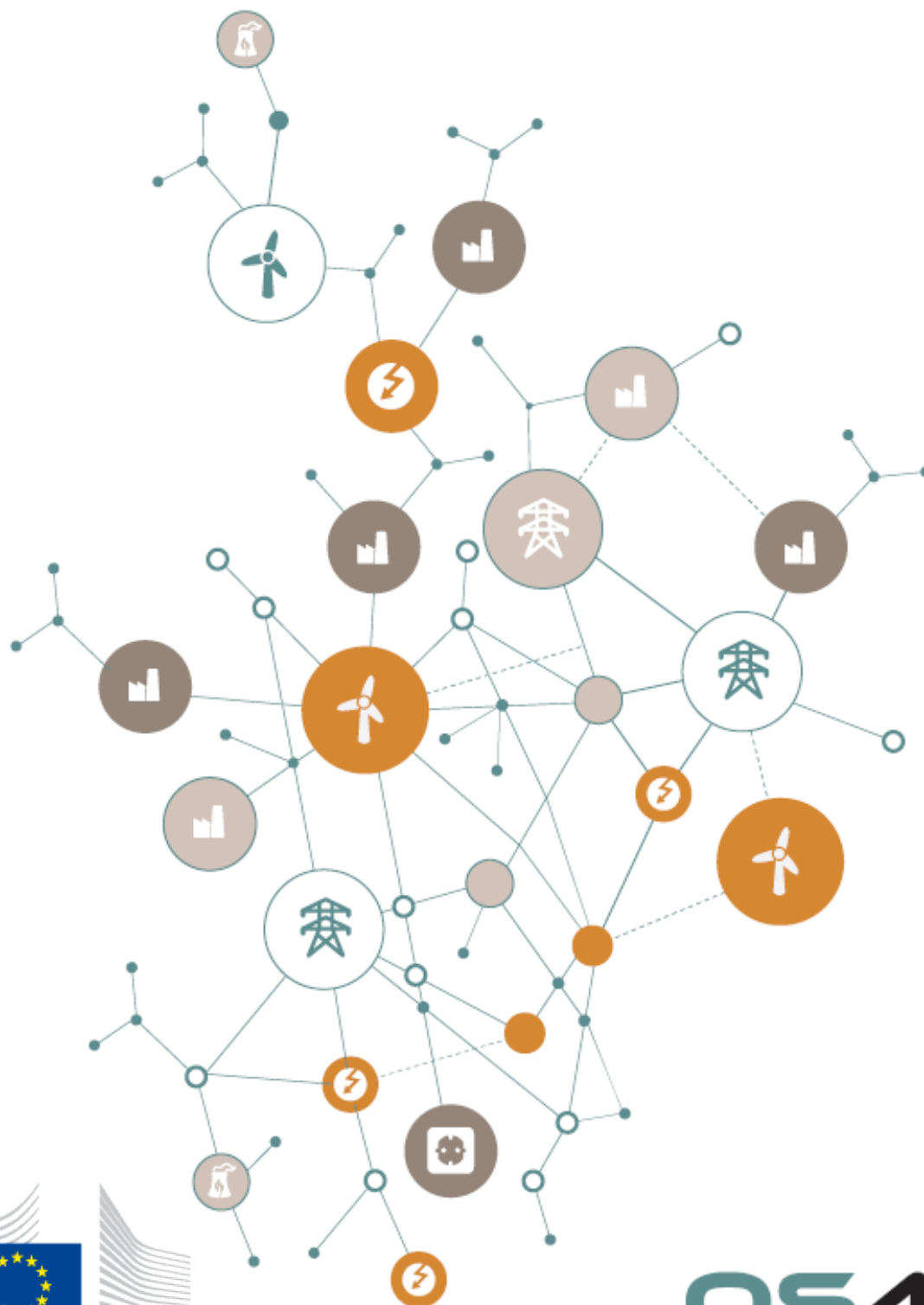


Deliverable 9.2.3

User group feedback report 3



D9.2.3 User group feedback report 3

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Executive Summary

This deliverable is the third report about the feedback received by the OS4ES User Group.

As the last deliverable in a series of three User Group deliverables it comprises all relevant information of the OS4ES User Group activities during the project runtime. It contains

- an introduction to this deliverable,
- the history and development of the OS4ES User Group,
- an overview and details of all User Group meetings held during the project runtime,
- an assessment of the User Group.

The main focus is on providing an overview of all activities initiated and conducted by the OS4ES consortium for the OS4ES User Group and listing the input and replies received by these activities (physical meetings, webinars, phone calls and personal talks).

In the assessment section it is finally concluded if the objectives for having a User Group as laid out in the Description of Work [1] could be reached.

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1 Introduction

This deliverable presents all OS4ES User Group (UG) activities before and during the project runtime. It is based on deliverable D9.2.1 [2] and D9.2.2 [3] and features the following sections:

- Section 1: Overview of the content of this deliverable
- Section 2: History and development of the User Group
- Section 3: Overview and details of the User Group activities
- Section 4: Assessment of the User Group activities

2 History and development of the User Group

Already in the stage of project proposal setup the consortium analyzed which companies might be interested in the OS4ES project and be potential customers of the project results. The massive interest of the approached companies resulted in the establishment of a preliminary OS4ES stakeholder Industrial User Group which at this point of time consisted of nine companies (see Table 1).

Company	Type of company	Country
Energinet.dk	TSO	Denmark
Ericsson Croatia	telecommunication provider	Croatia
Hamburg Energie	municipal energy provider	Germany
Phoenix Contact	industrial company	Germany
Senertec	CHP manufacturer	Germany
IDS	control system provider	Germany
E.ON Ruhrgas	supply company	Germany
IFAK	Institute for Automation and Communication	Germany
ABB	research centre	Switzerland

Table 1: Preliminary list of User Group members

Out of this group the following five companies have signed letters of intent, which had been attached to the Description of Work [1]: ABB, Hamburg Energie, IDS, Senertec and IFAK.

Since the project start more User Group members could be attracted by means of the OS4ES website, participation in conferences, bilateral talks with existing business contacts of consortium partners and OS4ES publications.

Company	Name of UG member	Country	Main interest
ABB	Carsten Franke, Martin Näf	Switzerland	Communication protocols as well as lab and field tests
b-Quadrat Vertrags GmbH % Co. KG	Wolfgang Klinker	Germany	General interest in the project
Cassini Consulting GmbH	Philipp Hechler	Germany	General interest in the project
Computer Technology Institute	Prodromos Makris	Greece	ICT-Based Solutions for the Smart Energy Grid in general (The Computer Technology Institute is a project partner of the EU FP7 research project VIMSEN)
DVGW Service & Consult GmbH	Torsten Göbel	Germany	General interest in the project
EDF Group	Thierry Coste	France	IEC 61850 based interfaces and registry concept
E.ON New Build & Technology GmbH	Thomas Fischer	Germany	General interest in the project
EnBW Energie Baden-Württemberg AG	Holger Wiechmann	Germany	General interest in the project
Eneco	Henry Cheung	The Netherlands	General interest in the project
Energienet.dk	Knud Johansen	Denmark	Generic interface for DER components, Open System for Energy Services
Ericsson	Andrej Grguric, Darko Huljenic	Croatia	Communication protocols, Distributed Registry System, Open Middleware Implementation
Grid Cloud Systems	John Gillermann	US	Communication protocols
Hamburg Energie	Onnen Heitmann, Jan Sudeikat	Germany	Generic interface for DER components, Distributed registry system and Open System for Energy Services

Company	Name of UG member	Country	Main interest
IdE – Institut dezentrale Energietechnologien	Nermin Brgulja	Germany	General interest in the project
IDS	Michael Conrad	Germany	Communication protocols, Registry, Generic interface for DER components and field tests
Institut für Automation und Kommunikation e.V.	Christian Hübner	Germany	Communication protocols, Distributed Registry System, Open Middleware Implementation
MVV	Michael Niemann	Germany	Field tests
OMICRON electronics	Alexander Apostolov	USA	IEC 61850 data model and communication stack
Phoenix Contact	Holger Krings	Germany	Communication protocols, Generic interface for DER components, Registry
Senertec	Gunter Grosch	Germany	Generic interface for DER components, Communication protocols and lab and field tests
SIEMENS	Henry Dawidczak	Germany	Registry, Data model
SpinLab – The HHL Accelerator c/o Explicates	Matthias Mietz	Germany	General interest in the project
Teleseo GmbH	Dominik Reusser	Germany	General interest in the project
Vattenfall	Hauke Beeck, Sebastian Gerhard	Germany	General interest in the project
Eurisco	Claus Amtrup Anderson	Denmark	General interest in the project

Table 2 : Current list of UG members

Table 2 features all members of the OS4ES User Group that participated during the project runtime. Unfortunately, not all of the members listed in the table still participate in the User Group (crossed out entries) due to a change in their professional careers.

3 Overview and details of User Group activities

The User Group activities of the consortium have been centered around the following activities:

- preparing and conducting User Group meetings, both physical meetings and web meetings;
- maintaining bilateral contacts to User Group members for discussing specific issues;
- keeping the User Group section of the OS4ES website up to date;
- setting up an OS4ES brochure and sending them to all members of the User Group and other interested parties.

Section 3.1 will provide an overview of these activities while section 3.2 will describe them in more depth.

3.1 Overview of User Group activities

User Group meetings

A series of User Group meetings has been held during the project runtime. A tabular overview is given in Table 3. It includes the number, date and type of User Group Meeting, its scope and the names of participating User Group members.

Number of UG meeting	Date/Type	Scope	UG members participating
1	21.11.2014 / web meeting	Introduction to OS4ES, Report on D1.1 and Identification of benefits for UG members	H. Krings (Phoenix Contact), G. Grosch (Senertec), H. Kirrmann (ABB)
2	28.01.2015 / physical meeting in Hamburg, Germany	Presentation of the results of D1.1 and D2.1 and Impact of the UG	H. Beeck (Vattenfall), G. Grosch (Senertec), O. Heitmann and J. Sudeikat (Hamburg Energie), H. Krings (Phoenix Contact), H. Schäfer (HUAS), H. Wiechmann (EnBW) <u>per web meeting:</u> M. Conrad (IDS), H. Dawidczak (SIEMENS), C. Franke (ABB), U. Hofmann (University of Salzburg)

Number of UG meeting	Date/Type	Scope	UG members participating
3	20.02.2015 /web meeting	Sequence diagrams of the following UCs annotated with communication requirements: <ul style="list-style-type: none"> • Volt/VAr, • Dwelling information exchange, • Primary control 	M. Conrad (IDS), J. Sudeikat (Hamburg Energie)
4	24.4.2015 / web meeting	Presentation of the use cases “Marketization of balance group management” and “Demand response”	H. Cheung (Eneco), M. Conrad (IDS), H. Dawidczak (SIEMENS), H. Krings (Phoenix Contact), H. Wiechmann (EnBW)
5	22.05.2015 / web meeting	Registry and Energy Services	H. Cheung (Eneco), M. Conrad (IDS), H. Dawidczak (SIEMENS), H. Wiechmann (EnBW)
6	10.07.2015 / web meeting	OS4ES data model	N. Bjugulja (IdE), Ch. Hübner (Ifak), H. Dawidczak (SIEMENS), H. Krings (Phoenix Contact)
7	21.08.2015 / web meeting	Generic interface to utilize existing telecom infrastructure	N. Bjugulja (IdE), G. Grosch (Senertec)
8	18.09.2016 / web meeting	Definition of test cases for the application prototypes	M. Conrad (IDS), H. Dawidczak (SIEMENS), H. Krings (Phoenix Contact), H. Wiechmann (EnBW)
9	16.10.2015 / web meeting	Matching algorithms of DER capabilities with requirements from EMS	H. Dawidczak (SIEMENS), H. Wiechmann (EnBW), G. Grosch (Senertec)
10	04.12.2015 / web meeting	Lab and field tests	H. Dawidczak (SIEMENS), N. Bjugulja (IdE)
11	23.02.2016 / physical meeting in Frankfurt, Germany	Overview of the OS4ES architecture, lab and field tests and exploitation	H. Beeck (Vattenfall), N. Bjugulja (IdE)

Number of UG meeting	Date/Type	Scope	UG members participating
12	07.04.2016 / web meeting	OS4ES applications and lab and field tests	Holger Krings (Phoenix Contact), Hauke Beeck (Vattenfall), Nermin Brjula (IdE), Gunter Grosch (Senertec), Christian Hübner (Ifak)
13	19.05.2016 / web meeting	OS4ES exploitation	G. Grosch (Senertec)
14	05.09.2016 / web meeting	Overview of planned prototype versions and presentation of prototype v1	Christian Hübner (Ifak)
15	19.05.2017 / web meeting	Field tests	Christian Hübner (Ifak), Claus Andersen (Eurisco), Gunter Grosch (Senertec), Matthias Mietz (Explicates)
16	06.07.2017 / web meeting	Integration of the OS4ES system in lab and field tests	Holger Krings (Phoenix Contact), Hauke Beeck (Vattenfall), Matthias Mietz (Explicates)
17	25.09.2017 / web meeting	Exploitation OS4ES follow-up project	Hauke Beeck (Vattenfall), Gunter Grosch (Senertec), Christian Hübner (Ifak), Holger Krings (Phoenix Contact), Matthias Mietz (Explicates)

Table 3: User Group meetings held during the project runtime

Bilateral contacts

Apart from the User Group meetings a series of bilateral contacts between the OS4ES consortium partners and members of the UG have been taken place (see Table 4).

These contacts tackled specific issues that do not concern the whole UG but affect just one company / institution of the UG. Among those e.g. integration of devices from the UG member companies in OS4ES lab and field test have been tackled.

Number of meeting	Date/Type	Scope	UG members participating
1	07.05.2015 / web meeting	Registry services "Register" and "Search"	H. Dawidczak (SIEMENS), T. Dufaure (SIEMENS)
2	17.06.2015 / phone call	IEC 61850-8-2	T. Dufaure (SIEMENS)
3	04.02.2016 / web meeting	Use of Senertec CHPs for lab tests	G. Grosch (Senertec)
4	10.03.2016 / phone call	Integration of Phoenix Contact devices in OS4ES test environment	H. Krings (Phoenix Contact)
5	23.03.2016 / web meeting	Integration of Senertec CHPs in HUAS lab tests	G. Grosch (Senertec)
6	07.04.2016 / phone call	Test of the OS4ES components	Nermin Brjula (IdE)
7 8 9 10 11 12	15.04.2016, 22.04.2016, 28.04.2016, 05.05.2016, 12.05.2016, 18.05.2016 / web meeting	Standardization of the OS4ES data model within IEC 61850 TF90-15	H. Dawidczak (SIEMENS)
13	08.07.2016 / web meeting	Integration of Phoenix Contact devices in OS4ES test environment	H. Krings (Phoenix Contact)
14	08.07.2016 / phone call	Integration of Senertec's CHP(s) and possibly e-mobility devices in OS4ES test environment	G. Grosch (Senertec)
15	18.07.2016 / phone call	Integration of Senertec CHP	G. Grosch (Senertec)
16	09.01.2017 / web meeting	Presentation of OS4ES project in a nutshell and the registry	L. Emmermacher and Mr. Zacharias (BDEW)
17	31.01.2017 / web meeting	Presentation of OS4ES project in a nutshell and the registry	Dr. Jürgen Anke (KiwigrId)
18	15.02.2017 /web meeting	OS4ES in a nutshell	Claus Andersen and Jacob Dall (Eurisco)

Number of meeting	Date/Type	Scope	UG members participating
19	16.02.2017 / talk during IEC 61850 meeting	OS4ES in a nutshell	Thierry Coste (EDF)
20	06.02.2017 / web meeting	OS4ES and Green Access – joint efforts	Wolfgang Friedrich (Mauell)
21	May 2017 / Phone call	Engagement of BNetzA in OS4ES	Wladimir Tiderko
22	26.09.2017 / Phone call	Finding a date for a presentation of OS4ES at BNetzA in Bonn and answering questions to the OS4ES registry	Wladimir Tiderko
23	29.09.2017 / Phone call	Enhancement of the TRL of the OS4ES software	Matthias Mietz (Explicates)
24	27.10.2017 / Web meeting	Use of OS4ES in microgrids	Matthias Mietz (Explicates)

Table 4: Bilateral contacts during the project runtime

OS4ES website

During the project runtime, the whole OS4ES website has continuously be maintained including also the access restricted area for the User Group (cp. D9.3.2 [4]). This work comprised updating the list of UG members, documenting the User Group and bilateral meetings, providing the OS4ES deliverables and OS4ES publications for download and keeping a calendar revealing relevant User Group dates for web meetings and physical meetings as well as conferences on which OS4ES was presented.

OS4ES brochure

During the User Group Meetings it was agreed to design an OS4ES project brochure. The aim of this brochure [5] is to provide an overview of the whole project, to give an insight into the individual subsections and to provide contact information to possible users and companies that might want to join the User Group and/or even be able to occupy a role in the OS4ES business model. In summer 2017 the brochure was distributed to all User Group members and additional persons/companies with an interest in OS4ES. The brochure can be found as an annex in deliverable 9.3.2 [4].

3.2 Details of User Group activities

The following section concentrates on the feedback that has been received during the User Group meetings and in bilateral contacts between OS4ES consortium members and members of the OS4ES User Group during the project runtime. Furthermore, the answers provided and steps taken by the OS4ES consortium upon the feedback of the User Group are described.

21.11.2014 (Webinar):

Introduction to OS4ES, report on D1.1 and identification of benefits for UG members

The UG stresses the importance of concise requirements for communication upon which the communication protocol will be chosen out of various communication protocol candidates. Some requirements such as control signal or file and transfer time are mentioned as indispensable. The consortium takes the suggested requirements into account when working on this task (T2.1).

The need for controllable loads is brought forth. This aspect is considered in the definition of use cases in WP1 and hence in all other relevant work based on it.

It becomes clear that security issues are very important to the UG as insecure systems will not be acceptable and only trusted systems will be successful in the energy market. As the OS4ES consortium considers security issues right from the start when the architecture of the OS4ES is set up and also later on in the various implementation steps this concern is addressed throughout the project.

One User Group member proposes to think about a certification of the test scenarios, because

- on one hand not much additional effort of getting a test specification certified is assumed,
- on the other hand a certified OS4ES platform could attract more users in the energy market.

The consortium will take this aspect into consideration when the prototype is ready and include it in the exploitation plan.

Senertec offers to provide combined heat and power devices for testing and Phoenix will try to provide some IEC 61850 products for OS4ES. The OS4ES consortium will think about this offer when the lab and field tests start.

It is suggested to get into contact with regulators and present them our ideas. First some tests will be done at Stedin in order to see which tests are beneficial for the market. Although, by experience, regulatory bodies are mostly two years behind the process state of the art, the OS4ES consortium will search the dialog with regulators.

*28.01.2015 (Physical Meeting in Hamburg, Germany):
Presentation of the results of D1.1 and D2.1 & impact of the UG*

The UG regards the following use cases as most important:

- Volt/VAr balancing and
- demand response.

It is proposed to start with the use cases which involve a balance responsible. The OS4ES consortium will consider that in their decision, which use cases to implement in the OS4ES project. Furthermore, the OS4ES consortium will set up a questionnaire in which the UG members can fill in the use cases they deem crucial for today's and future energy market scenarios.

Germany is setting up a Green Book and information in D1.1 could make a valuable contribution to it. It has been proposed by the UG to have a look at the German Green Book on the new energy law and check if the OS4ES use cases match with the concepts of the Green Book. The OS4ES consortium responds that, on the level of detail described there, the innovative use cases are in focus of the Green Book. A more detailed statement should be possible after the White Book announced for summer 2015 is published.

Questions regarding time constraints in D2.1 and the registry concept are asked by the UG and answered by OS4ES partners. The User Group feels that there should be one authorized registry for accounting and billing. Next to this, commercial registries could exist for other services. The OS4ES consortium refers to the OS4ES system architecture that assigns the technological functions of DER system registration, search and matching to the OS4ES system components (including the registry) while the business logic and administration including billing is to be implemented in stakeholders applications on top of the OS4ES platform. In particular, not all operational data relevant for billing need to be logged in the OS4ES system while that very well fulfills its technical requirements.

*20.02.2015 and 24.04.2015 (Webinar):
Sequence diagrams of the use cases Volt/VAr, Dwelling information exchange, Primary Control annotated with communication requirements and presentation of the use cases "Marketization of balance group management" and "Demand response"*

The questions raised by the UG regarding the presented use cases (Volt/VAr, frequency control, dwelling information exchange, demand response, marketization of balance group management) are answered by the OS4ES consortium.

*27.04.2015 (Questionnaire):**Relevance of use cases*

A questionnaire (see Annex A) has been sent to the User Group with the focus of getting feedback on the relevance of the use cases described in D1.1. Unfortunately only one member of the UG filled in the questionnaire and sent it back to the consortium. Some UG members gave feedback in web meetings and the physical meeting, so that a well-grounded decision on the use cases to develop for the OS4ES project could be taken.

*07.05.2015 (Bilateral web meeting with SIEMENS):**Register and Search service*

The discussion following FGH's presentation of the register service for the OS4ES project has as result, that the current approach is feasible and that no new ACSI service "Register" is needed in IEC 61850-7-2. What needs to be provided by IEC 61850 in future, though, and what already has been planned to be done (IEC 61850-8-2) is to allow for a server-side "Associate" for registration. Currently the associate service is only dedicated to clients.

For the search service SIEMENS proposes to use a new, dedicated ACSI service with which SQL statements can be sent to the registry. In the SQL statements also semantic information of IEC 61850-7-3 and 7-4 could be used.

The OS4ES consortium disregards the two variants for the search service proposed so far and goes for the variant proposed by SIEMENS.

*22.05.2015 (Webinar):**Registry and Energy Services*

In the discussion after HUAS' presentations on D4.1 and its subsequent results recently obtained in a Hamburg workshop together with IT4, the UG proposes to have a look at the German DAM (Data Access Manager) and to consider the concepts in the OS4ES Registry.

The OS4ES consortium states that it is aware of this document. However, the current concept described in the draft, which is accessible to the public, is not yet elaborated in such detail as necessary for future implementation. The OS4ES consortium expects the OS4ES Registry to be compatible with the challenges and requirements outlined in the DAM concept.

It is furthermore suggested that the registry structure should be a copy of the physical grid. So the DER system would be listed in the registry level where it is connected. OS4ES consortium: The logical structure of the OS4ES registry supports a (hierarchical) zone concept that allows for an efficient DER system search. The physical structure of registry instances, their distribution and replication depends on its final deployment and configuration. In the OS4ES lab and field test this will be very simple. If adopted by

authorities the distributed registry can and will be configured and deployed so as to obey regulation conditions including security and privacy concerns.

Various comprehension questions were asked by the UG members and answered by the responsible consortium partner.

*10.06.2015 (phone call with SIEMENS):
IEC 61850-8-2*

This phone call has been a continuation of the bilateral web meeting with User Group members from SIEMENS held on 07.05.2015. Further issues of the evolving standard IEC 61850-8-2 impacting OS4ES have been discussed.

*10.07.2015 (Webinar):
OS4ES data model*

Beside some questions regarding the general understanding of the UML data model the User Group members proposed to take the data objects average power of a battery and start time into account in the UML model. The necessity of these two data objects is seen by the consortium. Hence, they are entered in the next version of the data model.

Out of the discussion, the idea to model an interruptible load profile came to the mind of the responsible consortium partner for the data model and was hence implemented as an additional data object in the OS4ES data model.

*21.08.2015 (Webinar):
Generic interface to utilize existing telecom infrastructure*

Feedback of the UG consisted in questions asked to the presented content (Generic interface to utilize existing telecom infrastructure).

*18.09.2015 (Webinar):
Definition of test cases for the application prototypes*

The UG proposes to use a state machine for handling the various activities shown in the presentation slides for the use case "Flexibility". The presenter replies that the purpose of the utilization of activity diagrams is just to illustrate the test case definition. The consortium will of course include application state machines in D5.3 which will contain the whole applications design.

Besides, it is discussed if the term Virtual Power Plants (VPP) should be employed for OS4ES purposes. In OS4ES a VPP is defined as an aggregation of services and not as an aggregation of DER systems. The UG clearly states that a new name should be used instead of VPP as this term has a clear definition (aggregation of DER systems). Several terms are proposed by UG

members. The OS4ES consortium will consider these proposed terms when thinking about a new name.

16.10.2015 (Webinar):

Matching algorithms of DER capabilities with requirements from EMS

The work on matching algorithms is presented to the participants. The following questions have been asked by User Group members and have been answered by the presenter and/or other consortium members:

Question 1: Is not Automatic Frequency Control a requirement of the DSO/TSO that a DER system must fulfill before it is connected to the system?

Answer: AFC is not a requirement of the Registry as of today, but it is anticipated that in future there is a need for DER systems that can offer such DER system energy services. It is agreed that the number of conventional power plants will decrease in future, so a substitute for these conventional plants is needed.

The security requirements regarding the registration of a DER system capable of offering AFC at the OS4ES registry is part of T4.4, which is not yet completed.

Question 2: Is it necessary for the matching algorithms to check the AFC capabilities of a DER system (see slide 18)? Shouldn't it be clear from the pre-qualification process if a DER System has these capabilities?

Answer: The DER system is responsible for the services offered. As not every DER system has the technical capabilities to offer frequency control, DER systems that have those capabilities update these in the Registry to make the aggregator find them.

Question 3: This question is related to the diagram on Autonomous Frequency Control (AFC) and is answered by a detailed description of this diagram by the presenter.

Upon another question the presenter mentions futures and options, which have not been part of the presentation. The futures determine which amount of power can be offered by the DER system for AFC. The presenter shows in D4.2 that the option line lies between the futures and the reserved power. The questioner who dialed in the web meeting only by phone and therefore is not able to see the screen with the presented slides is invited to download D4.2 from the user group site and to look at figure 4 and the describing text as this gives more details and provides a good understanding of the asked issue.

04.12.2015 (Webinar):

Lab and field tests

The various OS4ES test sites - namely the Tecnalia lab (Bilbao, Spain) and the HUAS lab (Hamburg, Germany) as well as the Hoog Dalem (Hoog Dalem, Netherlands) field test site - and use cases tested there are presented. The User Group members ask the following questions and receive the answers noted below:

Question 1: How does the scenario look in the Hoog Dalem field test in reality? How is flexibility (storage and load) done? What about billing?

Answer: USEF gives the connection to the market for interactions of the BRP and DSO with the Aggregator. The Aggregator has the link to the OS4ES Registry and the contracts with the Prosumers.

Question 2: Does the Aggregator and the prosumer have a kind of “flat rate contract”?

Answer: It should be a type of service solution. If the prosumer needs energy, he would pay more. And on the other side, if the Aggregator needs flexibility from the prosumer he would also pay more for this flexibility.

*04.02.2016 (Bilateral web meeting with Senertec):
Possibility of using Senertec CHP for lab tests*

Tecnalia gives an overview of OS4ES lab and field tests. The HUAS lab is identified as the most interesting test site for Senertec CHPs as they conduct the use cases on VPP in which active power is controlled (and also thermal power).

Senertec assumes that the CHP used in the lab test will be used for usual operation of a customer and also in some tests, and therefore is interested to know the following details:

- What are the requirements of the test lab for the CHPs?
- How often is CHP influenced (switched on/off etc.)?
- What would be the benefits for the customer?

Senertec also comments that for a lab installation maybe Senertec could offer to HUAS a kind of session for the scope/timeframe of the OS4ES project. Tecnalia suggests to involve the responsible person for the HUAS lab tests in future talks as he knows best about the possibilities of CHP integration and requirements for CHP operation.

The decisions taken are that FGH will arrange a web meeting with HUAS and Senertec in the last two weeks of March to discuss further details on a possible integration of Senertec's CHP(s). This web meeting has been held on 23rd March and is listed on the next page.

*23.02.2016 (Physical user group meeting in Frankfurt):
General architecture of the OS4ES system, exploitation of the OS4ES system and DER management applications and lab and field tests*

FGH welcomes the participants of the User Group, presents the agenda and initiates a short introduction of the UG meeting attendees.

Unfortunately only two UG members out of 6 who confirmed their attendance actually attended the UG meeting (three of them notified the consortium that they could not come due to medical reasons). However, the discussion was very vivid and helped to provide valuable input for the lab and field test and also for the exploitation strategy.

From the discussion it becomes obvious that the engagement of the stakeholders to join the OS4ES User Group is mainly motivated by the search for a good platform to build on and to see in how far the OS4ES platform will be beneficial for installations of wind power plants and attached batteries.

TNO gives a short introduction of the general architecture of OS4ES and answers some comprehension questions asked by the participating UG members.

Afterwards T-System presents the document “Update the exploitation plan” (see Annex A of D9.3.1a [3]) that has been sent to the UG members in advance to allow them to read it beforehand and to prepare some input for the meeting. Various questions are raised and suggestions are given. Both are noted down in the document.

As there is a big interest in USEF, TNO reports how USEF has evolved and presents the USEF field test in Hoog Dalem. The presentation is followed by positioning OS4ES in the USEF context.

The presentation on the lab tests has been skipped due to lack of time. It will be presented in the next UG web meeting.

At the end of the meeting the UG members provide the following feedback:

- It is suggested to have up to 2 physical meetings a year.
- Vattenfall has big interest in the project as it raises the same questions as currently discussed at their company. Although at the moment no proposals how to go forward and how to help the OS4ES project the further steps in the OS4ES project will be closely followed up.
- IdE is interested in setting up a demonstration environment with USEF and OS4ES. FGH proposes that IdE could act as an additional tester of the OS4ES components before the OS4ES prototype version is released and it is agreed to continue on this in bilateral talks.

10.03.2016 (Bilateral phone call between Koncar and Phoenix Contact)

Integration of Phoenix Contact devices in OS4ES test environment

The basic result of this phone call was that Phoenix Contact has IEC 61850 equipment that could be used in the lab/field trials. Further details need to be agreed on in following calls.

23.03.2016 (Bilateral web meeting between Senertec, HUAS and FGH)

Integration of Senertec CHPs in HUAS lab tests

HUAS gives an overview of their laboratory in Hamburg. It is then discussed what kind of Senertec CHPs and how many of them could be used in the HUAS lab tests. It might be possible that a Senertec customer in the city of Hamburg could provide a CHP for these tests. The following phases are envisaged in the lab field tests:

Phase 1: Installation and transfer of measured values

Installation would be done by HUAS with support from Senertec.

Phase 2: Test execution – Optimisation of the electrical system by means of OS4ES

Senertec asks if excess power is marketed virtually which is answered by HUAS with “yes”. Besides, Senertec mentions that it would be nice to have a user interface that show how excess power can be marketed. It should be avoided to switch on and off CHPs too often. Once a week is not critical but they should not be switched on and off every day in chronological intervals of 30 minutes. Details of the buffer storage are exchanged (750 l for the DACHS with 5.3 kW)

Senertec details some technical data of their CHPs that could be used in the lab test and stresses that it is essential for them to know what is expected of the participant of the lab test and what are the advantages of such a participation. HUAS commits itself to provide an answer to this question asap.

07.04.2016 (Webinar)

OS4ES applications in lab and field tests

Tecnalia gives the presentation covering the OS4ES applications as well as the lab and field tests that could not be shown at the physical User Group meeting due to a lack of time.

Unfortunately, there was not much time for discussion and questions as the presentation took the complete hour of the web meeting. To allow UG members to “digest” the content of the presentation and to ask questions or provide comments on it, the presentation is uploaded to the User Group website right after the meeting.

Senertec recommended to include e-mobility in the field and lab tests as this is a hot topic now and also in the future. Senertec currently works on a project with the university of Schweinfurt-Würzburg and will provide some information and contact data to the OS4ES consortium that will be evaluated in how far e-mobility could be considered in the OS4ES field and lab test.

07.04.2016 (Bilateral phone call between IdE and FGH):

Test of the OS4ES components at IdE before official release of the OS4ES system

In this phone call the offer to IdE was renewed to test the OS4ES components at their company before the official release of the OS4ES system as it was already mentioned in the OS4ES UG Meeting in Frankfurt. IdE will check within their institution if they are going to accept this offer and what the implications would be.

*15.04.2016, 22.04.2016, 28.04.2016, 05.05.2016, 12.5.2016 and 18.05.2016 (Webinars)
Standardisation of the OS4ES data model*

Apart from the participation in standardization meetings of IEC 61850 TC57 WG17 there has been a series of bi-lateral web meetings with the leader of IEC 61850 TC57 WG17 TF90-15 (SIEMENS).

In these meetings with SIEMENS, IT4 and FGH described the OS4ES data model, discussed it and updated it according to the results of prior discussions. It is important to convince the TF90-15 leader of the OS4ES data model as he is the responsible for defining new necessary Logical Nodes for the integration of DER systems within electric power systems in a Technical Report, the results of which will go into Edition 2 of IEC 61850-7-420. If we can convince him of the OS4ES data model it will be easier to convince the other members of the task force and finally the standardization group working out edition 2 of IEC 61850-7-420.

*19.05.2016 (Webinar)
Exploitation of the OS4ES System*

T-System gives a short introduction in the roles of the OS4ES System and the concept of flexibility before presenting the Business Model Canvas.

Unfortunately only one member of the UG participated although five UG members indicated their availability before. Therefore the feedback received was very limited.

It has been recommended to take SchwarmDirigent (a product of Lichtblick) into account for the exploitation strategy to position OS4ES in contrast to the Lichtblick software which has a similar focus. However, a high fee needs to be paid for the use of SchwarmDirigent which might limit its application.

*08.07.2016 (Bilateral phone call between FGH and Phoenix Contact)
Integration of Phoenix Contact devices in OS4ES test environment*

Devices that could be provided by Phoenix Contact for the lab tests are the charging poles that are installed at their premises. However, it needs to be checked with the experts of Phoenix Contact if those can be made accessible without too much effort on the Phoenix Contact side.

*08.07.2016 (Bilateral phone call between FGH and Senertec)
Integration of Senertec's CHP(s) and possibly e-mobility devices in OS4ES test environment*

FGH reminds Senertec to provide the contact to the e-mobility project at the University of Schweinfurt-Würzburg in order to check if e-mobility could be included in the OS4ES lab tests. Senertec asks for an advertising brochure of the OS4ES project to attract users of Senertec CHPs to participate in the lab tests in Hamburg.

*18.07.2016 (Bilateral contact between HUAS and Senertec)
Integration of Senertec CHP(s) in OS4ES test environment*

Senertec needs some good arguments why their customers should use the OS4ES system in order to win them as participants for the OS4ES lab tests. HUAS tells that some advertising material is currently being prepared by T-Systems and will be at hand soon.

05.09.2016 (Webinar)

Overview of planned prototype versions and presentation of prototype v1

An overview on the prototype versions that will be developed in the OS4ES project is given and prototype version 1 is presented. The User Group members ask the following questions and receive the answers noted below:

Question 1: What is the software license of Open Source Software?

Answer: There has not been a decision on the license, yet, but will be decided in the next weeks.

Question 2: Will the prototypes be developed into products?

Answer: Main focus is to integrate the OS4ES components into a functional software. However, some partners might further develop the software into products or might assist members of the UG doing so.

Question 3: Which library was used for the IEC 61850?

Answer: An IEC 61850 stack according to the future standard IEC 61850-8-2 has been developed from scratch by Končar.

Question 4: Will searching and contracting of energy resources be automated?

Answer 1: It is definitely envisioned that it can be automated. The idea is that a DER request will come from a BRP or a DSO and that a request will automatically be directed to a search that goes to the registry. This is something that the aggregator would actually need to do. The aggregator software in this project has the purpose of showing the OS4ES system and not to make the actual software for the aggregator.

Answer 2: The idea behind OS4ES is that an aggregator can search for and contract energy services but it is not in the scope of the OS4ES project to deliver a module to providing the business intelligence on the aggregator side. So, such a module would be the one to decide which energy service to contract depending on the price that the resource providers are asking for the provision of their service(s) and also depending on the expected income that the aggregator would get from the BRP/TSO/DSO for the management of those services. To date we just have a dummy interface but the idea is that it can be automated once the aggregator wants to add business intelligence on top of the OS4ES software. In fact the implementation for the aggregator software is based on the USEF implementation and USEF envisages that this module is provided by the aggregator, so it is completely prepared for that coding.

Question 5: What about the current state of the IEC 61850 mapping to XMPP?

Answer: It is no standard, yet, but a CDV (Committee Draft for Vote) was intended to be circulated to the national committees for comments end of August 2016. Assumptions on some services that have not been available in the ACSI are fed back to the standardization task force so that they will be considered in the standard in future.

09.01.2017 (Bilateral contact between FGH, HUAS and BDEW)

Presentation of the OS4ES project with focus on the OS4ES registry

The OS4ES project as a whole and the registry as one of its core components have been presented to BDEW with the intention to attract BDEW to the OS4ES User Group and to either win BDEW as a project partner for a follow-up project or to get its support in recruiting consortium partners within its members companies. Hence, ideas for a follow-up EU research project have been presented and discussed with BDEW. The following questions arose:

Question 1: Where is the OS4ES registry located physically?

Answer: Currently it is located on the computer of a project partner but principally it can be located everywhere, e.g. at a DSO, a regulator as the BNetzA or an ICT or telecom provider.

Question 2: Is the registry comparable with ebay small adds?

Answer: In principle, yes.

BDEW commented that the content of the White Pages is similar to the content of the German “Marktstammdatenregister” and that therefore a comparison would be reasonable. BDEW will check with its members if they are interested to work on a follow-up EU research project and keep the FGH informed. In addition, BDEW suggests to make contact to the German research project “Proaktives Verteilnetz” led by Innogy that tackles the ascertainment of the yellow traffic phase and is also heading for a registry.

31.01.2017 (Bilateral contact between FGH and Kiwigrid)

Presentation of the OS4ES project and especially the OS4ES registry

The OS4ES project has been presented and questions to the project and its registry have been answered. Kiwigrid is interested in using the OS4ES registry in its Energy IoT platform and to implement it as part of a follow-up research project. FGH and Kiwigrid agree that this web meeting will be followed by series of future web meetings and physical meetings to work out a proposal for a follow-up project.

*02.02./21.02./14.03./30.03./12.05./01.06./11.08./15.08./24.08./29.08.2017
(FGH, HUAS and Kiwigrid)*

How can OS4ES be further developed and implemented in an existing and certified energy management software solution?

In a series of web meetings and a physical meeting at Kiwigrid in Dresden, brainstorming for a German research project in which the OS4ES registry will be further developed and implemented as a distributed registry in the energy management platform of Kiwigrid has been done and a proposal has been set up and submitted to the German Federal Ministry of Economics end of August 2017.

*15.02.2017 (Bilateral contact between FGH and Eurisco)
OS4ES in a nutshell*

On the IEC 61850 meeting of TC57 WG17 in Berlin, FGH provided some core OS4ES project information to EURISCO, a Danish research company, during a break. Subsequent to this meeting FGH sent more information on OS4ES by email.

*16.02.2017 (Bilateral contact between FGH and EDF)
OS4ES in a nutshell*

On the IEC 61850 meeting of TC57 WG17 in Berlin, FGH provided some core OS4ES project information to EDF, a French TSO, during a break. Subsequent to this meeting FGH sent more information on OS4ES by email and agreed on a phone call detailing the OS4ES communication stack.

*06.02.2017 (Bilateral contact between FGH and Mauell)
Joint effort between OS4ES and Green Access?*

Mrs Schröder presents the core of the OS4ES project and Mr Friedrichs provides information on the German research project Green Access (sponsored by BMWi).

In the Green Access project the set-up of an infrastructure for energy services has already been concluded. Hence, OS4ES cannot contribute here. However, Mr Friedrichs is positive on what concerns the use of OS4ES in the German SINTEG project ENERA on which he provides an overview of the Mauell activities. He will check in his next meetings with the ENERA consortium if the OS4ES registry and its data model could be useful.

*17.05.2017 (Bilateral contact between FGH and BNetzA)
Engagement of BNetzA in OS4ES*

FGH informed BNetzA on the OS4ES activities during a phone call. Currently BNetzA is occupied with setting up the German Marktstammdatenregister, a registry which step by step will implement the various German registries that are around. After the successful

launch of this Register which is envisaged for July, BNetzA will contact FGH for more information.

19.05.2017 (Webinar)

Field tests

A presentation on the field test in Hoog Dalem is given.

Eurisco gives the following side information: Eurisco starts a project with Dong Energy (TSO in Denmark) where the OS4ES platform may be suitable. Claus will give a short presentation on OS4ES to Dong Energy next Wednesday. Andrea asked Claus on the 22nd May if he would need further information. This request was answered with yes, so Andrea set up a slide set focussing on the OS4ES concept of energy services, the registry concept and the overall OS4ES architecture. The following questions are asked during and after the presentation:

Question 1: Who hosts the OS4ES registry – hosted by Stedin or in the project?

Answer: It's hosted in the project.

Question 2: How do you see the hosting in the future?

Answer: we expect a distributed registry in the future. Companies hosting the registry should be neutral with respect to the market. There might be a chance that DSOs will host the registries but this depends on future regulation. It is expected that the registry will be distributed in many companies and will be used by all companies.

Question 3: Do you see any problems or challenges that we should be aware about that you have faced with the DSO. Are they considering this as part of the Grid Code infrastructure?

Answer: Yes. Registries like the OS4ES registry can provide flexibility in a much higher quality way than if you just talked to one or two aggregators.

Question 4: If there is an emergency problem, then you would decouple the market. How would this system be in that case. Would it be part of the market and be decoupled in an emergency case?

Answer 1: Yes, if the flexibility is not provided or if there is some other problem the DSO takes control.

Answer 2: There are two main benefits of the registry:

- DERs can offer their energy services to the market without relying on the aggregator in whose network area they are located. This also implies that they can be booked for various energy services that they are able to provide (also at the same time) and that they can also offer partial services to various aggregators.
- Aggregators profit from be able to choose from a variety from DER systems offering their services. So if there is a flex need it is easier for an aggregator to settle this issue and resolve this issue instead of entering the emergency mode.

Question 5: Solar panels and batteries is too little for energy flows in the house. If we want to reach the complete energy flow in the house we need other resources like wind, EVs, heat pumps, etc. The problem Stedin had with the acceptance of the heat pumps at their customers is well understood as Senertec also had issues with their customers when installing micro-CHPs in their building which take over master control of the heating (burner). You have to convince the consumer that his comfort is guaranteed and that he can enter the field trial.

Answer: At Stedin there are other demonstration projects using heat pumps or EVs. They did not combine those, yet. In future the various resources of these projects will be combined. The larger the plants you have the more useful is a registry like the OS4ES registry for offering flexibility.

06.07.2017 (Webinar)

Integration of the OS4ES system in lab and field tests

Presentation of how the OS4ES system has been integrated in the lab- and field tests. The following questions are asked during and after the presentation:

Question 1: What is the detailing timing of OS4ES?

Answer: Currently it is 15 minutes, the PTU (program time unit) period.

Question 2: Have efforts for DER-integration been less time consuming with generic interface?

Answer 1: Subset of 61850-services (reporting, monitoring, control) was used.

Answer 2: Focus on Energy Services in OS4ES.

Question 3: Connecting DER to cloud database - does STEDIN use cloud services?

Answer: Stedin already has set-up for test of USEF framework.

Question 4: SQL-database is also used for transmitting PV-forecast. Did Stedin have any security issues?

Answer: Yes. At several levels there are security checks.

Question 5: How is the reliability/stability in the field test?

Answer: No data available, yet.

Question 6: Isn't security an issue?

Answer: Not in Stedin's VPN due to geographic distributed implementation.

Question 7: Resilience and stability after error(s): What measures to take?

Answer: Not yet discussed. All wired connections now. Mobile would be an alternative.

Question 8: Are additional boxes/hardware necessary for considering the market role?

Answer: OS4ES is centered on flexibility requests. USEF framework is key to non-conflicting solution.

Question 9: XMPP server connection via http/https/websocket?

Answer: Once selection is made: straight-forward.

Question 10: Would grid operators accept websocket?

Answer: XMPP is comparable regarding security to https.

Question 11: Where were the biggest challenges?

Answer: DER integration - getting to the right data models in IEC-61850. Legacy devices did require additional effort.

25.09.2017 (Webinar)

Exploiting OS4ES

Participants: Holger Krings, Hauke Beeck, Matthias Mietz, Gunter Grosch, Christian Hübner

This webinar is dedicated to the exploitation of OS4ES results and ideas for a follow-up project. The consortium partners start with providing an overview of the OS4ES exploitation activities and then give an outlook on open issues that could be tackled in a follow-up research project. As usual, the project slides are uploaded to the User Group website. Questions asked during and after the presentation as well as comments provided center mainly around the following issues:

Question 1: Central roles are missing, e.g. Aggregator role. Next exploitation step could be to test the OS4ES system within the User Group within a future research project.

Answer 1a: The field test in Hoog Dalem is mentioned where the shiftable load use case is currently tested. Parties interested to test OS4ES could start with the system used in the field test and evaluate how much adjustments are necessary to make it run. When the OS4ES system is up and running, it can be thought of other relevant use cases for which OS4ES could be used and be retrofitted.

Question 2: Which end devices have been addressed in the field test.

Answer 2: In Hoog Dalem only PV and batteries have been used for the OS4ES field test. Interesting would be to extend this tests to implement also other resources like wind turbines, CHP and heat pumps.

Question 3: How big was the scope of adjustment work until OS4ES was running in the field test.

Answer 3: Mostly, administrative adjustment work had to be done (e.g. how can batteries be controlled?).

Comment 1: missing the business case for using OS4ES in the power grid of his company.

Answer from another UG member: In today's networks there are various control mechanisms and platforms with which the power system can be balanced. It would therefore be interesting to check the cost of existing control systems with the cost involved in using an open-source platform like OS4ES.

Comment 2: Grid management often implies curtailment of decentralised energy resources. Because of the mostly conservative attitude of system operators on the one hand side and urgent issues in their daily business on the other hand side the implementation of OS4ES and its use in existing grids is currently only conceivable as parallel application which implies that no real control commands are issued. Such an approach would allow to evaluate how OS4ES performs in contrast to traditional systems and which technical and financial benefit can be derived. However, a direct implementation and operation of OS4ES is conceivable in mini-grids and micro-grids as they currently emerge in larger numbers. In such a new, spatially limited area (similar to the field test site in Hoog Dalem) the willingness to use new technologies like OS4ES is certainly higher. Therefore he recommends to address business models the future implementation of the OS4ES in mini- and micro-grids in which electricity is going to play a predominant role in the near future and states the interest of his company to participate in a project like this.

An OS4ES consortium partner mentions that according to the latest edition (09/2017) Thüga aims to set up a central platform for municipal companies for tackling the area of electromobility and Smart Cities in future. Such a platform would aggregate, enhance and refine data. So the consciousness for the need of such platforms like OS4ES is there. Mr Mietz agrees that the awareness of the need for such platforms is indeed there for most of the system operators but that often financial issues prevent the launch of these platforms within their companies. Hence, it is essential to provide business models that show which financial benefit can be received by the implementation of an energy service platform.

Comment 3: States the necessity to address the issues that could be tackled in a follow-up process and that have been presented before. Phoenix Contact would be interested to contribute to such a project. Blockchain technology could be used to provide evidence of a promised and contracted energy service behaviour.

Mr Krings offers to check if OS4ES could exemplary be used in one of the SINTEG projects. As Phoenix is participating in the SINTEG project ENERA he could check if there is a possibility to test the OS4ES platform during the project runtime.

Question 5: What happens with OS4ES after the project end?

Answer 5: We will submit a proposal for a follow-up research project (German and/or EU project). OS4ES, however, can be used by interested parties and be downloaded as an open source software. Either this software is further developed by the respective company without support of the OS4ES partners or the work is carried out as commissioned work where OS4ES partners provide consulting.

Comment 4: The interest of system operators in Virtual power plants has declined during the OS4ES project runtime so that it is difficult to find business models that . In their daily work Senertec observes that the current trend is the optimization of domestic current. While this is done as a first step, a second step exists in communities like manufacturers of PV plant or manufacturers of CHPs cropping up to provide their self-generated energy to consumers within their own community. Currently business models for energy services are still lacking.

Comment 5: Just market-driven approaches will not convince system operators. In addition legal requirements as they are given by regulation are necessary to trigger the implementation of OS4ES like systems. He also stresses the importance of cellular approaches as they are followed by VDE in a dedicated workshop in Nuremberg in January 2018 where a community will be build up to bring together the developments and activities in the area of cellular networks. Probably also OS4ES could be presented there (comment Schröder). What Mr Hübner deems essential is coupling the various sectors such as electric energy, traffic and heat to meet the requirements that e-mobility will put forward. It is deemed important to tackle the estimated increase in load of $1/5$ to $1/4$ for e-mobility in Germany with mini- and micro-grids communicating with each other – even if up to now business models are still lacking.

*29.09.2017 (Bilateral contact between FGH and Explicates)
Enhancement of the OS4ES TRL*

Based on the information given at the UG meeting on 25th September Explicates and FGH exchange their ideas on how the technology readiness level of the OS4ES software can be enhanced. It is agreed to carefully monitor existing and future calls for research activities in this area and if applicable set up a proposal.

*27.10.2017 (Bilateral contact between FGH and Explicates)
Use of the OS4ES in micro-grids and mini-grids*

Micro-grids and mini-grids are often established in rural areas in Australia and New Zealand where only few people live and where long-distance overhead lines would need to be built in order to provide just a few customers. Mr Mietz who worked for many years in New Zealand and still has business contacts with companies in this region will check with supply companies the use of the OS4ES system in such an environment.

*16.11.2017 (HUAS and FGH presentation at the BNetzA in Bonn, Germany)
Relevance of the OS4ES registry to the current BNetzA activities*

A meeting with the German BNetzA (Federal Network Agency) will take place on 16th November 2017 in Bonn to present the OS4ES registry and analyse its impact on the current BNetzA activities centered on the installation registers of BNetzA and SMARD, the new platform for the energy market that has just gone online this summer.

4 Assessment of the User Group

As laid out in the Description of Work [1] the intention of having an OS4ES User Group was

1. to disseminate the OS4ES project contents to a group of experts from the industry, research institutions, supply companies, manufacturers and telecommunication providers who in turn act as multipliers of the OS4ES project within their companies and to the outside;
2. to have an advisory body commenting the work and the achievements of the OS4ES consortium and provide important practical advice;
3. to stimulate discussion and exchange of knowledge among different user and developers groups, helping to extract expert knowledge to be used within the project.

The first objective, the dissemination of OS4ES project scope and results, has been fully reached:

The project results have been presented to the User Group in various web meetings, two physical meetings and bilateral conversations with members of the User Group. All presentations, deliverables and minutes of the User Group meetings are available for download on the User Group website so that also User Group members who missed a meeting are always kept updated. During the project runtime a lot of new UG members could be won.

In terms of standardisation many bi-lateral UG web meetings have been held with the leader of the WG17 TF90-15 who does work that is related to the OS4ES work on the data model. Finally, he could be convinced that the OS4ES data model is also a feasible approach for the TF90-15 report which will form part of the 2nd Edition of IEC 61850-7-420. Hence, the OS4ES data model has been presented at the WG17 meeting in Beijing, China, in June 2016. The TF 90-15 Report has initially been scheduled to be available as a first draft at the end of the year 2016 and it has been expected that IEC 61850 Logical Nodes of the OS4ES data model will be considered for it. Currently, work on this report is standing still for the time being and will be resumed at a later point of time.

The second aim has only been achieved partially:

The OS4ES consortium expected more feedback on deliverables and especially on the exploitation plan (see D9.3.1a [3] Annex A). As already stated in D9.2.1 [4] the reason for low input is mainly seen in a lack of time/resources of the UG members. In their daily business they can hardly afford the time to read the various and comprehensive OS4ES deliverables and provide detailed feedback on them. So the comments received are mainly based on the presentations given during web meetings, physical meetings and bilateral talks. It was really a pity that so many User Group members who confirmed their participation in the physical meeting in Frankfurt were absent due to sickness. Although all slides and documents presented on this meeting have been uploaded to the User Group section on the OS4ES web

site and the members have been notified of the provision of these documents and been asked to provide input no further feedback was obtained.

One drawback also has been that no devices from manufactureres like Senertec and Phoenix Contact could be integrated in the lab and field tests although both companies expressed their interest to provide DER equipment in the second term of OS4ES project. The reasons for this are:

- in the case of Senertec: the OS4ES brochure was distributed later than initially intended so that only little time remained to find customers willing to participate in the HUAS lab test. It has been indicated by Senertec that there is a general customer reluctance to provide their operating CHPs within a field test as they fear disadvantages in their CHP operation and a loss of comfort. So even if the OS4ES brochure had been available in time it would have been unlikely to be offered access to a customer CHP.
- in the case of Phoenix Contact: internal processes made it impossible to invest the time to provide DER equipment and the needed information for the lab- and field tests: new acquisitions have been made and new development decisions have been taken which required all resources within the company and did not leave much time for OS4ES lab and field test activities.

Our contact at IdE who was interested in setting up a demonstration environment with USEF and OS4ES left the company. When the OS4ES team contacted IdE in order to ask who would take up the work of the colleague who left we learned that IdE has financial problems and was closed.

Despite of these drawbacks, the following feedback and practical advice has been received:

- Especially Vattenfall sees very high chances for wide take up of the OS4ES platform as a platform with OS4ES features is currently still missing on the market. Contacts to Vattenfall will be kept also after the project runtime to check if OS4ES can be used within their grids – maybe also in the context of a follow-up project;
- The IEC 61850 TC57 WG17 standardisation body sees the benefit of modelling DER system services as logical nodes and will consider the OS4ES data model approach in the Technical Report of TF 90-15 and consequently in the second edition of IEC 61850-7-420 (Basic communication structure – Distributed energy resources logical nodes);
- UG members show a big interest in USEF and its integration within the OS4ES project;
- Eurisco, a Danish research institute, that joined the UG in the last phase of the project, will evaluate the use of the OS4ES system in their project with Dong Energy. When FGH came back to Eurisco on the project with Dong Energy, they answered that they had a project meeting at DONG Energy in the DREM project on 13.09.2017 but the project still lacks being fully up and running. So for the detailed dialog on the basic concept of the DREM 'Trade Permission System' (where the OS4ES was to be introduced) the partners involved in the requirement specification are long behind the planned time schedule. Hence, during the OS4ES project runtime, we will not

know if components of OS4ES will be used in the DREM project in future. However, there is a high change of the OS4ES system to be used.

- Mauell reported that the work package in the SINTEG project ENERA that deals with a registry solution and an energy service data model starts in October 2017. By then the OS4ES results will be addressed with the consortium. The OS4ES concept will especially be presented to EWE, a distribution system operator in Germany, and feedback will be provided.
- BNetzA showed its interest in the OS4ES approach and will decide after the OS4ES presentation on 16th November 2017 if the OS4ES registry approach can be used for their needs along with the new online platform for the energy market, SMARD.
- BDEW provided contacts of member companies interested in an EU-follow-up project. As the deadline for submission of an apt H2020 call was early this year and the consortium was not final, the idea to submit a proposal for a European research project has been discarded for the time being. We will check in autumn, if a suitable EU call is available. If so, we will go for that with the interested parties that announced their interest in the EU H2020 call.
- A proposal for a German research project has been set up and submitted. If accepted the OS4ES registry will be implemented into a commercial and BSI-certified software product.

The third objective has been largely reached:

The UG members coming from different businesses stimulated discussions in the various meetings on the following aspects:

- exploitation of the OS4ES system;
- lab and field tests;
- standardisation activities
- ideas for future projects

Besides, they provided their expert knowledge on a lot of project issues, e.g.:

- integration of CHP(s) and e-mobility charging poles for the lab and field tests;
- support in setting up and testing an OS4ES system;
- comments on the OS4ES data model
- SchwarmDirigent, an obviously competing product to OS4ES
- Used their contacts to promote the OS4ES project idea

Although not all objectives could be fully reached the received input from the User Group has been very valuable. It is good to have such an interested group of experts who invest their scarce time to contribute to this research project.

References

- [1] Grant Agreement Annex I – “Description of Work”
- [2] D9.2.1 User Group Feedback Report 1
- [3] D9.2.2 User Group Feedback Report 2
- [4] D9.3.2 Update of the Dissemination and Exploitation Plan
- [5] OS4ES Brochure