange.eu>	NO
ECO-Life: Sustainable zero carbon ECO-town developments improving quality of life across EU	ecolife-project.eu <http://www.ecolife-project.eu/>	NO
SRS NET & EEE Harmonising European energy data	ec.europa.eu > Research > Fp6 > Ssp > Srs net en <http://ec.europa.eu/research/fp6/ssp/srs_net_en.htm>	NO
HYDRA	hydramiddleware.eu <http://www.hydramiddleware.eu/>	
POBICOS: Platform for Opportunistic Behaviour in	ict-pobicos.eu <http://www.ict-pobicos.eu/>	

Project name	Project URL	Uses/develops ontologies (Y/N)
Incompletely Specified, Heterogeneous Object Communities		
GENESI: Green sEnsor NEtworks for Structural monItoring	genesi.di.uniroma1.it <http://genesi.di.uniroma1.it/>	
S4EEB: Sounds for Energy-Efficient Buildings	s4eeb.eu <http://s4eeb.eu/>	NO
TIBUCON: Self Powered Wireless Sensor Network for HVAC System Energy Improvement	tibucon <http://tibucon.eu>	
Clear-up	clear-up.eu <http://www.clear-up.eu/>	
Cost-effective: Convert facades into multifunctional, energy-gaining components	cost-effective-renewables.eu <http://www.cost-effective-renewables.eu/>	
HOBNET: Holistic Platform Design for Smart Buildings of the Future Internet	hobnet-project.eu <http://www.hobnet-project.eu/>	
SESAME-S: SEmantic SmArt MEtering – Services for Energy Efficient Houses	sesame-s.ftw.at <http://sesame-s.ftw.at/>	YES
SmartKYE	smartkye.eu <http://smartkye.eu/>	
Semantic Web Energy Efficiency Project (SWEEP)	www.greenspaceresearch.uhi.ac.uk/site/index.php?option=com_content &view=article&catid=41:informatics&id=123	
eeEmbedded	http://141.30.165.10/	*In Progress*
HOLISTEEC	http://www.holisteecproject.eu/	
Design4Energy	http://www.design4energy.eu/	
STREAMER	streamer-project.eu <http://www.streamer-project.eu/>	*In Progress*

6.3 Institutions participating in VoCamps

Table 6-2: Institutions participating in VoCamps

Institution	Affiliation	Expert Level	City	Country	Project
AEC3			Munich	Germany	Ready4SmartCities
AEC3			Germany	Dresden	Ready4SmartCities
Albstadt-Sigmaringen University			Albstadt-Sigmaringen	Germany	SEMANCO
ALMENDE	Researcher	Ontology Expert			
ARC Enginyeria i Arquitectura La Salle	Technical Coordinator		Barcelona	Spain	
Arcadis	Senior Advisor Information Management (BIM)		Arnhem	The Netherlands	
Artificial Intelligence Laboratory				Slovenia	
Beuth Hochschule für Technik Berlin			Berlin	Germany	
BOC	Computer Engineer				
BOC Company	Business Process Modelling	Domain Expert			
BSH Bosch und Siemens Hausgeräte GmbH			Munich	Germany	
Cardiff University			Cardiff	UK	
Cartif Research Centre	Energy Division	Renewable Energies Area	Valladolid	Spain	
Center For Research and Technology Hellas / Information Technologies Institute			Thessaloniki	Greece	Ready4SmartCities
CERTH/ITI			Thessaloniki	Greece	Ready4SmartCities
CERTH/ITI	Researcher	Ontology Expert			
CIMNE			Barcelona	Spain	SEMANCO

CSTB (French research center of the Building/Construction sector)			Sophia Antipolis	France	Odysseus
D'Appolonia SpA	Senior Engineer		Genova	Italy	
D'Appolonia SpA			Genova	Italy	Ready4SmartCities
Designer	Planner and Civil Engineer	Energy Efficiency Inspector			
DG CONNECT	H5 Smart Cities & Sustainability		Brussels	Belgium	
empirica			Bonn	Germany	Ready4SmartCities
Energaia - Energy Agency			Lissabon	Portugal	
Engineering and Architecture School La Salle (FUNITEC)			Barcelona	Spain	SEMANCO
Engineering and Architecture School La Salle (FUNITEC)			Barcelona	Spain	
European Commission	DG CONNECT Unit H5 - Smart Cities and Sustainability				
Fraunhofer	Researcher/Computer Engineer Device & Sensor Semantic Interoperability Expert	Ontology Expert			
Fraunhofer - FIT			Bonn	Germany	
Fraunhofer IAIS			Sankt Augustin	Germany	
Fraunhofer IIS/EAS			Dresden	Germany	
Fraunhofer IOSB			Karlsruhe	Germany	OpenIoT
Fraunhofer-Institut für Integrierte Schaltungen			Dresden	Germany	
Ghent University			Ghent	Belgium	

Group Manager Automation Systems	Fraunhofer Institute for Integrated Circuits IIS		Dresden	Germany	
Head of R&D Division	CEMOSA		Malaga	Spain	
HES-SO Valais, 3960			Sierre	Switzerland	
High Schools of Switzerland - HES-SO				Switzerland	
Hippolyte Cardiff University			Cardiff	UK	Resilient
HYPERTECH	Computer Engineer / Energy Efficiency in Home and Buildings				
Imperial College London			London	UK	
Informaton Technologies Institute				Greece	
Ingenieurbüro conGRUent			Vienna	Austria	
INRIA			Grenoble	France	
INRIA & LIG			Grenoble	France	Ready4SmartCities
Institute for Logic, Language and Computation (ILLC) University of Amsterdam (UvA)			Amsterdam	The Netherlands	
Institute Mihajlo Pupin			Belgrade	Serbia	
Institute of Energy and Sustainable Development, De Montfort University			Leicester	UK	
ISA	Computer Engineer	Ontology Expert			
ISA Company	Sensor Devices Management and Semantics Expert	Ontology Expert			
Istanbul Technical University, Faculty of Architecture, Department of Urban and Regional Planning			Istanbul	Turkey	

Josef Stefan Institute			Ljubljana	Slovenia	NRG4Cast
Karlsruhe Institute of Technology	Researcher			Germany	
LightingEurope			Brussels	Belgium	
Mihailo Pupin Institute from Belgrade		(Phd Student)			
Ontology Engineering Group			Madrid	Spain	Ready4SmartCities
Politecnico di Torino			Torino	Italy	Dimmer
Politecnico di Torino			Torino	Italy	SEMANCO
Politecnico di Torino				Italy	
Public Power Corporation (PPC)	Assistant Director				
Research Associate	School of Engineering	Cardiff University	Cardiff	UK	
Researcher	Fraunhofer Institute for Integrated Circuits IIS		Germany.	Dresden	
RWTH Aachen University - Software Engineering			Aachen	Germany	COOPERaTE
Schneider Electric, Strategy & Innovation				France	
Senior Engineer	D'Appolonia SpA		Genova	Italy	
Senior Research Engineer	Honeywell Prague Laboratory			Czech Republic	
Senior Researcher	Centro Tecnologico Cartif	Energy Division	Valladolid	Spain	
Tampere University of Technology, FAST.-Lab				Finland	URB-Grade
Technical University of Košice			Košice	Slovakia	
Technical University of Madrid (UPM)		Ontology Expert			
Technische Universität Dresden			Dresden	Germany	
TECNALIA			onostia-San Sebastián	Spain	BETAAS
TNO				The Netherlands	Odysseus
TNO	BIM Expert			The Netherlands	

Trinity College Dublin	Postdoctoral Researcher		Dublin	Ireland	
TU Kaiserslautern (Germany) FB Informatik	Design of Cyber-Physical Systems		Kaiserslautern	Germany	
TU Vienna	Fraunhofer IESE Institute		Vienna	Austria	
TUK University		Ontology Expert			
UNAV	Architect	BIM Modelling			
Universidad Politécnica de Madrid			Madrid	Spain	Ready4SmartCities
Universidad Politécnica de Madrid (UPM)	Ontology Engineering Group		Madrid	Spain	Ready4SmartCities
Universitat Politècnica de Catalunya			Barcelona	Spain	Ready4SmartCities
Universitat Ramon Llull	Director of ARC Enginyeria i Arquitectura La Salle		Barcelona	Spain	
University of Applied Science in Switzerland			Sierre	Switzerland	
University of Lille 1 Politech-Lille Engineering school LGCgE Laboratory				France	
Urban & Regional Innovation Research Unit (URENIO)	Researcher Smart Cities Energy Efficiency				
virtualcitySYSTEMS GmbH			Berlin	Germany	
VTT - Technical Research Centre			Espoo	Finland	

6.4 VoCamps R4SC was participating in

Table 6-3: VoCamps R4SC was participating in

Nr	Title of VoCamp	Topics	Location	Date
1	Energy Efficiency Modeling	Vocabularies/Ontologies for buildingperformance analysis	Thessaloniki,Greece	15-16 November 2012
2	BuildingInformationModels (BIM)	Enriching BIM models used duringdesign phases for enhanced energyperformance analysis and simulation	Brussels, Belgium	21-22 February 2013
3	Energy using and producing Products Management(EupP)	Definition of vocabularies/ontologies related to EupP and interoperability with eeManagement Systems.Scientifically preparing standardization of M2M communication for energy management of Energy using and producing Products (EupP) in buildings and its environments	Kaiserslautern, Germany	13-14June 2013
4	Integrating Multiple Domains and Scales	Application of ontologies to integrate multiple domains and scales in order to develop models of urban energy systems.Help different actors– urban planners, consultants, policy makers, dwellers – to take better informed decisions to reduce energy consumption and carbon emissions in urban environments	Barcelona, Spain	13-14 February 2014
5	Devices & Sensors	Vocabularies/Ontologies used in Middleware to foster interoperability and share of knowledge in the AEC domain.	Bonn, Germany	20-21 May 2014
6	Linked Data in Architecture and Construction	Use cases for ifcOWL and Semantic Web, Agreements towards a standardized ifcOWL represenation	Espoo, Finland	26-27 May 2014

7	Energy measurement data in municipalities	Participants obtained a common ontology that can be used by municipalities to represent their energy measurement data in order to publish such data online as Linked Data	Vienna, Austria	22-23 April 2015
8	Interoperability for Efficient energy systems in Smart Cities,	Use cases and alignments for SAREF, IFC and other ontologies	Genoa, Italy	14-15 Sept. 2015