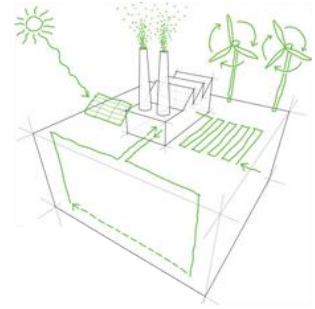


SmartC2Net Project Newsletter



SMARTC²NET

Smart Control of Energy Distribution Grids
over Heterogeneous Communication
Networks

Newsletter 2

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Welcome to the second edition of SmartC2Net biannual Newsletter.

With this edition we aim to keep you informed about the project progress and achievements.

PUBLICATIONS

The SmartC2Net consortium is active regarding the publications at the conferences and events. Within the 2014 project partners have published papers at several European events, very prestigious and relevant to the industry.

Papers and events are as follows:

- **CIRED Workshop 2014**; June 2014 (<http://www.cired2014-workshop.org/>)

"Smart Grid Architectures: from Use Cases to ICT Requirements"

by G. Dondossola, R. Terruggia, S. Bessler, J.Grønbæk, R. Løvenstein Olsen, F. Iov ,
C. Hägerling, D. Iacono and C. Wietfeld

"Security Risk Analysis and Evaluation of Integrating Customer Energy Management Systems
into Smart Distribution Grids"

by C. Hägerling, F. Kurtz, C. Wietfeld, D. Iacono, A. Daidone and F. Giandomenico



- **BIG4CIP 2014**; May 2014 (<http://www.big4cip.org>)

"A Complex Event Processing Approach for Crisis-Management Systems"

by M. L. Itria, A. Daidone, A. Ceccarelli



- **IEEE Energycon 2014**; May 2014 (<http://www.energycon2014.org>)

"Communication Architecture for Monitoring and Control of Power Distribution Grids
over Heterogeneous ICT Networks"

by C. Hägerling, F. Kurtz, R. Olsen and C. Wietfeld

"Utilizing Network QoS for Dependability of Adaptive Smart Grid Control"

by J. T. Madsen, T. I. F. Kristensen, R. Løvenstein Olsen, H.-P. Schwefel, L. C. Totu



- **EDCC 2014**; May 2014 (<http://conferences.ncl.ac.uk/edcc2014/>)



"On a Modeling Approach to Analyze Resilience of a Smart Grid Infrastructure"
S. Chiaradonna, F. Di Giandomenico, N. Murru

- **GWS (Global Wireless Summit) Workshop**; May 2014 (<http://gws2014.org/>)



"Smart Control of Energy Distribution Grids over Heterogeneous Communication Networks"
by R. Løvenstein Olsen, F. Iov, C. Hagerling, C. Wietfeld

- **2014 IFAC World Congress**, August 2014 (<http://www.ifac2014.org>)



"Aggregation and Control of Supermarket Refrigeration Systems in a Smart Grid"
by R. Pedersen, J. Schwensen, B. Biegel, J. Stoustrup, T. Green

Regarding future publications, activities are currently ongoing to prepare materials to be published at 2014 CIGRÉ Session in Paris – France, August 24-29 (<http://www.cigre.org/>); and the SmartGridComm 2014 to be held in Venice – Italy, November 3-6 (<http://sgc2014.ieee-smartgridcomm.org/>).

For more information, please visit the publications section at the project website (<http://smartc2net.eu/publications>).

UPCOMING EVENTS

CIGRÉ Session 2014

SmartC2Net will be present at the 2014 CIGRÉ Session that will take place in August, between 24 and 29, at the Palais des Congrès in Paris. Paper on Security of communications in voltage control for grids connecting DER: impact analysis and anomalous behaviours was accepted for publication.



The CIGRÉ is organized in biennial sessions' frame and is held in Paris, France. Every year it brings together about 3,200 international experts and other decision-makers from the electrical power industry; where over 400 papers, focused on the association's 16 fields of activities, are discussed.

IEEE Smart Grid Comm

The SmartC2Net is preparing also its participation at the 2014 edition of IEEE Smart Grid Comm, to be held in Venice – Italy, November 3-6. Project partners have submitted four papers for committee analyse. In this scope a C-DAX + SmartC2Net joint workshop will take place.



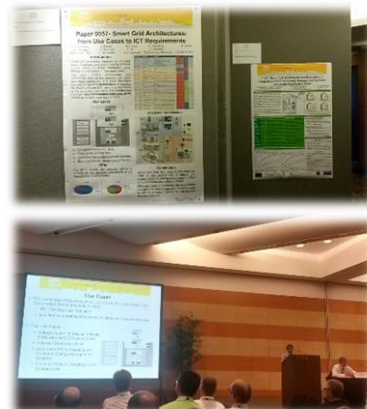
In this scope, a C-DAX + SmartC2Net joint workshop will take place about "Managing Heterogeneous and Secure Communication Networks for Smart Grids". This workshop aims at addressing the communication challenges of smart grid applications. The presentations will deal with how to develop a holistic communication strategy and manage multiple communication networks, i.e., a scalable information infrastructure supporting a broad range of smart grid applications and communication technologies, as well as managing multiple/heterogeneous communication networks. The developments in the SmartC2Net and C-DAX European projects will set the technical background for the roundtable discussion among the speakers and the invited panellists.

PAST EVENTS

CIREC Workshop 2014

SmartC2Net was present at the CIREC Workshop, held in Rome - Italy, between 11 and 12 of June. This year edition was entitled *Challenges of Implementing Active Distribution System Management*. SmartC2Net partners presented two papers, one dedicated to Smart Grid Architectures: from Use Cases to ICT Requirements, and other one to Security Risk Analysis and Evaluation of Integrating Customer Energy Management Systems into Smart Distribution Grids.

For more information please visit: <http://www.cired2014-workshop.org/>



SmartGridsWeek 2014

SmartC2Net was present with a poster at the Austrian yearly SmartGridsWeek 2014 event that took place between 19. And 23 of May in Graz, Austria.

The event included an ERA-NET matchmaking and open space day, an overview of the strategy process and roadmap for smart grids as part of the Technology Platform Smart Grids Austria, poster sessions and round table discussions.

To learn more please visit: <http://www.energiesystemederzukunft.at/results.html/id7475>



IEEE Energycon 2014

SmartC2Net was present at the IEEE Energycon with presentation of two papers. The event took place in Dubrovnik – Croatia, between 13 and 16 of May.

IEEE EnergyCon is a forum dedicated to experts carrying out research focused to energy and power systems. The 2014 edition was the third time IEEE EnergyCon organized.

To learn more please visit: <http://www.energycon2014.org/>



GWS Workshop

In the scope of the activity within the SmartC2Net project Aalborg University, in cooperation with other projects, organized GWS workshop that took place in May 11-14 in Aalborg. The paper presented at this workshop focused around the external generation site and the network architecture from WP3. The organization of the event included contributions from 6 different national (Danish) and EU projects (Intrepid, Edge, Smart&Cool, Sunseed, and Advantage).

To learn more please visit: <http://gws2014.org/>



BIG4CIP 2014

SmartC2Net was present at the BIG4CIP, the international workshop on real-time big data analytics for critical infrastructure protection, it took place in Newcastle upon Tyne – UK, on 13 of May. On this event a paper on Complex Event Processing Approach for Crisis-Management Systems was presented.

To learn more please visit: <http://www.big4cip.org/>



EDCC 2014

SmartC2Net also was present at the EDCC, the European dependable computing conference, it took place in Newcastle upon Tyne – UK, between 13 and 16 of May. The paper presented during this conference was dedicated to the subject "On a modelling approach to analyse resilience of a smart grid infrastructure".

To learn more please visit: <http://conferences.ncl.ac.uk/edcc2014/>



EXPERT ADVISORY BOARD MEETING

In order to disseminate the SmartC2Net project, several actions were leveraged together with the Expert Advisory Board (EAB) members. The EAB is composed by high-level Experts with a very thorough knowledge of distribution grid systems. They also transmit the perspective from their respective companies, introducing feedback from partners outside the project consortium and assuring the adequacy to several European countries operational and regulatory frameworks. The role of EAB is to give an input to requirements and use-case description, to support of dissemination and exploitation, to provide feedback on project approaches and results, to participate in the review processes for selected technical deliverables.

EAB Members:

- Enexis, Netherlands;
C. M. Portela, F. Bodewes;
- Thy-Mors Energi, Denmark;
P. Melgaard;
- EDP Distribuição SA, Portugal;
A. Blanquet;
- EVN Netz, Austria;
M. Urban.



The first EAB meeting took a place in March 2013 in Italy. It was organized in a frame of a workshop where key aspect of the project were presented and discussed, namely four use-cases, technical architecture and its requirements, lab prototypes and data for project results testing. These topics were commented by the EAB and recommendations were raised that drew guidelines for project partners to improve and strengthen the project outcomes.

Being aware of the crucial importance of the frequent contributions from the EAB and a constant interaction, a set of individual meetings took place during last May and June: in Portugal with EDP, in Denmark with Thy/Mors Energi, in Austria with EVN, and in Italy with Enexis.

The meeting with EDP Distribuição was held in Porto, with the participation of a team of 5 senior-staff EDP members from both planning & operational level. The profile of participants included automation and grid control (HV, MV and LV), telecommunications, DG control and planning, protections and Smart Grids. EDP's interest in grid control functionalities and the project architecture was known and the presentation of the presentation took that into consideration.

During the meeting, the SmartC2Net objectives and overall approach was presented, as well as the system scope, use cases, current state of developments, main achievements and the critical questions faced by the project that are related to the DSO vision.

A debate followed where details on specific implementations were discussed. With the wide experience from EDP, the consortium can proceed with developments with the assurance that their potential is aligned with the interest and future roadmap of European DSOs.

The EAB Meeting with the Austrian DSO EVN took place at the EVN headquarter near Vienna. The Consortium was represented by 2 departments of AAU and by FTW. The purpose of the meeting was to update the EAB representative with the progress achieved in the project, and also to get the industry view on a number of questions we have prepared in advance.

The main issues EVN is interested in, are the MV grid control and EV charging. As a DSO, the overvoltage in the LV grid caused by many PV installation is currently dealt with curtailment e.g. down to 60% all the inverters. A more "intelligent", differentiate control action should be investigated. Summarizing, EVN is quite interested to learn about the SmartC2Net results and achievements, intelligent control strategies and best use of existing telecommunication technologies.

The meeting with Thy/Mors Energi started with a presentation of the overall project, followed by a detailed discussion on the external generation case. In particular the interest of the capability of the test bed to emulate electrical grids and communication was discussed. After end discussion, the representative was given a tour in the laboratory to see the test bed, where discussion continued.

The EAB meeting with Enexis took place in Netherlands, it was attended by three members of Enexis and was led by RSE and TUDO. During this meeting was presented an overview of smart grid developments at Enexis, and an overview of SmartC2Net project. Critical questions faced by SmartC2Net related to DSO vision were discussed, followed by a debate.

The insights of DSOs as potential users of the outcomes of the project are a major input for the implementations by all the partners. The second general EAB meeting is scheduled for the end of this year, to be hosted in Denmark at Aalborg University.

USE CASES

To validate the effectiveness of project results, four representative use-cases are assessed, they demonstrate the active operation of Distributed Energy Resources connected to medium and low voltage distribution grids. The assessment methodology uses a combination of model-based analysis and experimental measurements in lab prototypes.

The use cases are the following:

- *Automated Meter Reading (AMR) and Customer Energy Management Systems (CEMS)*

This use case describes two basic functionalities for enabling future distribution grids for load balancing and integration of decentralized and distributed (renewable) energy resources.

- *Electrical Vehicle Charging in Low Voltage Grids*

This use case describes the charging of electrical vehicles in low voltage grids considering both public as well as private charging.

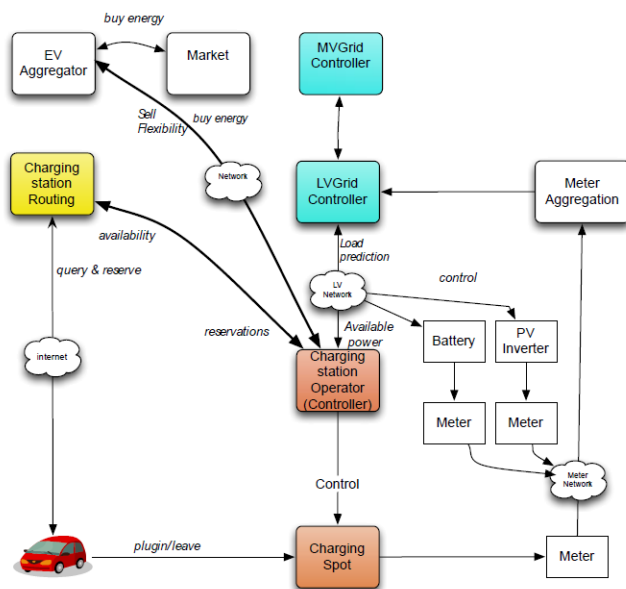
- *External Generation Site*

The objective of this use case is to demonstrate the feasibility of controlling flexible, distributed loads and renewable energy resources in low voltage grids over an imperfect communication network.

- *Voltage Control in Medium Voltage Grids*

The primary aim of this use case is to evaluate the communication security of voltage control for medium voltage grids connecting Distributed Energy Resources (DERs).

To learn more please visit: <http://smarc2net.eu/use-cases-1>



TESTBED SUMMARY

The work on the three test beds in SmartC2Net has progressed and the specific architecture of each of the test bed has been specified and materialized. These activities assure the correct implementation of the Use Cases which enable the project to pursue the proposed objectives.

The test beds, working synergetically, enable the project to emulate an electrical grid supported by a communication infrastructure which can represent several technologies and under different conditions. Each test bed will be used to 1) gain insight into security solutions on MV grid control via the MV grid control case, 2) investigate network and communication technology impact on control in realistic grid environment and realistic communication technology and 3) validate and evaluate the developed adaptive ICT platform and control framework to overcome the challenges in using third party networks for smart grids.

