



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

Work Package 6

NA2 - Dissemination, Communication and International Collaboration

Deliverable D6.2

D-NA2.2a: “Progress report on the cooperation with international and national projects and initiatives within the scope of ERIGrid”

Grant Agreement No:	654113
Funding Instrument:	Research and Innovation Actions (RIA) – Integrating Activity (IA)
Funded under:	INFRAIA-1-2014/2015: Integrating and opening existing national and regional research infrastructures of European interest
Starting date of project:	01.11.2015
Project Duration:	54 month

Contractual delivery date:	31.10.2016
Actual delivery date:	07.11.2016
Name of lead beneficiary for this deliverable:	4 European Distributed Energy Resources Laboratories e.V.
Deliverable Type:	Report (R)
Security Class:	Public (PU)
Revision / Status:	released

Document Information

Document Version: 06
Revision / Status: released

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Distribution List ERIGrid consortium members

Document History

Revision	Content / Changes	Resp. Partner	Date
1	Initial structure of the document generated	DERlab	06.09.16
2	Incorporation of collected partner inputs	DERlab	18.10.16
3	Finalization of all sections	DERlab	24.10.16
4	Update, review, improvements	DERlab	26.10.16
5	Update, review, improvements	DERlab	27.10.16
6	Update, review, improvements	DERlab	31.01.16

Document Approval

Final Approval	Name	Resp. Partner	Date
Review WP Level	Efren Guillo-Sansano	UST	27.10.16
Review WP Level	Martin Büscher	OFFIS	31.10.16
Review Steering Committee Level	Thomas Strasser	AIT	07.11.16

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Abbreviations

<i>AC</i>	Alternating Current
<i>ACCESS</i>	Assisting Communities to Connect to Electric Sustainable Sources
<i>CITIES</i>	Centre for IT based Intelligent Energy Systems in cities
<i>DC</i>	Direct Current
<i>DG</i>	Distributed Generation
<i>DNO</i>	Distribution Network Operator
<i>DSO</i>	Distribution System Operator
<i>EE</i>	Energy Efficiency
<i>ELECTRA IRP</i>	European Liaison on Electricity Committed Towards long-term Research Activity Integrated Research Programme
<i>EU</i>	European Union
<i>FLINK</i>	Flexible DC-links for Smart Grids
<i>HIL</i>	Hardware-in-the-Loop
<i>IEA</i>	International Energy Agency
<i>ICT</i>	Information and Communication Technology
<i>JP</i>	Joint Programme
<i>JRA</i>	Joint Research Activities
<i>LV</i>	Low Voltage
<i>MEAN4SG</i>	Metrology Excellence Academic Network for Smart Grids
<i>MIGRATE</i>	Massive InteGRATion of power Electronic devices
<i>MV</i>	Medium Voltage
<i>NA</i>	Networking Activities
<i>OpenNES</i>	Open and Interoperable ICT Solution for Integration of ReNewABIES
<i>PPInterop</i>	Interoperability of PREDIS/PRISMES platforms
<i>R&D</i>	Research and Development
<i>RES</i>	Renewable Energy Sources
<i>RI</i>	Research Infrastructure
<i>SALVAGE</i>	Cyber-phySicAl security for Low-VoltAGE grids
<i>SG</i>	Smart Grids
<i>SGAM</i>	Smart Grids Architecture Model
<i>SPARKS</i>	Smart Grid Protection against Cyber Attacks
<i>SMARTEREMC2</i>	Smarter Grid: Empowering SG Market ACtors through Information and Communi-cation Technologies
<i>SmILES</i>	Smart Integration of Energy Storages in Local Multi Energy Systems for maximising the Share of Renewables in Europe's Energy Mix
<i>TA</i>	Trans-national Access
<i>TARES+</i>	Technical Assistance for renewable energies and energy efficiency in Greece
<i>TSO</i>	Transmission System Operator
<i>TU</i>	Technical University

Executive Summary

This document summarizes the collaborative activities with international and national Research and Development (R&D) projects, initiatives, networks, and platforms in the field of smart grids, which have been planned and performed during the first year of the ERIGrid project. The main collaborative activities in this period have been the information exchange on smart grid scenarios, use cases, research infrastructures requirements and needs, and testing and evaluation methodologies. This collaboration and information exchange, which is realised by means of emails exchange, webinars, joint events like workshops and joint papers, is 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 Renewable Energy Sources (RES) into the power system has increased over the past years. This has introduced increased complexity to 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 smart grid. However, a holistic and integrated approach for analysing and evaluating such complex system has not been developed yet. 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 in smart grid evaluation approaches, the current testing and evaluation approaches developed and used by relevant research activities should be identified and analysed. In addition, it is necessary that the holistic approach for system evaluation, which will be 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 summarize the progress of the collaborative activities that have been planned and performed within the ERIGrid NA2 work package "Dissemination, Communication and International Collaboration" during the first year of the project. The provided information in this document was gathered through a questionnaire circulated between ERIGrid partners. These exchange activities are realised through regular contact in form of webinars, newsletters, emails exchange, joint papers, and joint physical meetings.

In addition to collaborative activities, a short description and an overview of each international/national project, initiative, network, and platform is provided. Besides, the contact persons as representative of each side of cooperation who have led these activities are introduced.

1.3 Structure of the Document

This document is organised as follows: Section 2 provides information about the performed, ongoing and planned collaborative activities with relevant smart grids projects' consortia. In addition, short descriptions of these projects are provided. Section 3 describes collaborative 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 relevant to ERIGrid activities. Links to those projects have already been established during the first project year.

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 (IWES) Marita Blank (OFFIS)	Luciano Martini (RSE) Maria Nuschke (IWES)
02	SPARKS	FP7	http://project-sparks.eu/	Yes	Thomas Strasser (AIT)	Paul Smith (AIT)
03	SmartNet	H2020	http://smartnet-project.eu/	Yes	Thomas Strasser (AIT) Carlo Sandroni (RSE) Marco Rossi (RSE)	Gianluigi Migliavacca (RSE) Marco Rossi (RSE)
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) Ata Khavari (DERlab)	Aris Dimeas (ICCS-NTUA) Jan Ringelstein (IWES) Mohamed Shalaby (DERlab)
06	MIGRATE	H2020	http://www.h2020-migrate.eu/	Yes	Peter Palensky (TUD)	Jose Rueda (TUD)
07	SALVAGE	SmartGrids ERA-Net	http://www.salvage-project.com/	Yes	Oliver Gehrke, Kai Heussen (DTU)	Oliver Gehrke (DTU)
08	SmILES	H2020	N/A	Yes	Oliver Gehrke (DTU) Edmund Widl (AIT)	Elisa Gil Bardaji (KIT)

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 (IWES) and Marita Blank (OFFIS)

Contact persons on behalf of the ELECTRA Consortium: Luciano Martini (RSE) and Maria Nuschke (IWES)

Project duration: 12.2013 - 11.2017

Project description:

The wholesale deployment of Renewable Energy Resources (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 new vertically-integrated control schemes (frequency and voltage control) reinforced with horizontally-distributed control schemes to provide for a dynamic power balance that is closer to its equilibrium value than a conventional central control scheme. [2]

Collaborative activities:

Several ERIGrid partners are also involved in the FP7 ELECTRA IRP project. This makes the collaborative activities easier and facilitates the mutually beneficial exchange of information between these two EU-funded projects.

During the last year, several collaborative activities have been done or planned through joint workshop/events (e.g., RTDS EUGM 2016) and joint papers (e.g., paper on “Towards Holistic Power Distribution System Validation and Testing” [3] published in CIGRE 2016). These activities are as following:

- ELECTRA IRP testing and validation methods for smart grid systems were used as an input for the ERIGrid project.
- ELECTRA IRP reference scenarios and use cases that regard frequency and voltage control were used as an input for direct use by ERIGrid.
- Information exchange regarding the needs and requirements of research infrastructures in order to perform different types of tests.
- The ELECTRA IRP consortium has the option to access ERIGrid testing facilities for implementation and evaluation of the developed control strategies within the Trans-national Access (TA) activities.
- Similarly, the researcher exchange programme offered by ELECTRA IRP is open to the ERIGrid partners.
- The Research Infrastructure (RI) capabilities and the methodologies for systems testing elaborated by the ERIGrid consortium will constitute an input for experiments planned within ELECTRA IRP.
- The ELECTRA IRP project glossary and terminology regarding testing and validation has been used in the ERIGrid project in particular for NA5¹ and JRA1².

2.1.2 SPARKS: Smart Grid Protection against Cyber Attacks

Funding Framework: FP7

Coordinator: AIT (Austria) - Paul Smith (Paul.Smith@ait.ac.at)

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

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

Contact persons on behalf of the SPARKS Consortium: Paul Smith (AIT)

¹ NA5: “Holistic System Integration and Testing Procedure” work package in ERIGrid project

² JRA1: “Use Case / Scenario Identification, Analysis and Selection” work package in ERIGrid project

Project duration: 04.2014 - 03.2017

Project description:

The SPARKS project aims to provide innovative solutions in a number of ways including approaches to risk assessment and reference architectures for secure smart grids. The project will make recommendations regarding the future direction of smart grid security standards. Furthermore, key smart grid technologies will be investigated, such as the use of big data for security analytics in smart grids and novel hardware-supported approaches for smart meter (gateway) authentication. All of these contributions and technologies will be assessed from a societal and economic impact perspective and evaluated in real-world demonstrators. [4]

Collaborative activities:

The AIT research institute, as the coordinator of both the ERIGrid and the SPARKS project, has made some interactions between the projects through organising joint meetings and information exchange by emails. As an outcome of these activities, the Information and Communication Technology (ICT)/cybersecurity-related assessment methods developed within the SPARKS project were provided to the ERIGrid JRA2³ work package.

The SPARKS project will have the possibility to take advantage of the project RI provided by ERIGrid partners for validation of smart grid systems.

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 (RSE) and Marco Rossi (RSE)

Contact persons on behalf of the SmartNet Consortium: Gianluigi Migliavacca (RSE) and Marco Rossi (RSE)

Project duration: 01.2016 - 12.2018

Project description:

SmartNet aims at comparing different architectures for optimised interaction between Transmission System Operators (TSOs) and Distribution System Operators (DSOs) in managing the purchase of ancillary services (reserve and balancing, voltage regulation and congestion management) from subjects located in the distribution segment. [5]

Collaborative activities:

SmartNet is currently concluding a very exhaustive investigation on the future needs of electricity systems in terms of ancillary services. From these needs, a list of use cases has been deduced and is going to be considered for the selection of the ERIGrid focal use cases. In particular, the

³ JRA2: "Co-Simulation based Assessment Methods" work package in ERIGrid project

future scenario considered within SmartNet coincides with the ERIGrid system configuration of “vertical integration” which deals with a TSO/DSO collaboration

In addition, SmartNet has a dedicated task in which the practical concepts of TSO/DSO coordination will be implemented in a laboratory (more specifically, the SmartEST laboratory at AIT) and for which the procedures, nomenclature, concepts and methods investigated in ERIGrid will be applied.

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

Funding Framework: H2020

Coordinator: Intracom Telecom (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 description:

SmarterEMC2 implements ICT tools that support the integration of consumers through demand response services and the integration of Distributed Generation (DG)/RES through virtual power plants. These tools take into account the Smart Grids Architecture Model (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. [6]

Collaborative activities:

The planned exchange of information will provide the ERIGrid partners with an insight on current state of the art activities in the field of co-simulation of power systems and ICT.

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) and Ata Khavari (DERlab)

Contact persons on behalf of the Nobel Grid Consortium: Aris Dimeas (ICCS-NTUA), Jan Ringelstein (IWES) and Mohamed Shalaby (DERlab)

Project duration: 01.2016 - 12.2019

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. [7]

Collaborative activities:

There has been an exchange of information through web/physical meetings on topics such as Hardware-in-the-Loop (HIL) and advanced component/system testing. This will be an ongoing activity over the course of the project.

2.1.6 MIGRATE: Massive InteGRATion of power Electronic devices

Funding Framework: H2020

Coordinator: TenneT (Germany) - Andreas Menze (migrate@tennet.eu)

Website: <https://www.h2020-migrate.eu/>

Contact persons on behalf of the ERIGrid Consortium: Peter Palensky (TUD)

Contact persons on behalf of the MIGRATE Consortium: Jose Rueda (TUD)

Project duration: 01.2016 - 12.2019

Project description:

The aim of MIGRATE is to find solutions for the technological challenges the grid is currently and especially in future faced with, in particular with the increasing share of renewable energy which is integrated into the grid. The project will try to develop new approaches, paving the way for the implementation of power electronic devices in large scale. [8]

Collaborative activities:

Several potential use cases that can be tested within the ERIGrid project have been acquired from the MIGRATE project.

2.1.7 SALVAGE: Cyber-phySicAl security for Low-VoltAGE grids

Funding Framework: SmartGrids ERA-Net

Coordinator: DTU (Denmark) - Oliver Gehrke (olge@elektro.dtu.dk)

Website: <http://www.salvage-project.com>

Contact persons on behalf of the ERIGrid Consortium: Oliver Gehrke (DTU), Kai Heussen (DTU) and Anna Kosek (DTU)

Contact persons on behalf of the SALVAGE Consortium: Oliver Gehrke (DTU)

Project duration: 04.2014 - 03.2017

Description:

The purpose of the SALVAGE project is to develop better support for managing and designing a secure future smart grid. This approach includes cybersecurity technologies dedicated to power

grid operation as well as support for the migration to future smart grid solutions, including the legacy of ICT that necessarily will be part of it. The further objective is to develop cybersecurity technology and methodology optimised with the particular needs and context of the power industry, something that is to a large extent lacking in best practices and technologies for cybersecurity today. More precisely, the focus of the project will be on smart grids with many small distributed energy resources, in particular Low Voltage (LV) substation automation systems and LV distribution system. [9]

Collaborative activities:

ERIGrid collects some cyber-physical security use cases defined in the SALVAGE project. There is also an information exchange about co-simulation set-ups between the projects.

In the future, the SALVAGE project will benefit from the development of the ERIGrid testing methodology in the context of smart grids.

2.1.8 SmILES: Smart Integration of Energy Storages in Local Multi Energy Systems for maximising the Share of Renewables in Europe's Energy Mix

Funding Framework: H2020

Coordinator: KIT (Germany) - Elisa Gil Bardaji (elisa.gil@kit.edu)

Contact persons on behalf of the ERIGrid Consortium: Oliver Gehrke (DTU) and Edmund Widl (AIT)

Contact persons on behalf of the SmILES Consortium: Elisa Gil Bardaji (KIT)

Project duration: Starts in the 1st quarter of 2017

Project description:

The SmILES project aims to obtain fundamental knowledge about linking and optimising heterogeneous energy carriers and systems including storage and renewable energy technologies. It will also develop and disseminate guidelines for modelling, simulating and optimising such systems.

Collaborative activities:

The project will start in January/February 2017 and no decision has been made regarding the collaborative activities yet. However, considering the goals of this project, there will be synergies with the ERIGrid JRA2 work package in the field of co-simulation technology.

2.2 National Projects

The following table provides a brief overview of national projects relevant to ERIGrid activities. Links to those projects have already been established during the first project year.

Table 2: List of national projects

ID No.	Name	Country	Website	ERIGrid Partners involved	ERIGrid Contact Persons	Project Contact Persons
09	PPInterop	France	N/A	Yes	Van Hoa Nguyen (GINP)	Quoc Tuan Tran (CEA)
10	OpenNES	Austria	http://www.ait.ac.at/departments/energy/smart-grids/smart-grids-projects/opennes/	Yes	Thomas Strasser (AIT)	Thomas Strasser (AIT)
11	FLINK	The Netherlands	N/A	Yes	Erik de Jong (DNV GL)	Erik de Jong (DNV GL)
12	TARES+	Greece	N/A	Yes	Evangelos Rikos (CRES)	Konstantina Mentesidi (GIZ)
13	Communications network emulation for real-time smart grid modelling	United Kingdom	N/A	Yes	Ibrahim Abdulhadi (UST)	Ibrahim Abdulhadi (UST)
14	CITIES	Denmark	http://smart-cities-centre.org/	Yes	Oliver Gehrke, Kai Heussen and Esteban Bondy (DTU)	Henrik Madsen (Center Manager)
15	Energylab Nordhavn	Denmark	http://energylabnordhavn.weebly.com/	Yes	DTU: Oliver Gehrke, Kai Heussen and Esteban Bondy (DTU)	Christoffer Greisen (DTU)

2.2.1 PPInterop: Interoperability of PREDIS/PRISMES platforms

Country: France

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

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

Project description:

The PPinterop project investigates the interoperability of two smart grid platforms: PREDIS, located at the G2Elab, Grenoble INP, France, and PRISMES, located at CEA INES, le Bourget-du-lac, France. PPinterop aims to make these platforms interoperable, to remotely monitor and control the available experimental tools in real time. The interoperable platform PREDIS - PRISMES will be the work support of the joint team between CEA and G2Elab regarding the intelligent management of multi-vector energy networks.

Collaborative activities:

The experience from PPInterop project may provide some insight and support to JRA2, JRA3⁴ of the ERIGrid project in terms of co-simulation and heterogeneous simulations in the near future.

⁴ JRA3: "Integrated Laboratory based Assessment Methods" work package in ERIGrid project

2.2.2 OpenNES: Open and Interoperable ICT Solution for Integration of ReNewables

Country: Austria

Coordinator: AIT - Thomas Strasser (Thomas.Strasser@ait.ac.at)

Website: <http://www.ait.ac.at/departments/energy/smart-grids/smart-grids-projects/opennes/>

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

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

Project duration: 2014 - 2017

Project description:

The OpenNES projects aims to provide an open and interoperable ICT solution for the integration of renewables. [10]

Collaborative activities:

As mutual activities, several joint workshops have already taken place and as a result, DER controller architectures will be provided to the ERIGrid project for testing. The OpenNES project will benefit from the developed validation and testing approaches in the framework of the NA5 work package of the ERIGrid project.

2.2.3 FLINK: Flexible DC-links for Smart Grids

Country: The Netherlands

Contact persons on behalf of the ERIGrid Consortium: Erik de Jong (DNV GL)

Contact persons on behalf of the FLINK Consortium: Erik de Jong (DNV GL)

Project description:

The FLINK project investigates the feasibility of refurbishing AC cables as DC links in MV smart grids. It involves research in collaboration with the TU Delft, TU Eindhoven and two Dutch DNOs.

Collaborative activities:

There are collaborative activities in terms of joint simulation use case development and HIL deployment. The ERIGrid project has received a test case for the real-time simulation of DC application(s) in smart grids defined by the FLINK project. In the near future, the FLINK project will access to advanced real-time and co-simulation methods developed by the ERIGrid project.

2.2.4 TARES+: Technical Assistance for renewable energies and energy efficiency in Greece

Country: Greece

Contact persons on behalf of the ERIGrid Consortium: Evangelos Rikos (CRES)

Contact persons on behalf of the TARES+ Consortium: Konstantina Mentesidi (GIZ)

Project description:

The overall objective of the TARES+ project is to improve the framework conditions for the further development of RES and Energy Efficiency (EE) in Greece as well as the achievement of the national RES and EE targets for 2020.

Collaborative activities:

Information exchange with regard to the ERIGrid TA will give the TARES+ project the opportunity of running part of its tests in the ERIGrid consortium's facilities. This activity is planned to be done via emails and joint physical meetings for the end of 2016 and in the beginning of 2017.

In return, the exchange of test results can be used for validating the ERIGrid testing procedures.

2.2.5 Communications network emulation for real-time smart grid modelling

Country: United Kingdom

Contact persons on behalf of the ERIGrid Consortium: Ibrahim Abdulhadi (UST)

Contact persons on behalf of the mentioned project Consortium: Ibrahim Abdulhadi (UST)

Project description:

This project focuses on integrating realistic communications network models with real-time simulation resources for the purpose of validating smart grid control and further protection functions.

Collaborative activities:

There are potential synergies between this project and ERIGrid. Communications network models and approaches can support JRA2 and JRA3 activities in order to realise more realistic co-simulation platforms. Additionally, the real-time communications emulation capability will support and enrich the activities undertaken as part of TA1⁵ and TA2⁶ in the ERIGrid project.

Furthermore, scenarios, system configurations and use cases defined by ERIGrid will provide a common platform for the validation and comparison of results as well as inform the modelling requirements.

2.2.6 CITIES: Centre for IT based intelligent energy systems in cities

Country: Denmark

Coordinator: DTU - Henrik Madsen (henrik.madsen@smart-cities-centre.org)

Website: <http://smart-cities-centre.org/>

Contact persons on behalf of the ERIGrid Consortium: Oliver Gehrke (DTU), Kai Heussen (DTU) and Esteban Bondy (DTU)

Contact persons on behalf of the CITIES Consortium: Henrik Madsen (DTU)

⁵ TA1: "Facilities for Improved Component Characterisation and Micro Grid Validation" work package in ERIGrid project

⁶ TA2: "Facilities for Large-Scale Smart Grid System Integration and Testing" work package in ERIGrid project.

Project description:

CITIES is an international research-oriented centre for the development of numerical models and simulation platforms for smart, integrated and complex energy systems on all scales, such as time resolutions ranging from seconds to hours, space ranging from components to continents and a complexity level between trends and operation optimisation. [11]

Collaborative activities:

There has been an exchange of use cases concerning multi-energy systems between two projects. In addition, the ERIGrid project took advantage of co-simulation set-ups/models developed in the CITIES project. In the future, CITIES will get insights from developments of the ERIGrid testing methodology.

2.2.7 Energylab Nordhavn

Country: Denmark

Coordinator: DTU - Christoffer Greisen (cgre@elektro.dtu.dk)

Website: <http://energylabnordhavn.weebly.com/>

Contact persons on behalf of the ERIGrid Consortium: Oliver Gehrke (DTU), Kai Heussen (DTU) and Esteban Bondy (DTU)

Contact persons on behalf of the Energylab Nordhavn Consortium: Christoffer Greisen (DTU)

Project duration: 2015 - 2019

Project description:

Energylab Nordhavn is a large-scale project that contributes to the grand challenge of transforming the energy system to integrate a large share of renewable energy, a means of supporting international and national climate goals.

The project focuses on the cost-effective smart energy system of the future that integrates multiple energy infrastructures (electricity, thermal and transportation) and provides an intelligent control of subsystems and components - providing necessary energy flexibility for efficient utilisation of renewable energy.

Collaborative activities:

There has been an exchange of use cases about cyber-physical security between ERIGrid and Energylab Nordhavn. Furthermore, ERIGrid uses co-simulation set-ups developed by the Energylab Nordhavn project. In the future, this Danish project will get insights from testing methodology developments by ERIGrid.

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

The following table provides a brief overview of initiatives, networks, and platforms relevant to ERIGrid activities. Links to those initiatives, networks, and platforms have already been established during the first project year.

Table 3: List of networks, platforms, and initiatives

ID No.	Name	Type	Website	ERIGrid Partners involved	ERIGrid contact persons	Network/ Initiative/ Platform Contact Persons
16	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 (IWES)	Luciano Martini (RSE) Maria Nuschke (IWES)
17	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 (IWES) Mihai Calin (DERlab)	Philipp Strauss (DERlab) Diana Strauss-Mincu (DERlab) Maurizio Verga (RSE)
18	Power Cybernetics	Initiative	http://www.dnvgl.com/energy/	Yes	Erik de Jong (DNV GL)	Erik de Jong (DNV GL)
19	FUTURED	Platform (Spain)	http://www.futured.es/	Yes	Iñaki Orue (Ormazabal)	Enrique Morgades (FUTURED)
20	MEAN4SG	Network (EU)	http://www.mean4sg-itn.eu/	Yes	Ian Gilbert (Ormazabal)	Eduardo Cembrano (Foundation CIRCE)
21	openKONSEQUENZ	Platform (Germany)	http://www.openkonsequenz.de/	Yes	Marita Blank (OFFIS)	N/A

3.1 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 (IWES)

Contact persons on behalf of the network: Luciano Martini (RSE) and Maria Nuschke (IWES)

Focus area:

The Joint Programme (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 at addressing 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. [12]

Collaborative activities:

During the last year, there have been several collaborative activities between this network and ERIGrid in the form of joint workshop/events. These activities bring several mutual benefits that are mentioned in the following:

- The ERIGrid consortium is regularly informed about EERA/EU-related activities, publications, etc.
- Through EERA JP SG, the ERIGrid project and the TA opportunities are advertised to a substantial number of European and international stakeholders.
- There will be an opportunity for external users related to EERA to access the ERIGrid facilities and benefit from the harmonised testing procedures on the topics that ERIGrid covers.
- EERA JP SG will get insights from ERIGrid testing methodology developments and the results of investigations about RI needs.

3.2 IEA ISGAN/SIRFN: IEA International Smart Grid Action Network/Smart Grid International Research Facility Network

Type: Network (international)

SIRFN Operating Agent: DERlab – office@der-lab.net

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

Contact persons on behalf of the ERIGrid Consortium: Roland Bründlinger (AIT), Kari Mäki (VTT), Erik de Jong (DNV GL), Carlo Sandroni (RSE), Ron Brandl (IWES) and Mihai Calin (DERlab)

Contact persons on behalf of the network: Philipp Strauss (DERlab), Diana Strauss-Mincu (DERlab) and Maurizio Verga (RSE)

Focus area:

The ISGAN Annex 5 called Smart Grid International Research Facility Network (SIRFN) gives the participating countries the ability to evaluate pre-competitive technologies and systems approaches in a wide range of smart grids implementation use cases and geographies using common testing procedures. 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 publicly available to the smart grid community to accelerate the development of smart grid technologies and systems and enabling policies. [13]

Collaborative activities:

The collaborative activities which are done by means of emails exchange or joint workshops are as following:

- An information exchange on validation and testing requirements (e.g., test protocols for advanced interoperability functions of DER, power system testing and advanced laboratory testing methods) can provide useful information especially for ERIGrid JRA3 activities (HIL and harmonised laboratory-based system integration testing procedures).
- The ERIGrid consortium gets to know international perspectives and ideas for the topics of the project.
- ISGAN and SIRFN members will get insights from ERIGrid testing methodology developments.
- There will be an opportunity for external users related to ISGAN/SIRFN to access the ERIGrid research facilities in the framework of trans-national activities.

3.3 Power Cybernetics

Type: Initiative

Website: <http://www.dnvgl.com/energy>

Contact persons on behalf of the ERIGrid Consortium: Erik de Jong (DNV GL)

Contact persons on behalf of the initiative: Erik de Jong (DNV GL)

Focus area:

Power Cybernetics' focus area is HIL testing as a certification tool for power system validation.

Collaborative activities:

There is a continuous information exchange and possibly round-robin testing planned as means of collaboration in the future. Power Cybernetics will get insights from ERIGrid HIL testing solutions and approaches.

3.4 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)

Focus area:

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

Collaborative activities:

There will be a dissemination of ERIGrid activities about the RI technological capabilities within the platform.

3.5 MEAN4SG: Metrology Excellence Academic Network for Smart Grids

Type: Network (EU H2020)

Coordinator: Julio J. Melero (Foundation CIRCE) - melero@fcirce.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: Eduardo Cembrano (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 [14]:

- Power quality analysis
- Smart grids modelling and management
- Advanced monitoring through phasor measurement units applications
- Smart cable diagnosis

Collaborative activities:

There will be a possibility to organise joint workshops on the common topics in the fields of smart grids. Furthermore, there will be a possibility for researchers in the MEAN4SG network to get access to smart grid laboratories provided by ERIGrid partners.

3.6 openKONSEQUENZ

Type: Platform (Germany)

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

Contact persons on behalf of the ERIGrid Consortium: Marita Blank (OFFIS)

Focus area:

The openKONSEQUENZ is a platform for developed, open, modular and secure software with the goal to operate energy and water networks based on harmonised processes. [15]

Collaborative activities:

There is information exchange on common practical applications and challenges.

4 Conclusions and Outlook

This report summarises the ERIGrid partners' collaborations that are planned and performed with other international/national R&D projects, initiatives, networks, and platforms on the topics relevant to the ERIGrid activity domain. These networking activities are planned in the ERIGrid NA2 "Dissemination, Communication and International Collaboration" work package. The used means of information exchange and joint activities are emails exchange, webinars, joint events like workshops, and joint papers.

During the last year, the ERIGrid partners have been in touch and cooperating with participants of eight EU funded (FP7, H2020, and SmartGrids ERA-Net) projects, seven national projects, three networks, two platforms, and one initiative, which are all, dealing with different aspects of smart grids. These activities have already brought or are expected to bring mutual benefits and inputs for both sides of the collaborations. The most important ones are highlighted in the following:

- Several reference smart grids scenarios and use cases from other ongoing projects were used as an input for NA5 and JRA work packages of the ERIGrid project.
- ERIGrid partners acquired information about current testing and validation methods for smart grid systems as well as research infrastructures needs and requirements for performing different types of tests in the scope of smart grids.
- Information exchange on ERIGrid testing methodology development based on NA5 work package achievements is expected within the next months.
- There will be an opportunity for the external user's active in similar projects to access the ERIGrid facilities and benefit from the harmonised testing procedures on the topics that ERIGrid covers.

According to this report, most of the described collaborative activities, have been done or planned with a project, initiative, network, or a platform in which ERIGrid partners are involved. It is recommended that for the next cooperation activity period, the domain of collaborative activities be expanded through interaction with more relevant ongoing research activities beyond the ones in which ERIGrid partners are active. This definitely will help ERIGrid consortium to gain broader perspective about the technologies, methodologies, concepts and procedures in terms of smart grid systems evaluation and testing. It is foreseen that this level of interaction will be achieved through dissemination activities and channels, which are planned and established within NA2 work package like setting up a project stakeholders group and organising technical workshops as well as ERIGrid TA opportunities.

Considering the results so far, it is concluded that successful cooperation with several ongoing international/national activities on smart grids has already been achieved within the first year of the project. This will stimulate further improvements of the integrated RI and also establish the basis for an even more effective cooperation in the next activity period of ERIGrid in which more technical results are expected.

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