



INTERPLAN

INTEgrated opeRation PLAnning tool towards the Pan-European Network

Work Package 7

Dissemination, communication and exploitation

Deliverable 7.5

Progress report on the cooperation with national and international projects and initiatives (third year)

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Abbreviations

<i>AIT</i>	Austrian Institute of Technology
<i>CSA</i>	Coordination and support actions
<i>DER</i>	Distributed Energy Resource
<i>DERlab</i>	European Distributed Energy Resources Laboratories
<i>DG</i>	Distribution Grid
<i>DR</i>	Demand Response
<i>DSO</i>	Distribution System Operator
<i>EMS</i>	Energy management systems
<i>ENEA</i>	Italian National Agency for New Technologies, Energy and Sustainable Economic Development
<i>EU</i>	European Union
<i>EV</i>	Electric Vehicle
<i>H2020</i>	Horizon 2020
<i>ICT</i>	Information and Communication Technology
<i>IEE</i>	Fraunhofer Institute for Energy Economics and Energy System Technology
<i>IEn</i>	Institute of Power Engineering
<i>INEA</i>	Innovation and Networks Executive Agency
<i>LV</i>	Low Voltage
<i>MI</i>	Mission Innovation
<i>MV</i>	Medium Voltage
<i>PANTERA</i>	Pan European Technology Energy Research Approach
<i>R&D</i>	Research and Development
<i>RES</i>	Renewable Energy System
<i>RdS</i>	Ricerca di Sistema
<i>RES</i>	Renewable Energy System
<i>TRL</i>	Technology Readiness Level
<i>TSO</i>	Transmission System Operator
<i>WP</i>	Work Package

Executive Summary

Deliverable D7.5's aim is to gather and present all the collaborative activities with international and national research and development (R&D) projects, initiatives, networks, and platforms in the field of smart grids, which took place during the third and final year of the INTERPLAN project. Two previous versions (D7.3 and D7.4) of this deliverable have been submitted for the first and second year of the project.

We accounted during this period of time a cooperation with

- twenty-one EU funded projects
- three national projects
- two European programmes
- one European platform
- one national electric authority
- one working group
- one international network and
- one global initiative.

The common point of all these projects, platforms and initiatives is that they are related to different aspects of smart grids. To efficiently conduct these collaborations, different channels and means have been used. In particular, online channels such as emailing and social media, webinars, round tables, questionnaires, joint events and virtual workshops were used.

During the previous period and as reported in deliverable 7.4, most of the collaborative activities were focused on use cases and showcases developments. They were of tremendous importance as they provided the consortium with valuable feedback especially on the integrated network operation planning tool development and for the INTERPLAN scenarios and use cases.

During this last year of the INTERPLAN project and considering the developments made for the tool, the collaborations were particularly valuable as they enabled the consortium to interact with the project's main stakeholders and get deep insights on the tool's characteristics, positive points and aspects that could be enhanced to suit the stakeholders' needs even more.

1 Introduction

INTERPLAN aims to provide an integrated operation-planning tool for the pan-European electricity network, with a focus on the TSO-DSO interfaces, to support the EU in reaching its expected low-carbon targets. INTERPLAN's tool for grid operation planning is based on the implementation of innovative control approaches and designed by paying particular attention to aspects such as flexible possibilities coming from storage and demand response. Novel control strategies and operational approaches have been investigated in order to ensure the security of supply and flexibility of the interconnected EU electricity grids, based on a close cooperation among TSOs and DSOs.

A methodology has been developed [D4.2¹], aiming to generate grid equivalents as a growing library able to cover all the relevant system connection possibilities occurring in the real grid, by addressing operational issues at transmission, distribution and TSOs-DSOs interfaces. Its versatility in the concept of grid equivalents allows an accurate analysis of the complex network, by considering local active elements in the grid. The selection of a top-down approach has inspired the development of an integrated tool for grid operation planning purposes that span from high voltage to low voltage, and that enable structured assessment spanning long-term planning to operational controllers.

1.1 Purpose of the Document

The purpose of deliverable D7.5 is to present how and with which projects and initiatives INTERPLAN collaborated during the third and last year of the project. This report is the last of the three yearly reports that were planned in the project to present the collaborative activities that took place throughout the project duration. The provided information in this document was gathered through a questionnaire circulated between all INTERPLAN partners. Generally, the collaboration activities have been taking place via regular contacts and exchanges with consortia of relevant smart grid projects and other platforms and initiatives in form of online workshops, webinars, joint events, email exchange, joint papers, meetings and round tables. These collaborative activities have been central for the establishment of links with relevant projects, networks, initiatives and platforms dealing with similar topics and thus allowing knowledge sharing and research optimisation.

DERlab, as work package 7 leader, has contributed to the promotion of INTERPLAN and the establishment of relations and opportunities with relevant stakeholders from academia, industry and research institutes from Europe and the US through its networks. An example of this is the featuring of INTERPLAN in the DERlab Public Activity Report 2018-2020 "*The Pan-European Smart Grid: Innovative Tools and Demonstration Activities for Future Grid Planning and Operation*", which was promoted online and sent to members of the DERlab network.

¹ A. Palkhouskaya, A. Anta, M. Calin, A. Khavari, M. D. Somma, R. Ciavarella, G. Graditi, M. Valenti, H. Brunner, J. Ringelstein, M. Hof, M. Hadjikypris, S. Henein, S. Khan and V. Efthymiou, "D4.3 Approach for generating grid equivalents for different use cases (final version)" INTERPLAN Project; www.interplan-project.eu, 2020.

1.2 Structure of the Document

The structure of this document is as follows: section 2 provides information about the performed, ongoing and planned (also after the project ending) collaborative activities with relevant smart grid projects, and short descriptions of these projects are provided. Section 3 reports about collaborative activities with international initiatives, networks, and programs dealing with activities and subjects relevant to the INTERPLAN project, and a short description of the initiatives is also provided. Section 4 presents the other collaborations that took place, i.e. other than with projects, networks and platforms. Finally, section 5 concludes this reports and its main content.

2 Collaboration and information exchange with relevant European and national projects

The following table provides a brief overview of the R&D projects INTERPLAN has been in collaboration with, during the third year of the project and/or possible collaborations that could happen after the project ending. Many collaboration activities have been facilitated by INEA (Innovation and Networks Executive Agency) during the H2020 Low TRLSmart Grids and Storage project clustering workshops, held in Brussels in October 2018 and November 2019. Both editions of the workshop gathered 26 H2020 Smart Grids and Storage project representatives, with as main objective networking and the creation of synergies and other joint activities between projects. In this context, several areas of cooperation have been established between INTERPLAN and projects from ID No. 1 to ID No. 11 (see table below) in terms of discussing main project results and exchanging deliverables.

Table 1: List of European and national projects

ID No.	Name	Funding Framework	Website	INTERPLAN Contact Persons	Project Contact Persons
1	E-Lobster	H2020	http://www.e-lobster.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Gianni Loriga
2	Storage4grid	H2020	http://www.storage4grid.eu/pages/index.html	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Mihai Sanduleac (MicroDERlab)
3	Net2dg	H2020	http://www.net2dg.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Karsten Handrup
4	United-grid	H2020	https://united-grid.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Tuan Le
5	Sogno	H2020	https://www.sogno-energy.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Antonello Monti (RWTH Aachen)
6	TDX-ASSIST	H2020	http://www.tdx-assist.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Gareth Taylor
7	Plan4res	H2020	https://www.plan4res.eu/	Viviana Cigolotti, Marialaura Di Somma,	Sandrine Charousset (EDF)

				Giorgio Graditi (ENEA)	
8	eDream	H2020	https://edream-h2020.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Vincenzo Croce (ENGINEERING)
9	Flexcoop	H2020	http://www.flexcoop.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Silke Cuno (Fraunhofer FOKUS)
10	Delta	H2020	https://www.delta-h2020.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Dimosthenis Ioannidis
11	Drive	H2020	https://www.h2020-drive.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Monjur Mourshed
12	User-Chi	H2020	https://www.userchi.eu/the-project/	Gabriella Rossi, Maria Valenti (ENEA)	Antonio Marques (ETRA I+D) Nataschia Andrenacci (ENEA)
13	RdS - Project 2.7 within the framework of 2019-2021 Research Program for the National Electricity System	National	Not available yet	Gabriella Rossi, Maria Valenti (ENEA)	Maria Valenti (ENEA)
14	ERIGrid 2.0	H2020	https://erigrd.eu/	Helfried Brunner (AIT) Ata Khavari (DERlab)	Thomas Strasser (AIT) Ata Khavari (DERlab)
15	PoSyoCo	National	https://projekte.ffg.at/projekt/3036508 (German only)	Helfried Brunner (AIT)	Paul Zehetbauer
16	PANTERA	H2020	https://pantera-platform.eu/	Ata Khavari Melissa Setakhr (DERlab)	Venizelos Efthymiou, Christina Papadimitriou (FOSS) Mohamed Shalaby (DERlab)
17	Netzregelung 2.0	National	https://www.iee.fraunhofer.de/de/presse- infothek/Presse-	Ata Khavari (DERlab)	Mohamed Shalaby (DERlab)

			Medien/Pressemitteilungen/2018/netzregelung-2-0.html		
18	FEVER	H2020	https://fever-h2020.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Ilias Lamprinos (ICOM)
19	FLEXGRID	H2020	https://flexgrid-project.eu/	Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)	Prodromos Makris (ICCS-NTUA)
20	EU-SysFlex	H2020	https://eu-sysflex.com/	Jan Ringelstein (IEE)	Sebastian Wende von Berg (IEE)
21	INTERCONNECT	H2020	https://interconnectproject.eu/	Jan Ringelstein (IEE)	Annika Magdowski (Stadtnetz Hamburg)
22	Sharing Cities	H2020	http://www.sharingcities.eu/	Michał Kosmecki (IEn)	Bogdan Czarnecki (IEn)
23	EUniversal	H2020	https://euniversal.eu/	Michał Kosmecki (IEn)	Marcin Tarasiuk (IEn)
24	eNeuron	H2020	<i>Not available yet</i>	Michał Kosmecki (IEn)	Marcin Tarasiuk (IEn)

2.1 E-Lobster

Type - Country: Project - European

Funding Framework: Horizon 2020

Coordinator: RINA CONSULTING SPA

Website: <http://www.e-lobster.eu/>

Project duration: June 2018 - November 2021

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of E-Lobster: Gianni Loriga

Description: The renewable energy resources (RES) progressive penetration introduced an increasing degree of uncertainty on the direction of power flows. Network operators are looking at integrated solutions targeting: i) reduction of electricity losses ii) increase the grid stability in a high local RES penetration scenario iii) accommodate the needs of new energy actors such as electric vehicles (EVs), electrical storages and prosumers. Electrified transport networks such as light railways could act to enhance distribution grid stability providing ancillary services inter-exchanging electricity. However, such potential is still unexploited. E-LOBSTER intends to capture such potential through the development of an innovative, economically viable and easily replicable electric Transport-Grid Inter-Connection System that will be able to establish synergies between power distribution networks, electrified transport networks (metro, trams, light railways, etc.) and charging stations for EVs. The proposed solution encompasses the integration of high-power flow electric storage with smart soft open points providing flexible control. The system will be managed by an integrated railway plus grid management system which starting from the real time analysis of energy losses will be able to optimise the exchange of electricity between the networks maximising local RES self-consumption.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 2 "New compatible architectures for the grid" and mainly consisted of discussing use cases and exchange deliverables.

2.2 Storage4grid

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: FONDAZIONE LINKS - LEADING INNOVATION & KNOWLEDGE FOR SOCIETY

Website: <http://www.storage4grid.eu/>

Project duration: December 2016 - February 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Storage4grid: Mihai Sanduleac (MicroDERlab)

Description: The Storage4Grid (S4G) vision is to provide utilities and end-users with new tools for optimal grid planning, use and evaluation of storage technologies. S4G pre-designs new storage control models and interfaces built upon existing standards and suitable to support scalable and cost-efficient coordination of heterogeneous energy storage systems (ESS). S4G will deliver: (i) a Decision Support Framework allowing utilities to evaluate costs and benefits of existing and hypothetical storage installations, for various energy use patterns and regulatory landscapes; (ii) a

Distributed Control methodology for ESS; (iii) an innovative Unbundled Smart Meter to enable ESS control in real-life settings; (iv) an Energy Router for provision of future grid services by ESS.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In detail, the collaboration falls within the cluster area 2 “New compatible architectures for the grid” and consisted of the following actions:

- Discuss business cases and/or use cases together;
- Exchange deliverables.

2.3 Net2dg

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: AALBORG UNIVERSITET

Website: <http://www.net2dg.eu>

Project duration: January 2018 - June 2021

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Net2dg: Karsten Handrup

Description: The Net2DG project develops a proof-of-concept solution based on off-the-shelf computing hardware that uses existing communication technologies to leverage measurement capabilities of Smart Meters and distributed energy resources (DER) inverters deployed in low-voltage (LV) grids. The solution will correlate this data with information from existing DSO subsystems in order to provide novel LV grid observability applications for voltage quality, grid operation efficiency and LV grid outage diagnosis. The resulting observability is subsequently used by specifically developed robust control and coordination approaches, which utilise existing actuation capabilities for voltage quality enhancement and loss minimisation in the LV grid.

The use of off-the-shelf components, the system level resilience and security solution, and the offered customisability of the Net2DG approach specifically address the needs of small and medium-sized DSOs (less than 100.000 clients).

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 2 “New compatible architectures for the grid” and consisted of the following actions:

- Discuss business cases and/or use cases together;
- Exchange deliverables.

2.4 United-grid

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: CHALMERS TEKNISKA HOEGSKOLA AB

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

Project duration: November 2017 - April 2021

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of United-grid: Tuan Le

Description: UNITED-GRID develops a toolbox with technologies enabling at least 80% renewable-based energy production on an annual basis, with an increased reliability performance of 50%, while decreasing grid losses by 10%. The developed technologies include solutions for real-time system awareness and control, short-term generation and load forecasting, setting-less protection schemes and new business models. The toolbox will be integrated into a professional system ensuring interoperability and smooth integration with existing energy / distribution management systems on the market.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 2 “New compatible architectures for the grid” and consisted of the following actions:

- Discuss business cases and/or use cases together;
- Exchange deliverables.

2.5 Sogno

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: ERICSSON GMBH

Website: <https://www.sogno-energy.eu/>

Project duration: January 2018 - June 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Sogno: Antonello Monti (RWTH Aachen)

Description: SOGNO combines the application of deep intelligence techniques, industry grade data analysis and visualisation tools, advanced sensors, an advanced power measurement unit and 5G based information and communication technology (ICT) to provide fine grained visibility and control of both medium voltage (MV) and LV power networks using end-to-end automation in a virtualised environment. The project’s results are provided as turnkey services, validated in DSO field trials (to technology readiness level (TRL) level 6) preparing them for market introduction, beginning shortly after the project ends.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 2 “New compatible architectures for the grid” and consisted of the following actions:

- Discuss business cases or use cases together.
- Exchange deliverables.

2.6 TDX-ASSIST

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: BRUNEL UNIVERSITY LONDON

Website: <http://www.tdx-assist.eu>

Project duration: October 2017 - September 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of TDX-ASSIST: Gareth Taylor

Description: The project aims to design and develop novel ICT tools and techniques that facilitate scalable and secure information systems and data exchange between TSO and DSO. The three novel aspects of ICT tools and techniques to be developed in the project are: scalability – ability to deal with new users and increasingly larger volumes of information and data; security – protection against external threats and attacks; and interoperability – information exchange and communications based on existing and emerging international smart grid ICT standards.

The project focuses on TSO-DSO interoperability. In this context, the project will also consider data exchange between DSO and other market participants (DSOs, Aggregators, Distributed Energy Resource Operators, Micro-grid Operators) and information or data access portals that enable business processes involving relevant actors in the electrical power sector.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 2 “New compatible architectures for the grid” and consisted of the following actions:

- Discuss business cases and/or use cases together.
- Exchange deliverables.

2.7 Plan4RES

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: BRUNEL UNIVERSITY LONDON

Website: <https://www.plan4res.eu/>

Project duration: November 2017 - October 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Plan4RES: Sandrine Charousset (EDF)

Description: Plan4RES is a collaborative research and innovation project, which aims at developing an end-to-end planning tool to successfully increase the share of renewable energy into the European Energy system without compromising system reliability. The targeted platform gives account for the Pan-European interconnected electricity system, potential synergies with other energy systems, emerging technologies and flexibility resources, providing a fully integrated modelling environment. The objective is to strive towards a system where a multiplicity of models, properly organised in a functional hierarchy, synergistically contribute to the analysis of such complex systems. Targeting all main stakeholders of the power system, from generation to retail through grid operators, this innovative modelling platform will deliver a full system planning capability while considering a large set of future uncertainties, thus acting as a decision-making tool for future investments.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 4 “Flexibility assessment and modelling, including probabilistic services” and consisted of the following actions:

- Discuss business cases and/or use cases together.
- Exchange deliverables.

2.8 eDream

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: ENGINEERING - INGEGNERIA INFORMATICA SPA

Website: <https://edream-h2020.eu/>

Project duration: January 2018 - December 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of eDream: Vincenzo Croce (ENGINEERING)

Description: The eDREAM project aims to develop new solutions for DSOs, as well as improving decision-making of aggregators and energy retailers using a new decentralised and community-driven energy ecosystem by fully integrating the micro-grid and VPPs (Virtual Power Plants) to local power distribution networks. It develops blockchain-based applications for marketplace driven grid management and close-to real time demand response (DR).

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 4 “Flexibility assessment and modelling, including probabilistic services” and consisted of the following actions:

- Establish common terminology, common workshops, discuss business cases and/or use cases together;
- Exchange deliverables;
- Common distribution list, repository, discussion forum.

2.9 Flexcoop

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: Fraunhofer FOCUS

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

Project duration: January 2018 - December 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Flexcoop: Silke Cuno (Fraunhofer FOKUS)

Description: FLEXCoop introduces an end-to-end automated demand response optimisation framework. It enables the realisation of novel business models, allowing energy cooperatives to introduce themselves in energy markets under the role of an aggregator. It equips cooperatives with innovative and highly effective tools for the establishment of robust business practices to exploit their micro-grids and dynamic VPPs as balancing and ancillary assets toward grid stability and alleviation of network constraints.

Optimisation in FLEXCoop applies to multiple levels. It spans local generation output, demand and storage flexibility, as well as the flexibility offered by EVs to facilitate maximum RES integration into the grid, avoidance of curtailment and satisfaction of balancing and ancillary grid needs. This is achieved via automated, human-centric demand response schemes with the participation of appropriately selected residential prosumers.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 4 “Flexibility assessment and modelling, including probabilistic services” and consisted of the following actions:

- Establish common terminology, common workshops.
- Discuss business cases and/or use cases together.
- Exchange deliverables.

2.10 DELTA

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: ETHNIKO KENTRO EREVNAS KAI TECHNOLOGIKIS ANAPTYXIS

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

Project duration: May 2018 - April 2021

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of DELTA: Dimosthenis Ioannidis

Description: DELTA proposes a DR management platform that distributes parts of the aggregator’s intelligence into lower layers of a novel architecture, based on VPP (Virtual power plant) principles, in order to establish a more easily manageable and computationally efficient DR solution, ultimately aiming to introduce scalability & adaptiveness into the Aggregator’s DR toolkits; the DELTA engine will be able to adopt and integrate multiple strategies and policies provided from its energy market stakeholders, making it authentically modular and future-proof.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 4 “Flexibility assessment and modelling, including probabilistic services” and consisted of the following actions:

- Discuss business cases and/or use cases together.
- Exchange deliverables.

2.11 Drive

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: R2M SOLUTION SPAIN SL

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

Project duration: December 2017 - November 2020

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Drive: Monjur Mourshed

Description: DRIVE project develops and validates a fully-integrated ICT infrastructure consisting of interoperable DR-enabling Energy Management solutions for residential and tertiary buildings and a platform for effective and secure management of flexibility at the level of the distribution grid.

Collaboration activities: INTERPLAN collaborated with this project within the framework of H2020 Smart Grids and Storage projects clustering initiative. In more detail, the collaboration falls within the cluster area 4 “Flexibility assessment and modelling, including probabilistic services” and consisted of the following actions:

- Discuss business cases or use cases together.
- Exchange deliverables.

2.12 User-Chi

Type – Country: Project - European

Funding Framework: H2020

Coordinator: ETRA I+D

Website: <https://www.userchi.eu/>

Project duration: February 2020 - January 2024

Contact persons on behalf of INTERPLAN: Gabriella Rossi, Maria Valenti (ENEA)

Contact persons on behalf of User-Chi: Antonio Marques (ETRA I+D), Natascia Andrenacci (ENEA).

Description: The Project will co-create and demonstrate smart solutions around 7 connecting nodes of the Mediterranean and Scandinavian-Mediterranean Trans European Network-Transport (TEN-T) corridors to boost a massive e-mobility market take-up in Europe. Its industry powered, city driven and user-centric approach will allow to pursue the objectives of unlocking the massive potential of electromobility in Europe by designing electric charging networks around user needs, deploying an interoperability framework and platform, enhancing scalable infrastructure roll-out by means of smart grid integration. Furthermore, marketable, innovative and highly convenient charging systems will be developed and novel sustainable business and market models will be demonstrated, finally providing also legal and regulatory recommendations for a massive deployment of electric vehicles.

Collaboration activities: The main envisaged collaboration activities consist in the following actions:

- Establish common terminology, discuss business cases or use cases together;
- Exchange deliverables;
- Common distribution list, repository, discussion forum.

2.13 RdS– Project 2.7

Type – Country: Project – National (Italy)

Funding Framework: 2019-2021 Research Program for the National Electricity System (RdS)

Coordinator: ENEA

Website: n.a.

Project duration: January 2019 - December 2021

Contact persons on behalf of INTERPLAN: Gabriella Rossi, Maria Valenti (ENEA)

Contact persons on behalf of the RdS Project: Maria Valenti (ENEA)

Description: The project aims to study the integration of new DC networks into the current AC distribution networks with a view to improving the overall system reliability. Thus, in the project methodologies and tools will be studied for analysing the reliability of DC –AC integrated distribution networks, both medium and low voltage. Also, the project will aim to implement a tool for the study of the reliability of configurations including necessary systems and equipment to meet the

environmental targets set out in national energy plans. In detail, the project will address the DC-AC interconnection issues in order to assess and highlight the effects on the reliability of mixed networks in evolutionary scenarios for the Italian electricity market and will also validate the configurations and scenarios modelled in an experimental laboratory environment.

Collaboration activities: The collaboration activities have mainly been including the following actions:

- Exchange of deliverables;
- Organization of workshops and joint assessment of common use cases and control systems;
- Organization of a virtual meeting for discussing the possible exploitation of the INTERPLAN tools and methodologies by the RdS Project.

2.14 ERIGrid 2.0

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: Austrian Institute of technology (AIT)

Website: <https://erigrad2.eu/>

Project duration: April 2020 - September 2024

Contact persons on behalf of INTERPLAN: Ata Khavari (DERlab), Helfried Brunner (AIT)

Contact persons on behalf of ERIGrid 2.0: Ata Khavari (DERlab), Thomas Strasser (AIT)

Description: ERIGrid 2.0 is a Horizon 2020 project funded and supported by the European Commission. It serves as a single point of reference, promoting research, technology development and innovation on all aspects of smart grids, smart energy systems, and integration of renewables. This is achieved through a pan European approach by integrating over 20 European research centres and institutions. This is to co-develop novel methods, test procedures and use cases for future smart energy systems. Developing a coordinated and integrated approach using each partners' expertise and infrastructures more effectively adds value to research projects and investments at all levels. Thus, spearheading European leadership in smart grids, smart energy systems, and renewables' integration is advanced even further. The project also facilitates a wider sharing of knowledge, research services, and corresponding tools/techniques across fields and between academia and industry all over Europe. Based on the results from the ERIGrid 1.0 project, its successor ERIGrid 2.0 will expand the research services and tools of research infrastructures for validating smart energy networks with the electric power grid as the main backbone. Committed to the holistic and cyber-physical systems-based validation approach, ERIGrid 2.0 will foster system-level support and education for industrial and academic researchers in power and energy systems research and technology development.

Collaboration activities: In the INTERLAN project, several use cases were developed in order to showcase the developed tool and to test and validate control functions meant for network operation planning. As ERIGrid 2.0 is aimed to enhance testing methodologies, these use cases will be also considered as candidates for the evaluation process in this project.

2.15 Power System Cognification - PoSyCo

Type – Country: Collaborative Research Project - Austria

Funding Framework: National Funding “Lighthouse Project Energy Research”

Coordinator: AIT - Austrian Institute of Technology

Website: <https://projekte.ffg.at/projekt/3036508> (German only, no project website available)

Project duration: January 2019 - December 2021

Contact persons on behalf of INTERPLAN: Helfried Brunner

Contact persons on behalf of PoSyCo: Paul Zehetbauer

Description: PoSyCo – the Power System Cognification flagship project – aims for a blueprint of smart grid implementation of advanced functionalities from a system specific point of view. PoSyCo supports the ‘Energiewende’ (energy transition) and the cognification (increasing intelligence within system operation). PoSyCo’s ambitious functional goal is the conceptualization and laboratory proof of concept of a ‘SOFTprotection’ system as an add-on for protection and control mechanisms in low and medium voltage grids. The project result will be a widely autonomous support system offering extendable functionality and their efficient system and process integration enabled by state of the art industrial Internet of Things technology. The ‘SOFTprotection’ concept will be investigated within six PoSyCo Use Cases and along the physical, ICT and process dimension to ensure future protection of the power system.

Collaboration activities: Deep interaction concerning the grid equivalent approach. For developing and testing functionalities of PoSyCo Soft protection, different types of low voltage grids were requested. Within PoSyCo, the INTERPLAN grid equivalent approach has been applied in order to gain exemplary low voltage grids.

2.16 PAN European Technology Energy Research Approach (PANTERA)

Type - Country: Project - European

Funding Framework: Horizon 2020

Coordinator: FOSS

Website: <https://pantera-platform.eu/>

Project duration: January 2019 - December 2022

Contact persons on behalf of INTERPLAN: Ata Khavari, Melissa Setakhr (DERlab)

Contact persons on behalf of PANTERA: Venizelos Efthymiou, Christina Papadimitriou (FOSS), Mohamed Shalaby (DERlab)

Description: PAN European Technology Energy Research Approach (PANTERA) is a EU H2020 project aimed at setting up a European forum composed of Research & Innovation stakeholders active in the fields of smart grids, storage and local energy systems, including policy makers,

standardisation bodies and experts in both research and academia, representing the EU energy system.

Collaboration activities: PANTERA project aims to identify the needs and missing links that hinder the R&D on smart grids for the European platform by engaging different stakeholders through workshops and consultation processes. Under this prism, PANTERA is in collaboration with INTERPLAN and especially with WP2 activities that highlight the needs for regulation and grid codes and provide recommendation. Especially, the outcomes of WP2 activities during the last year of the project i.e. consultation, virtual workshop and targeted interviews will be supporting the PANTERA platform.

Furthermore, INTERPLAN joined forces with PANTERA and organised a joint workshop at the MedPower 2020 conference on 10 & 11 November 2020. The workshop covered different aspects that the Energy Transition needs to address in order to contribute to the Energy Targets of EU efficiently. The status of the smart grids regional evolution was presented while use cases were highlighted covering technologies -such as Energy storage, Demand Response, Renewables and Electric mobility- that are critical to the energy transition including the Energy Communities and the Operators' perspective. The workshop mainly hosted activities and content of the Horizon 2020 CSA project PANTERA complimented with the work / results of the NAVIGANT / SWECO contract and the Horizon 2020 project INTERPLAN.

2.17 Netzregelung 2.0 (Grid Control 2.0)

Type - Country: Project - Germany

Funding Framework: Federal Ministry of Economic Affairs and Energy (National project)

Coordinator: Dr. -Ing. Philipp Strauß, Fraunhofer IEE

Project duration: December 2017 – November 2021

Website: <https://www.iee.fraunhofer.de/de/presse-infothek/Presse-Medien/Pressemitteilungen/2018/netzregelung-2-0.html>

Contact persons on behalf of INTERPLAN: Ata Khavari (DERlab)

Contact persons on behalf of Netzregelung 2.0: Mohamed Shalaby (DERlab).

Description: In order to cut down the greenhouse gases emission levels, conventional power plants will be replaced by decentralized generation (renewable energy resources) in the near future. In this research project, "Grid Control 2.0" research institutes, inverter manufacturing companies, technical regulators of power grids in Germany and grid operators develop new technologies in which the electric grid will be mainly operated from inverter-connected generators, without compromising safety and stability of the grid. To attain frequency and voltage stability, the grid inverters should possess similar properties like synchronous generators. Grid-forming inverters would replace today's conventional power plants providing virtual inertia.

Grid codes sets the minimum technical requirements for connecting renewable energy resources and battery systems, which were recently harmonized at all the voltage levels. After completion of this project, the results from this project will also help in further improving the aforementioned technical guidelines.

Collaboration activities: INTERPLAN and Netzregelung 2.0 share the task of the analysis of grid codes and regulatory framework in the context of integration and connection of RES into the grid. In this context, there was an exchange of information and analysis results, which was an added value for both projects.

2.18 FEVER

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: INTRACOM

Website: <https://fever-h2020.eu/>

Project duration: February 2020 - July 2023

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of FEVER: Ilias Lamprinos

Description or focus area: The European Research & Innovation project FEVER will demonstrate and implement solutions that leverage the potential of flexibility in generation, consumption and storage of electricity for optimal management of power grids. Deploying artificial intelligence and ledger technologies, peer-to-peer trading of flexible energies and a toolbox comprising advanced monitoring and prediction algorithms, FEVER empowers distribution system operators (DSOs) to better observe and manage their grids.

Collaboration activities: INTERPLAN can collaborate with this project in the future as the INTERPLAN tool solutions can fit in and complement the DSO toolbox of FEVER project. The DSO operational challenges as addressed in INTERPLAN through the use cases and the relevant showcases can form a basis for FEVER to test the flexibility solutions that they develop.

2.19 Flexgrid

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: ICCS-National Technical University of Athens (NTUA)

Website: <https://flexgrid-project.eu/>

Project duration: October 2019 - September 2022

Contact persons on behalf of INTERPLAN: Viviana Cigolotti, Marialaura Di Somma, Giorgio Graditi (ENEA)

Contact persons on behalf of Fever: Prodromos Makris

Description or focus area: FLEXGRID's main objective is to develop and deliver tools and solutions that facilitate:

- DSOs/TSOs who manage their electricity grid safely and at low-cost by interacting with Energy Service Providers (ESPs) and Renewables Producers (RESPs) through novel flexibility market procedures,
- Modern ESPs becoming more competitive and sustainable, and
- RESPs optimally composing and exploiting their production in a risk-averse manner by making their RES generation dispatchable.

Collaboration activities: INTERPLAN can collaborate with this project in the future as the INTERPLAN tool solutions can complement the FLEXGRID market solutions, offering a holistic approach of the energy value chain that is missing today. The DSO operational challenges as addressed within INTERPLAN through the use cases and the relevant showcases can form a basis for FLEXGRID to develop the business cases and test the market solutions for offering flexibility.

2.20 EU-SysFlex

Type – Country: R&D, Europe

Funding Framework: H2020

Coordinator: EIRGRID, Ireland

Website: <https://eu-sysflex.com/>

Project duration: November 2017 - October 2021

Contact persons on behalf of INTERPLAN: Jan Ringelstein (IEE)

Contact persons on behalf of EU-Sysflex: Sebastian Wende von Berg (IEE)

Description: From the project [brochure](#): *“Given the ambitious target set by the EU, power system operations across Europe will go through transformational change over the next decade. There are several key factors affecting the system that will lead to a more complex environment. This will require innovative solutions to facilitate the necessary level of integration of renewable energy sources. This will result in a more complex environment from a system operation perspective presenting new challenges not previously seen before. This increasingly complex environment will require a flexible and responsive system that is far more dynamic than ever before, while remaining secure, reliable, resilient, stable and cost-effective for citizens. EU-SysFlex will first identify the needs of the future power system with a high share of renewables. It will then make recommendations for enhancing market design and regulation to enable new business solutions. Seven industrial-scale demonstrations will be conducted testing new flexibility and system services. Drawing on the replicability and scalability analysis, the research and innovation project will ultimately come up with a roadmap of change for Europe.”*

Collaboration activities: The EU-SysFlex partners include EIRGRID, Innogy and EDF. The advisory board also includes Fingrid, Tennet, 50hertz and Litgrid. All of these are considered stakeholders interested in INTERPLAN and its outcomes, so there is potential for collaboration. As a first step, information about INTERPLAN and a short questionnaire was sent to EURACTIV, the EU-SysFlex partner responsible for dissemination and collaboration.

2.21 INTERCONNECT

Type – Country: R&D, Europe

Funding Framework: H2020

Coordinator: INESC TEC, Portugal

Website: <https://interconnectproject.eu/>

Project duration: October 2019 - September 2023

Contact persons on behalf of INTERPLAN: Jan Ringelstein (IEE)

Contact persons on behalf of INTERCONNECT: Annika Magdowski

Description: The goal of INTERCONNECT is to develop and demonstrate advanced solutions for connecting and converging digital homes and buildings with the electricity sector, researching interoperable Smart Home, Building and Smart Grid solutions. From the project booklet: *“The project, which was approved by the European Commission under the Horizon 2020 programme, places the foundation for the future of smart energy management solutions by seven connected large-scale test-sites in Portugal, Belgium, Germany, the Netherlands, Italy, Greece and France. The solutions developed within the scope of InterConnect will allow a digitalisation of homes, buildings and electric grids based on an Internet of Things (IoT) architecture. By including digital technologies (artificial intelligence, Blockchain, Cloud and Big Data) based on open standards, such as SAREF, it will guarantee the interoperability between equipment, systems and privacy/cybersecurity of user data. Energy users in buildings, either residential or non-residential, manufacturers, distribution grid operators and the energy retailers will have the opportunity to take advantage of these solutions. The InterConnect project will focus on eight major domains: standardisation, ontology, digital platforms, IoT, cloud, electric grid, big data and cybersecurity.”*

Collaboration activities: INTERCONNECT is a major H2020 project gathering 50 partners from 11 countries. Although it is focused on IT, smart homes and buildings, it includes three DSOs and several manufacturers who may well be interested in application of smart low-voltage grid automation for grid friendly operation of emerging technologies up to the TSO level. Hence, there is potential for collaboration in the future.

2.22 Sharing Cities

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: GREATER LONDON AUTHORITY

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

Project duration: January 2016 - December 2020

Contact persons on behalf of INTERPLAN: Michał Kosmecki (IEn)

Contact persons on behalf of Sharing Cities: Bogdan Czarnecki (IEn)

Description: The Sharing Cities ‘lighthouse’ programme is a proving ground for a better, common approach to making smart cities a reality. By fostering international collaboration between industry

and cities, the project seeks to develop affordable, integrated, commercial-scale smart city solutions with a high market potential. The project partners work in close cooperation with the European Innovation Partnership on Smart Cities and Communities and with other `lighthouse` consortia.

Sharing Cities offers a framework for citizen engagement and collaboration at local level, thereby strengthening trust between cities and citizens. The project draws on €24 million in EU funding. It aims to trigger €500 million in investment and to engage over 100 municipalities across Europe.

Collaboration activities: An extensive part of the Sharing Cities project is aimed at utilisation and further development of energy management systems (EMS) for cities. Apart from considerations in the areas of data and communication technology, interfaces and system architecture and integration, a lot of attention was put to devising different control strategies and algorithms. Therefore, there are at least two ways of possible collaboration between Sharing Cities project and INTERPLAN project. The first one consists in analysing how a city equipped with EMS could possibly constitute a controllable asset for the DSO or the TSO in a way that it could provide ancillary services. The main purpose of city EMS is to optimise energy consumption, but there could be other goals that EMS could contribute to. The second collaboration activity is to analyse which control algorithms could be mutually adopted in the project. For instance, some mechanisms of UC2 (Grid Congestion Management) or UC7 (Optimal Energy Interruption Management) could be applied to the city level. And vice versa - EMS control strategies such as 'advanced predictive controls optimising performance based on a forecast of the future' could be generalised and utilised for a wider scale of DSO or TSO. These two collaboration areas were discussed between IEn's project representatives.

2.23 EUniversal

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: EDP DISTRIBUICAO ENERGIA SA

Website: <https://euniversal.eu/>

Project duration: February 2020 - July 2023

Contact persons on behalf of INTERPLAN: Michał Kosmecki (IEn)

Contact persons on behalf of EUniversal: Marcin Tarasiuk (IEn)

Description: The EUniversal project, funded by the European Union, aims to develop a universal approach on the use of flexibility by Distribution System Operators (DSO) and their interaction with the new flexibility markets, enabled through the development of the concept of the Universal Market Enabling Interface (UMEI) – a unique approach to foster interoperability across Europe. The UMEI represents an innovative, agnostic, adaptable, modular and evolutionary approach that will be the basis for the development of new innovative services, market solutions and, above all, implementing the real mechanisms for active consumer, prosumer, and energy community's participation in the energy transition.

Collaboration activities: Collaboration activities between the two projects are focused around the Polish demo of the EUniversal project. The background of this demo is the following. An increased

number of micro-generation systems (in case of Polish network – PV installation) can potentially result in the following problems: increase of voltage levels above the admissible values and overloads of network elements (lines and transformers). The proposed solution, which is improving distribution grid resiliency by:

- new innovative monitoring and control,
- integrated tools/systems to support grid operation and planning,
- new market mechanisms and services incentivizing flexibility

is highly embedded in the methodology devised within the INTERPLAN. Not only does the demo reflect one of the INTERPLAN scenarios, but more importantly the solutions developed in the two projects are similar.

2.24 eNeuron

Type – Country: Project - European

Funding Framework: Horizon 2020

Coordinator: AGENZIA NAZIONALE PER LE NUOVE TECNOLOGIE, L'ENERGIA E LO SVILUPPO ECONOMICO SOSTENIBILE (ENEA)

Website: Not available yet

Project duration: November 2020 - 31 October 2024

Contact persons on behalf of INTERPLAN: Michał Kosmecki (IEn)

Contact persons on behalf of eNeuron: Marcin Tarasiuk (IEn)

Description: The main goal of the eNeuron project is to develop innovative tools for the optimal design and operation of local energy communities (LECs) integrating distributed energy resources and multiple energy carriers at different scales. This goal will be achieved by having in mind all the potential benefits for the different actors involved and by promoting the Energy Hub concept, as a conceptual model for controlling and managing multi-carrier and integrated energy systems in order to optimize their architecture and operation. In order to ensure both the short-term and the long-term sustainability of this new energy paradigm and thus support an effective implementation and deployment, economic and environmental aspects will be taken into account in the optimization tools through a multi-objective approach. eNeuron's proposed tools enable tangible sustainability and energy security benefits for all the stakeholders in the LEC. Local prosumers (households, commercial and industrial actors) stand to benefit through the reduction of energy costs while leveraging local, low carbon energy. Developers and solution providers will find new opportunities for technologies as part of an integrated, replicable operational business model. Distribution system operators (DSOs) benefit from avoiding grid congestion and deferring network investments. Policy makers benefit from increasingly sustainable and secure energy supply systems. eNeuron is a high TRL project in line with the Work Programme, by developing innovative approaches and methodologies to optimally plan and operate integrated LECs through the optimal selection and use of multiple energy carriers and by considering both short- and long-run priorities. Through optimally

coordinating all energy carriers and vectors, cost-effective and low-carbon solutions will be provided for fostering the deployment and implementation of this new energy paradigm at European level.²

Collaboration activities: eNeuron is a new project that could demonstrate the controllability and manageability of a local energy community (LEC). From the INTERPLAN perspective, such a LEC could serve the purpose of a controllable asset, which the planning tool of INTERPLAN could take into account. However, the level of controllability is yet unknown, so this could be a valuable result of the eNeuron project for the INTERPLAN project.

² <https://cordis.europa.eu/project/id/957779/de>

3 Collaboration and information exchange with initiatives, networks and platforms

In the following table is a brief overview of the initiatives, networks and platforms INTERPLAN has been in collaboration with during the third year of the project and/or possible collaborations that could happen after the project ending.

Table 2: List of networks, platforms, and initiatives

<i>ID No.</i>	<i>Name</i>	<i>Type</i>	<i>Website</i>	<i>INTERPLAN contact persons</i>	<i>Network/ Initiative/ Platform contact person</i>
1	INEA	Organisation	https://ec.europa.eu/inea/en	Marialaura Di Somma, Maria Valenti (ENEA), Ata Khavari (DERlab) Christina Papadimitriou (FOSS)	Adas Pangonis (EC)
2	Mission Innovation - Innovation Challenge on Smart Grids	Initiative (global)	http://mission-innovation.net/our-work/innovation-challenges/smart-grids-challenge/	Marialaura Di Somma (ENEA)	Luciano Martini (RSE)
3	International Smart Grid Action Network - Annex 6	IEA Technology Collaboration Program	https://www.iea-isgan.org/our-work/annex-6/	Helfried Brunner	Joni Rossi (RISE, Sweden, Annex 6 lead), Barbara Herndler (AIT)
4	DERlab	Network	https://der-lab.net/	Ata Khavari Melissa Setakhr (DERlab)	Ata Khavari Melissa Setakhr (DERlab)
5	EERA JP SG	Network/ Programme	https://www.eera-set.eu/eera-joint-programmes-jps/list-of-jps/smart-grids/	Venizelos Efthymiou, Christina Papadimitriou (FOSS)	Luciano Martini (RSE), Giorgio Graditi (ENEA)

6	Electricity Authority of Cyprus (EAC)	Company (authority)	https://www.eac.com.cy	Venizelos Efthymou (FOSS)	Minas Patsalides, Tasos Gregoriou (EAC)
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3.1 INEA

Type – Country: Initiative – European

Website: <https://ec.europa.eu/inea/en>

Contact persons on behalf of INTERPLAN: Maria Valenti (ENEA), Marialaura Di Somma (ENEA), Ata Khavari (DERlab), Christina Papadimitriou (FOSS)

Contact persons on behalf of INEA: Adas Pangonis (EC)

Description: The Innovation and Networks Executive Agency (INEA) is the successor of the Trans-European Transport Network Executive Agency (TEN-T EA), which was created by the European Commission in 2006 to manage the technical and financial implementation of its TEN-T programme. INEA officially started its activities on 1 January 2014 in order to implement the following EU programmes:

- Connecting Europe Facility (CEF)
- Parts of Horizon 2020 – Smart, green and integrated transport & secure, clean and efficient energy
- Legacy programmes: TEN-T and Marco Polo 2007-2013

INEA's main objective is to increase the efficiency of the technical and financial management of the programmes it manages.

Collaboration activities: INTERPLAN reported on the activities carried out during the reference period. Furthermore, potential synergies and initiatives within the “H2020 Low TRL Smart Grids and Storage project clustering workshops” were jointly discussed.

3.2 Mission Innovation (Innovation Challenge #1 on Smart Grids)

Type – Country: Initiative - Global

Coordinators of the Innovation Challenge #1 on Smart Grids: Italy, China, India

Website: <http://mission-innovation.net/our-work/innovation-challenges/smart-grids-challenge/>

Contact persons on behalf of INTERPLAN: Marialaura Di Somma (ENEA)

Contact persons on behalf of Mission Innovation (Innovation Challenge #1 on Smart Grids): Luciano Martini (RSE)

Description: Mission Innovation (MI) is a global initiative of 23 countries and the EU which aims to accelerate the global clean energy innovation. As part of the initiative, participating countries have committed to double their governments' clean energy research and development (R&D) investments over five years, while encouraging greater levels of private sector investment in transformative clean energy technologies. These additional resources will dramatically accelerate the availability of advanced technologies, in order to define a future global energy mix that is clean, affordable, and reliable. MI consists of eight Innovation Challenges, aimed at catalysing the global research efforts in areas that could provide significant benefits in reducing GHG emissions, increasing energy security, and creating new opportunities for clean economic growth. Among these challenges, Innovation Challenge #1 is dedicated to smart grids development and has the goal to enable future grids that are powered by affordable, reliable and decentralised renewable electricity systems.

Collaboration activities: There has been information sharing about INTERPLAN project with the Italian members participating to MI Innovation Challenge #1 on Smart Grids.

3.3 International Smart Grid Action Network (ISGAN)

Type – Country: IEA Technology Collaboration Programme - Global

Coordinator(s): Luciano Martini (Italy), Russ Conklin (Belgium), Maarten Noeninckx (Belgium), Arun K. Mishra (India)

Website: <https://www.iea-isgan.org>

Contact persons on behalf of INTERPLAN: Helfried Brunner (AIT)

Contact persons on behalf of ISGAN Annex 6: Joni Rossi (RISE, Sweden), Barbara Herndler (AIT, Austria)

Description: ISGAN is the short name for the International Energy Agency (IEA) Technology Collaboration Programme (TCP) for a Co-operative Programme on Smart Grids (ISGAN – International Smart Grids Action Network). It is also an initiative of the Clean Energy Ministerial (CEM) and was formally established at CEM2 in Abu Dhabi, in 2011 as an Implementing Agreement under a framework of the International Energy Agency (IEA).

The International Smart Grid Action Network (ISGAN) creates a strategic platform to support high-level government attention and action for the accelerated development and deployment of smarter, cleaner electricity grids around the world.

Annex 6 on Power Transmission & Distribution Systems focuses on system-related challenges, with emphasis on the technologies, market solutions, and policies, which contribute to the development of system solutions. Among others, there is one focus on transmission and distribution system interaction. It includes studies on how distribution and transmission networks could interact in the future, ensuring stable grid operation under high levels of renewables.

Collaboration activities: By the end of 2020, ISGAN is going to publish a report on lessons learned from international projects on TSO-DSO interaction. INTERPLAN is going to share the main project results and lessons learned to be included in the ISGAN report.

3.4 DERlab: European Distributed Energy Resources Laboratories e.V.

Type - Country: Network - International

General Manager: Diana Strauss-Mincu

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

Contact persons on behalf of INTERPLAN: Ata Khavari, Melissa Setakhr (DERlab)

Contact persons on behalf of DERlab e. V.: Ata Khavari, Melissa Setakhr (DERlab)

Description: 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.

Collaboration activities: INTERPLAN is regularly promoted through DERlab's various online and offline channels such as the internal (members-reserved) newsletter, the public newsletter, the LinkedIn channel and the public website. In addition to that, INTERPLAN was featured in more than 10 pages in the DERlab Public Activity Report 2018-2020 "*The Pan-European Smart Grid: Innovative Tools and Demonstration Activities for Future Grid Planning and Operation*", which was promoted online and also sent to members of the DERlab network and the INTERPLAN consortium. USB sticks were also used as a means of promotion, containing INTERPLAN logo and all project information (factsheets, flyers, public deliverables, publications, etc.)

3.5 EERA Joint Programme Smart Grids (EERA JP SM) network

Type – Country: Initiative - European

Coordinator(s): Luciano Martini (RSE)

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

Contact persons on behalf of INTERPLAN: Venizelos Efthymiou, Christina Papadimitriou (FOSS)

Contact persons on behalf of EERA JP SG: Luciano Martini (RSE), Giorgio Graditi (ENEA)

Description: The Joint Programme on Smart Grids was officially launched at the SET Plan Conference in Madrid (3-4 June 2010). The Joint Programme, coordinated by RSE and ENEA from Italy by means of an extended cross-disciplinary cooperation involving many Research and Development (R&D) participants with different and complementary expertise and facilities aims at addressing one of the most critical areas directly relating to the effective acceleration of smart grid development and deployment in a medium to long-term research perspective. On December 2013, the JP successfully launched ELECTRA, the EC funded (FP7) Integrated Research Programme on Smart Grids technologies.

Collaboration activities: EERA JP SG closely follows the project and its outcomes. INTERPLAN partners report in every meeting on the collaboration with stakeholders groups of EERA for contribution to INTERPLAN.

- 33th EERA JP Steering Committee Meeting, virtual meeting 2020

3.6 Electricity Authority of Cyprus (EAC-Cyprus)

Type – Country: Company - Cyprus

Website: www.eac.cy

Contact persons on behalf of INTERPLAN: Venizelos Efthymiou (FOSS)

Contact persons on behalf of EAC: Tasos Gregoriou (EAC), Minas Patsalides (FOSS)

Description: EAC is the distribution and transmission operator of the Cyprus grid.

Collaboration activities: The main collaboration activities between INTERPLAN and EAC within the last year of the project are:

- Brainstorming sessions and targeted interviews for the INTERPLAN outcomes
- Validation and testing of the INTERPLAN tool

- Proposals for enhancing the tool in the future

4 Other collaborations

The INTERPLAN consortium collaborated with three online international events during which the project was presented and project partners participated in round tables and interacted with stakeholders.

4.1 Enlit

Website: <https://www.enlit-europe.com/>

Contact persons on behalf of INTERPLAN: Ata Khavari, Melissa Setakhr (DERlab)

Contact persons on behalf of Enlit: Rogier Kuttschreuter, Linda Görtler-Weiss (Clarion Energy)

Description: Enlit, which is the new unifying brand for Clarion Energy's worldwide series of Utility Week (European Utility Week, etc.) and POWERGEN events, has been adapting itself to fit to the current SARS-CoV 2 situation and according limitations. Enlit put in place an online platform for collaboration and innovation to find solutions to the most pressing energy-related issues. In 2020, Enlit Europe has been hosting its programme online, through live sessions, interviews, panel discussions, networking breakout sessions, etc.

Collaboration activities: It was planned to host the last INTERPLAN workshop at Enlit 2020 as we believe Enlit's event is a key event to disseminate project results and interact with relevant stakeholders. However, considering the situation the event was cancelled and Enlit came up with an online platform on which live sessions, panel discussions, etc. happen on a regular basis. Enlit also prepared a special section for Horizon 2020 projects in collaboration with the European Commission, called the EU zone and INTERPLAN is being represented (<https://www.enlit-europe.com/visiting/eu-projects-zone>), in the EU zone page and through a video pitching what the project is about, which will be promoted to Enlit's large audience and social media coverage.

4.2 European Power Strategy & Systems Summit 2020

Website: <https://www.europeanpowergeneration.eu>

Contact persons on behalf of INTERPLAN: Ata Khavari, Melissa Setakhr (DERlab)

Contact persons on behalf of European Power Strategy & Systems Summit: Constantine Ioannides

Description: The European Power Strategy & Systems Summit takes places every year and focuses on the challenges and opportunities faced by the energy and power-related stakeholders. *“Examining the inter-play between the technological, regulatory and economic trends affecting the development of conventional and renewable power, delegates gain crucial market intelligence regarding how to proceed with the development and management of their assets and power portfolio. At the summit delegates have the opportunity to hear from the most qualified experts bringing the issues to life using the most recent, high profile and relevant case-studies.”*³. Because of the

³ Description of the event from <https://www.europeanpowergeneration.eu/index.html>

situation, the event is taking place online this year, between the 30th of November and 2nd of December.

Collaboration activities: We have been collaborating with the EPG Summit to have a dedicated session for INTERPLAN to be presented. We have been pre-recording a session that will be promoted to the large audience of the event and through their social media channels, as well as ours. The event is particularly relevant to the project as the audience is mainly composed of system operators and regulators.

(https://europeanpowergeneration.eu/PowerEuropeAgendaMainConferenceDay1_1stDec.html)

4.3 Mediterranean Conference on Power Generation, Transmission, Distribution and Energy Conversion (MedPower 2020)

Website: <http://medpower2020.org/>

Contact persons on behalf of INTERPLAN: Ata Khavari, Melissa Setakhr (DERlab)

Contact persons on behalf of MedPower: Venizelos Efthymiou (FOSS)

Description: MedPower 2020 virtually took place between the 9 and 12th of November 2020 and provided the opportunity for engineers, scientists, technicians, researchers, scholars and companies to exchange ideas and discuss the latest research achievements in academia and industry. MedPower 2020 covers all aspects of power system design, operation, and planning, including the integration of ICT and energy systems, as well as addressing challenges in the future energy markets.

Collaboration activities: The INTERPLAN session in MedPower 2020 *“The INTERPLAN tool: How emerging technologies can support the operators in managing efficiently a high RES grid”* took place on 11 November 2020. INTERPLAN collaborated with H2020 PANTERA project within their virtual workshop *“Energy transition through optimal use of the rich Renewable Energy Resources of the Mediterranean basin”*.

The workshop covered many aspects the energy transition needs to address in order to contribute efficiently to the Energy Targets of the EU. The status of the smart grids regional evolution was also discussed, along with use cases covering technologies such as Energy storage, Demand Response, Renewables and Electric mobility, which are critical to the energy transition.

The INTERPLAN session tackled the INTERPLAN tool and how it can provide solutions to the operators for managing the grid with high RES penetration and emerging technologies, especially applicable to the challenges of the non-interconnected islands of the Mediterranean.

5 Conclusion and outlook

In this report, the collaborations of the INTERPLAN consortium with other relevant projects (national and international), initiatives, networks, organisations, platforms, as well as other kinds of collaboration are reported and summarised. Various means and channels were used for these collaborations and information exchange to take place, namely personal contact, email exchanges, participation at online events and webinars, round tables, joint events, joint papers, etc.

During the third and final project year, INTERPLAN partners have been in touch and cooperated with stakeholders of 21 EU-funded projects, 3 national projects, 2 European programmes, 1 European platform, 1 national electric authority, 1 working group, 1 international network and 1 global initiative. All of these collaborations have been fruitful in various ways and have brought important feedback and insights to the project partners. A few examples of how these collaborations have been valuable to the INTERPLAN project are listed below:

- With H2020 ERIGrid 2.0: In INTERPLAN project, several use cases were developed in order to showcase the developed tool and to test and validate control functions meant for network operation planning. As ERIGrid 2.0 is aimed to enhance testing methodologies, these use cases will be also considered as candidates for the evaluation process in this project.
- With Power System Cognification - PoSyCo (Austrian project): There was deep interaction concerning the grid equivalent approach. For developing and testing functionalities of PoSyCo Soft protection, different types of low voltage grids were requested. Within PoSyCo, the INTERPLAN grid equivalent approach has been applied in order to gain exemplary low voltage grids.
- With H2020 PANTERA: PANTERA and INTERPLAN collaborated closely, especially within WP2 activities that highlight the needs for regulation and grid codes and provide recommendation. The outcomes these activities during the last year of the project i.e. consultation, virtual workshop and targeted interviews will be supporting and promoted through PANTERA platform. Furthermore, INTERPLAN joined forces with PANTERA and organised a joint workshop, which took place at MedPower 2020.
- With H2020 Fever: INTERPLAN can collaborate with this project in the future as the INTERPLAN tool solutions can fit in and complement the DSO toolbox of FEVER project. The DSO operational challenges as addressed in INTERPLAN through the use cases and the relevant showcases can form a basis for FEVER to test the flexibility solutions that they develop.
- With H2020 eNeuron: eNeuron is a new project that aims to demonstrate the controllability and manageability of a local energy community. From the INTERPLAN perspective, such a community could serve the purpose of a controllable asset, which the planning tool of INTERPLAN could take into account.
- With EAC Cyprus: INTERPLAN has been in collaboration with EAC Cyprus, especially regarding the tool development and for the INTERPLAN scenarios and use cases i.e. forming the grid case study, time series etc.

- With ISGAN: By the end of 2020, ISGAN is going to publish a report on lessons learned from international projects on TSO-DSO interaction. INTERPLAN is going to share the main project results and lessons learned to be included in the ISGAN report.
- With DERlab: INTERPLAN was featured in more than 10 pages in DERlab Public Activity Report 2018-2020 *“The Pan-European Smart Grid: Innovative Tools and Demonstration Activities for Future Grid Planning and Operation”*, which was promoted online and sent to members of the DERlab network and the INTERPLAN consortium.
- With various international events and conferences, including Enlit, MedPower2020 and European Power Strategy & Systems Summit 2020.

Considering the above-listed collaborations and the results we achieved during the third and final year of the project, we consider that successful cooperation with several ongoing international/national activities related to INTERPLAN’s domain of activity has been achieved.

6 Annex

6.1 List of tables

Table 1: List of European and national projects 9
Table 2: List of networks, platforms, and initiatives 28