



European Research Infrastructure supporting Smart Grid Systems Technology Development, Validation and Roll Out

Work Package 6

NA2 - Dissemination, Communication and International Collaboration

Deliverable D6.4

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Abbreviations

<i>CIM</i>	Common Information Model
<i>DER</i>	Distributed Energy Resources
<i>DG</i>	Distributed Generation
<i>DMS</i>	Distribution Management System
<i>DRTS</i>	Digital Real Time Simulator
<i>DSO</i>	Distribution System Operator
<i>EERA</i>	European Energy Research Alliance
<i>EU</i>	European Union
<i>FMI</i>	Functional Mock-up Interface
<i>HIL</i>	Hardware-in-the-Loop
<i>H2020</i>	Horizon 2020
<i>ICT</i>	Information and Communication Technology
<i>IEC</i>	International Electrotechnical Commission
<i>IRP</i>	Integrated Research Programme
<i>JaNDER</i>	Joint Test Facility for Smart Energy Networks with Distributed Energy Resources
<i>JP</i>	Joint Programme
<i>JRA</i>	Joint Research Activities
<i>LV</i>	Low Voltage
<i>MV</i>	Medium Voltage
<i>NA</i>	Networking Activities
<i>NCP</i>	National Contact Point
<i>R&D</i>	Research and Development
<i>RES</i>	Renewable Energy Sources
<i>RI</i>	Research Infrastructure
<i>ROS</i>	Rest-of-the-System
<i>SG</i>	Smart Grids
<i>SGAM</i>	Smart Grids Architecture Model
<i>TA</i>	Transnational Access
<i>TSO</i>	Transmission System Operator
<i>TU</i>	Technical University
<i>UC</i>	Use Case
<i>WoC</i>	Web-of-Cells
<i>WP</i>	Work Package

Executive Summary

This report outlines the collaboration activities, undertaken by the ERIGrid consortium, with international and national R&D projects, initiatives, networks, and platforms in the field of smart grids. These have been planned and performed during the third year of the ERIGrid project. Cooperation with 14 EU-funded (FP7, H2020, ERA-Net SG+) projects, 10 national projects, 5 networks, 2 platforms, and one initiative, all dealing with different aspects of smart grids, has been established since the project start. The main collaboration activities in this period have covered several topics in the scope of testing and validation methods, needs and requirements of the research infrastructures, real-time simulation and Hardware-in-the-Loop (HIL) testing, co-simulation, specification of scenarios/use cases/test cases, power system operation and protection, TSO/DSO collaboration, ICT/cyber-security and metrology. This collaboration and information exchange, realised through email exchange, webinars, joint events (e.g., workshops) and joint papers, was planned and described within the ERIGrid NA2 work package “Dissemination, Communication and International Collaboration”.

1 Introduction

1.1 International and National Collaboration as an Objective of ERIGrid Project

The integration of RES into the power system has increased over the past years. This has introduced further complexity into the electric power system. The increased availability of advanced automation and communication technology, along with novel intelligent solutions for system operation has transformed the traditional power system into a cyber-physical energy system, which is called a smart grid. The research activities so far have mainly focused on validating certain aspects of the smart grid. Until now, a holistic and integrated approach for analysing and evaluating such complex system has not yet been developed. The ERIGrid project aims to support the technology development and roll out of smart grid approaches, solutions and concepts in Europe by addressing the aspect of system validation for smart grids and developing common methods, concepts and procedures by integrating eighteen European research centres and institutions with outstanding research infrastructures [1].

In order to address the gaps within smart grid evaluation approaches, the current testing and evaluation methods that are being developed and used for relevant research activities should be identified and analysed. In addition, it is necessary that the holistic approach for system evaluation, which has been developed by ERIGrid project, is validated for different applications in relevant ongoing research activities in the scope of smart grids. In this regard, one of the objectives of the ERIGrid project is to create synergies with such R&D activities within the framework of the Networking Activities (NA) in the project.

1.2 Purpose and Scope of the Document

The purpose of this document is to summarise the progress of the collaboration activities that were planned and carried out within the ERIGrid NA2 work package “Dissemination, Communication and International Collaboration”, during the second year of the project. These knowledge exchange activities are realised through regular contact in form of webinars, newsletters, emails exchange, joint papers, and joint physical meetings and workshops.

In addition to collaboration activities, a short description and an overview of each international/national project, initiative, network, or platform is provided. Additionally, the contact persons leading these collaboration activities are indicated.

The information provided in this document was gathered through an input template circulated to all ERIGrid partners.

1.3 Structure of the Document

This document is organised as follows: Section 2 provides information about the performed, ongoing and planned collaboration activities with relevant smart grid project consortia. In addition, short descriptions of these projects are provided. Section 0 describes collaboration activities with international initiatives, networks, and platforms dealing with relevant activities for ERIGrid. Finally, a conclusion of the report is provided in Section 4.

2 Collaboration and Information Exchange with relevant European and National Projects

2.1 European Projects

The following table provides a brief overview of European projects that have been cooperating with ERIGrid during the third year of the project or have the potential of performing collaboration activities with the project in the near future.

Table 1: List of European projects

ID No.	Name	Funding Framework	Website	ERIGrid Partners Involved	ERIGrid Contact Persons	Project Contact Persons
01	ELECTRA IRP	FP7	http://www.electrairp.eu/	Yes	Thomas Strasser (AIT) Kari Mäki (VTT) Evangelos Rikos (CRES) Ron Brandl (IEE) Emilio Rodríguez (TECNALIA) Ata Khavari, Maria Sosnina (DERlab)	Luciano Martini (RSE) Maria Nuschke (IEE) Thomas Strasser (AIT) Emilio Rodríguez (TECNALIA) Graeme Burt (UST)
02	INTERPLAN	H2020	http://interplan-project.eu/	yes	Ata Khavari, Maria Sosnina (DERlab)	Giorgio Graditi (ENEA) Helfried Brunner (AIT)
03	SmartNet	H2020	http://smartnet-project.eu/	Yes	Thomas Strasser (AIT) Carlo Sandroni, Marco Rossi (RSE) Julia Merino (TECNALIA)	Gianluigi Migliavacca, Marco Rossi (RSE) Carlos Madina (TECNALIA)
04	SmarterEMC2	H2020	http://www.smarteremc2.eu/	Yes	Panos Kotsampopoulos (ICCS-NTUA)	Aris Dimeas (ICCS-NTUA)
05	NOBEL GRID	H2020	http://nobelgrid.eu/	Yes	Panos Kotsampopoulos (ICCS-NTUA)	Aris Dimeas (ICCS-NTUA)
06	CloudGrid	H2020	http://www.eranet-cloudgrid.eu/	No	Merkebu Zenebe Dergefa (SIN)	Elisabetta Tedeschi (NTNU)
07	Sci4All	H2020	http://sci4all.eu/	No	Thomas Strasser (AIT)	Munir Merdan (PRIA)
08	OpenUP	H2020	http://openup-h2020.eu/	Yes	Thomas Strasser (AIT)	Vignoli Michela (AIT)
09	RICH	H2020	http://www.rich2020.eu/	No	Thomas Strasser (AIT)	Manfred Halver (FFG)
10	United-Grid	H2020	https://united-grid.eu/	Yes	Quoc Tuan Tran (CEA)	Anh Tuan Le (Chalmers)
11	M2M-GRID	SG+, H2020	http://m2m-grid.eu	Yes	Quoc Tuan Tran (CEA)	Phuong Nguyen (Eindhoven University of Technology)
12	FLEXMETER	H2020	http://flexmeter.polito.it	Yes	Yvon Besanger (Grenoble INP)	Enrico Macii (Politecnico di Torino)
13	uGRIP	ERA-Net SG+	http://www.ugrip.eu/	Yes	Cornelius Steinbrink (OFFIS)	---
14	LarGo!	ERA-Net SG+	http://www.largo-project.eu/	Yes	Cornelius Steinbrink (OFFIS)	Filip Pröbstl Andrén (AIT)

2.1.1 ELECTRA IRP: European Liaison on Electricity Committed Towards long-term Research Activity - Integrated Research Programme

Funding Framework: FP7

Coordinator: RSE (Italy) - Luciano Martini (luciano.martini@rse-web.it)

Website: <http://www.electrairp.eu>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT), Kari Mäki (VTT), Evangelos Rikos (CRES), Ron Brandl (IEE), Emilio Rodríguez (TECNALIA), Ata Khavari (DERlab) and Maria Sosnina (DERlab)

Contact persons on behalf of the ELECTRA Consortium: Luciano Martini (RSE), Maria Nuschke (IEE), Thomas Strasser (AIT), Emilio Rodríguez (TECNALIA), Graeme Burt (UST)

Project duration: 12.2013 - 02.2018

Project description:

The wholesale deployment of RES connected to the network at all voltage levels will require radically new approaches for real time control that can accommodate the coordinated operation of millions of devices of various technologies at many different scales and voltage levels dispersed across the EU grid. ELECTRA IRP addresses this challenge and aims to establish and validate proofs of concept that utilise flexibility from across traditional boundaries in a holistic fashion. The ELECTRA IRP consortium is working towards developing and testing a new control architecture for the power system, based on concurrent decentralised controls of portions of the grid, named cells. The so-called “Web-of-Cells” (WoC) architecture aims to improve the management of the distributed energy resources and use of their flexibility to provide for a dynamic power balance that is closer to its equilibrium value than a conventional central control scheme [2].

Collaboration activities:

Several ERIGrid partners were also involved in the FP7 ELECTRA IRP project. This facilitated the collaboration activities and the mutually beneficial exchange of information between these two EU-funded projects. The following collaboration activities have been performed:

- The ERIGrid holistic validation approach has been successfully applied in the course of the proof-of-concept validation of the ELECTRA’s WoC. Lessons learned about the approach have been communicated back to the ERIGrid partners.
- The ERIGrid integrated Research Infrastructure (RI) approach has been presented in the final, public event of ELECTRA IRP.
- Information exchange regarding the needs and requirements of research infrastructures in order to perform different types of experiments.
- The RI capabilities and the methodologies for systems testing elaborated by the ERIGrid consortium as well as the developed holistic testing methodology constituted an input for experiments within ELECTRA IRP. For the proof-of-concept validation of the ELECTRA’s Web-of-Cell (WoC) the ERIGrid holistic validation approach has been successfully applied. Lessons learned about the approach has been communicated back to the ERIGrid partners.
- The ELECTRA IRP consortium had the possibility to access ERIGrid testing facilities for implementation and evaluation of the developed control strategies within the ERIGrid Transnational Access (TA). Similarly, the researcher exchange programme offered by ELECTRA IRP was open to the ERIGrid partners.
- The Database of DER and Smart Grid Research Infrastructure, which was developed with ELECTRA IRP support, is extensively used by the users of the ERIGrid TA.

- ERIGrid representatives participated in the final public event of ELECTRA IRP held on 21st-22nd February 2018 in Milan, Italy. During the event, which gathered over 80 participants, key experts of the ELECTRA consortium presented the main outcomes of the project and discussed with relevant stakeholders of the European smart grids community the next steps needed in view of the deployment of the project results. In particular, during Round Table “*Grid main challenges and how to bring the WoC concept to maturity*”, the ERIGrid integrated RI approach was illustrated highlighting as benefits:
 - Improvement and integration of design and validation tools
 - Development of system level validation procedures and benchmark criteria
 - Improvement of research infrastructures supporting system level validation
 - Developing protocols for education, training of network operators and standardisation of innovative components

2.1.2 INTERPLAN: INTEgrated opeRation PLANning tool towards the pan-European network

Funding Framework: H2020

Coordinator: ENEA (Italy) – Giorgio Graditi (giorgio.graditi@enea.it)

Website: <http://interplan-project.eu/>

Contact persons on behalf of the ERIGrid Consortium: Ata Khavari (DERlab), Maria Sosnina (DERlab)

Contact persons on behalf of the INTERPLAN Consortium: Giorgio Graditi (ENEA), Helfried Brunner (AIT)

Project duration: 11.2017 - 10.2020

Project description:

INTERPLAN is a project that aims to provide an INTEgrated opeRation PLANning tool towards the pan-European network, to support the EU in reaching the expected low-carbon targets, while maintaining network security. INTERPLAN will provide a methodology for a proper representation of a “clustered” model of the pan-European network, with the aim to generate grid equivalents as a growing library able to cover all relevant system connectivity possibilities occurring in the real grid, by addressing operational issues at all network levels (transmission, distribution and TSOs-DSOs interfaces).

Collaboration activities:

INTERPLAN project gathered information on ERIGrid scenario descriptions as well as ERIGrid focal UC collection. The INTERPLAN consortium analysed and used this information for defining INTERPLAN UCs and future EU grid scenarios.

2.1.3 SmartNet: Smart TSO-DSO interaction schemes, market architectures and ICT Solutions for the integration of ancillary services from demand side management and distributed generation

Funding Framework: H2020

Coordinator: RSE (Italy) - Gianluigi Migliavacca (Gianluigi.Migliavacca@rse-web.it)

Website: <http://smartnet-project.eu>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT), Carlo Sandroni, Marco Rossi (RSE), Julia Merino (TECNALIA)

Contact persons on behalf of the SmartNet Consortium: Gianluigi Migliavacca (RSE), Marco Rossi (RSE), Carlos Madina (TECNALIA)

Project duration: 01.2016 - 12.2018

Project description:

SmartNet aims to compare different architectures for optimised interaction between TSOs and DSOs in managing the purchase of ancillary services (reserve and balancing, voltage regulation and congestion management) from subjects located in the distribution segment [3].

Collaboration activities:

For the lab-based testing of the SmartNet TSO/DSO coordination schemes in AIT's SmartEST laboratory, the ERIGrid holistic validation approach has been successfully applied. Lessons learned will be communicated to the ERIGrid consortium.

2.1.4 SmarterEMC2: Smarter Grid: Empowering SG Market ACTors through Information and Communication Technologies

Funding Framework: H2020

Coordinator: Intracom SA Telecom Solutions (Greece) – labil@intracom-telecom.com

Website: <http://www.smarteremc2.eu/>

Contact persons on behalf of the ERIGrid Consortium: Panos Kotsampopoulos (ICCS-NTUA)

Contact persons on behalf of the SmarterEMC2 Consortium: Aris Dimeas (ICCS-NTUA)

Project duration: 01.2015 – 12.2017

Project description:

SmarterEMC2 implements ICT tools that support the integration of consumers through demand response services and the integration of DG/RES through virtual power plants. These tools take into account the SGAM as well as the future structure of the distribution network as described by the relevant EU bodies and organisations. The project explores whether the existing telecommunication infrastructure is sufficient to support the emerging business models and smart grid services on a mass scale. In addition, the project supports standardisation activities by proposing adaptation to data models of market-oriented and field-level standards [4].

Collaboration activities:

There was knowledge exchange on the current state of the art activities in the field of co-simulation of power systems and ICT through physical meetings. The ERIGrid project gained useful information and experience especially on the two mentioned topics.

2.1.5 NOBEL GRID: New Cost Efficient Business Models for Flexible Smart Grids

Funding Framework: H2020

Coordinator: ETRA I+D (Spain) - Lola Alacreu Garcia (lalacreu.etra-id@grupoetra.com)

Website: <http://nobelgrid.eu/>

Contact persons on behalf of the ERIGrid Consortium: Panos Kotsampopoulos (ICCS-NTUA)

Contact persons on behalf of the NOBEL GRID Consortium: Aris Dimeas (ICCS-NTUA)

Project duration: 01.2015 - 06.2018

Project description:

NOBEL GRID will offer innovative solutions for all the actors of the smart grid in order to create more secure and stable smart grids as well as cleaner and affordable energy. In addition, to facilitate an efficient implementation of these solutions, the project will work on the analysis of new business models as well as improvements in legislation and regulation in the field of smart grids [5].

Collaboration activities:

There has been an exchange of information through physical meetings on the topics of power/control HIL and advanced component/system testing.

2.1.6 CloudGrid: Transnational Cloud for Interconnection of Demonstration Facilities for Smart Grid Lab Research and Development

Funding Framework: H2020

Coordinator: STRI AB (Sweden) - Emil Hillberg (emil.hillberg@stri.se)

Website: <http://www.eranet-cloudgrid.eu/>

Contact persons on behalf of the ERIGrid Consortium: Merkebu Zenebe Degefa (SINTEF)

Contact persons on behalf of the CloudGrid Consortium: Elisabetta Tedeschi (NTNU)

Project duration: 03.2016 - 03.2019

Project description:

The goal of the CloudGrid project is to provide recommendations and strategies to meet the challenges of the future power system, to facilitate a larger amount of intermittent renewable generation together with less nuclear production while providing a secure and reliable electrical power supply [6].

Collaboration activities:

A transnational access project user group of two members working on CloudGrid has successfully conducted from 28th January 2018 to 10th February 2018. The user group of the user project 'Real-time Price-based Energy Management Strategies of Commercial building (ROCOF)' came from the Institute of Physical Energetics (IPE), Latvia, which is consortium member of the CloudGrid project. In the ROCOF project the test specification templates developed in ERIGrid are used to clarify the experiment plans. The user group has further plans stated in their final report as: 'The project out-

comes will be primarily presented at local events of CloudGrid project and the gained experience will be used as added value for CloudGrid WP5 – Ancillary Services and Energy Management.'

2.1.7 Sci4All: Science is for All of us

Funding Framework: H2020

Coordinator: Practical Robotics Institute Austria (PRIA) - Dr. Munir Merdan (info@sci4all.eu)

Website: <http://sci4all.eu>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT)

Contact persons on behalf of the Sci4All Consortium: Dr. Munir Merdan (PRIA)

Project description:

The main goal of Sci4all is to bring the general public and especially young people closer to the exciting world of research and to show that science is fun and accessible for everyone. Scientists from most of highly significant research institutions in Vienna participate in the event and present their recent research results in order to generate enthusiasm among young people for science and research. A focus is laid on the fields of science, technology, engineering and mathematics and the exiting topics cover informatics, mobility, energy, construction, biology, chemistry, mathematics, and automation [7].

Collaboration activities:

ERIGrid organised a stand with two live demos (co-simulation of a voltage control approach and virtual lab access to ICCS-NTUA) at the European Researcher's Night on 28th September 2018 in Vienna (represented by H2020 Sci4all project).

2.1.8 OpenUP: OPENing UP new methods, indicators and tools for peer review, impact measurement and dissemination of research results

Funding Framework: H2020

Coordinator: Public Policy and Management Institute - Vilius Stanciaskas (vilius@ppmi.lt)

Website: <http://openup-h2020.eu/>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT)

Contact persons on behalf of the OpenUP Consortium: Vignoli Michela (AIT)

Project duration: 06.2016 - 11.2018

Project description:

Open Access and Open Scholarship have revolutionised the way scholarly artefacts are evaluated and published, while the introduction of new technologies and media in scientific workflows has changed the "how and to whom" audience that science is communicated to, and how stakeholders interact with the scientific community. OpenUP addresses key aspects and challenges of the currently transforming science landscape and aspires to come up with a cohesive framework for the review-disseminate-assess phases of the research life cycle that is fit to support and promote Open Science [8].

Collaboration activities:

The ERIGrid project implemented some advice from OpenUp related to the transfer of research life cycle to the web. For example, a Zenodo community [9] for ERIGrid has been set up in order to publish in the future project results open access to the research community.

2.1.9 RICH: Research Infrastructures Consortium for Horizon 2020

Funding Framework: H2020

Coordinator: Agenzia Per La Promozione Della Ricerca Europea - Monique Bossi (bossi@apre.it)

Website: <http://www.rich2020.eu/>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT)

Contact persons on behalf of the RICH Consortium: Manfred Halver (FFG)

Project duration: 12.2014 - 11.2018

Project description:

RICH 2020, the European Network of NCPs for Research Infrastructures in Horizon 2020, performs valuable services in guiding and supporting national applicants in preparing proposals for Horizon 2020 funding. We expect that through an enhanced transnational cooperation and networking between NCPs for research infrastructures, a higher quality of their consulting services and thus of proposals and projects can be achieved. Therefore, the specific objective of RICH is to facilitate transnational cooperation between NCPs for research infrastructures with a view towards identifying and sharing good practices and raising the general standard of support to programme applicants, taking into account the diversity of actors [10].

Collaboration activities:

As in the last years ERIGrid coordinator AIT had several discussions with RICH partner FFG (i.e., Austrian H2020 NCP) about experiences and lessons learned from RI projects. The RICH project is also supporting ERIGrid in the dissemination of TA calls.

2.1.10 United-Grid: SOLUTIONS FOR INTELLIGENT DISTRIBUTION GRIDS

Funding Framework: H2020

Coordinator: Tuan Le (tuan.le@chalmers.se)

Website: <https://united-grid.eu/>

Contact persons on behalf of the ERIGrid Consortium: Quoc Tuan Tran (CEA)

Contact persons on behalf of the project: Anh Tuan Le (Chalmers)

Project duration: 11.2017– 04.2021

Project description:

UNITED-GRID aims to secure and optimise operation of the future intelligent distribution networks. The grids unprecedented complexity is caused by new distributed market actors along with emerging technologies such as renewable generation, energy storage, and demand resources.

The project will provide integrated cyber-physical solutions and exploit the opportunities provided by the new actors and technologies.

The core deliverable is the UNITED-GRID tool-box that could be “plugged in” to the existing Distribution Management System (DMS) via a cross-platform for advanced energy management, grid-level control and protection. This cross-platform allows interoperability from inverter-based DER up to the distribution grid at the low and medium voltage levels, thus going beyond the state-of-the-art to optimise operation of the grid with real-time control solutions in a high level of automation and cyber-physical security.

The project has genuine ambitions to create impacts and to enhance the position of European member states in the development of smart grids [11].

Collaboration activities:

Several of the members of CEA team are involved in both United-Grid and ERIGrid. ERIGrid provides perspectives for implementation and demonstration of United-Grid testcase.

2.1.11 M2M-GRID: From micro to Mega-GRID

Funding Framework: ERA-Net SG+, H2020

Coordinator: Magnus Brodin (magnus.brolin@ri.se)

Website: <http://m2m-grid.eu>

Contact persons on behalf of the ERIGrid Consortium: Quoc Tuan Tran (CEA)

Contact persons on behalf of the project: Phuong Nguyen (Eindhoven University of Technology)

Project description:

The project “From micro to Mega-GRID” (m2M-GRID) will develop solutions to overcome these challenges within the following themes:

- Enhancement of the distribution grid planning process
- Development of control functions for effective coordination with distribution grids
- Development of a tool-box to exploit the potential flexibility of microgrids.

The results will be validated in a range of test environments, and three dedicated demonstration sites – one in France and two in Sweden – will facilitate validation and replicability analyses based on real conditions [12].

Collaboration activities:

Several of the members of CEA and Grenoble INP team are involved in both United-Grid and ERIGrid. ERIGrid provides perspectives for implementation and demonstration of M2M-GRID testcases.

2.1.12 FLEXMETER: Flexible Smart Metering for multiple Energy vectors with active prosumers

Funding Framework: H2020

Coordinator: Enrico Macii (Politecnico di Torino)

Website: <http://flexmeter.polito.it>

Contact persons on behalf of the ERIGrid Consortium: Yvon Besanger (Grenoble INP)

Contact persons on behalf of the project: Enrico Macii (Politecnico di Torino)

Project duration: 01.2015-12.2017

Project description:

In the FLEXMETER project, a flexible, multi-utility, multi-service metering architecture will be designed and deployed in two demonstrators. Simple off-the-shelf meters will be placed at the users for electric, thermal and gas metering; they will communicate with a building concentrator, where the “smartness” of the metering system will reside. A central cloud system will collect data from the building concentrators and from MV/LV substation meters. Data collection, fusion and mining algorithms will be adopted. The proposed architecture will allow for innovative services for the prosumers (e.g. analysis of the energy consumption), for the DSOs (e.g. fault detection, network balancing and storage integration) and for the retail market. Also demand side management devices could be plugged into the system.

In the FLEXMETER project two pilot applications in two different countries (Italy and Sweden), on real systems, with the involvement of the local DSOs and volunteer prosumers will be demonstrated [13].

Collaboration activities:

Members of the Grenoble INP team are involved both in FLEXMETER and ERIGrid. Some of the test-cases in FLEXMETER are involved with remote hardware-in-the-loop and can provide good inputs for JRA3 activities in ERIGrid.

2.1.13 uGRIP: microGRID Positioning

Funding Framework: ERA-Net SG+

Coordinator: Faculty of Electrical Engineering and Computing University of Zagreb – FER UNIZG(Croatia)

Website: <http://www.ugrip.eu/>

Contact persons on behalf of the ERIGrid Consortium: Cornelius Steinbrink (OFFIS)

Project duration: 04.2016 - 03.2019

Project description:

The growing share of intermittent and partly predictable RES requires a more flexible operation of the power system. Flexibility is a key to maximise the utilisation of RES, while minimising the negative impact of their associated variability and uncertainty. An effective way of increasing system flexibility is the integration of price-responsive microgrids. This project aims to develop a full-scale microgrid that consists of distributed generators, both renewable and controllable, storage units and flexible loads. A real-life microgrid may perform arbitrage, provide flexibility thus increasing the utilisation of RES, take part in corrective actions, provide voltage support, and defer investments in power lines and (distributed) generation. A structure of the local, distribution-level market will be defined and demonstrated within the project. The complex interactions between the microgrid, distribution network, transmission network, wholesale electricity market and local distribution level market will be investigated, and a viable operation mechanism will be proposed [14].

Collaboration activities:

Members of the OFFIS team are involved in both uGRIP and ERIGrid. ERIGrid co-simulation technologies developed in the context of JRA2 are to be employed and demonstrated in uGRIP.

2.1.14 LarGo!: Large-Scale Smart Grid Application Roll-Out

Funding Framework: ERA-Net SG+, H2020

Coordinator: AIT Austrian Institute of Technology GmbH

Website: <http://www.largo-project.eu/>

Contact persons on behalf of the ERIGrid Consortium: Cornelius Steinbrink (OFFIS)

Contact persons on behalf of the project: Filip Prörtl Andrén (AIT)

Project description:

LarGo! is a cooperative transnational research project focusing on the large-scale roll-out of smart grid applications.

LarGo! enables the mass roll-out of smart grid applications for grid and energy management by defining a seamless, safe and secure application deployment process for the grid and customer domain. The critical challenge of stable and resilient system operation is addressed in a setting where communication systems are used for both smart grid run-time operation, including monitoring and control, and ICT maintenance, such as application deployment and remote configuration. To assess the large-scale effects of application deployment, system maintenance and operations, a utility-scale, but highly accurate, emulation of the required ICT systems will be developed. Potential suboptimal operational states are analysed in-depth, and appropriate measures for resilient system operation will be designed and tested. In local testbeds at the DSO (Austria) and customer (Germany) level, selected smart grid applications are deployed to demonstrate and verify the LarGo! deployment process [15].

Collaboration activities:

Research synergies between LarGo! and ERIGrid-JRA2 can be found. Discussions about the analysed topics are taking place among OFFIS researchers involved in either of the two projects. Based in this, concepts that have been analysed in ERIGrid are likely to be pushed forward and demonstrated in LarGo!.

2.2 National Projects

The following table provides a brief overview of national projects, which have been in cooperation with ERIGrid during the third year of the project or have the potential of being involved in collaboration activities with the project in the near future.

Table 2: List of national projects

ID No.	Name	Country	Website	ERIGrid Partners Involved	ERIGrid Contact Persons	Project Contact Persons
1	HEILA	Finland	N/A	Yes	Anna Kulmala (VTT)	Pertti Järventausta (TUT)
2	MESSE	Austria	https://www.salzburgresearch.at/en/projekt/messe/	Yes	Filip Prössl Andrén, Thomas Strasser (AIT)	Filip Prössl Andrén, Thomas Strasser (AIT)
3	RPC2	Germany	TBA	Yes	Juan Montoya (Fraunhofer IEE)	Christian Töbermann (Fraunhofer IEE)
4	NR2.0: Grid Control 2.0	Germany	TBA	Yes	Ron Brandl (Fraunhofer IEE)	Ron Brandl (Fraunhofer IEE)
5	PPInterop 1&2	France	http://www.energiesdufutur.eu/	Yes	Van Hoa Nguyen (CEA)	Yvon Besanger (Grenoble INP)
6	WEST	France	https://sourceforge.net/p/westsandbox/code/	Yes	Van Hoa Nguyen (CEA)	Benoit Delinchant (Grenoble INP)
7	CINELDI	Norway	https://www.sintef.no/prosjekter/cineldi/	Yes	Merkebu Zenebe Degefa (SIN)	Andrei Morch (SINTEF)
8	CybResLab	Germany	https://www.offis.de/en/offis/project/cybreslab.html	Yes	Davood Babazadeh (OFFIS)	-
9	ENSURE	Germany	https://www.kopernikus-projekte.de/projekte/neue-netzstrukturen	Yes	Davood Babazadeh (OFFIS)	-
10	SMART-DSYS	Italy	http://www.rse-web.it/progetti.page	Yes	Carlo Tornelli (RSE)	Carlo Tornelli (RSE)

2.2.1 HEILA: Integrated business platform for distributed energy resources

Country: Finland

Coordinator: Pertti Järventausta (Tampere University of Technology)

Contact persons on behalf of the ERIGrid Consortium: Anna Kulmala, Kari Mäki (VTT)

Contact persons on behalf of the HEILA Consortium: Pertti Järventausta (Tampere University of Technology), Ville Tikka (Lappeenranta University of Technology), Anna Kulmala (VTT)

Project description:

HEILA project (Integrated business platform of DER) aims to create a business platform for the development, testing, piloting and finally also commercialisation of new smart energy system functionalities. The objective is to link diverse industrial and academic pilots into a united energy system by means of an ICT infrastructure to host a wide range of possible smart grid applications that are intended to integrate DERs into novel business models of energy systems. This goal will be accomplished in the following steps:

- Definition of innovative UCs promoting integration of DERs into active grid management and flexibility markets
- Implementation of the required functionality for the corresponding UCs
- Design and deployment of an information exchange architecture for the platform that would enable visibility and controllability of DERs among simulated business actors
- Demonstration of innovative smart grid solutions in the platform environment

The HEILA information exchange architecture is decentralised and has been developed based on UC methodology and SGAM framework. At the first stage, the information exchange interfaces have been implemented at laboratories of research partners in the project (VTT Technical Research Centre of Finland, Tampere University of Technology and Lappeenranta University of Technology) and also real-life pilot sites will be included as a part of the platform in further work. Demonstrations associated with the flexibility management of geographically distributed microgrids are being implemented.

Collaboration activities:

Both ERIGrid and HEILA projects have tasks in which remote connections between laboratories are implemented and, hence, there are significant synergies between the projects. ERIGrid results have been disseminated to HEILA partners and utilised as input for the work in HEILA project. The same laboratory is used in test cases of both ERIGrid and HEILA and same development efforts of the lab benefit both projects.

2.2.2 MESSE: Model-based Engineering and Validation Support for Cyber-Physical Energy Systems

Country: Austria

Coordinator: Salzburg Research - Christof Brandauer (christof.brandauer@salzburgresearch.at)

Website: <https://www.salzburgresearch.at/en/projekt/messe/>

Contact persons on behalf of the ERIGrid Consortium: Filip Prössl Andrén, Thomas Strasser (AIT)

Contact persons on behalf of the MESSE Consortium: Filip Prössl Andrén, Thomas Strasser (AIT)

Project duration: 10.2017 - 11.2019

Project description:

The massive deployment of distributed generators from renewable sources in recent years has led to a fundamental paradigm shift in terms of planning and operation of the electric power system. MESSE develops a concept for a model-based engineering and validation support system, covering the overall engineering process for smart grid applications – from UC design to validation and deployment [16].

Collaboration activities:

MESSE and ERIGrid have exchanged ideas about the holistic validation procedure as well as the support for the generation of testing and validation plans/configurations. A further exchange of ideas and approaches is planned in the following project year.

2.2.3 RPC2: Reactive Power Controls

Country: Germany

Coordinator: Christian Töbermann (Fraunhofer IEE)

Website: TBA

Contact persons on behalf of the ERIGrid Consortium: Juan Montoya (Fraunhofer IEE)

Contact persons on behalf of the project: Christian Töbermann (Fraunhofer IEE)

Project duration: 04.2018-03.2020

Project description:

The objective of the project is the development and testing of possible measures to balance reactive power of electrical distribution networks in all voltage levels. For this, an active and situation-dependent use of reactive power supply potential from decentralised generation plants and compensation plants, as well as transformer in distribution networks should be carried out in order to influence the reactive power balance in a targeted manner. On the one hand, innovative decentralised processes in the LV level will be developed, as well as innovative centralised voltage level independent control management will be developed and investigated.

Collaboration activities:

In a joined work of several ERIGrid TA projects, Ormazabal and Fraunhofer IEE are developing a useful demonstration site to investigate LV reactive power balancing. Therefore, a centralised controller for LV networks is developed to manage PV-inverters, battery systems, tap change transformers and metering system to coordinate the network according to its limitations.

2.2.4 NR2.0: Grid Control 2.0

Country: Germany

Coordinator: Philipp Strauss (Fraunhofer IEE)

Website: TBA

Contact persons on behalf of the ERIGrid Consortium: Ron Brandl (Fraunhofer IEE)

Contact persons on behalf of the project: Philipp Strauss (Fraunhofer IEE)

Project duration: 12.2017 – 11.2021

Project description:

The project NR2.0 deals with the controls of the electrical networks to ensure stable system behaviour. NR2.0 focuses on the pre-treatment of a converging implementation in the German part of the Central European Network, by dealing with following points:

- Description of requirements of the Central European Network
- Contribution to the proof of system stability of electrical networks
- Robust control procedures for grid-forming converters

Collaboration activities:

In NR2.0 the results of NA5 and JRA1 are used to define descriptions templates of UCs and test case scenarios. Especially the outcome of the holistic test cases descriptions is used to explain the research proposition of the NR2.0 project. Furthermore, according to the defined UCs in JRA1 of the ERIGrid project, NR2.0 is using those UCs to readapt them to align the research topics of NR2.0.

2.2.5 PPInterop 1&2: PREDIS – PRISMES Interoperability

Country: France

Coordinator: Van Hoa Nguyen (CEA) – vanhoa.nguyen@cea.fr

Website: <http://www.energiesdufutur.eu/>

Contact persons on behalf of the ERIGrid Consortium: Van Hoa Nguyen (CEA)

Contact persons on behalf of the project: Yvon Besanger (Grenoble INP)

Project duration:

PPInterop 1: 01.01.2015 – 31.03.2016

PPInterop 2: 01.01.2017 – 31.12.2018

Project description:

The PPInterop 1&2 projects aim to create an interoperability framework between two technological platforms: PREDIS (Grenoble INP) and PRISMES (CEA). On one hand, it proposes and demonstrates novel interoperability architecture based on hybrid cloud and ontologies; on the other hand, the projects are a showcase of technical development of interfaces and new experimental tools for smart grid [17].

Collaboration activities:

PPInterop 1&2 are bilateral collaboration projects between Grenoble-INP and CEA, financed by CARNOT institute. Several of the members of CEA and Grenoble INP team are involved in both PPInterop and ERIGrid. PPInterop provides the physical platform for implementation of ERIGrid test case in JRA3.2.

2.2.6 WEST: Web Energy Services and Tools

Country: France

Coordinator: Federic Wurtz (Grenoble-INP) (federic.wurtz@g2elab.grenoble-inp.fr)

Website: <https://sourceforge.net/p/westsandbox/code/>

Contact persons on behalf of the ERIGrid Consortium: Van Hoa Nguyen (CEA)

Contact persons on behalf of the project: Benoit Delinchant (Grenoble INP)

Project description:

WEST project aims to facilitate the utilization and implementation of the Functional Mock-up Interface standard (FMI) by creating a framework that delivers these models via webservice [18].

Collaboration activities:

As FMI is also a focus of ERIGrid in JRA2, a lot of exchange took place between the two teams during the course of developing the task.

2.2.7 CINELDI: Centre for intelligent electricity distribution- to empower the future Smart Grid**Funding Framework: The Research Council of Norway**

Coordinator: SINTEF Energi AS - Gerd Kjølle (Gerd.kjolle@sintef.no)

Website: <https://www.sintef.no/prosjekter/cineldi/>

Contact persons on behalf of the ERIGrid Consortium: Merkebu Zenebe Degefa (SINTEF)

Contact persons on behalf of the CINELDI Consortium: Andrei Morch (SINTEF)

Project duration: 2016 - 2024

Project description:

The scheme of the Centres for Environment-friendly Energy Research (FME) seeks to develop expertise and promote innovation through focus on long-term research in selected areas of environment-friendly energy. The CINELDI centre will ensure that we are building the smart energy system of the future. CINELDI will work towards digitalising and modernising the electricity distribution grid for higher efficiency, flexibility and robustness. The research activity is carried out in close cooperation between prominent research communities and users. The centres will operate for eight years (2016 – 2024) [19].

Collaboration activities:

On CINELDI workshop on 5th June 2018, an introductory presentation was delivered from ERIGrid on co-simulation. The purpose of the presentation was to create awareness on co-simulation methods for holistic power system testing and also to introduce the activities of JRA2 of the ERIGrid project. The presentation is initial activity where a joint workshop or webinar is planned to continue between ERIGrid and CINELDI projects. The plan is to avail methods, models and templates developed in ERIGrid project to activities in CINELDI project with a feedback loop back to activities in ERIGrid.

2.2.8 CybResLab: Smart Grid Cyber-Resilience Laboratory

Country: Germany

Coordinator: Davood Babazadeh (OFFIS)

Website: <https://www.offis.de/en/offis/project/cybreslab.html>

Contact persons on behalf of the ERIGrid Consortium: Davood Babazadeh (OFFIS)

Project description:

In this project, a test environment is established to test the concepts for system integration and management under uncertain communication and information conditions in digitalised energy supply systems. This unique laboratory design combines techniques for hazard identification and anal-

ysis of smart grid architectures with methods for detecting anomalies in information processes at different levels (OT/IT) of today's electric power systems. The purpose of the laboratory environment is to develop preventative security and resilience measures that prevent such incidents, but also to develop and test reactive measures for the rapid detection and immediate handling of physical- and cyber- induced incidents in electric power systems.

The goal of cyber-resilient energy systems is the tolerance for temporary loss of confidentiality and integrity in data communications and other events in the primary or cyber system. One possibility, for example, is to temporarily accept limited efficiency, while still allowing the critical supply task to continue uninterrupted [20].

Collaboration activities:

Members of the OFFIS team are involved in both CybResLab and ERIGrid. ERIGrid concepts developed in the context of JRA2 (co-simulation) as well as NA5 (test planning) are planned to be employed and practically demonstrated in the CybResLab project.

2.2.9 ENSURE: New Energy Grid Structures for the Energy Transition

Country: Germany

Coordinator: KIT Karlsruhe Institute of Technology

Website: <https://www.kopernikus-projekte.de/projekte/neue-netzstrukturen>

Contact persons on behalf of the ERIGrid Consortium: Davood Babazadeh (OFFIS)

Project description:

The Kopernikus project ENSURE - New energy grid structures for the Energy Transition – is divided into three phases. The first phase is dedicated to fundamental research (2016-2019), the second phase is dedicated to prototypical implementations (2019-2022) and the results form the basis for a multimodal grid demonstrator which will be built in the third phase (2022-2025).

The goal of ENSURE is to provide new structures for the energy system. In a holistic approach the energy system will be optimised considering relevant energy sources and corresponding infrastructures [21].

Collaboration activities:

Members of the OFFIS team are involved in both ENSURE and ERIGrid. ERIGrid concepts developed in the context of JRA2 (co-simulation) are planned to be employed and practically demonstrated in the ENSURE project.

2.2.10 SMART-DSYS: Development and Management of Distribution Networks

Country: Italy

Coordinator: Carlo Tornelli (RSE)

Website: <http://www.rse-web.it/progetti.page>

Contact persons on behalf of the ERIGrid Consortium: Carlo Tornelli (RSE)

Project description:

The project is part of the Italian Electric System Research, funded by Ministry of Economic Development. The overall objective of SMART-DSYS is the study, development and testing of electrical distribution system technologies to allow high penetration degree of distributed generation from renewable sources and high levels of quality of service. The project takes into account management, control, automation and protection of the distribution system, new architectural models and services with the application of power electronics devices, energy storage systems, information and communication technologies and tools to support investment decisions.

The theoretical research activities were complemented with experimental work in laboratories and in RSE test facilities, which include a real low voltage distribution network able to control different types of generators, loads and storage devices connected to it [22].

Collaboration activities:

Laboratories and RSE distributed generation test facility, involved in the ERIGrid activities, are updated with new technologies and control solutions thanks to the SMART-DSYS project.

Moreover, many results and experiences on ICT interoperability standards developed in SMART-DSYS project was applied to develop in WP10-JRA4 the ICT platform JaNDER (Joint Test Facility for Smart Energy Networks with Distributed Energy Resources). More in detail, some IEC 61850 and CIM tools (e.g. CIMDraw) and ICT architectural solutions based on microservices were used and enhanced for ERIGrid purposes.

The collaboration activities between SMART-DSYS and ERIGrid offered opportunities, on one side, to take advantage from already available results and, on the other side, for improvement and widening the applicability of existing solutions.

3 Collaboration and Information Exchange with Networks, Platforms, and Initiatives

The following table provides a brief overview of initiatives, networks and platforms, which have been in cooperation with ERIGrid during the third year of the project or have the potential of performing collaboration activities with the project in the near future.

Table 3: List of networks, platforms, and initiatives collaborating with ERIGrid

ID No.	Name	Type	Website	ERIGrid Partners Involved	ERIGrid contact persons	Network/ Initiative/ Platform Contact Persons
1	EERA JP Smart Grids	Network (EU)	http://www.eera-set.eu/eera-joint-programmes-jps/smart-grids/	Yes	Thomas Strasser (AIT) Evangelos Rikos (CRES) Ron Brandl (IEE)	Luciano Martini (RSE) Maria Nuschke (IEE) Ángel Díaz (TECNALIA)
2	IEEE WG P2004	Network (international)	https://standards.ieee.org/develop/project/2004.html	Yes	Ron Brandl (IEE) Georg Lauss, Thomas Strasser (AIT) Erik de Jong (DNV GL)	Michael Steurer (FSU) Georg Lauss (AIT) Blake Lundstrom (NREL)
3	IEA ISGAN/SIRFN	Network (international)	http://www.sirfn.net/	Yes	Roland Bründlinger (AIT) Kari Mäki (VTT) Erik de Jong (DNV GL) Carlo Sandroni (RSE) Ron Brandl (IEE)	Philipp Strauss (DERlab) Diana Strauss-Mincu (DERlab) Maurizio Verga (RSE)
4	MEAN4SG	Network (EU)	http://www.mean4sq-itn.eu/	Yes	Ian Gilbert (Ormazabal) Graeme Burt (UST)	Eduardo Cembrano (Foundation CIRCE) Andrew Roscoe (UST)
5	DERlab network	Network (EU)	http://der-lab.net	Yes	Ata Khavari, Maria Sosnina (DERlab) Thomas Strasser (AIT)	Diana Strauss-Mincu (DERlab), Roland Bründlinger (AIT) Graeme Burt (UST)
6	FUTURED	Platform (Spain)	http://www.futured.es/	Yes	Iñaki Orue (Ormazabal) Emilio Rodríguez (TECNALIA)	Enrique Morgades (FUTURED) Ángel Díaz (TECNALIA)
7	openKONSEQUENZ	Platform (Germany)	http://www.openkonsequenz.de/	Yes	Davood Babazadeh (OFFIS)	-
8	Institut Smart Grid	Collaboration/Institution	TBA	Yes	Quoc Tuan Tran (CEA), Yvon Besanger (Grenoble-INP)	Quoc Tuan Tran (CEA), Nourredine Hadjissad (Grenoble-INP)

3.1 Networks

3.1.1 EERA JP SG (Joint Programme on Smart Grids)

Type: Network (EU)

Coordinators: RSE (Italy) and ENEA (Italy) - secretariat@eera-set.eu

Website: <http://www.eera-set.eu/eera-joint-programmes-jps/smart-grids/>

Contact persons on behalf of the ERIGrid Consortium: Thomas Strasser (AIT), Evangelos Rikos (CRES) and Ron Brandl (IEE)

Contact persons on behalf of the network: Luciano Martini (RSE), Maria Nuschke (IEE), Ángel Díaz (TECNALIA)

Focus area:

The JP on smart grids is coordinated by RSE and ENEA from Italy by means of an extended cross-disciplinary cooperation involving many R&D participants with different and complementary expertise and facilities. It aims to address one of the most critical areas directly related to the effective acceleration of smart grid development and deployment in a medium- to long-term research perspective [23].

Collaboration activities:

During the last year, a strong collaboration with EERA JP SG has been maintained. Several collaboration activities have been done as following:

- ERIGrid success stories about the holistic validation approach have been shared with the EERA JP SG community.
- As in previous years, the ERIGrid consortium is regularly informed about EERA/EU-related activities, publications, etc.
- As previously done, the ERIGrid project and the TA opportunities are advertised to a substantial number of European and international stakeholders via the EERA JP SG network.

3.1.2 IEEE P2004: Recommended Practice for HIL Simulation Based Testing of Electric Power Apparatus and Controls

Type: Network (international IEEE Working Group)

Coordinator: Michael Steurer (Florida State University)

Website: TBA

Contact persons on behalf of the ERIGrid Consortium: Ron Brandl (Fraunhofer IEE)

Contact persons on behalf of the network: Blake Lundstrom (NREL)

Focus area:

In the development phase WG P2004 will bring together all the stakeholders interested in HIL such as HIL equipment manufacturers, users, consultants, testing facilities, regulatory agencies, research facilities, and members of academia. P2004 will serve as a platform to further promote HIL testing and educate the broader audience about this method.

The WG P2004 is addressing following objectives:

- Establish practices for ROS model development
- Discuss HIL specific documentation, verification and validation
- Provide guidance on requirements for power amplifiers, DRTS, and HIL interface algorithms for classes of HIL testing needs

Collaboration activities:

During the last years a closed collaboration between the P2004 working group and partners from ERIGrid was built. The WG serves as a possibility to not only publish work especially of JRA2, 3 and 4 on specific conferences supported by the WG P2004, but also to publish and rise discussion to a community of experts in the field of hardware-in-the-loop testing. Both, ERIGrid and WG P2004, are supporting and benefit from each other in the topic to standardise advanced testing methods.

3.1.3 ISGAN-SIRFN: International Smart Grid Action Network/Smart Grid International Research Facility Network

Type: Network (international IEA network)

Coordinator: Russel Conkling (DOE, USA)

Website: <http://www.sirfn.net/>

Contact persons on behalf of the ERIGrid Consortium: Ron Brandl (Fraunhofer IEE)

Contact persons on behalf of the network: Ron Brandl (DERlab)

Focus area:

SIRFN will give participating countries the ability to evaluate pre-competitive technologies and systems approaches in a wide range of smart grid implementation UCs and geographies using common testing procedures. Research test-bed facilities will be selected based on their complementary capabilities to conduct specialised, controlled laboratory evaluations of integrated smart grid technologies including cyber security, plug-in hybrid integration, load management, automated metering infrastructure, protection, network sensing, energy management, renewable energy integration and similar applications. In this way, research within each individual member country will derive the value of the unique capabilities and environments of the other partner nations. Data from these tests will be made available to all SIRFN participants to accelerate the development of smart grid technologies and systems, and enabling policies [24].

Collaboration activities:

Close collaboration between SIRFN and ERIGrid benefits SIRFN task 'Power System Testing' where the topic of holistic test cases description is experiencing further development. Therefore, the outcome of ERIGrid will be taken as a foundation to form a generic testing process of innovative Smart Grid solution. In addition, the work of JRA 3 and 4 is directly relevant to the SIRFN task 'Advanced Lab-based Testing Methods', which will use ERIGrid results as a base for further development.

3.1.4 MEAN4SG: Metrology Excellence Academic Network for Smart Grids

Type: Network (EU H2020)

Coordinator: Julio J. Melero (Foundation CIRCE) - melero@circe.es

Website: <http://www.mean4sg-itn.eu>

Contact persons on behalf of the ERIGrid Consortium: Ian Gilbert (Ormazabal)

Contact persons on behalf of the network: Breogan Sanchez (Foundation CIRCE)

Focus area:

The MEAN4SG network aims to educate 11 young researchers in the smart grids metrology field by constructing a sustainable training network gathering the whole innovation value chain.

The overall MEAN4SG research programme tackles the main research challenges in the smart grids metrology field identified by the European R&D community:

- Power quality analysis
- Smart grids modelling and management
- Advanced monitoring through phasor measurement unit's applications
- Smart cable diagnosis [25]

Collaboration activities:

The MEAN4SG project held a Summer School at Ormazabal in June 2018 giving the opportunity for the host institutions and their respective researchers to visit not only Ormazabal but also TECNALIA, further promoting ERIGrid activities. Both projects benefitted from a wider dissemination of their progress through the workshop. The scope of ERIGrid was to increase visibility as far as metrology aspects for Smart Grids testing are concerned.

3.1.5 DERlab Network:

Type: Network (international)

Website: <http://der-lab.net>

Coordinator: DERlab e.V., Diana Strauss-Mincu (diana.strauss-mincu@der-lab.net)

Contact persons on behalf of the ERIGrid Consortium: Ata Khavari (DERlab), Maria Sosnina (DERlab), Thomas Strasser (AIT)

Contact persons on behalf of the network: Diana Strauss-Mincu (DERlab), Roland Bründlinger (AIT), Graeme Burt (UST)

Focus area:

DERlab is an association of leading laboratories and research institutes in the field of distributed energy resources (DER) equipment and systems. The association develops joint requirements and quality criteria for the connection and operation of DER and strongly supports the consistent development of DER technologies. DERlab offers testing and consulting services for distributed generation (DG) to support the transition towards more decentralised power systems [26].

Collaboration activities:

The DERlab association is, on one hand, a member of the ERIGrid consortium and is actively participating in NA and JRA activities. On the other hand, DERlab provides a network of more than 30 research centres as potential ERIGrid stakeholders. DERlab actively promotes ERIGrid activities through its member network and events, as well as DERlab's communication channels (website, newsletters, LinkedIn). Furthermore, the Database of DER and Smart Grid Research Infrastructures [27], created and maintained by DERlab, has been updated with the announcements on ERIGrid TA and linked to the ERIGrid TA webpage.

3.2 Platforms

3.2.1 FUTURED

Type: Platform (Spain)

Technical secretary: Enrique Morgades (FUTURED) (secretaria@futured.es)

Website: <http://www.futured.es>

Contact persons on behalf of the ERIGrid Consortium: Iñaki Orue (Ormazabal)

Contact persons on behalf of the platform: Enrique Morgades (FUTURED), Ángel Díaz (TECNALIA)

Focus area:

The Spanish Technological Platform of Electrical Grids FUTURED was created for the purpose of integrating all the agents involved in the electricity sector to define and promote strategies at the national level, in order to allow the consolidation of a much more advanced network capable of responding to the challenges of the future [28].

Collaboration activities:

There will be dissemination of ERIGrid activities about the RI technological capabilities within the platform. Closer interaction will take place between ERIGrid and the Research Infrastructures Working Group titled FUTURED, which is in charge of the promotion of the facilities in Spain. In addition to the holistic testing and validation procedures developed in ERIGrid and being potentially used by FUTURED associates, the TA appears to be a promising mechanism for collaboration.

3.2.2 openKONSEQUENZ

Type: Platform (Germany)

Website: <http://www.openkonsequenz.de>

Contact persons on behalf of the ERIGrid Consortium: Davood Babazadeh (OFFIS)

Focus area:

OpenKONSEQUENZ is a national consortium to develop a market-recognised platform for open, modular and secure software, which supports the essential tasks of operating energy and water networks on the basis of coordinated processes. The consortium consists of driver members (mostly TSOs, DSOs), the service providers (who support the developer side) and guest members (who are potential future members) [29].

Collaboration activities:

In OFFIS, in the context of ERIGrid, the SCADA Lab is being integrated and is available for external partners. Part of this SCADA incorporates three industrial solutions that would be tested with the open source modules developed in the context of openKONSEQUENZ and the result would be available and of interest to DSOs and TSOs and ERIGrid partners. Besides the ERIGrid's guidelines, the co-simulation platform, and TA opportunities are being used in openKONSEQUENZ activities of OFFIS and promoted during openKONSEQUENZ consortium meetings by OFFIS as a guest member.

3.3 Initiatives

3.3.1 Institut Smart Grid

Type: Collaboration/Institution

Coordinator: TBA

Website: TBA

Contact persons on behalf of the ERIGrid Consortium: Quoc Tuan Tran (CEA), Yvon Besanger (Grenoble-INP)

Contact persons on behalf of the project: Quoc Tuan Tran (CEA), Nourredine Hadijsad (Grenoble-INP)

Focus area:

The Institut Smart Grid is an initiative of the Auvergne Rhone-Alpes region to create a pole of activities for researches and developments of innovative solutions for smart grid. The initiative regroups various major energy actors in France: RTE (TSO), ENEDIS (DSO), CEA, etc. and is supported by the Lyon and Grenoble Metropoles.

Collaboration activities:

CEA and Grenoble INP team are in the consortium of Institut Smart Grid. The perspectives of development of the institute may bring potential application for ERIGrid experimental solutions.

4 Conclusions and Outlook

This report summarises the ERIGrid partners’ collaborations that have been planned and performed with other international/national R&D projects, initiatives, networks, and platforms on the topics relevant to ERIGrid domains during the third year of the project. These networking activities were planned in the ERIGrid NA2 “Dissemination, Communication and International Collaboration” work package. Information exchange and joint activities were carried out through email communication, webinars, joint events, and joint papers.

During the past year, the ERIGrid partners have established and/or maintained lines of communication and cooperation with participants of 14 EU funded (FP7, H2020, ERA-Net SG+) projects, 10 national projects, 5 networks, 2 platforms, and one initiative, all of which are dealing with different aspects of smart grids. The topics of these activities are marked green for each project/initiative/network/platform in Table 4. The table shows that the performed collaboration activities cover all the main aspects of ERIGrid project. The activities have been focused on: testing and validation methods, needs and requirements of the research infrastructures, real-time simulation and HIL testing, scenarios/use cases/test cases, power system operation, TSO/DSO collaboration and ICT/cyber-security.

Table 4: Topics of collaboration activities with relevant projects, networks, initiatives and networks

<i>Topic of the collaboration activities</i>	Testing and validation methods	Needs and requirements of research infrastructures	Co-simulation	Real-time simulation and Hardware-in-the-Loop (HIL) testing	Multi-lab testing	Scenarios / UCs / Test cases	Power system operation	Power system protection	TSO/DSO collaboration	ICT / Cyber-security	Metrology	Dissemination, Communication, and Exploitation
<i>Project / Initiative / Network / Platform</i>												
ELECTRA IRP												
INTERPLAN												
SmartNet												
SmarterEMC2												
NOBEL GRID												
CloudGrid												
Sci4All												
OpenUP												
RICH												
United Grid												
M2M-GRID												
FLEXMETER												
uGRIP												
LarGo!												
HEILA												
MESSE												
RPC2												
NR2.0												
PPInterpop 1&2												
WEST												

<i>Topic of the collaboration activities</i>	Testing and validation methods	Needs and requirements of research infrastructures	Co-simulation	Real-time simulation and Hardware-in-the-Loop (HIL) testing	Multi-lab testing	Scenarios / UCs / Test cases	Power system operation	Power system protection	TSO/DSO collaboration	ICT / Cyber-security	Metrology	Dissemination, Communication, and Exploitation
<i>Project / Initiative / Network / Platform</i>												
CINELDI	■		■			■						
CybResLab	■	■				■				■		
ENSURE			■							■		
SMART-DSYS										■		
EERA JP Smart Grids			■	■		■	■		■	■		■
IEEE WG P2004	■	■		■								
IEA ISGAN /SIRFN	■	■		■								■
MEAN4SG		■					■				■	
DERlab network	■	■			■	■						■
FUTURED	■						■		■			
openKONSEQUENZ						■	■		■	■		
Institut Smart Grid	■		■	■						■		

The mentioned activities have already delivered or are expected to provide mutual benefits and inputs for both sides of the collaborations. The most important points are highlighted as follows:

- ERIGrid partners acquired information about the research infrastructures needs and requirements as well as approaches and methodologies for power/control HIL testing and co-simulation for performing different types of tests in the scope of smart grids.
- ERIGrid shared the developed holistic testing methodology as the main outcome of NA5 WP with several stakeholders and experts in the relevant fields and received feedback. This methodology has been also applied in several experiments in the other projects. This will help the consortium to improve the methodology based on the practical experiences obtained for the future.
- There will be an opportunity for the external users, active in similar projects, to access the ERIGrid facilities and benefit from the harmonised testing procedures on the topics that the project covers.
- The collaboration activities between SMART-DSYS and ERIGrid offered opportunities, on one side, to take advantage from already available results and, on the other side, for improvement and widening the applicability of existing solutions.

With all this in mind, it can be concluded that successful cooperation with several ongoing international/national activities on smart grids has been achieved within the third year of the project. This progress will be used to stimulate further improvements of the methodologies developed within the project and increase the visibility of the TA opportunity offered by the project.

As detailed in this report, the established collaboration activities will continue, and several activities have been planned, such as information exchange on the topics that the consortium will deal with during the next year of the project (e.g., tools and methodologies for HIL testing, co-simulation and multi-lab testing). Additionally, there is a high possibility of organising joint events during this period with the other projects, networks, initiatives and platforms mentioned in this report in order to facilitate a better information exchange.

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6 Annex

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