European Commission

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Synergies between demos – ID Cards

Regulation & Data Management Working Groups

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LEGAL NOTICE

DOCUMENT INFORMATION

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Bridge WG/TF Chairmanship

- Manuel Serrano – *Chair*
- Helena Gerard – *Chair*
- Kriss Kessels – *Co-Leader*

INDEX

List of Acronyms and Abbreviations

aFRR	Automatic Frequency Restoration Reserve
AM	Ancillary Market
AVC	Automatic Voltage Control
BESS	Battery Energy Storage System
BRP	Balance Responsible Party
CHP	Combined Heat and Power
DH	District Heating
DSM	Demand Side Management
DR	Demand Response
DSO	Distribution System Operator
DSR	Demand Side Response
DTR	Dynamic Thermal Rating
ESS	Energy Storage Systems
EV	Electric Vehicle
FRR	Frequency Restoration Reserve
HPP	Hydro Power Plant
HV	High Voltage
IACMS	Integrated Asset Condition Management System
mFRR	Manual Frequency Restoration Reserve
MV	Medium Voltage
OLTC	On Load Tap Changer
PFC	Power Flow Control
PV	Photovoltaic
RES	Renewable Energy Sources
RES-CC	Renewable Energy Sources Coordination Centre
SCADA	Supervisory Control and Data Acquisition
SETS	Smart Electric Thermal Storage
SO	System Operator
STATCOM	Static Synchronous Compensator
STO-CC	Storage Coordination Centre
TSO	Transmission System Operator

V2B	Vehicle-2-Building
V2G	Vehicle-to-Grid
VSP	Virtual Storage Plant
WAMS	Wide Area Monitoring System
WG	Working Group
WPP	Wind Power Plant

Executive Summary

This report summarises the activities undertaken by BRIDGE Regulation WG related to Action 5 – Synergies between demos (ID Cards). This Action aims to initiate a common repository of information on demo sites using generic demo ID cards which were developed within this action.

The ID cards were designed based on discussions and experiences from the members of the Regulation WG and provide information on development of demo sites, their assets and expected outcomes.

This report presents samples of the ID cards from various projects that participated in the first stage of the data collection process.

The report also provides a specification for a solution for a web repository that should allow easy search through the demo sites across Europe.

Introduction

This report summarises the activities undertaken by BRIDGE Regulation WG related to Action 5 – Synergies between demos (ID Cards). This Action aims to initiate a common repository of information on demo sites using generic demo ID cards which were developed within this action. The set of data to be collected was defined based on discussions and experiences from the members of the Regulation WG and provides data on development of demo sites, their assets and expected outcomes.

This report presents samples of the ID cards from various projects that participated in the first stage of the data collection process. The report also provides a specification for a solution for a web repository that should allow easy search through the demo sites across Europe. A solution like that would enable its users to quickly grasp the scope of the projects through the experimental set-ups and developed services and platforms.

The outcomes of this Action should enable further utilisation of the hand-on knowledge and test experiences to:

- Develop a generic overview - "ID cards" - per project and to be able to quickly grasp the project scope;
- Report on set-ups, cases and results,
- Extract barriers and enablers (emerging from implemented scalability/replicability analyses in projects); and
- Provide inputs to developing a methodology for comparison.

Action 5 – approach and scope

1.1 Scope

Action 5 aims to provide an overview of the demo cases from H2020 projects. In addition, the aim is to provide specification for a solution that will extend the work undertaken in this Action and create a repository of information on test sites and demo cases across Europe, thus preparing conditions for continuity of the efforts within the Regulatory WG.

The Action 5 considers innovation projects that are dedicated to testing and validation of the technical and economic viability of their products, solutions and services under realistic, operational conditions. The scope of the Action is to provide insight on the testing environment used by the various projects through concise information on the assets, experiments and objectives. The project demo ID cards are envisaged as an effective way to grasp project developments and expected outcomes. These cards may serve for multiple purposes including unified manner of representation of various project demos, project dissemination and exchange of data about ongoing demonstration activities, reporting on set-ups and cases, easy extraction of useful data which could be used from other projects in the future, etc.

1.2 Approach

In a similar manner as in other actions of the Regulatory WG, the approach was based on collecting data from projects using a questionnaire especially developed for the purpose of the action. The questionnaire was developed through consultations between the members of the group responsible for implementation of Action 5. With the support of DOWEL Management, the questionnaire was made available to the projects through an online tool. This approach was selected with the objective to reduce the required time for filling the document and further on, for data collection and processing. In addition, it was already successfully applied for other actions within BRIDGE.

The questionnaire is used to collect the following set of data:

- Contributor data:
  - basic information for the contributor (name and surname, e-mail, institution);
- Project and demo information:
  - project name, demo name, starting and ending date;
- Demonstration ID card:
  - location and status of the demo (not started/ongoing/finished);
  - description of the available assets for the demo;
  - description of the demo case(s) and the objectives of the demonstrations;
  - short information on types of products that are tested and the actors involved;
  - links to other projects; and
  - illustration of demos via pictures (where available).

The introductory part of the questionnaire included short explanation on the objective of the questionnaire and how it should be completed.

1.2.1 Projects

In this first stage of the process, the questionnaire was disseminated to 28 projects involved in the BRIDGE Regulatory WG and it was available to complete in the period mid-August to beginning-of October. The questionnaire was completed by 12 projects, with 35 demonstration ID cards completed.

Table 1 presents the list of projects that participated in the first stage of Action 5 and provided data for their demos. The projects are listed in alphabetical order.

Table 1 List of the projects and demos

Project Name	Demos
COORDINET	The project provided descriptions of 5 demos which are used to test solutions on congestion management at transmission and distribution level, voltage control, balancing, controlled islanding
CROSSBOW	The project provided descriptions of 7 demos aimed to test various solutions dealing with regional renewable energy sources (RES) coordination, demand side management (DSM) implementation on regional level, virtual storage plants (VSP) and storage coordination centre (STO-CC), the operation of hybrid RES dispatchable units as well as implementation of various transmission network solutions.
EU Platone	The project provided description of one demo aimed to test innovative distribution network technologies enabling interaction between aggregators and customers.
EU-SysFlex	The project provided 2 descriptions of demos dealing with aggregation of flexible resources and new technologies for provision of services for the transmission system operators (TSOs) and distribution system operators (DSOs)
FLEXITRANSTORE	The project provided one description of a demo which is used to test an innovative platform that will facilitate the communication between involved actors and enable secure data exchange. It comprises several tools aimed at TSOs, but also DSOs, for the more efficient and secure operation of their networks, by unleashing the flexibility potential of the power systems.
iElectrix	The project provided descriptions of 5 demo cases used to test various solutions for voltage deviation and congestion management as well as demand response.
INTERRFACE	The project describes a platform that integrates all the project demos and provides various services for the TSOs and DSOs
PHOENIX	The project provided data on a demo used to test peer-to-peer market for electricity trading

Project Name	Demos
Muse Grids	The project aims to exploit synergies among various energy networks and describes a demo that develops a replicable Smart Grid control architecture.
OSMOSE	The project provided data on a number of demos used to test various network solutions, including grid forming control strategies as well as congestion management, synthetic inertia and automatic voltage control
TRINITY	The project provided data on a demo that shall be used to test a transnational guarantee of origin for RES in South East Europe.
X-FLEX	The project provided descriptions of 4 demos that are used to test solutions for DSM, network resilience, security of supply for both electricity and heat.

ID cards

This section presents sample demo ID cards from the projects that participated in the first stage of Action 5. Due to the large number of cards and data, a sample ID card is represented for each project. The other collected data is available in the Annex of this Report.

1.3 Sample ID cards

1.3.1 COORDINET

Project & demo information: COORDINET

Name of the demo	Malaga (Spain)
Starting date of the demo	01/10/2020
Final demo date	30/03/2021

coordiNET	Malaga demo ID
Location	ESP, Malaga
Status of the demo	Not yet started
Assets	Wind, solar PV, CHP, demand response, EV, batteries
Details on demo development	Demand side associated with generation: • BIOGAS_MAL1: Four thermal groups using the biogas (landfill), 1MW capacity each, the flexibility is obtained from reduction/increase of generation • COGEN_MAL1: Urban water treatment, four thermal groups, using biogas (wate water), 2.5 MW capacity each, the flexibility is obtained from reduction/increase of generation • sFSP_MAL2: Microgrid w/several EV charging points, lead acid battery, 15kW PV units, the flexibility is obtained from modifying the set-point from v2G charging point, batteries charger, and solar generation • sFSP_MAL3: municipality building: offices, museum, start-up campus. Only loads from the start-up campus will be used as service provider • sFSP_MAL4: V2G charging w/12kWh lithium- ion BESS, 3.7kW solar PV, the flexibility is obtained from modifying the set-point from v2G charging point, batteries charger, and solar generation

	Malaga demo ID
	• sFSP_MAL5: convention centre w/100 kW solar PV and lighting circuits. The flexibility is to be obtained from the solar PV • sFSP_MAL1: urban microgrid: 10kW PV generator, i kW mini-wind turbine, V2G charging, public lighting, lead acid batteries, supercapacitors
Demo illustration	
Details on demo experiments	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems. Deployment of new grid monitoring systems (sensors) to increase observability.
Roles & actors involved	TSO, DSO, CoordiNet Platform, FSP providers
Services & products offered	Congestion management: distribution, transmission Balancing: transmission
Links to other Projects	
Website	https://coordinet-project.eu/

1.3.2 CROSSBOW

Project & demo information - CROSSBOW

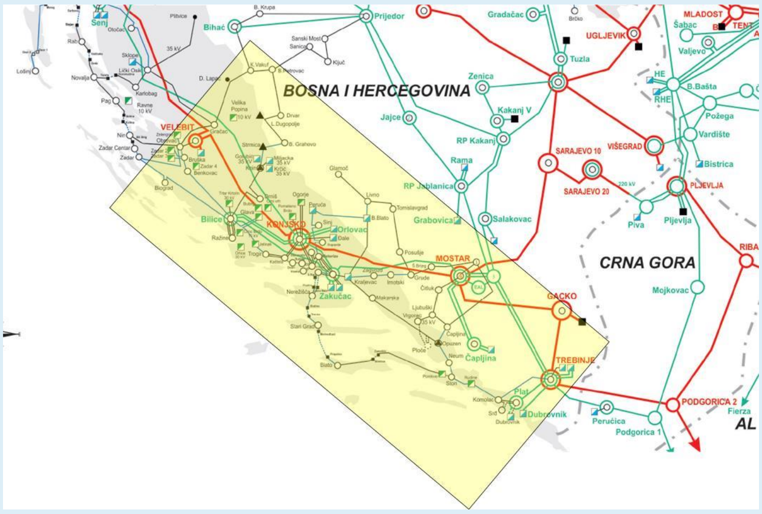
Name of the demo	**Bosnian-Croatian Border RES Coordination**
Starting date of the demo	01/06/2020
Final demo date	30/09/2020

	Bosnian-Croatian Border RES Coordination ID
Location	HR, Konjsko, BA, Mostar
Status of the demo	on-going
Assets	HV-HV and HV-MV substations, SCADA and PMUs
Details on demo development	The aim of the demo is to apply CROSSBOW solutions for coordinating RES assets and solving network problems in the border between Bosnia and Herzegovina and Croatia. The assets and tools for development and deployment of the demo include: Wide Area Monitoring System (WAMS); protection system for the WAMS - network status and real time values taken from TSO Supervisory Control and Data Acquisition (SCADA) and phasor measurement units (PMUs) deployed; RES Control Centre (RES-CC); Regional SCADA Systems; sub-regional SCADA Systems (generation plant-specific SCADAs). In addition, external systems interfacing with the demo tools for different purposes include: current weather conditions; one-hour forecast within 1-minute granularity; hour-by-hour and day-by-day forecasts out to seven days; hour-by-hour and day-by-day observations going back decades. The physical energy assets available to demonstrate include: • 10 Bosnian-Croatian cross-border substations • 15 generation assets in Croatia (Konjsko region): HPP Dubrovnik 1 126 MW, connected to 110 kV transmission network; WPP Rudine 12x2,85 MW, connected to 110 kV transmission network; WPP Ponikve 16x2,3 MW, connected to 110 kV transmission network; HPP Zakučac 4x144 MW, connected to 110 kV (1&4) & 220 kV (2&3) transmission network; HPP Kraljevac 2x20,8 MW, connected to 110 kV transmission network; HPP Đale 2x20,4 MW, connected to 110 kV transmission network; HPP Orlovac 3x79 MW, connected to 220 kV transmission network; HPP Peruća 2x30,6 MW, connected to 110 kV transmission network; HPP Buško Blato 3x3,8 MW/3x-3,4 MW (pump HPP), connected to 110 kV transmission network; WPP Voštane 7x3 MW, connected to 110 kV transmission network; WPP Ogorje 14x3 MW, connected to 110 kV transmission network; WPP Pometeno Brdo 15×1 MW + 2,5 MW, connected to 110 kV transmission network; WPP Jelinak 20x1,5 MW, connected to 110 kV transmission network; HPP Velebit 2x138 MW/2x-120 MW (pump HPP), connected on 400 kV transmission network; WPP Zelengrad 14x3 MW, connected to 110 kV transmission network; • 7 generation assets in Bosnia and Herzegovina (Mostar region): HPP Capljina 2x210MW (pump HPP), connected on 220kV transmission network; HPP Trebinje 1 3x60MW, connected on 220kV transmission network; HPP Dubrovnik 2 126MW, connected on 220kV transmission network; HPP Mostarsko blato 2x30MW, connected on 110kV transmission network; HPP Mostar 3x25MW, connected on 110kV

Bosnian-Croatian Border RES Coordination ID

transmission network; HPP Pec Mlini 2x15MW, connected on 110kV transmission network; WPP Mesihovina 50,6MW, connected on 110kV transmission network

Demo illustration



Details on demo experiments

The set of experiments is intended to help the system operator (SO) in handling network problematic situations in the southern border between Croatia and Bosnia & Herzegovina. The problems in focus are high voltages in the main substations, linked to a big amount of production in a relatively small area, and congestion in the corridors for the same reason. The following experiments will be demonstrated:

Integrating the control of the renewable parks in the region (southern Bosnian-Croatian border) for the purpose of solving network problems (congestion) using the RES-CC as an intermediate entity. The actions in the demo will show how the RES assets in the region are integrated in the manual frequency restoration reserve (mFRR) portfolio:

- Using the WAMS tool, the SO will receive updated information about current and forecasted network status.
- Using the developed interface, the SO will select different RES assets in the region and will specify production limitations based on expertise and knowledge. The aim of the actions will be to solve the identified network problems.
- The WAMS toll will be used to show the cost of the action based on the mFRR market bids made by the RES assets in the relevant period. The operator will use this to identify the best and cheaper set of solving actions.
- The actions could be marked for immediate execution or scheduled for a future period. Activation of the actions will be sent to the RES-CC and the WAMAS interface will present operator with the successful (or not) reception of the message by RES-CC.
- The RES-CC user interface will warn RES operator on the reception of the mFRR activation command. Since the command will be specific for a certain generator, this limitation will be directly passed to the generator with no further processing.
- Accurately predict the generation of the RES portfolio for two main purposes:

	Bosnian-Croatian Border RES Coordination ID
	• To participate in the energy market offering the most accurate amount of energy for the different periods, • To pass this information to the relevant system operator so that this information can be used to better control the network and predict problems. • Monitoring of the assets and how the information is presented to the operator. • The experiment will be used to test the different mechanisms and gateways used to access the data sources Analysing RES curtailment strategies. • The experiment is intended to help the SO a region whose RES production may be curtailed and the curtailment amount, and passes this limitation to the RES-CC. With this limitation in mind, the RES-CC optimal curtailment algorithms aim to obtain the best operation point for the RES parks in a region, regarding the limitations imposed by the SO.
Roles & actors involved	TSO, Energy producers
Services & products offered	RES-CC, WAMS, Ancillary Markets Platform (AM)
Links to other Projects	
Website	http://crossbowproject.eu/deliverables/

1.3.3 EU Platone

Project & demo information – EU Platone

Name of the demo	**EU Platone Italian Demo**
Starting date of the demo	01/10/2019
Final demo date	31/08/2023

Platone PLATFORM FOR OPERATION OF DISTRIBUTION NETWORKS	**EU Platone Italian Demo**
Location	ITA, City of Rome
Status of the demo	on-going
Assets	1) HW Assets: Primary Stations, Secundary Sub-Stations, Grid Control Equipments (RTUs, Routers, Modem, Automatic Enhanced Switches, Reclosers), Advanced Metering Systems (Second Generation Smart Meters and Ligh Nodes Blockchain based), Measurement and Set-Point DataBases, Servers for SW Project Platforms, Sorage, EC Charging Stations, EMS for Customer Energy Consumption Modulation, Controllers for PV Installations. 2) SW Assets: Enhanced SCADA, DMS to perform Grid State Analysis, "DSO Technical Platform" (to enable local flexibility mechanisms for interaction Grid-Customer, to send flexibility requests to Market Palce, to control of TSOs commands on Customers using the Trafiic Light concept), Market Place Platform, Aggregator Platform, Shared Customer DataBase (to register Customer Flexibility Measurement and Set-Points to allow the Settlement), Dual Layer BlockChain Platform (One Layer for Customer Access Certified Handling and One Layer for Market transaction Certification).
Details on demo development	The aim of Italian's demo, coordinated by the Italian DSO areti, is to realise a complete "END TO END FLEXIBLE ENVIRONMENT", i.e. a real integrated market where, appying higly innovative distribution network technologies like Blockchain and new grid equipments, retail and business customers interact with both aggregators (to access new flexibility market options) and the DSO to become active players of the "network optimised management" in an effective and efficient Active Distribution Network. The result will be a fully functional system that enables distributed flexible resources, connected in medium and low voltage to the DSO's grid, to provide services in a

EU Platone Italian Demo

combined TSO/DSO flexibility market which include all the stakeholders (TSO, DSO, aggregators and end-users).

The architecture of the Italian demo allows the creation of an innovative market structure implementing the following innovations:

- creation of a flexibility massive market; thanks to the DSO investments in the new costumer smart meters and data systems: each POD is potentially enabled to access the flexibility market
- removal of the entry barriers; the aggregator no longer needs to invest in measurement technologies and telecommunications on customers, which costs are not repayable except for a few large industrial bodies
- availability of certified measures; according to the current national measurement service and its extension, the aggregator receives all the flexibility measures (up to 4''), certified by the blockchain and therefore immediately usable in the smart contract with the customer, without facing disputes during billing processes
- easy switching between aggregators; the shared customer database enables the clients switches between different aggregators fostering competition and avoiding "customer locking" phenomena.
- liquidity and impartiality of the market; alike TSO, the DSO is enabled to request (locally) flexibility resources: this increases the liquidity of the market and, through the marketplace (third party), its neutrality with respect to the network operators (TSOs and DSOs).

This solution will increase the hosting capacity and the stability of the grid and will allow to include also the flexibility resources between the key parameters to run an optimal grid service beside the actual indicators (connection power, voltage level, peak power…).

To enable the Active Distribution Network first of all will be increased the grid observability in Medium and in Low Voltage, installing new electronic devices on the:

- DSO infrastructure to measure the electrical quantities and detect wheater conditions (Device owned by DSO);
- Users Smart Meters to measures the electrical quantities and certifying flexibility requests and actions thanks to innovative Blockchain Based apparatus;
- Other stakeholders Platforms and System managing distributed IoT data.

The DSO will gather data from the field, will analyse them and will decide the necessary actions for solving the grid critical issues (congestions, voltage violations) involving the resources (i.e., the customers) connected to grid.

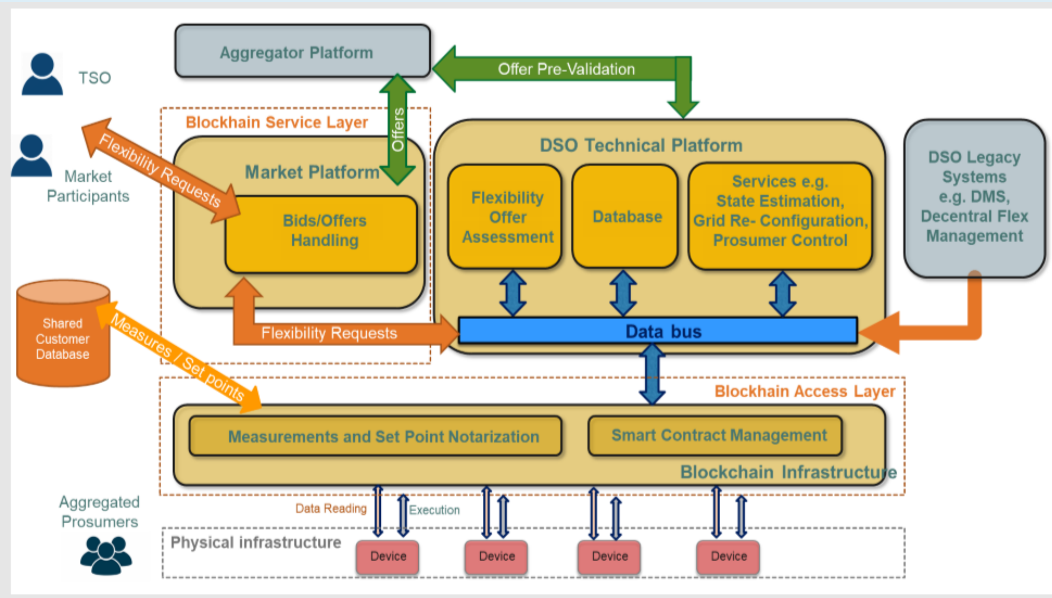
The active rule of the DSO foreshadows a new model of dispatching market, that enables the customers flexibility in MV and LV identifying solutions to overcome the barriers that limit the participation of these resources to the market: the EU Platone Italian Pilot will implement a standard and cost-efficient solution to enable this huge potential.

Platone
PLATFORM FOR OPERATION OF DISTRIBUTION NETWORKS

EU Platone Italian Demo

Furthermore, to minimise the impacts of renewables and of the transition of consumptions to the elecrit vector to support decarbonisation, improving at the same time the network stability, the Italian Demo will upgrade the DSO system architecture including the analysis capability of LV grid and elaborating real time state estimation.

Demo illustration



Details on demo experiments

The Use Cases of the EU Platone Italian Demo, i.e. the flexibility resources used to test the interaction with the distribution grid, will be:

- a high efficiency cogeneration plant, serving, among the others, a huge waste water treatment plant (delivered to 1,1 million inhabitants, 35 GWh/year of energy consumption) and nearby houses with heating;
- a Citizen Energy Community (10 selected «early adopters» residential user);
- an electric vehicle pool site serving a fleet of 40 EV Cars equipped with charging stations, photovoltaic (PV) production and storage;
- a residential building suitable for storage and PV production shared between house holders and flexibility in use of energy common services;
- an office building equipped with the most advanced technologies in building automation and sustainable use and production of energy.

The expected outcomes should to verify:

- the full functionality of the platforms for interoperability of flexible resources with the DSO grid and the DSO/TSO requests of flexibility;
- the full functionality of the Local Flexibility Market (Requests, Offers, Bids, Commercial Results, Sending of Set Point, Implementation of the Set Points, Metering, Settlement) in conjunction with the TSO dispatching activities;
- the positive impacts on the DSO operations of the usage of flexibility;

Platone PLATFORM FOR OPERATION OF DISTRIBUTION NETWORKS	EU Platone Italian Demo
	● the capability of flexibility to support DSOs in solving grid issues; ● the development of Low-Cost Customer equipment (Blockchain Based) to massively enable residential customers to the flexibility market; ● the improvement of the general efficiency for the lectic sector of flexibility services.
Roles & actors involved	DSO, Aggregator, Market Place Operator, Customers, TSO, Citizen Energy Community.
Services & products offered	Services related to the local flexibility market and more in specific: ● Congestion Management ● - Voltage Control
Links to other Projects	ETIP SNET and Projects run in the University of Alberta (Canada).
Website	https://platone-h2020.eu/

1.3.4 EU-SysFlex

Project & demo information – EU-SysFlex

Name of the demo	Italian Demo
Starting date of the demo	01/01/2021
Final demo date	30/09/2021

EU-SysFlex	EU-SysFlex Italian Demo
Location	ITA, Sarsina (FC) località Quarto, 43°53'34.1" N; 12°05'36.6"E
Status of the demo	On-going (under construction)

EU-SysFlex	**EU-SysFlex Italian Demo**
Assets	Assets owned by the DSO (Electric Storage System (ESS), On-Load Tap Changer (OLTC) in Primary Substation, Static Synchronous Compensators (STATCOMs)) and flexibilities connected to the distribution network (4 PV Plants remote controlled by the DSO after a voluntary agreement between the DSO itself and the plants' owners)
Details on demo development	The involved resources are: 1 ESS (1 MVA/1 MWh); 4 remote controlled PV generators (with a total capacity of 3MW). The two-remote controlled OLTCs at HV/MV substation; 2 STATCOMs – (1x1.2MVAr for each MV busbar). The tools developed for the project scopes are: • Observability tools. The demonstrator already makes use of generation forecasts, which will be updated with the new Nowcast functionality, and it collects a complete set of measurements coming from the field devices, installed in correspondence of the feeders and some selected secondary substations. • For loads and generators, without forecast information, the state estimation tool, included in Local Scada System located in Primary Substation, takes also into account of smart metering data. These tools provide an accurate observability of the networks and they are therefore a prerequisite for the development of new tools); • Aggregated capability calculation tools. The integration of the state estimator with a network optimisation tool, named Vocant, allows to update the reactive power capability for each resource and computes the reactive power capability of the whole distribution network at the Primary Substation. This can be done in different network scenarios and, in particular, with forecast and with real time values. The capability computed with the forecasts allows the DSO to give to the TSO information about the future availability of the network of reactive power flexibility, while the real time values point out the actual capability that the DSO can provide in the very next future. The same approach can be adopted also for computing the aggregated active power capability of the distribution network. This functionality will be tested only in a simulated environment); Network optimisations tools for respecting TSO request The same tool described before can be also used to calculate the optimal set points for each involved regulating resource for two operation modes: 1. Normal operation of the system, when no set point from TSO is requested; 2. Based on a requested reactive or active power profile at the primary substation interface: in this case the set points of the resources are used to reach the desired power at Primary Substation, respecting the network constraints and satisfying a TSO request). All this information is reported in the project Deliverable D6.6 available at the following link: https://eu-sysflex.com/documents/

EU-SysFlex	**EU-SysFlex Italian Demo**
Demo illustration	
Details on demo experiments	What the Italian Demonstrator is going to obtain, as a result, from this project is a proof of concept of an efficient and as far as possible automated coordination process between DSO and TSO. The forecasting tools should demonstrate that DSO can provide to the TSO a better observability of the resources connected to the distribution network. In particular, by integrating forecast with network state estimation and reactive power capability calculation, the DSO can send to the TSO reliable information on the amount of power, in particular reactive, that can be provided by local resources, improving data exchange between the two System Operators in order to guarantee safety in the operation of the electrical system. Besides, the enhanced observability of the distributed resources will support also the network state estimation contributing to a better management of the network. In addition, the results will demonstrate the capability of the DSO to support the TSO requests in both simulated and real field tests. The demonstration will not only evaluate the effectiveness of the adopted solutions, but the acquired experience will be also used to improve the operation of the network and to update the SCADA system to be ready for the potential new functionality requested by the regulator. Eventually, considering that the STATCOM is a new device in E-distribution infrastructure, the project represents an occasion to demonstrate that its action is successful, in terms of reactive power capability management. In particular, its operation will provide the following benefits: Limitation of reactive power flows at the Primary Substation; Meeting TSO requests at TSO/DSO interface; Supporting Voltage Control; Power factor compensation. All this information is reported in the project Deliverable D6.6 available at the following link: https://eu-sysflex.com/documents/
Roles & actors involved	DSO, TSO (simulated - the Italian TSO, TERNA, is not a project partner),
Services & products offered	In the Italian Demonstrator flexibility resources from the 10 to 30 kV voltage level are offered to the transmission level and the flexibilities are used as measures against voltage violations, congestions and frequency deviations.
Links to other Projects	GRID4EU
Website	https://eu-sysflex.com/

1.3.5 FLEXITRANSTORE

Project & demo information – FLEXITRANSTORE

Name of the demo	FEG Platform
Starting date of the demo	01/02/2018
Final demo date	30/04/2021

flexitranstore	**FEG Platform**
Location	CY, EL, BG, ES
Status of the demo	On-going
Assets	BESS, Hierarchical Controllers, DLR Sensors, Power Flow Controllers, PSS
Details on demo development	The FEG Platform will facilitate the communication between involved actors and enable secure data exchange, It comprises several tools aimed at System Operators (especially TSOs but also DSOs) for the more efficient and secure operation of their networks, by unleashing the flexibility potential of the power systems. It also provides tools for flexibility studies and for strategic analysis aiding them with formulating the TYNDP. The tools integrated in the FEG platform are based on hardware installed on the network. BESS in combination with advanced hierarchical controllers at the TSO/DSO interface and at a Wind Park substation. BESS integrated with a conventional CCGT to increase the number of services that can be provided. DLR sensors installed at TSO and DSO grid to prevent icing and to increase transmission capacity according to weather conditions avoiding congestions. Power flow controllers redirecting power flows from over congested lines allowing more RES production. A PSS integrated to a conventional power plant to mitigate oscillations caused by increased RES penetration. A HIL-based simulator able to accurately simulate power systems and perform analyses Finally a simulated market for the trading of flexibility services.
Demo illustration	
Details on demo experiments	The project envisions to create awareness around the regulatory framework and the gaps that act as obstacles to the innovation and the realisation of the measures foreseen in the regulation and EU strategies. Following this, the project will gain significant experience though the deployment of new technologies in the grid, whereas

FEG Platform

lessons learnt will be used to create value. More specifically, and as far as the technologies employed are concerned:

The demos via their implementation through the FEG platform are dealing, among other, with the grid integration of battery storage and the development of an enhanced electricity market. The activities promote EU clean energy policies, providing technical and market solutions for flexibility resources provision. The results obtained from the Power Flow Controller operation were encouraging for alleviating congestions using smart grid technology and efficient asset capacity utilisation in the transmission network. The power flow control device showcased that greater volumes of renewable energy can be dispatched through optimal management of available network capacities, hence increasing diversity of generation and already acts as a clear reference for adoption elsewhere in Europe. A further aim is to improve existing DLR technology with de-icing functionality, achieving to increase power flows with weather resilience, so decreasing significantly the needed investments in the HV grid and increasing transmission reliability. The wind-storage integration will provide ancillary services to the grid while mitigating voltage and frequency instabilities. Thus, the reliable integration of Variable Renewable Energy Sources will be supported. The TSO-DSO border connected battery storage can optimally provide flexibility services with appropriate business model, as well as in the case of GT-battery storage integration where efficient operation can be accompanied with market incentivisation to elevate the flexibility provision of conventional GT generation. The PSS innovative technology for generation will mitigate low frequency oscillations and ensure generation robustness, permitting reliable RES penetration to the transmission network.

Use cases and functionality of the FEG platform have been defined providing the basis for the grid flexibility platform. The use cases are directly connected to the market and regulatory gaps identified and to the opportunities for flexibility identified by technology providers inside and outside the consortium, especially related to energy storage, smart grids, power flow control and dynamic line rating technology. The FEG functionality builds on leading frameworks such as USEF, whereas the vision is to include new market players and the TSOs in the core of the flexibility market platforms, whereas also to build new functions for the flexibility adequacy and strategic planning of the operators' activities.

Business model development is underway that considers all value streams and technical benefits of transmission connected storage, including demand side response with self-consumption.

The platform design is closely aligned to services that will be provided by each demo.

The technical development of the FEG platform is supported by the Flexibility Assessment study of the Greek power System. The South East Europe flexibility study will provide a strategic tool for employing technical and market innovations to improve grid flexibility and provide a basis for applying the platform. The flexibility assessment considers areas outside Greece: for example, partners are investigating replicability potential in the Portuguese transmission network and market) and regulation. Nevertheless, best practices from countries well developed in RES penetration and their feedback on FLEXITRANSTORE flexibility methodology is valuable information i.e.

flexitranstore	**FEG Platform**
	Portugal has achieved to generate three-quarters of its electricity with renewable energy even back in 2013. The demonstration of an enhanced electricity market in Cyprus and Bulgaria is also in scope. It will suggest a flexibility trading platform aiming to complement existing markets and enabling the trading and remuneration of flexibility services.
Roles & actors involved	TSO, DSO, Energy Producers, Market Operators, (Virtual) Aggregator
Services & products offered	Primary Frequency Response, Fast Frequency Response, Synthetic Inertia, Voltage Support, Black-start, Power Balance Provision, Generation Scheduling Optimisation,
Links to other Projects	
Website	www.flexitranstore.eu

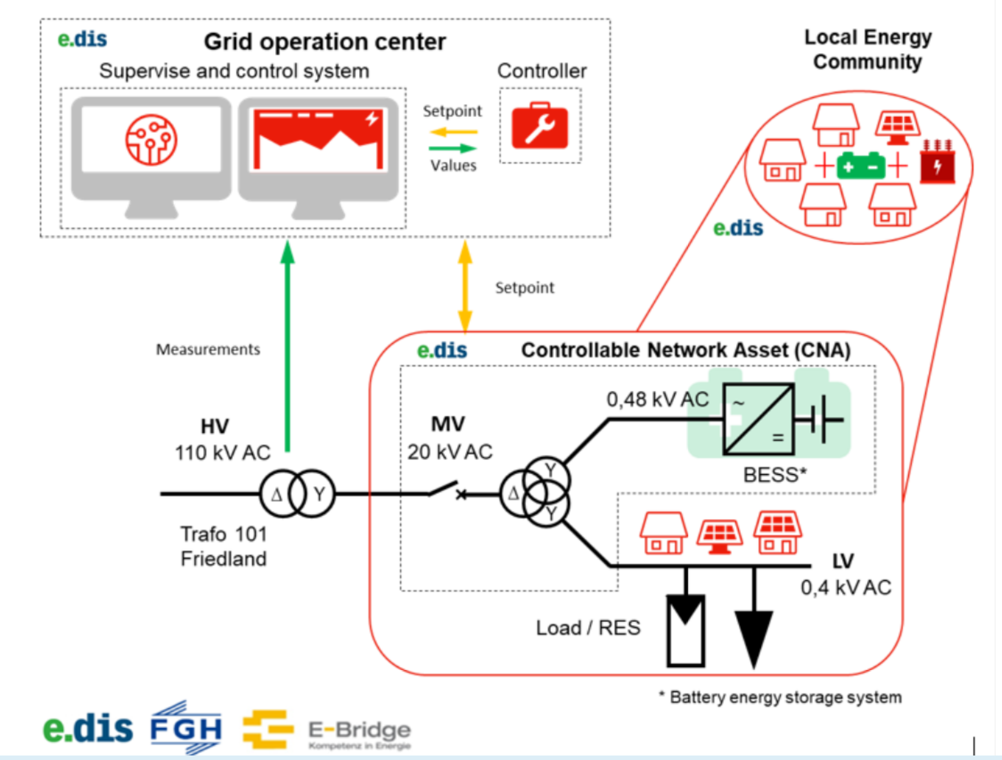
1.3.6 iElectrix

Project & demo information – iElectix

Name of the demo	MOEWE
Starting date of the demo	24/09/2020
Final demo date	30/09/2021

IElectrix	MOEWE ID
Location	Battery Energy Storage System (BESS)
Status of the demo	DE, Friedland https://goo.gl/maps/nQyJY7xYnqR8P38m8,
Assets	on-going
Details on demo development	The selected substation in Friedland (Mecklenburg western Pomerania) will be replaced by a Controllable Network Asset (CNA). This system includes a 3-winding transformer and a battery storage, including an inverter. The transformer will be connected to the grid on the primary and secondary side (20/0.4kV). The tertiary winding (480 volts) will be used to connect the inverter and battery storage. The battery has a rated power of 500 kW and a capacity of 1000 kWh. The separate winding guarantees the galvanic separation of the battery storage from the grid. The reason for this is the advantages in inverter operation, longer operating life, smaller cable cross-sections due to lower currents etc. The data communication between the involved equipment is based on the IEC 60870-5-104 protocol. In addition to wired communication, communication via the mobile phone network is also provided for. The data transmission will take place between the HV/MV transformer, the network control centre, the developed controller and the CNA. The data transmitted to the control centre and the CNA are real-time measured values of the transformer in the substation in Friedland. The interfaces used enable the control of the battery storage according to the load level of the transformer and thus help to reduce temporary grid bottlenecks.

MOEWE ID

Demo illustration	
Details on demo experiments	In the project there are three major areas of activity that are being addressed. Each area is divided into two phases. In the first phase, appropriate solutions are developed and in the second phase the solutions are implemented and tested. The first area of responsibility includes interface development. The interface is to be a "plug and play" solution. In addition, the grid connection is intended to be open for innovative storage technologies by a high level of standardisation. Not only from a technological point of view, but also in relation to the network connection using the possibilities of digitalisation. The second area of responsibility consists of network operation management and network control. In this area, a tool with two separate algorithms will be developed. On the one hand, an algorithm for congestion management will be developed and implemented, and on the other hand, an algorithm for frequency stabilisation. The aim is to use the algorithms to increase the security of supply, to reduce the load on the grid and to reduce the curtailment of RES. Based on defined grid parameters, such as the measurement values of the transformer in the substation in Friedland and the battery, the developed tool will determine the operating mode of the battery storage. Specifically, the operation of the storage unit will be based on the load of the transformer in the substation in Friedland. The aim is to relieve the grid in times of high-RES feed-in at low supply loads in order to reduce the load on the equipment. The task of the second algorithm to be developed in this process is to realise frequency stability. Since the increasing feed-in of RES, in the future there will be less and less

IElectrix	**MOEWE ID**
	conventionally generated energy available from power plants, the rotating inertia in the grid will decrease, which will influence the frequency stability. Due to these developments, it will be necessary to virtually simulate the missing rotating inertia mass ("virtual inertia"). With the help of the algorithm, the missing rotating mass will be replaced in the form of a replicated synchronous machine. The base for the algorithm will be a linear-square controller respectively a linear-square integrator. The feedback for adaptive adaptation of the virtual inertia is caused by frequency disturbances. The advantage of the used controller is that the energy demand of the battery memory for providing the virtual inertia, in combination with the frequency stabilisation, will be reduced to a minimum. Furthermore, the operational capabilities of the developed functions will be demonstrated. This will enable a cost-efficient system integration of additional renewable energy sources by using a mobile storage system. In addition to the technical local system integration of RES, the formation of energy communities will be promoted. Among other things, the LECs can contribute to the development of local economic centres around local energy production. The third area of responsibility concerns network planning. The aim is to develop a planning tool that reduces uncertainties in network planning. The use of this tool allows planning further grid connections of RES plants with consideration of existing storage capacities. To validate the advantages and disadvantages of the use of such an innovative battery storage system, different scenarios and tests will be carried out during the one-year operating period. The project will develop a customer engagement strategy to enable people to take a more active part in the Energy Transition. For this purpose, interviews and workshops were conducted to understand people's understanding of the Energy Transition and RES. Furthermore, these interviews were used to talk about barriers, social challenges and the potential of RES. The aim of these interviews was to promote existing incentives and explore possible future incentives for customers to participate in the Energy Transition.
Roles & actors involved	DSO

MOEWE ID

Services & products offered	Congestion and voltage management The region of eastern Germany needs to include high amounts of installed renewable DER into distribution networks, especially PV and wind. At the same time, it faces low consumption due to limited number of inhabitants and industry, which generally poses a challenge for stable and reliable grid operation. Especially E.DIS as one of the main DSOs in eastern Germany faces the challenge to integrate a large capacity of DER into its distribution network and thus must execute costly network reinforcements. The high investments lead to significantly increasing network tariffs for grid customers, both domestic and commercial. In other cases, connection of new DER need to be refused because of missing network capacity. The site of Friedland (Mecklenburg-Western Pomerania) has been selected for the demonstration since this region already produces 200 % of the demand with renewable energy sources and expect a further increase of RES capacities. In order to postpone costly network reinforcements and vice versa to integrate more DER in a faster way, a network-integrated storage system is expected to significantly manage network congestions by provision of ancillary services, mainly supply reactive power to and from the grid, stabilise frequency by injecting active power and contribute to prevent disturbing harmonics as system perturbations, which will be tested by this demonstration within the project. It would also allow start-up capabilities after blackouts. A mobile electrical battery energy storage system (BESS) has been selected, which is transportable and could be connected to another site in case of future demands would be extremely helpful to manage the dynamic development since the hot spots of congestions in the network change during the time. The BESS is built into an industrial container, where the main components are battery cells and power electronics. For congestion management and/or market purposes the battery energy and power as well as reaction times, expected life cycles and losses and efficiency are the main characteristics, which are attributes of the battery cells. The grid connection itself is done via a power electronics device, the inverter. It features an on-board controlling device which senses the current AC grid waveform and outputs a voltage to correspond with the grid. The inverter can also be controlled automatically or remotely. It also allows start up capabilities after blackouts via the active and reactive power management. Network stability The region of eastern Germany needs to include high amounts of installed renewable DER into distribution networks, especially PV and wind. At the same time, it faces low consumption due to limited number of inhabitants and industry, which generally poses a challenge for stable and reliable grid operation. Especially E.DIS as one of the main DSOs in eastern Germany faces the challenge to integrate a large capacity of DER into its distribution network and thus has to execute costly network reinforcements. The high investments lead to significantly increasing

	MOEWE ID
	network tariffs for grid customers, both domestic and commercial. In other cases, connection of new DER need to be refused as a result of missing network capacity. The site of Friedland (Mecklenburg-Western Pomerania) has been selected for the demonstration since this region already produces 200 % of the demand with renewable energy sources and expect a further increase of RES capacities. The grid connection itself is done via a power electronics device, the inverter. It features an on-board controlling device which senses the current AC grid waveform and outputs a voltage to correspond with the grid. The inverter can also be controlled automatically or remotely to supply reactive power to the grid, stabilise frequency and contribute to problems regarding harmonics in the grid. The increasing connection of RES requires more local frequency support in form of virtual inertia. This can be provided by storage systems on the basis of the local transient frequency measurement. During the transient phase, large oscillations can be locally observed and used to perform a model estimation of the system.
Links to other Projects	
Website	https://ielectrix-h2020.eu/

1.3.7 INTERRFACE

Project & demo information –INTERRFACE

Name of the demo	**IEGSA Platform**
Starting date of the demo	01/06/2019
Final demo date	30/06/2022

	IEGSA Platform ID
Location	IT, BG, EE, FI, LV, SI, RO, HU, EL

INTERRFACE — **IEGSA Platform ID**

Status of the demo	On-going
Assets	Photovoltaics, Smart Meters, Energy Management System, Prosumers, CHP, electric vehicles (EVs), EV Chargers, BESS, Hierarchical Controllers,
Details on demo development	IEGSA brings together all the project demos which include: • A city scale (35.000 inhabitants) microgrid characterised by a single Point of Common Coupling with the national TSO, a high share of renewable generation and a CHP-District Heating network (serving 1000 final users). • An intelligent controller (Intelligent Distribution Node), to be connected at the point of supply of a group of buildings and demonstrate a common set of grid services for DSOs and TSOs but also aiding Balancing Responsible Party (BRP).The demo includes a combination of local congestion management markets with wholesale and balancing markets, ancillary services provision by aggregated end-users, prosumers and distributed generation, usage of digital information and communication technologies, like wide-area measurement systems, computational intelligence, big-data analytics, and networked control in modern power systems operation • A single flexibility platform to test main congestion management, frequency and balance management, and flexible integration of distributed generation/consumption business use-cases with “slow” and “quick” load activation product candidates and to allow for cascading balance to be achieved between grid levels. • An automated marketplace and an integrated asset condition management system (IACMS) aiming to examine the cooperative use of these two elements of the toolset and benefits from the exchange of heterogeneous data with the IACMS. These tools will be part of the integrated asset condition management system (IEGSA), thus their collaborative operation could be demonstrated, and mutual benefits could be exploited, in this P2P marketplace with the participation of local prosumers and consumers. • An intelligent platform (EFLEX) with blockchain-based technology, which is scalable to be applicable across Europe, allowing trading of flexibility services among prosumers TSO and DSO. • A market platform scenario simulator. This prototype will reflect the modelling frameworks and technologies developed within IEGSA platform and will use considerable amount of data from the TSOs, DSOs, market operators and energy suppliers to provide implementation of actual and realistic representation of the wholesale and retail markets in the examined South-East Europe region • A EUPHEMIA-based market platform to engage local flexibility resources, introducing spatial dimensions into existing wholesale market design. IEGSA platform will facilitate data exchange and communication between System operators, enabling coordination and the more robust operation of the power systems. It will also enable communication and data exchange between all involved actors

INTERRFACE

IEGSA Platform ID

enhancing transparency and allowing market access and participation of new actors, such as prosumers.

The project created a focus on cross border balancing and congestion schemes and proposed standardised schemes and related products across Europe, to be tested during demonstration implementation. The aim is to showcase that the proposed IEGSA will be able to maintain data exchange despite the technology chosen for the data storage and exchange and will act as the platform connecting technologies, markets, actors.

To this direction, new technologies will be tested in the various demos. Also, Blockchain will be deployed in one of the demos to showcase how such a novel technology can be employed to solve current issues faced by the power systems. Various technologies for hyper ledgers and distributed databases will be examined.

Additional sources of flexibility will be mobilised. The flexibility potential of a micro-grid will be exploited and existing RES and loads will be mobilised, through the participation of prosumers in a local market. Indeed, this local market will have no significant influence on the other conventional markets, however it will definitely move forward the flexibility capabilities of smallest grid users, which are currently less active in the demand management.

IEGSA platform through its components will facilitate the digitisation of the power systems and will standardise administrative-intensive processes such as qualification and settlement. The flexibility register, one of the main IEGSA components will offer an insight into the available flexibility potential at any time, making the tackling of congestions more efficient and proactive.

The IEGSA solution, which is under development, is aimed to be replicable across the EU energy system and to empower EU consumers for delivering flexibility services at national and cross-border markets.

Experience gained from robust modelling simulations will provide recommendations for improving the pan-European electricity market. The market effects from the active participation of DERs into the market operation will be presented and evaluated, the use of local flexibilities and the efficiency of their market integration will be weighed against conventional practices, volume and correctness of transactions will be validated, as well as market/procurement process of flexibility services and cross-border transactions. It will assess on how market design meets customer needs and will be channeled into future pan EU market evolution plan.

Moreover, new trading platforms, based on different market designs and time-horizons are being developed within each project demo. The evaluation of the trials will provide insightful results leading to more efficient and cost-effective trading of flexibility and services across Europe.

TSO, DSO, Market Operator, Consumer, Prosumer, Imbalance Settlement Responsible, Flexibility Register Operator, TSO-DSO Coordination Platform Operator, Single Interface to Market Operator, Balance Responsible Party, Flexibility Provider, Aggregator

INTERRFACE	IEGSA Platform ID
	aFRR, mFRR, Short Term Congestion Management, Operational Congestion Management
Demo illustration	
Details on demo experiments	IEGSA platform will facilitate data exchange and communication between System operators, enabling coordination and the more robust operation of the power systems. It will also enable communication and data exchange between all involved actors enhancing transparency and allowing market access and participation of new actors, such as prosumers. The project created a focus on cross border balancing and congestion schemes and proposed standardised schemes and related products across Europe, to be tested during demonstration implementation. The aim is to showcase that the proposed IEGSA will be able to maintain data exchange despite the technology chosen for the data storage and exchange and will act as the platform connecting technologies, markets, actors. To this direction, new technologies will be tested in the various demos. Also, Blockchain will be deployed in one of the demos to showcase how such a novel technology can be employed to solve current issues faced by the power systems. Various technologies for hyperledgers and distributed databases will be examined. Additional sources of flexibility will be mobilised. The flexibility potential of a micro-grid will be exploited and existing RES and loads will be mobilised, through the participation of prosumers in a local market. Indeed, this local market will have no significant influence on the other conventional markets, however it will definitely move forward the flexibility capabilities of smallest grid users, which are currently less active in the demand management. IEGSA platform through its components will facilitate the digitisation of the power systems and will standardise administrative-intensive processes such as qualification and settlement. The flexibility register, one of the main IEGSA components will offer an insight into the available flexibility potential at any time, making the tackling of congestions more efficient and proactive. The IEGSA solution, which is under development, is aimed to be replicable across the EU energy system and to empower EU consumers for delivering flexibility services at national and cross-border markets. Experience gained from robust modelling simulations will provide recommendations for improving the pan-European electricity market. The market effects from the active participation of DERs into the market operation will be presented and evaluated, the use of local flexibilities and the efficiency of their market integration will be weighed against conventional practices, volume and correctness of transactions will be validated, as well as market/procurement process of flexibility services and cross-border transactions. It will assess on how market design meets customer needs and will be channelled into future pan EU market evolution plan.

INTERRFACE	IEGSA Platform ID
	Moreover, new trading platforms, based on different market designs and time-horizons are being developed within each project demo. The evaluation of the trials will provide insightful results leading to more efficient and cost-effective trading of flexibility and services across Europe.
Roles & actors involved	TSO, DSO, Market Operator, Consumer, Prosumer, Imbalance Settlement Responsible, Flexibility Register Operator, TSO-DSO Coordination Platform Operator, Single Interface to Market Operator, Balance Responsible Party, Flexibility Provider, Aggregator
Services & products offered	aFRR, mFRR, Short Term Congestion Management, Operational Congestion Management
Links to other Projects	
Website	www.interrface.eu

1.3.8 PHOENIX

Project & demo information – PHOENIX

Name of the demo	**LSP 3 (Slovenian Pilot)**
Starting date of the demo	31/12/2020
Final demo date	01/07/2022

Note: Demo related to INTERRFACE

PHOENIX	LSP 3 (Slovenian Pilot) ID
Location	SI, HU Slovenia: Škofljica, two transformer stations supply the electricity mainly to the households (TS “sp. Besnica Drčar, TS Gradišče) PHOENIX: Šmartinska c. 152, 1000 Ljubljana, Slovenia, a big shopping area. Hungary: the city, actually a part of the supplying area of NKM DSO in Zsombó, second demo site is Mohács-Belvárdgyula, the local DSO is E.ON.

PHOENIX	LSP 3 (Slovenian Pilot) ID
Status of the demo	on going
Assets	distribution grid assets: transformers, overhead lines (OHLs), smart meters
Details on demo development	Interrface: The pilot aims to demonstrate (in lab environment) a local p2p market that enables consumers to buy electricity from other parties, other than their suppliers (e.g. in Slovenia the largest electricity trader is GEN-I, the largest electricity distribution company is Elektro Ljubljana, d.d.) and on the other hand, to offer their locally produced (household's generation) electricity for sale to one another (the parties present on the market, e.g. their neighbours). Trading on those local p2p markets might impact the electricity flows (physical) in the grid and it needs to be ensured that there are no negative effects on the grid operation. Therefore, the wholesale market mechanism needs to be adapted for small electricity small electricity volumes. The dynamic pricing can be implemented to reduce negative effects on the grid. PHOENIX: geographically limited demo site, the scope is to make a secure connection and interaction between the DSO's SCADA and local SCADA, supervising the business building of a grid user. DSO will interact with the user in a manner of offering the flexible active power. The scope is to develop a universal secure interrface.
Demo illustration	
Details on demo experiments	The resulting market model is tuned to incentivise local flexibility by enabling local participants to bid on a connected TSO-DSO level market. The connection of both global-TSO and local-DSO dimension and the joint allocation of energy and local flexibility provides proper price incentives through coupling different slices of trading. The varying size of each DSO zone is mitigated by the cost sharing feature enabled within the market by PUN pricing.
Roles & actors involved	DSOs, grid users
Services & products offered	local market, flexible power for the DSO
Links to other Projects	/
Website	/

1.3.9 MuseGrid

Project & demo information – MuseGrid

Name of the demo	Osimo demosite
Starting date of the demo	01/11/2018
Final demo date	31/10/2022

MUSE GRIDS	Osimo demosite ID
Location	IT, Osimo, Latitude 43.486019 – Longitude 13.482410
Status of the demo	on-going
Assets	• Assets already present in Osimo demo-site: Cogeneration Plant supplying a District Heating Network (CHP-DH Plant); two water-pumping stations; photovoltaic plants (about 30 MWp); Astea headquarter with electric vehicles and charging station. • Assets to be installed/implemented in Osimo demo-site: thermal energy storage, electric energy storage, smart electric thermal storages, water heating cylinders, plant automation system, charging stations, smart water and energy meters.
Details on demo development	During the four years project the Osimo multi-energy municipal microgrid will be improved by installing different technologies in order to better exploit synergies among different energy network thus achieving the goal of increasing the self-consumption of electricity produced locally by distributed generation systems. These technologies are: • 85 m3 Thermal Energy storage to be coupled with the existing CHP plant in order to enhance flexibility of the plant and increase the availability of the CHP plant in middle season and summer; • Smart Electric Thermal Storage (SETS) systems: 3 SETS space heaters and 2 water heaters will be installed in order to increase the flexibility related with heating/cooling systems and DHW production; • Two EV charging station, in order to test flexibility in charging EV and to test vehicle-to-grid (V2G) and vehicle-to-building (V2B) flexibility strategies; • 16,8 kWh EES to be installed at Campocavallo pumping station; • SCADA/Server ASTEA able to control the CHP district heating network and to monitor all the ASTEA distributed generation assets; • Installation of a real time monitoring system of thermal energy and water consumptions in the DH and water network

	Osimo demosite ID
Demo illustration	
Details on demo experiments	MUSE Grids validates solutions for decarbonisation of local energy communities focusing not only in the technological solutions (storage systems, smart control, prediction models, energy exchange among different energy vectors), but also in the consumers and the whole socio-technological energy system involved. Thanks to the technologies implemented in the Osimo demo-site, the aim is to optimise energy management through the greater interconnection of the energy vectors involved (electricity, water, gas and district heating) thus reducing waste and increasing self-consumption. Another important aspect is the involvement of end-users and energy communities and support to the local authorities to exploit synergies in the local context. In addition, raise awareness of the citizen to an optimal energy use through the real-time consumption knowledge, as well as the demand/response program.
Roles & actors involved	ASTEA SpA is the local multiutility demo-site leader. Osimo assets are managed thanks to UNIVPM support, who is take care of DSM implementation and monitoring data evaluation. GALU, GD and DUFERCO are technology and support installation providers, as well as the integration of their management strategies in the DSM provided by SGRE and CAR. RINA-C supervises demonstration activities as project coordinator.
Services & products offered	The project develops the Muse Grids smart control architecture replicable on other Local Energy Communities.
Links to other Projects	
Website	https://www.muse-grids.eu

1.3.10 OSMOSE

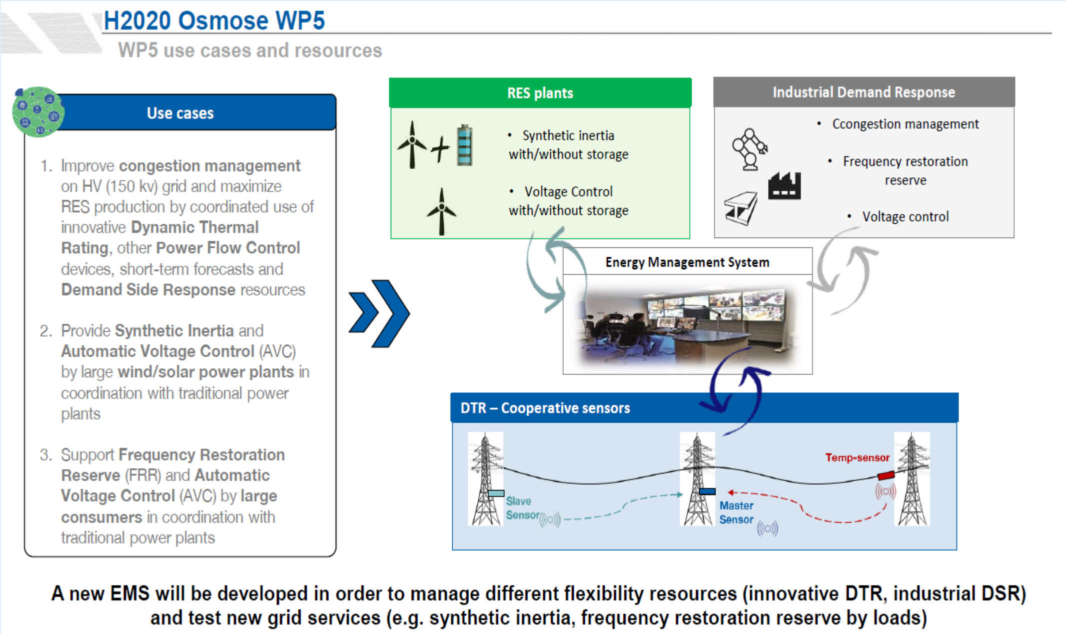
Project & demo information – OSMOSE

Name of the demo	**Italian Demo**
Starting date of the demo	01/01/2018
Final demo date	31/12/2021

OSMOSE Demo 2 - Italian demo ID	
Location	IT
Status of the demo	ongoing
Assets	Power Flow Control (PFC) devices An innovative battery connected to HV in DC with an advanced BMS Technologies to enable Dynamic Thermal Rating of lines Demand Side Response (DSR) and RES aggregation tools RES forecast tools
Details on demo development	The demo objective was to assess and increase the real-life techno-economic efficiency of multiple services provided by grid devices, large demand-response and RES generation coordinated in a smart management system, and to provide field data contributing to the others WP. This objective was supported by a field demonstration on Terna’s grid that consisted of three use cases: Use case 1 - Congestion management by optimal coordination of demand-response and grid devices Improve congestion management on HV grid and maximise RES production by coordinated use of Dynamic Thermal Rating (DTR) short-term forecasts, PFC devices and DSR resources Use case 2 - Demonstrate, in a relevant HV grid portion, the reliability of provision of Synthetic Inertia and Automatic Voltage Control (AVC) by single or aggregated large wind/solar power plants Use case 3 - Demonstrate, in a relevant HV grid portion, the reliability of provision of Frequency Restoration Reserve (FRR) and Automatic Voltage Control by single or aggregated large industrial loads

Demo 2 - Italian demo ID

Demo illustration



Details on demo experiments

The aims are to:

- Improve congestion management on HV grid and maximise RES production by coordinated use of DTR short-term forecasts, PFC devices and DSR resources (UC1). The related expected results is to provide a software tool for local congestion management capable of coordinating DSR, PFC devices and data from DTR short-term forecasts, along with conventional power plants.
- Demonstrate, in a relevant HV grid portion, the reliability of provision of FRR and AVC by single or aggregated large industrial loads (UC2). The expected result is to address, through exhaustive energy audits of the processes of targeted industrial customers, the implementation and testing of FRR and AVC provided by industrial consumers, focusing on the role of HV aggregators as key players to increase DSR availability on ASM
- Demonstrate, in a relevant HV grid portion, the reliability of provision of Synthetic Inertia and AVC by single or aggregated large wind/solar power plants (UC3) provide technical recommendations in order to better integrate synthetic inertia in the European grid codes, by implementing and testing service provision based on an advanced control logic

Roles & actors involved

TSOs (project manager and coordinators), actors that contribute to the functionalities of the project: owners of DER units, owners of storage units;

Services & products offered

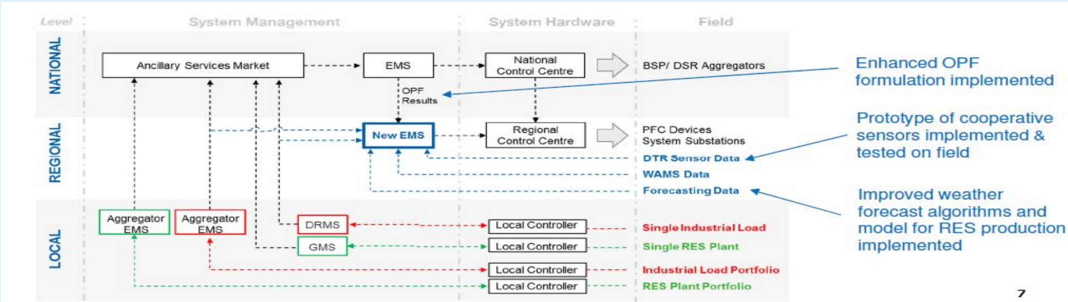
Enable Congestion management by optimal coordination of demand-response and grid devices. This service is enabled thanks to a real-environment application of the EMS for 10 months (see below

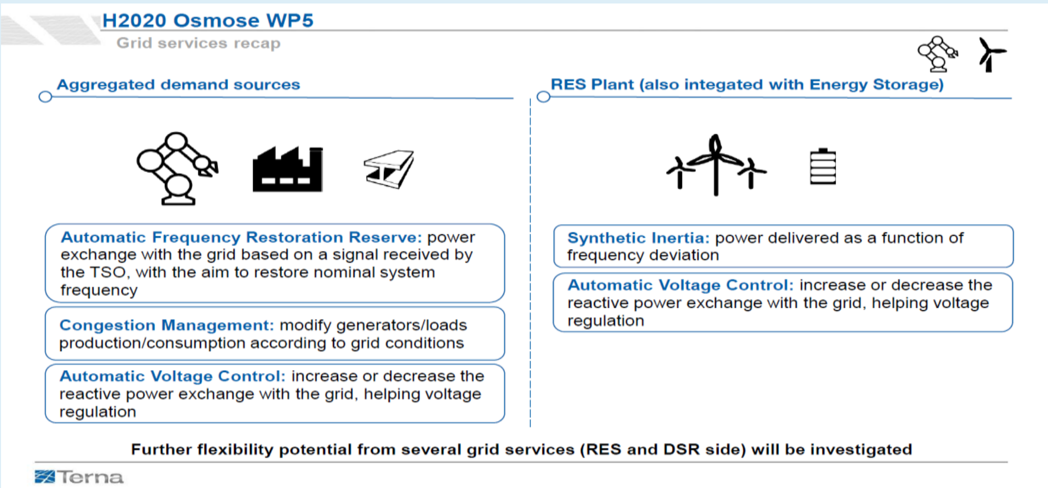
OSMOSE – OPTIMAL SYSTEM-MIX OF FLEXIBILITY SOLUTIONS FOR EUROPEAN ELECTRICITY

Demo 2 - Italian demo ID

The development of synthetic inertia: the main result is the definition of technical specifications required to size PE devices and to enable the aggregation among RES plants. Furthermore, an innovative control scheme for RES synthetic inertia provision was implemented and tested

Increasing Availability of System Services from DR through Aggregation An analysis of DSR services addressed the sizing of PE devices necessary to provide load modulation, accounting also for the case of multiservice provision (congestion management combined with FRR/AVC)





Links to other Projects

Website

https://www.osmose-h2020.eu/

https://www.osmose-h2020.eu/presentations/

https://www.osmose-h2020.eu/downloads/

1.3.11 TRINITY

Project & demo information – TRINITY

Name of the demo	Transnational GoO issuing in SEE
Starting date of the demo	01/08/2022
Final demo date	31/07/2023

TRINITY Transnational GoO issuing in SEE ID	
Location	
Status of the demo	Not started
Assets	RES Units
Details on demo development	The deployed tool for the realisation of the experiments is: - T-RES CONTROL CENTRE Other external systems interfacing with the demo tools for different purposes: - Issuing body systems (Serbia) The physical energy assets available to demonstrate - KREKEZA Wind Farm (Greece) Total installed capacity: 30 MW Number of Units: 12 - Vathychori I PV Power Plant (Greece) Total installed capacity: 5,98 MW - Vathychori II PV Power Plant (Greece) Total installed capacity: 1,496 MW - Pometeno brdo Windfarm (Croatia) Total installed capacity: 20 MW

TRINITY Transnational GoO issuing in SEE ID	
	Number of Units: 15x 1 MW Wind turbines, 2x 2.5 MW wind turbines.
Demo illustration	
Details on demo experiments	1. The RES generation plant starts to generate. On receipt of meter readings from RES generation plant, the Issuing Body gives the corresponding of 1MWh GoO (a guarantee of origin shall be of the standard size of 1 MWh). No more than one guarantee of origin shall be issued in respect of each unit of energy produced. The Issuing Body records this in its registry. 2. Creation and validation (by public ledgers nodes) of a new block by the T-RES CONTROL CENTRE. Each block is made of two parts: header and data. Block header is a metadata. Usually, it contains such information as block number, timestamp (the record of when the block was created), block hash, and nonce. A GoO is issued. 3. The RES producer can sell GoO to the market. Once provided, the T-RES CONTROL CENTRE tells the Issuing Body each time a certificate is transferred to another account. The Issuing Body records this in its registry. 4. Cancellation is the method for allocating the attributes of the electricity to the single end-user. Cancelling a GoO is the only way to redeem its benefits while ensuring that the certificate will not be traded, given, sold, or used by another end-user. The transaction is marked as completed both the T-RES CONTROL CENTRE and the Issuing Body.
Roles & actors involved	RES producer, Issuing body
Services & products offered	A Renewable Energy Sources Control Centre with capabilities to issue GoO (via blockchain) per each MWh of RES energy produced.

TRINITY Transnational GoO issuing in SEE ID	
Links to other Projects	CROSSBOW
Website	http://trinityh2020.eu/

1.3.12 X-FLEX

Project & demo information – X-FLEX

Name of the demo	**Xanthi pilot**
Starting date of the demo	01/04/2020
Final demo date	30/09/2023

Xanthi pilot ID	
Location	Xanthi (GR)
Status of the demo	On-going
Assets	MV & LV network, transformers, smart meters, RES, batteries, Fuel cells, inverters and converters of the microgrid
Details on demo development	The deployed tools for the realisation of the experiments are: X-FLEX Platform GRIDFLEX SERVIFLEX SLAM meters Regional SCADA System

	Xanthi pilot ID
	AMI system Other external systems interfacing with the demo tools for different purposes: Current weather conditions Weather forecast The assets included in the demo: Xanthi Distribution Grid operated by HEDNO: 3 MV lines from 2 HV/MV substations (Substations of Xanthi and Magiko) with 211 MV/LV substations of total installed power approximately 52 MVA 23 telemetered PVs of around 4 MWp (total installed power) (connected to MV and LV network) 21 MV and 41 big LV telemetered consumers SUNLIGHT's microgrid: PV of 4680 Wp Battery system of 1500 Ah PEM FC: 3000 W PEM electrolyser AC loads

	Xanthi pilot ID
Demo illustration	
Details on demo experiments	The goals of Xanthi pilot are the following: the minimisation of the impact of extreme weather events the increase of the resiliency of the network the scheduling of DERs for coordinated energy management the cost-effective power production and P2G optimisation at SUNLIGHT's microgrid. All the above will be achieved through the implementation of the advanced functionalities of GRIDFLEX and SERVIFLEX and their combinatory usage along with measurements and data retrieval using SLAMs, AMI and SCADA systems. SUNLIGHT is going to use SERVIFLEX in order: to have access to detailed modelling and forecast of the Distributed Energy Generation and Storage Systems in their microgrid to manage and segment flexibility in dynamic clusters in order to optimally provide the requested service to establish a coordinated flexibility management framework for balancing local production, storage and consumption based on internal or external parameters and control these assets. HEDNO is going to use GRIDFLEX

Xanthi pilot ID

	to have access to real time monitoring of the distribution network with data coming from SCADA, AMI and smart meters to perform state-estimation of the network, which serves as basis for most of the other functionalities to be equipped with advanced forecasting tools for RES and load forecast, based on historical data and current information to implement scenario-based long-term planning and scheduling of the grid to reconfigure the network in order to avoid problems or minimise their impact and operate more efficiently the network to schedule dispatchable RES and storage to optimise the operation of the grid to manage more efficiently detected incidents and assist the personnel handling these incidents in the problem resolution to detect congestions occurring in the network using power flow calculations and mitigate them, but also forecast probable congestions and act on time to avoid them using different measures, including flexibility to minimise the effect of extreme weather events (e.g. strong winds), through the relevant tool of GRIDFLEX where the resiliency of the grid is firstly assessed and then, a list of measures is provided to the operator to cooperate with other actors (like SUNLIGHT as aggregator in this case) in order either to perform coordinated actions for the minimisation of the impact from extreme weather events or improve the operation of the network (minimising losses, absorb more energy coming from RES) to communicate with the end-users and notify them for incidents (outages, maintenance etc) affecting them.
Roles & actors involved	DSO, microgrid operator, large volume customer, consumers, energy producers
Services & products offered	SERVIFLEX for flexibility management, GRIDFLEX for network management, X-FLEX platform for the management of heterogenous data streams from the different operational systems, the field devices and the project tools.

	Xanthi pilot ID
Links to other Projects	WiseGRID (H2020 project)
Website	X-FLEX D2.2, X-FLEX D7.1, X-FLEX D7.4

1.4 Map of demos across Europe

The map below presents a provisional distribution of sites based on the collected data from the first phase of Action 5. The pins do not show the exact location of the demo, but the country where it is located. The transnational demonstrations are presented with clips, each country.

Figure 1 Provisional distribution of sites and platforms based on the data collected in the first phase of Action 5

ID cards repository

The final objective of Action 5 is the proposal of a dynamic knowledge sharing mechanism to facilitate the access to the definition of the demonstration sites used by the H2020 projects, in particular the ones engaged at the Regulatory Working Group.

It is noteworthy stressing that the purpose of the ID cards is on the "demonstrations" – i.e. field experiments, and not in the uses cases being defined by each project, which are already tackled by the relevant action within the Data Management Working group. Obviously, there is a natural link between the definition of the use cases, which may be common to different projects, and their final execution – deployment and evaluation – in the field.

Action 5, and the ID cards repository, focus on the real-life constraints that H2020 projects face when bringing their developments to the field.

1.5 Requirements

In order to escalate the ID cards gathering and to increase its usability over time, a number of requirements have been identified as result of the work done with the first round of projects participating in this action.

- R01. The ID cards repository must be made available on a web site.
- R02. The ID cards repository must consider dynamic contents.
  - R02.1 Projects must be able to upload and update the information available on their demo ID cards as the project evolve(following the stages preidentified in the ID cards: preparation, partial execution, final execution).
  - R02.2 Information on the ID cards may be able to link with external contents, notably deliverables of the project with extensive information.
  - R02.3 The ID cards must be able to seamless integrate diagrams and pictures provided by the project.
- R03. The ID cards repository must allow to search and filter for specific projects and common characteristics.
  - R03.1. The repository must support queries by project name.
  - R03.2 The repository must support queries by partners names.
  - R03.3 The repository must support geospatial queries.
  - R03.4 The repository must support time-based queries.
  - R03.5 The repository must support role-based queries. (*, link to R04).
  - R03.6 The repository must support service-based queries. (*link to R05).
- R04. The ID cards repository must use the Harmonised Market Role Model for the definition of the roles in each demo.
- R05. The ID cards repository should link with the Use Case repository also defined within BRIDGE.
- R06. The ID cards repository should provide a dynamic map to show all the demonstration sites promoted by H2020 projects.
- R07. A mechanism to establish relationship between demo sites must be provided.

- R07.1 If a demo site is used in more than one project with different experiment, two demo ID cards will be necessary, but the relationship between projects must be flagged.
- R07.2 If a demo site continues the experiments from a previous project, two demo ID cards will be necessary, but the relationship between projects must be flagged.

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Annex 1. Collected data

By filling in this form, you acknowledge that you have been informed about the use of your personal data and about the measures/procedures taken to protect and rectify them.	First name of the respondent	Last name of the respondent	Respondent's e-mail	Name of the project	Name of the demo	Starting date of the demo	Final demo date	Type of assets	Details on demo development (maximum 1000 words). Please describe the tools and energy assets to be used in the experiments.	Do not hesitate to upload a file/ picture to illustrate the demo development	Geoposition (Please provide Country (ISO CODE), City, Coordinates)	Status of the demo (on-going, finished)	Details on demo experiments (maximum 1000 words). Please specify the expected outcomes of the experiments and goals to achieve.	Do not hesitate to upload a file/ picture to illustrate the demo experiments	Roles and actors involved (TSO, DSO, Energy producers, etc.). Please use the Harmonized Model if possible when enumerating/describing the roles	Services and products offered (enumerate the products and services offered by the project and used within this demo.)	Links to other Projects	Website (Link to further details, maybe the Deliverables describing the demo and experiments)	Pictures (Link to the source of the pictures used in the fields above. High definition to print. You can use google drive, dropbox, or upload the picture using the next button)	Please use the button below to upload your +I4+U3:U4+U3:U5+I4+U3:U4+U3:U7+U3:U5
YES	Aleksandra	Krkoleva	krkoleva@pees-feit.edu.mk	CROSSBOW	Bosnian-Croatian Border RES Coordination	01/06/2020	30/09/2020	HV-HV and HV-MV substations, SCADA and PMUs	The aim of the demo is apply CROSSBOW solutions for coordinating RES assets and solving network problems in the border between Bosnia and Herzegovina and Croatia. The assets and tools for development and deployment of the demo include: Wide Area Monitoring System (WAMS); protection system for the WAMS - network status and real time values taken from TSO SCADA and PMUs deployed; RES Control Centre (RES-CC); Regional SCADA Systems; sub-regional SCADA Systems (generation plant-specific SCADAs). In addition, external systems interfacing with the demo tools for different purposes	Demo1.jpg;demo2.jpg	HR, Konjsko, BA, Mostar	on-going	The set of experiments is intended to help the system operator (SO) in handling network problematic situations in the southern border between Croatia and Bosnia & Herzegovina. The problems in focus are high voltages in the main substations, linked to a big amount of production in a relatively small area, and congestion in the corridors for the same reason. The following experiments will be demonstrated: •Integrating the control of the renewable parks in the region (southern Bosnian-Croatian border) for the purpose of solving network problems (congestion) using the RES-CC as an intermediate entity. The actions in the demo will show how the RES assets in the region are integrated in the mFRR portfolio:		TSO, Energy producers	Renewable Energy Sources Coordination Centre (RES-CC), Wide-area monitoring system (WAMAS), Ancillary Markets Platform (AM)		http://crossbowproject.eu/deliverables/		
YES	Aleksandra	Krkoleva	krkoleva@pees-feit.edu.mk	CROSSBOW	DSM in Croatia and Bosnia and Herzegovina	01/11/2020	31/10/2021	DSM assets, HV interconnection lines, SCADA	The assets and tools for development and deployment of the demo include: Demand Side Management Integration Platform (DSM-IP); Wide Area Monitoring System (WAMS); Regional SCADA systems. The physical energy assets available to demonstrate include: Cross-border lines: -Konjsko (HOPS) – Mostar (NOSBIH), 400 kV; DSM assets: -DS Smith Belisce Croatia d.o.o – 6 MW flexibility, connected at 400 kV; -Cemex Hrvatska d.d – 20 MW flexibility, connected at 400 kV; -NASICECEMENT d.d – 9 MW flexibility, connected at 220 kV; -Messer Croatia Plin d.d. – 6 MW flexibility; -Petrokemija d.d. – 5 MW flexibility. Storage:		HR, BA	on-going	The experiments will show how DSM application at different locations in the transmission system affects voltages and power transfers between these networks, and to what extent it can be used to mitigate network operation issues related to high penetration of renewable generation. The experiments will allow to monitor the grid and identify voltage and frequency deviations, monitor the DSM units and access the contribution of DSM in mitigation of voltage and frequency deviations and congestion. The preliminary demonstration activities in Croatia and Bosnia and Herzegovina foresee three parts: •The simultaneous activation of distributed		TSO, DSM provider	DSM-IP, WAMS		http://crossbowproject.eu/deliverables/		

YES	Svilen	Piralkov	svilen.piralkov@albena.bg	X-FLEX	Bulgarian pilot demonstration	01/10/2019	01/10/2023	Energy flexibility, Battery, Controllable loads (P2H), RES	To increase the reliability of energy monitoring and grid resilience and create flexibility market mechanisms with the provision of a model for financial incentives as a motivation for future flexibility efforts and collaborations. Systems involved: • 27kWp PV panel • Multiple controllable loads converted legacy boilers system stations. o Currently (7): with varying power capacity from 24kW to 282kW for a current total of 974kW. o Multiple Solar thermal collectors installed at some of the boiler station sites. o By the end of the project we expect to increase the controllable loads by up to 32 boiler stations for a total power of up to 2.1MW		Bulgaria (BG), Albena, 43°22'03" N 28°04'48" E	On-going	• Demand side management: Monitor and control the on-site industrial size battery, controllable loads (boiler stations) and RES using GRIDFLEX and SERVIFLEX X-FLEX tools in order to increase efficiency, stability and resilience, while decreasing costs and operational resources. o Involved parties: Albena AD. o This section mainly consists of converting more infrastructure to controllable loads and increasing Albena's flexibility. • Ancillary services to TSO: Use GRIDFLEX and MARKETFLEX X-FLEX tools in order to provide Ancillary services to local TSO. o Involved parties: Albena AD, ESO EAD o This task mainly consists of performing		Microgrid operator, TSO	• Demand side management of controllable loads • Ancillary services to TSO	INVADE (Grant Agreement No 731148)	https://h2020invade.eu http://xflexproject.eu/scenarios/bulgaria/		
YES	Ercole	De Luca	ercole.deluca@areti.it	EU Platone	EU Platone Italian Demo	01/10/2019	31/08/2023	1) HW Assets: Primary Stations, Secundary Sub-Stations, Grid Control Equipments (RTUs, Routers, Modem, Automatic Enhanced Switches, Reclosers), Advanced Metering Systems (Second Generation Smart Meters and Ligh Nodes Blockchain based), Measurement and Set-Point DataBases, Servers for SW Project Platforms, Sorage, EC Charging Stations, EMS for Customer Energy Consumption Modulation, Controllers for PV Installations. 2) SW Assets: Enhanced SCADA, DMS to perform Grid State Analysis, "DSO Technical Platform" (to enable local flexibility mechanisms for interaction Grid-Customer, to send flexibility requests to Market Palce, to	The aim of Italian's demo, coordinated by the Italian DSO areti, is to realize a complete "END TO END FLEXIBLE ENVIRONMENT", i.e. a real integrated market where, appying higly innovative distribution network technologies like Blockchain and new grid equipments, retail and business customers interact with both aggregators (to access new flexibility market options) and the DSO to become active players of the "network optimized management" in an effective and efficient Active Distribution Network. The result will be a fully functional system that enables distributed flexible resources, connected in medium and low voltage to the DSO's grid, to provide services in a combined		Italy (ITA), City of Rome	On Going	The Use Cases of the EU Platone Italian Demo, i.e. the flexibility resources used to test the interaction with the distribution grid, will be: - an high efficiency cogeneration plant, serving, among the others, a huge waste water treatment plant (delivered to 1,1 million inhabitants, 35 GWh/year of energy consumption) and nearby houses with heating; - a Citizen Energy Community (10 selected «early adopters» residential user); - an electric vehicle pool site serving a fleet of 40 EV Cars equipped with charging stations, photovoltaic (PV) production and storage; - a residential building suitable for storage and PV production shared		DSO, Aggregator, Market Place Operator, Customers, TSO, Citizen Energy Community.	Services related to the local flexibility market and more in specific: - Congestion Management - Voltage Control	ETIP SNET and Projects run in the University of Alberta (Canada).	https://platone-h2020.eu/		Platone_Framework.pdf
YES	ilaria	losa	ilaria.losa@rse-web.it	OSMOSE	Demo 1 French demo Demo 2 Italian demo Demo 3 Spanish demo Demo 4 Slovenian demo	01/01/2018	31/12/2021	Demo 1 French demo includes the following assets connected to the RTE grids: •1 MVA grid forming inverter •500 kW / 1H lithium ion battery •1MW 10sec Supercapacitor. Demo 2 Italian demo: •Power Flow Control (PFC) devices •An innovative battery connected to HV in DC with an advanced BMS •Technologies to enable Dynamic Thermal Rating of lines •Demand Side Response (DSR) and RES aggregation tools •RES forecast tools Demo 3 Spanish demo: •New hybrid and modular storage solution with the capability to offer multiple system	see the attached file	osmose_tools_and_assets_for_bridge_mk.docx	France, Italy Spain Slovenia	ongoing	Demo 1 The aims are to •Validate controls that have been developed within MIGRATE project in real condition. -grid forming controls -current limitation controls •Test multiservice controls with grid forming controls •Split the AC service to the different DC device. -grid forming with the super capacitor -« classical service » with the battery The goals to be achieved are: to enable the new assets to behave as a voltage source and ti synchronize with other sources, SM or other inverters and finally to protect the network against overcurrent Demo 2: The aims are to:	osmose_demo_goals_mk.docx	Demo1 TSOs (project manager and coordinators), owners of DER units: actors that contribute to the functionalities of the project) Demo 2 TSOs (project manager and coordinators), actors that contribute to the functionalities of the project: owners of DER units, owners of storage units; Demo 3; TSOs (project manager and coordinators), actors that contribute to the functionalities of the project: owners of DER units Demo 4; TSOs (project manager and coordinators), actors that contribute to the functionalities of the project: cross border TSOs; owners of DER units: national market operator	see the latest attachments "osmose demo services"		https://www.osmose-h2020.eu/ https://www.osmose-h2020.eu/presentations/ https://www.osmose-h2020.eu/downloads/		osmose_demo_services_mk.docx

YES	Maik	Staudt	maik.staudt1@mitnetz-strom.de	EU-SysFlex	German Demonstration - Active and Reactive Power Management in Distribution Grid	01/05/2020	30/04/2021	Generators in 110 kV grid	Using Generators in 110 kV grid in schedule-based active and reactive power management for congestion management and voltage Control at DSO. Providing information about available active and reactive power flexibilities at DSO Level for TSO schedule-based congestion management and voltage control.		DE	on-going	Proof of functionality of described process and operational Realisation.		DSO, energy producers	congestion management, voltage control				
YES	Houriyeh	Shadmehr	Houriyeh.Shadmehr@Eirgrid.com	H2020 EU-SysFlex	Qualification Trail Process (QTP)	01/09/2019	30/11/2021	Solar Residential (DSM) - Communication	The Qualification Trial Process (QTP) provides the link that facilitates the transition from a fossil fuel powered system to a sustainable renewable power system. The QTP acts as a platform to trial system services from new technology providers and identify the operational complexities to the provision of services from a range of providers. This will ultimately provide a route to an enduring services market. The QTP was launched in March 2017. The first round of trials consisted of fifteen individual technology trials across twelve separate Providing Units. Following the completion of the 2017 QTP, the TSOs published the Qualification Trials		Dublin-Ireland	on-going	Lot1- Hybrid Technology objective: the overall objective is to prove Hybrid technology capable of providing a range of the DS3 System Service products - FFR, POR,SOR,TOR1,TOR2,SSRP,RM1/3/8,SSRP,FPFAPR & DRR under the QTP and identify any operational complexities. Lot2- Other Technology open strand: The overall objective is to prove "Other Technology" capable of providing a range of DS3 System Service products under the QTP and identifying any operational complexities. Lo3 - Grid Forming: The aim of this project is to focus on the provision of services related to forming system voltage/frequency, increasing system		TSO, DSO, and Energy providers	DS3 System Service products - FFR, POR,SOR,TOR1,TOR2,SSRP,RM1/3/8,SSRP,FPFAPR & DRR, System strength, Inertia emulated		https://eu-sysflex.com/wp-content/uploads/2020/06/D4.5-M24-Approved.pdf		
YES	RUBÉN	DE ARRIBA	rdearriba@grupocobra.com	CROSSBOW Project	Hybrid RES Dispatchable Plants (RES-DU)	01/11/2019	29/10/2021	The main asset used is the SmartRUE laboratory that comprises a PV generator, a small Wind Turbine, battery energy storage, controllable loads and a controlled interconnection to the local LV grid.	As mentioned above, the demo phase is done in the Smart Rue Lab (Athens), which has several renewable and storage energy assets available for the CROSSBOW demonstration purposes. Through the combination of PV, Wind and batteries, a basic configuration of HPP (Hybrid Power Plant) connected to a PCC (Point of Common Coupling) is considered for the demonstration plan. In addition, the simulation models developed in CROSSBOW allow to consider the rest of technologies that do not exist at lab level (Biomass, Biogas, and Hydro Pump Storage). RES-DU has been developed for providing Power Production Profiles (PPP)	RES-DU_tool.png	GRC, Athens, 37.975710, 23.779966	On-going	The expected goals of the experiments depend on the use case activated: -UC-01: Application of Hybrid Power plants for Ancillary Services To demonstrate that a proper management of the Hybrid Power Plant (HPP) can provide ancillary services for FRR and RR when required by System Operator. -UC-02: Revenues improvement from Hybrid power plants To demonstrate that the proper management of Hybrid Power Plant (HPP) can increase the revenues from the generator sides, shifting the energy from the period of the day when the energy prices are lower to the periods when the energy prices is higher. -UC-03: Analysis of quality services		TSOs and Energy producers (RES and Storage Units)	Hybrid RES Dispatchable Plants aims to offer the following services or Use Cases: -UC-01: Application of Hybrid Power plants for Ancillary Services -UC-02: Revenues improvement from Hybrid power plants -UC-03: Analysis of quality services provided by Hybrid power Plants -UC-04: Analysis of power supply according to the demand -UC-05: Hybrid Power Plant design according to System Operator Requirements	http://crossbowproject.eu/	https://www.youtube.com/watch?v=3L7FeHhLFIQ&t=6s		
YES	Guillaume	DENIS	guillaume.denis@rte-france.com	Osmose	WP3 EPLF grid-forming demonstration	01/01/2020	31/12/2021	Li-Titanate BESS	Besides the BESS, several PMUs have been installed in the grid to measure local impact of grid-forming control.		EPFL's campus. Lausanne, Switzland	On-going	Originally in grid-following mode, the BESS will be turned in grid-forming mode. We will evaluate its effective contribution to the grid through Advanced measurements techniques and see the impact on the hardware. To be tested : • Investigate portability of the control strategies over different hardware platforms. • Prove robustness and effectiveness of grid forming control • Assess multi-services compatibility. • Get insights on inverter sizing & DC side requirements		EPFL, RTE	Grid-forming and multi services	This Demo is done in parallel with Osmose WP3 Rte grid-forming demo			

YES	Simone	Tegas	simone.tegas@e-distribuzione.com	EUSysFlex	Italian Demo	01/01/2021	30/09/2021	Assets owned by the DSO (ESS, OLTC in Primary Substation, STATCOMs) and flexibilities connected to the distribution network (4 PV Plants remote controlled by the DSO after a voluntary agreement between the DSO itself and the plants' owners)	The involved resources are: 1 Electric Storage System (1 MVA/1 MWh); 4 remote controlled PV generators (with a total capacity of 3MW). The two remote controlled On-Load Tap Changer at HV/MV substation; 2 Static Compensators – STATCOMs – (1x1.2MVAr for each MV busbar). The tools developed for the project scopes are: Observability tools The demonstrator already makes use of generation forecasts, which will be updated with the new Nowcast functionality, and it collects a complete set of measurements coming from the field devices, installed in correspondence of the feeders and some selected secondary	EUSysFlex_ItalianDemo.jpg	ITA, Sarsina (FC) località Quarto, 43°53'34.1" N; 12°05'36.6"E	On-going (under construction)	What the Italian Demonstrator is going to obtain, as a result, from this project is a proof of concept of an efficient and as far as possible automated coordination process between DSO and TSO. The forecasting tools should demonstrate that DSO can provide to the TSO a better observability of the resources connected to the distribution network. In particular, by integrating forecast with network state estimation and reactive power capability calculation, the DSO can send to the TSO reliable information on the amount of power, in particular reactive, that can be provided by local resources, improving data exchange between the two System Operators in order to guarantee		DSO, TSO (simulated - the Italian TSO, TERNA, is not a project partner),	In the Italian Demonstrator flexibility resources from the 10 to 30 kV voltage level are offered to the transmission level and the flexibilities are used as measures against voltage violations, congestions and frequency deviations.	GRID4EU	https://eu-sysflex.com/		
YES	Suvi	Takala	suvi.takala@helen.fi	EU-SysFlex	WP6 Finnish Demonstrator	01/11/2017	31/10/2021	Flexible assets connected to medium/low voltage network (battery energy storage systems, EV charging stations, PV plant, electric heating loads)	Objectives: 1) Aggregation of small distributed assets in LV and MV network to the TSO's reserve markets and for the DSO's reactive power compensation needs 2) Forming appropriate forecasting, optimization and control signals as well as communication channels for different flexible assets & connecting assets to virtual power plant		FIN, Helsinki, 60.168079N, 24.930154E	on-going	1) Aggregation of so far untapped distributed assets in the low and medium voltage network and demonstration of flexibility service provision 2) Suitable interfaces to connect small distributed assets to the aggregation platform to create a virtual power plant 3) Forecasting and optimization tools to estimate the availability of the distributed assets to the TSO reserve markets 4) Technical proof of concept for a reactive power market mechanism 5) Evaluation of flexibility market operation schemes and business models		Aggregator, TSO, DSO, energy producers, prosumers, customers	Frequency regulation (reserve markets of TSO), reactive power compensation		https://eu-sysflex.com/documents/		
YES	Nikos	Bilidis	nikolaos.bilidis@eurodyn.com	FLEXITRANSTORE	FEG Platform	01/02/2018	30/04/2021	BESS, Hierarchical Controllers, DLR Sensors, Power Flow Controllers, PSS	The FEG Platform will facilitate the communication between involved actors and enable secure data exchange, It comprises several tools aimed at System Operators (especially TSOs but also DSOs) for the more efficient and secure operation of their networks, by unleashing the flexibility potential of the power systems. It also provides tools for flexibility studies and for strategic analysis aiding them with formulating the TYNDP. The tools integrated in the FEG platform are based on hardware installed on the network. BESS in combination with advanced hierarchical controlers at the TSO/DSO interface and at a Wind Park substation. BESS		Cyprus, Greece, Bulgaria, Spain	On-going	The project envisions to create awareness around the regulatory framework and the gaps that act as obstacles to the innovation and the realization of the measures foreseen in the regulation and EU strategies. Following this, the project will gain significant experience though the deployment of new technologies in the grid, whereas lessons learnt will be used to create value. More specifically, and as far as the technologies employed are concerned: The demos via their implementation through the FEG platform are dealing, among other, with the grid integration of battery storage and the development of an enhanced electricity market. The activities promote EU clean		TSO, DSO, Energy Producers, Market Operators, (Virtual) Aggregator	Primary Frequency Response, Fast Frequency Response, Synthetic Inertia, Voltage Support, Black-start, Power Balance Provision, Generation Scheduling Optimization,		www.flexitranstore.eu		

YES	Nikos	Bilidis	nikolaos.bilidis@eurodyn.com	INTERRFACE	IEGSA Platform	01/06/2019	30/06/2022	Photovoltaics, Smart Meters, Energy Management System, Prosumers, CHP, EVs, EV Chargers, BESS, Hierarchical Controllers,	IEGSA brings together all the project demos which include: - A city scale (35.000 inhabitants) microgrid characterized by a single Point of Common Coupling with the national TSO, a high share of renewable generation and a CHP-District Heating network (serving 1000 final users). - An intelligent controller (Intelligent Distribution Node), to be connected at the point of supply of a group of buildings and demonstrate a common set of grid services for DSOs and TSOs but also aiding Balancing Responsible Party (BRP).The demo includes a combination of local congestion management markets with wholesale and balancing markets, ancillary services provision by		Italy, Bulgaria, Estonia, Finland, Latvia, Slovenia, Romania, Hungary, Greece	On-going	IEGSA platform will facilitate data exchange and communication between System operators, enabling coordination and the more robust operation of the power systems. It will also enable communication and data exchange between all involved actors enhancing transparency and allowing market access and participation of new actors, such as prosumers. The project created a focus on cross border balancing and congestion schemes and proposed standardized schemes and related products across Europe, to be tested during demonstration implementation. The aim is to showcase that the proposed IEGSA will be able to maintain data exchange despite		TSO, DSO, Market Operator, Consumer, Prosumer, Imbalance Settlement Responsible, Flexibility Register Operator, TSO-DSO Coordination Platform Operator, Single Interface to Market Operator, Balance Responsible Party, Flexibility Provider, Aggregator	aFRR, mFRR, Short Term Congestion Management, Operational Congestion Management		www.interrface.eu		
YES	Carlos	Cruzat	c.cruzat@manchester.ac.uk	CROSSBOW Project	Storage Coordination Centre (STO-CC)	01/08/2020	31/10/2020	Energy Storage System	The Regional Storage Coordination Centre (STO-CC) is one of the products of the large scale storage solution for the transmission network within the CROSSBOW project. Its main objective is to efficiently incorporate intermittent RES generation, addressing system stability issues (voltage and frequency) as well as improving the reliability of the European interconnected network. In particular, STO-CC aims to the advance the optimal coordination of centralised storage units at a national and regional level for improvement of the stability of the system, enabling the provision of multiples services, such as improving penetration of RES, the cross-border power transfer, frequency and		Serbia, Perucac, Zlatibor. Latitude: 43.9645, Longitud: 19.4102	On-going	The goal is to assess the performance and contribution of STO-CC during frequency events. So to capture the impact on the frequency deviation within the Serbian network, the most representative synchronous generators from the system are taken out of service. The generators failures happen one at a time, and therefore only one synchronous machine fails within the network. The generators will be tripped off the network after 5 seconds of normal operation (i.e. without network disturbances). Thus, the two largest generators containing the highest inertia from the Serbian equivalent network are used to capture the impact on the frequency deviation within the system. In		TSO (EMS from Serbia), Energy Producer (EPS from Serbia), R&D (ETRA from Spain), Engineering Company (KONCAR from Croatia, and ELPROS from Slovenia).	Increase penetration of RES, the cross-border power transfer, and support frequency and voltage deviations occurred within the system.				
YES	Ursula	Krisper	ursula.krisper@elektro-ljubljana.si	Interrface, the second project would be PHOENIX	P2P local market, in PHOENIX project it wil be the LSP 3 or Slovenian pilot	31/12/2020	01/07/2022	distribution grid assets: transformers, OHLs, smart meters	Interrface:The pilot aims to demonstrate (in lab environment) a local p2p market that enables consumers to buy electricity from other parties, other than their suppliers (e.g. in Slovenia the largest electricity trader is GEN-I, the largest electricity distribution company is Elektro Ljubljana, d.d.) and on the other hand, to offer their locally produced (household's generation) electricity for sale to one another (the parties present on the market, e.g. their neighbours). Trading on those local p2p markets might impact the electricity flows (physical) in the grid and it needs to be ensured that there are no negative effects on the grid operation. Therefore, the wholesale market mechanism needs to be		Slovenia: Škofljica, two transformer stations supply the electricity mainly to the households (TS "sp. Besnica Drčar, TS Gradišče) PHOENIX: Šmartinska c. 152, 1000 Ljubljana, Slovenia, a big shopping area. Hungary: the city, actually a part of the supplying area of NKM DSO in Zsombó, second demo site is Mohács-Belvárdgyula, the local DSO is E.ON.	on going	The resulting market model is tuned to incentivize local flexibility by enabling local participants to bid on a connected TSO-DSO level market. The connection of both global-TSO and local-DSO dimension and the joint allocation of energy and local flexibility provides proper price incentives through coupling different slices of trading. The varying size of each DSO zone is mitigated by the cost sharing feature enabled within the market by PUN pricing.		DSOs, grid users	local market, flexible power for the DSO	/	*/	/	

YES	Peter	Nemcek	peter.nemcek@cyber-grid.com	CROSSBOW	Cooperative Flexibility Platform	01/10/2020	30/09/2021	C&I Demand Response	Cooperative Flexibility Platform (CFP) Although Flexibility Assets, like Demand Response systems and Virtual Power Plants (VPPs), are becoming common providers of balancing services in some European markets (Austria, France, Slovenia, UK, etc.) they are normally owned and operated mainly by electricity retailers or independent aggregators which business objectives might not necessarily be aligned with their providers of flexibility (consumers, prosumers, distrib-uted generators, RES, storage etc.). The cooperative ownership concept will be aligned with existing regulation and general enough to support existing flexibility		Slovenia	on-going	Demonstration and validation of CFP product To demonstrate and validate the newly developed business model and CFP products in CrossBow, various flexibility resources are needed. Elektro Ljubljana's flexibility resources from InteGrid (Horizon 2020 project) would help assess the CFP product and VPP functionalities in line with the CFP goals. Potentially all flexibility resources from the InteGrid technical VPP in Slovenia that are connected via IEC 60870-5-104 communication protocol would be used by CrossBow CFP. The flexibility resources and their owners will not have any direct participation in the		cyberGRID (ICT) and Elektro Ljubljana (DSO)	CFP product, flexibility management, ancillary services	https://integrid-h2020.eu/	http://crossbowproject.eu/	http://crossbowproject.eu/dissemination-material/	
YES	Stamatia	Gkiala Fikari	S.Gkiala@deddie.gr	X-FLEX	Xanthi pilot	01/04/2020	30/09/2023	MV &LV network, transformers, smart meters, RES, batteries, Fuel cells, inverters and converters of the microgrid	The deployed tools for the realization of the experiments are: •X-FLEX Platform •GRIDFLEX •SERVIFLEX •SLAM meters •Regional SCADA System •AMI system Other external systems interfacing with the demo tools for different purposes: •Current weather conditions •Weather forecast The assets included in the demo: Xanthi Distribution Grid operated by HEDNO: -3 MV lines from 2 HV/MV substations (Substations of Xanthi and Magiko) with 211 MV/LV substations of total installed power approximately 52 MVA -23 telemetered PVs	HEDNO_infrastructure_2.jpg;HPIM0384.jpg	Xanthi (GR)	On-going	The goals of Xanthi pilot are the following: •the minimization of the impact of extreme weather events •the increase of the resiliency of the network •the scheduling of DERs for coordinated energy management •the cost-effective power production and P2G optimization at SUNLIGHT's microgrid. All the above will be achieved through the implementation of the advanced functionalities of GRIDFLEX and SERVIFLEX and their combinatory usage along with measurements and data retrieval using SLAMs, AMI and SCADA systems. SUNLIGHT is going to use SERVIFLEX in order to •have access to		DSO, microgrid operator, large volume customer, consumers, energy producers	SERVIFLEX for flexibility management, GRIDFLEX for network management, X-FLEX platform for the management of heterogenous data streams from the different operational systems, the field devices and the project tools.	WiseGRID (H2020 project)	X-FLEX D2.2 X-FLEX D7.1 X-FLEX D7.4		
YES	Gašper	Artač	gasper.artac@petrol.si	X-FLEX	Pilot site Luče	01/05/2020	30/09/2023	Smart home EV chargers, community battery, PV, home batteries, biomass woodchip generation, SLAMs	The deployed tools developed during the project used for the realization of the experiments are: GRIDFLEX: - Distribution grid cooperation module. - Increase the carrying capacity of RES in the distribution grid of the local energy community. MARKETFLEX: - New market mechanisms. - Valuation of flexibility. - New technologies for efficient operation and verification. - Blockchain-enabled demand response settlement and remuneration. SERVIFLEX: - Unidirectional vehicle to grid (V2G). - Flexibility optimization. Other external systems interfacing with the demo tools for different		Luče (SI)	on-going	KEY ISSUE TO BE TACKLED: - Local network limitations: distributed RES generation to be curtailed and limited new RES installation. - Security of supply: frequent outages during extreme weather conditions. This set of experiments aims at resolving key issues of flexibility of local energy community with low local network capacity: - The pilot site will demonstrate all X-FLEX products, testing various use cases with the main aim of enabling further penetration of RES without standard measures to strengthen the grid. - Providing of the ancillary services for DSO and testing possibilities to provide ancillary services to the		DSO - Elektro Celje, aggregator - Petrol, ETRA, ICCS, S5	GRIDFLEX, MARKETFLEX, SERVIFLEX	COMPILE	http://xflexproject.eu/scenarios/luce/		

YES	Gašper	Artač	gasper.artac@petrol.si	X-FLEX	Pilot site Ravne na Koroškem	01/05/2020	30/09/2023	Electrode boiler, cooling system, SLAMs,CHP, PV, district heating system, natural gas distribution network	The deployed tools developed during the project used for the realization of the experiments are: GRIDFLEX: - Demonstrate DSO-DSO cooperation to improve the operation procedures during the extreme weather events to improve the security of supply. MARKETFLEX: - Provide flexible energy to the electricity market and ancillary services to TSO over a blockchain infrastructure for transactions' facilitation. SERVIFLEX: - RES power2heat optimization. - Increase security of supply for district heating and industry heating. Other external systems interfacing with the demo tools for different purposes:		Ravne na Koroškem (SI)	on-going	KEY ISSUE TO BE TACKLED: - RES power2heat optimisation. - Electricity supply reliability. - Heat supply reliability. - Industrial waste heat management. - Interoperability. This set of experiments aims at resolving key issues of flexibility of the power to heat on an industrial site: -Test of the use cases with the main aim of providing flexibility and ancillary services for the TSO and the DSO and to optimize the combined operation of CHP units and the electrode boiler (RES power2heat), resulting in improved efficiency and reliability of heat production. - Optimization of the engagement of flexible devices.		DSO - Petrol (industrial area) and Elektro Celje (residential area), Energy producer - Petrol (Heat, Electricity), ETRA, ICCS, S5	GRIDFLEX, MARKETFLEX, SERVIFLEX		http://xflexproject.eu/scenarios/greeceravne-na-koroskem/		
YES	Matteo	Lorenzetti	matteo.lorenzetti@gruppoastea.it	Muse Grids	Osimo demosite	01/11/2018	31/10/2022	-Assets already present in Osimo demo-site: Cogeneration Plant supplying a District Heating Network (CHP-DH Plant); two water-pumping stations; photovoltaic plants (about 30 MWp); Astea headquarter with electric vehicles and charging station. -Assets to be installed/implemented in Osimo demo-site: thermal energy storage, electric energy storage, smart electric thermal storages, water heating cylinders, plant automation system, charging stations, smart water and energy meters.	During the four years project the Osimo multi-energy municipal microgrid will be improved by installing different technologies in order to better exploit synergies among different energy network thus achieving the goal of increasing the self-consumption of electricity produced locally by distributed generation systems. These technologies are: - 85 m3 Thermal Energy storage to be coupled with the existing CHP plant in order to enhance flexibility of the plant and increase the availability of the CHP plant in middle season and summer; -Smart Electric Thermal Storage (SETS) systems: 3 SETS space heaters and 2 water heaters will be installed in order to		10.�Italy (IT), Osimo, Latitude 43.486019 – Longitude 13.482410	on-going	MUSE Grids validates solutions for decarbonisation of local energy communities focusing not only in the technological solutions (storage systems, smart control, prediction models, energy exchange among different energy vectors), but also in the consumers and the whole socio-technological energy system involved. Thanks to the technologies implemented in the Osimo demo-site, the aim is to optimize energy management through the greater interconnection of the energy vectors involved (electricity, water, gas and district heating) thus reducing waste and increasing self-consumption. Another important aspect is the involvement of end-users and energy		ASTEA SpA is the local multiutility demo-site leader. Osimo assets are managed thanks to UNIVPM support, who is take care of DSM implementation and monitoring data evaluation. GALU, GD and DUFERCO are technology and support installation providers, as well as the integration of their management strategies in the DSM provided by SGRE and CAR. RINA-C supervises demonstration activities as project coordinator.	The project develops the Muse Grids smart control architecture replicable on other Local Energy Communities.		https://www.muse-grids.eu		
YES	Dušan	Prešić	dusan.presic@scc-rsci.com	CROSS BOrder management of variable renewable energies and storage units enabling a transnational Wholesale market - CROSSBOW	Probabilistic regional adequacy assessment calculation	03/01/2020	28/02/2020	Software tools for statistical and load flow calculation	D12.1 Integration and deployment of CROSSBOW ecosystem Short Term Adequacy Assessment (STA) is an ENTSO-E project involving all European RSCs with the aim of determining if available generation capacity and possibilities for import of energy satisfy forecasted load in the week-ahead time-frame. Currently the Cross-Regional STA functionality is performed by RSCs on Pan-European level where adequacy is assessed by using two calculation approaches, deterministic and probabilistic, on a weekly basis. After performing STA, a first overview of the adequacy status in the whole European system is available. Following this		Bulgaria (ESO EAD), Serbia (SCC Ltd. Belgrade)	Lab testing (prototype demonstration) and preliminary demonstration are finished, while several partners are preparing for final demonstration	Lab testing was performed for the week starting from 19th of January till 25th of January 2019 (Week 4 of 2019). All details regarding lab testing are available in enclosed document: D12.3- HLU1-UC1 only - BRIGDE version.pdf (this is extrusion of D12.3 that contains only HLU1-UC1 lab testing results) Preliminary demonstration of this use case is done in January and February 2020 (M27 and M28). The goal of this demonstration was to prove that continual delivery of expected results is possible. Since prototype demonstration (lab testing), used in development phase to prove the concept, is performed using 3 different tools, including	D12.3-_HLU1-UC1_only_-_BRIGDE_version.pdf	ESO EAD - Bulgarian TSO, SCC Ltd. Belgrade - RSC for SEE region	3 CROSSBOW products involved: ROC-BC, RES-CC and RES-DU.	Upgrade of RAA algorithm will be done in TRINITY (TRansmission system enhancement of regIoNal borders by means of IntellIgenT market technologY) project - development phase is starting in Q4 of 2020	On the following link, you can find CROSSBOW Deliverables: http://crossbowproject.eu/deliverables/ Important for this subject are: D12.1 Integration and deployment of CROSSBOW ecosystem (finished) D12.3: CROSSBOW integrated ecosystem preliminary deployment (finished) D13.1: Demonstration activities planning (finished) D13.2 CROSSBOW integrated ecosystem preliminary demonstration (finished by the end of October 2020) Unfortunately, the first 3 of them are not available on the CROSSBOW site - if you are interested in examing them please contact ETRA	Some interesting display of calculation results could be found in reports on: http://eso.bg/?did=248	

YES	Kirsten	Glennung	projects@edsoforsmartgrids.eu	COORDINET	Malaga (Spain)	01/10/2020	30/03/2021	Wind, solar PV, CHP, demand response, EV, batteries	Demand side associated with generation: - BIOGAS_MAL1: Four thermal groups using the biogas (landfill), 1MW capacity each, the flexibility is obtained from reduction/increase of generation - COGEN_MAL1: Urban water treatement, four thermal groups, using biogas (wate water), 2.5 MW capacity each, the flexibility is obtained from reduction/increase of generation - sFSP_MAL2: Microgrid w/several EV charging points, lead acid battery, 15kW PV units, the flexibility is obtained from modifying the set-point from v2G charging point, batteries charger, and solar generation - sFSP_MAL3: municipality building: offices, museum, start-		ESP, Malaga	Not yet started	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems. deployment of new grid monitoring systems (sensors) to increase observability		TSO, DSO, CoordiNet Platform, FSP providers	congestion management: distribution, transmission balancing: transmission		https://coordinet-project.eu/		
YES	Kirsten	Glennung	projects@edsoforsmartgrids.eu	COORDINET	Cadiz (Spain)	01/10/2020	30/03/2021	Small renewable assets, large generators, aggregators, consumers, storage	wind 91 MW in four different locations: - Wind CAD1: total active power 10,68 MW - Wind CAD2: 32 MW - Wind CAD3: 42 MW - Wind CAD4: 6 MW solar PV - Solar CAD1: 123 converters, unit power 100kW, total active powe		ESP, Cadiz,	not yet startet	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems.		TSO, DSO, CoordiNet Platform, FSP providers	congestion management: distribution, transmission voltage control: transmission, distribution balancing: transmission		https://coordinet-project.eu/		
YES	Kirsten	Glennung	projects@edsoforsmartgrids.eu	COORDINET	Albacete (Spain)	01/10/2020	30/03/2021	Small renewable assets, large generators, aggregators, consumers, storage	wind: total capacity of the region < 2000MW. All wind considered in the demo is prequalified to participate in the balancing markets. 21 different wind units included hydro: 7 different units capacity 3.84MW - 13.68 - Hydro ALB 1: The maximum flexibility of the hydro units for active power are equal to their installed capacity and depends on the water inflows, except for Hydro ALB5 which, due to restrictions by the Water Management Authority, does not have flexibility. CHP: - Cogen ALB 1: 24 MW, felxibility 18MW (only down) 15 min response		ESP, Albacete,	not yet started	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems.		TSO, DSO, CoordiNet Platform, FSP providers			https://coordinet-project.eu/		

YES	Kirsten	Glennung	projects@edsoforsmartgrids.eu	COORDINET	Alicante (Spain)	01/10/2020	30/03/2021	Small renewable assets, large generators, aggregators, consumers, storage	Demand: - Customer ALI1: one unit 22.MW total cpacity, flexibility to increase or decrease active power up to 6 MW and flexibility of reactive power of 3 MVAr CHP, battery 180MW		ESP, Alicante,	not yet started	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems.		TSO, DSO, CoordiNet Platform, FSP providers			https://coordinet-project.eu/		
YES	Kirsten	Glennung	projects@edsoforsmartgrids.eu	COORDINET	Murcia (Spain)	01/10/2020	30/03/2021	Large generators, consumers, storage	Cogeneration: - Cogen MUR 1: plastic factory, 90MW total capacity Storage: - Battery(simulated FSP): 1.25MW, flexible power 1MW		ESP, Murcia	not yet started	The demo will proof the technical and economic viability of a system that enables flexibility services providers (FSP) regardless of their size and voltage level (in their connection point) to provide flexibility services to DSOs to solve congestions, voltage and islanding operation problems and TSO to solve congestions, voltage and balancing problems.		TSO, DSO, CoordiNet Platform, FSP providers	controlled islanding		https://coordinet-project.eu/		
YES	Álvaro	Nofuentes	anofuentes.etraid@grupoetra.com	TRINITY	Transnational GoO issuing in SEE	01/08/2022	31/07/2023	RES Units	The deployed tool for the realization of the experiments is: •T-RES CONTROL CENTRE Other external systems interfacing with the demo tools for different purposes: •Issuing body systems (Serbia) The physical energy assets available to demonstrate •KREKEZA Wind Farm (Greece) Total installed capacity: 30 MW Number of Units: 12 •Vathychori I PV Power Plant (Greece) Total installed capacity: 5,98 MW •Vathychori II PV Power Plant (Greece) Total installed capacity: 1,496 MW •Pometeno brdo Windfarm (Croatia) Total installed capacity: 20 MW Number of Units: 15x 1			Not started	1.The RES generation plant starts to generate. On receipt of meter readings from RES generation plant, the Issuing Body gives the corresponding of 1MWh GoO (a guarantee of origin shall be of the standard size of 1 MWh). No more than one guarantee of origin shall be issued in respect of each unit of energy produced. The Issuing Body records this in its registry. 2.Creation and validation (by public ledgers nodes) of a new block by the T-RES CONTROL CENTRE. Each block is made of two parts: header and data. Block header is a metadata. Usually, it contains such information as block number, timestamp (the record of when the block was created)		RES producer, Issuing body	A Renewable Energy Sources Control Centre with capabilities to issue GoO (via blockchain) per each MWh of RES energy produced.	CROSSBOW	http://trinityh2020.eu/		

YES	Joerg	Seiffert	joerg.seiffert@uniper.energy	iElectrix	HELGA - Zánka Site	01/12/2020	31/10/2022	Battery Energy Storage System (BESS), Energy Management system (EMS), Advanced metering infrastructure (AMI), Direct load control (DLC)	On Aszófő-Zánka medium voltage line, where the increasing number of PV generation, grid topology and consumption results that small PV power plant connection request cannot receive to this medium voltage line and has to find another connection point, which is probably further away and makes the investment more expensive and time consuming. The planned innovative solution is to connect a Battery Energy Storage System (BESS) to the MV line at Zánka and create an advanced Direct Load Control (DLC) system from the existing DLC system (radio controlled contractor which allows to directly activate/turn on devices, in this case electric water boiler). This innovative solution		HU, Zánka https://goo.gl/maps/26wEc4xVag9H4eTx7	on-going	The expected outcome of the developed solution to reduce the voltage deviation on the MV line with optimizing the battery energy storage system with local energy management system and at the same time increase the renewable hosting capacity to support the national climate goals.		DSO, Final customer	As a DSO we did not developed services or product in a commercial way.		https://ielectrix-h2020.eu/		

YES	Joerg	Seiffert	joerg.seiffert@uniper.energy	iElectrix	HELGA - Dúzs Site	01/04/2021	31/10/2022	Battery Energy Storage System (BESS), Energy Management system (EMS), Advanced metering infrastructure (AMI), Direct load control (DLC)	Dombóvár-Hőgyész medium voltage line, where a similar challenge appears as in case of Aszófő-Zánka MV line. In this case at the very end of the MV line there is one PV farm connected (2x390kVA) and more PV farms cannot be connected to this specific MV line. Connecting a BESS and advanced DLC can reduce the voltage deviation at the end of the line and increase the RES hosting capacity.		HU, Dúzs https://goo.gl/maps/C32jsgCcxBCKZsAf7	on-going	The expected outcome of the developed solution to reduce the voltage deviation on the MV line with optimizing the battery energy storage system with local energy management system and at the same time increase the renewable hosting capacity to support the national climate goals.		DSO, Final customer	As a DSO we did not developed services or product in a commercial way.		https://ielectrix-h2020.eu/		
YES	Joerg	Seiffert	joerg.seiffert@uniper.energy	iElectrix	MOEWE	24/09/2020	30/09/2021	Battery Energy Storage System (BESS)	The selected substation in Friedland (Mecklenburg western Pomerania) will be replaced by a Controllable Network Asset (CNA). This system includes a 3-winding transformer and a battery storage, including an inverter. The transformer will be connected to the grid on the primary and secondary side (20/0.4kV). The tertiary winding (480 volts) will be used to connect the inverter and battery storage. The battery has a rated power of 500 kW and a capacity of 1000 kWh. The separate winding guarantees the galvanic separation of the battery storage from the grid. The reason for this is the advantages in inverter operation, longer operating life, smaller cable cross-sections due to lower	Moewe_1.PNG	DE, Friedland https://goo.gl/maps/nQyJY7xYnqR8P38m8	on-going	In the project there are three major areas of activity that are being addressed. Each area is divided into two phases. In the first phase, appropriate solutions are developed and in the second phase the solutions are implemented and tested. The first area of responsibility includes interface development. The interface is to be a "plug and play" solution. In addition, the grid connection is intended to be open for innovative storage technologies by a high level of standardization. Not only from a technological point of view, but also in relation to the network connection using the possibilities of digitalisation. The second area of	Moewe_2.PNG	DSO	Congestion and voltage management The region of eastern Germany needs to include high amounts of installed renewable DER into distribution networks, especially PV and wind. At the same time, it faces low consumption due to limited number of inhabitants and industry, which generally poses a challenge for stable and reliable grid operation. Especially E.DIS as one of the main DSOs in eastern Germany faces the challenge to integrate a large capacity of DER into its distribution network and thus must execute costly network reinforcements. The high investments lead to significantly increasing network tariffs for grid customers, both domestic and		https://ielectrix-h2020.eu/		
YES	Joerg	Seiffert	joerg.seiffert@uniper.energy	iElectrix	SHAKTI	30/04/2021	31/10/2022	Battery Energy Storage System (BESS), Power and Energy Management System (PMS/EMS), DER Control, Smart Transformer, Advanced Metering Infrastructure (AMI), Condition monitoring sensors, LV switchboard, RTU, SCADA	The Indian demonstration, called SHAKTI and located in Delhi, is the first urban microgrid of its kind to identify the most appropriate solutions to support the energy transition in a challenging Indian context for DSOs, marked by rapid urbanization, high Aggregate Technical & Commercial (AT&C) losses, increasing power purchase cost and a lack of cost-reflective tariffs. SHAKTI demonstration will thus demonstrate various smart grid technologies, including microgrid solution, smart transformer and grid digitization techniques, to experiment three technical use cases on the LV grid with prosumer support:	SHAKTI_1.PNG	India, Delhi https://goo.gl/maps/bCTBdHnc19hFaHC89	Ongoing manufacturing of the tools and assets based on agreed technical specifications.	SHAKTI demonstration aims to demonstrate how network digitization allows to: 1.Optimize the quantity of local solar generation injected on the distribution network of Tata Power DDL (DSO of a control zone in Delhi, India): Expected outcomes: •Deliver as much energy as possible to the customers connected locally to a MV/LV substation. •Lower the reactive energy assuming a given solar asset with a given power specification, and relying on the smart substation, the advanced control of inverters and a dedicated electricity storage management. •Optimize the investment of the PV owners and speed up		DSO, final customers, supplier	•Storage of energy surplus generated by RES during off-peak periods, which can be used later, based on customer needs (e.g. power outage or failure of the main grid). •Deferral of network reinforcement investments for the DSO. •Demand response program.		https://ielectrix-h2020.eu/		
YES	Joerg	Seiffert	joerg.seiffert@uniper.energy	iElectrix	STROM Guessing	01/01/2021	31/10/2022	Battery Energy Storage System (BESS), Energy Management System (EMS), Distributed Energy Resources, Demand Response Schemes, Smart Home Equipment, Smart Meters	The Austrian Demo Solution can be departed in three main components: •Hardware at DSO level •Hardware at end customers level •Software for Integration Hardware at the DSO level summarizes on the one hand the monitoring devices installed at the 20/0,4 kV transformer stations in the distribution grid and on the other hand the connection of the new large-scale Battery Energy Storage System. Besides the ongoing Smart Meter Rollout installations and in order to enable Demand Response Schemes, new IoT equipment, like sensing and actuation devices for lightning and HVAC		Austria, Burgenland, Güssing https://goo.gl/maps/BaQRFpJY2z2DTgeu7	on-going deployment phase	In order to demonstrate the developments, the Austrian Demo will cover the following Use Cases: Use case #1 Maximise the quantity of local consumption of RES generation thanks to Forecasting and scheduling of DER within the Integrated Local Energy System (enabled through the usage of Generation and Demand Forecasting, Local Flexibility Manager and Flexibility scheduling modules) Use case #2 Personalised, human-centric and contract-safeguarding participation in explicit demand response programs, on the basis of context-aware flexibility profiles (based on the customer engagement actions)		DSO, final customer (as active consumer/prosumer), Demand response operator, BESS operator, PV plant operator	Based on the Demo development and the Use Cases do be demonstrated, the provided services are combined in the EMS development and deployment and include operation control and monitoring functionalities utilized for the everyday distribution grid operation managed by the local DSO.		https://ielectrix-h2020.eu/		

YES	Andreas	Tuerk	andreas.tuerk@joanneum.at	COMPILE	Demo Krizevci	04/04/2019	01/09/2022	PV, EVs on a tec park	Pilot site consists of an urban technology development centre with office buildings which is a part of town Križevci. The pilot site is focused on public buildings, mainly the technology park, where first Croatian citizen crowdfunded PV plant was built in 2018 through ZEZ's crowdfunding platform. The PV system of 30 kW intended for self-consumption was installed within the facility, which is hosting some 30 organizations ranging from IT start-ups to chemical companies. An additional 30 kW PV system was installed in a nearby library in 2019, also to be used primarily for self-consumption.	Krizcevci.jpg	Kricevzi, Croatia	Ongoing	Main aim of the demo is to create an energy community as role model for energy community development in Croatia. New models for self-consumption, energy sharing as well as financing will be tested alongside of developing tools for community creation.		Energy Cooperative is the main actor, DSO and municipaliyt are enablers	energy sharing and local supply by an energy community		https://www.compile-project.eu/		
YES	Andreas	Tuerk	andreas.tuerk@joanneum.at	X-Flex	Luce	01/04/2020	09/09/2023	Community battery: 100kW / 200 kWh; home batteries (5): 5 – 20 kWh ; Solar PV: 49,5 kW (goal is to add additional 110 kW; Wind generation: 3,5 kW, Biomass woodchip generation: 150kWt; EV charging points: 10 kW, Public EV charging point: 20 kW; SLAMs; 10 smart home EV chargers;	The pilot site will demonstrate various use cases with the main aim of enabling further penetration of RES (without standard measures to strengthen the grid), providing ancillary services for DSO and testing possibilities to provide ancillary services to the TSO with the use of flexibility from controllable units.		Luce, Slovenia	ongoing	Technolgies installed		The main actors are an energy community that aims to cooperate with an aggregator. The DSO acts as enabler.	The emphasis of this dmeo is on the development of a tool (MARKETFLEX tool) that will enable to unlock and trade new market mechanisms and foster the cooperation between the Local Energy Community an aggregator.	H2020 COMPILE	xflexproject.eu/		
YES	Samuel	Borroy	sborroy@fcirce.es	864579 - Interoperable solutions for implementing holistic FLEXIbility services in the distribution GRID (FLEXIGRID)	Demonstration in SPAIN	01/07/2021	30/06/2023	Distribution grid. Secondary substation. Fault location equipment	There will be a Demo Site for fault location and a Demo Site for the smart secondary substation. The fault location Demo Site consists of two cases in two different areas: Case 1: Artificially generated faults to ground at a predefined location in order to verify general performance and accuracy for different fault resistances to ground. Case 2: After successful testing during case 1, the test will shift to the second location where the detection system will be validated in a high fault occurrence overhead line. The secondary substation Demo Site will focus on automation of the		ISO 3166 - Country name: Spain ISO 3166-1 - Alpha-2 code: ES - Alpha-3 code: ESP - Numeric Code: 724 ISO 3166-2 - Subdivision code links - ISO 3166-2:ES Toranzo (Substation): 43°12'46.2"N; 3°56'42.3"W Meira (Substation): 43°13'17.1"N; 7°19'08.2"W Villabermudo (Secondary Substation): 42°36'58.0"N; 4°21'32.6"W Melgar de Fernamental (Secondary Substation): 42°24'11.2"N; 4°14'35.4"W	not started (starts in 2021)	The development of the "Secondary Substation (SS)" as a vehicle that includes operation and control algorithms and functionalities is proposed. These new SS will be able to take advantage of the available information and the communications channels used by meters, RTUs and other devices in an optimized way. The innovations proposed will be suitable for both the development of brand new SSs and the retrofitting of existing ones thanks to the use of the integration. Improvements include continuous monitoring of different parameters such us SF6 and transformers automation. The integration of all communications through only one device will make it easier for		•Energy Supplier •Grid Access Provider •Meter Operator •Metered Data Administrator •Metered Data Aggregator •Metered Data Collector •Metering Point Administrator	Better fault location means faster reaction time locating it on the field. This means savings in personnel and better exploitation of the assets due to minimizing the interruption of the service. Location of ghost faults allows for prevention against permanent faults. Better management of grids with high RES integration. Smart secondary substations allows for remote management of SS with the obvious savings in time and personnel. They also allow for better preventive maintenance. Smart secondary substations retrofit allows for improving	This Demo from Project FLEXIGRID is related with Project LOCATE (RTC-2017-6782-3) funded by FEDER and the Spanish Government. Project Locate is aimed to improving the maintenance and automation of LV grid. LOCATE is also coordinated by CIRCE with the involvement of VIESGO and so FLEXIGRID means a step forward in the same direction. More info about LOCATE can be found here: https://www.fcirce.es/retos-colaboracion/locate (Spanish only) FLEXIGRID also links with Project MIGRATE (Horizon 2020 research and innovation programme 691800) leaded by TenneT and with the involvement of	http://www.flexigrid-h2020.eu/demo-i/		Pictures_Demo_Spain.pdf
YES	Samuel	Borroy	sborroy@fcirce.es	864579 - Interoperable solutions for implementing holistic FLEXIbility services in the distribution GRID (FLEXIGRID)	Demonstration in Greece (Makryammos Bungalows Resort-IOSA)	01/07/2021	30/06/2023	The establishment's energy, metering and control assets that are utilized in the demo activities are the following: •MV/LV substation: 20 kV/0.4 kV, 50Hz, Dyn11, 400 KVA oMain low voltage board to all LV Loads □Energy-analyzer □VERD energy box (gateway) for data aggregation and bidirectional communication with VERD's cloud □EV charger □Energy-analyzer □Modbus relay for the remote control (on/off) of the EV-charger □3 sub-boards to Bungalow Loads •3 Bungalows with the following	Elin VERD in collaboration with Makryammos Hotel (IOSA) provide a demo site in Thasos island (Greece) operating at MV and LV. The hotel is in a transformation process in becoming a "green hotel" whose energy assets comprise photovoltaics, charging points for Electric Vehicles (EVs) and battery storage units. The hotel is located at a beach side of the island and is typically operated seasonally. As a commercial customer, the hotel has its own substation as a common coupling with the local distribution network. It is therefore charged with typical grid tariffs and energy tariffs for a commercial customer. FLEXIGRID provides a	Scheme_Greece_1.jpg	•Country (ISO CODE): GRC •City: Thasos •Coordinates: 40°46'14.4"N 24°43'33.1"E (40.770663, 24.725846)	Not started (starts in 2021)	The expected outcomes of the demo experiments are summarized as follows: - Reduction of overall energy costs for commercial customers. - Reduction of emissions related to operation of commercial energy systems. - Reduction of customer minutes lost for critical loads. - Understanding of potential business cases for energy communities. - Reduction of network charges for customers. - Contribution to distribution network congestion management.		Relevant Roles as defined in the Harmonized model Resource Provider VERD ESCO/AggregatorVERD ConsumerIOSA ProducerIOSA Party connected to the gridIOSA Roles not described in the Harmonized model RnD agentLINKS, VERD, CIRCE, ATOS Technology providerLINKS, ATOS, CIRCE, VERD ICT providerATOS, CIRCE, IOSA	Products: - FUSE platform: this is the platform provided by ATOS in FLEXIGRID which will serve as the end-to-end platform hosting a variety of applications and offering functionalities used in the Greek demo. - Energy Box (not yet clear) Services: - Forecasting algorithms for PV and load will be developed in FLEXIGRID's T4.2 - Scheduling/control algorithms will be developed in T4.4 - Interfaces for users		http://www.flexigrid-h2020.eu/demo-ii/		Picture_Greece_1.jpg; Picture_Greece_2.jpg; Picture_Greece_3.jpg; Picture_Greece_4.jpg; Picture_Greece_5.jpg; Picture_Greece_6.jpg; Picture_Greece_7.jpg; Picture_Greece_8.jpg; Picture_Greece_9.jpg

YES	Samuel	Borroy	sborroy@fcirce.es	864579 - Interoperable solutions for implementing holistic FLEXIbility services in the distribution GRID (FLEXIGRID)	Demonstration in Croatia	01/07/2021	30/06/2023	Flexibility assets, protection schemes, Protective relays, Virtual Energy Storage	The Croatian demo site is involved in two use cases within the FLEXIGRID project: UC5 (Coordinating distribution network flexibility assets & protections schemes in urban districts) and UC6 (Virtual energy storage for urban buildings). The most suitable part of the distribution network was selected for UC5 to coordinate the distribution network flexibility assets and protection schemes. Virtual Energy Storage (VES) trials will include an apartment building and three office buildings connected to Medium Voltage (MV) substations. Three of these substations provide electricity to large consumers, such as office spaces and businesses, while the fourth supplies the apartment building		Country: Croatia (HR/HRV) City: Zagreb Coordinates: Latitude: 45° 48' 51.98" N Longitude: 15° 58' 40.73" E	Not started (starts in 2021)	The expected outcomes of the experiments and goals to achieve: -avoid congestion -reduction of network peak load -improve voltage stability -N-1 criterion -reducing the number of (un)planned interruptions -reducing distribution network losses		DSO (Distribution System Operator): Data Provider, Grid Access Provider, Metered Data Administrator, Meter Data Collector, Metering Data Responsible	Improved interoperability, quantification and deployment of demand-side flexibility, reduction of energy losses, reduction of peak load.		http://www.flexigrid-h2020.eu/demo-iii/		Picture_Croatia_1.jpg; Picture_Croatia_2.jpg; Picture_Croatia_3.jpg; Picture_Croatia_4.jpg
YES	Samuel	Borroy	sborroy@fcirce.es	864579 - Interoperable solutions for implementing holistic FLEXIbility services in the distribution GRID (FLEXIGRID)	Demonstration in Italy	01/07/2021	30/06/2023	Flexible setting; Meters; Controllers	The scope of the pilot is the management of an electric grid in island mode. Edyna manages most of the power grid in the Sarentino/Sarntal valley, which includes 1 main transformation station (CP Sarentino), 6 medium voltage power lines (Ponticino, Valdurna, Sarnthein, Pennes, Mezzavia, SA Sarentino), 79 secondary transformation stations (along the medium voltage power lines). Edyna guarantees the power supply for 3193 low tension users (for example households) and 22 medium voltage users (for example companies) for a total of approx. 25.000kW. The high voltage power line is managed by the national TSO TERNA. The main trasformation station of the valley (CP Sarentino) gets		Country: Italy City: Sarentino/Sarnthein (BZ) Coordinates: 46°37'15.6"N 11°22'26.5"E	Not started (starts in 2021)	The expected outcomes of the experiments and goals to achieve: •Possibility to plan jobs for the HV line, without using spare MT groups •Reducing the number of unplanned interruptions •N-1 criterion		•Edyna (main DSO) •Other sub-DSOs •Energy producers	-Use of the dispersed generation in the distribution grid to maintain the power in the grid when the connection with the national transmission grid is unavailable; -For the DSO a better quality of the service (low penalties from NRA); -For the DSO save of money for the installation of the spare groups; -For customers a greater availability of electric energy; -For producers, mostly photovoltaics and flowing hydroelectric (non-programmable systems), the possibility to produce in case of emergency (no possible with the activation of spare groups) and the possibility to offer a service (gain of money);		http://www.flexigrid-h2020.eu/demo-iv/		Picture_Italy_1.jpg;Picture_Italy_2.jpg;Picture_Italy_3.jpg;Picture_Italy_4.jpg
YES	Tomi	Medved	tomi.medved@fe.uni-lj.si	COMPILE	Luče	01/06/2020	31/10/2020	PV, home battery, community batteries, EV chargers	The demo has successfully implemented 4 home batteries, community battery (150kW / 333kWh), 102 kW PV panels and 9 Home Energy Management Systems (HEMS) and one community EV charger. On top of these installations, we added 9 home EV charging within X-FLEX project. Within the pilot site we plan to test and develop the following products: HomeRule, GridRule, EVrule.	1.jpg;2.jpg;HEMS_luce.jpg;home_battery_luce.jpg;luce_baterry_finished.jpg	Slovenia, 3334 Luče	on-going	We have shown that with the developed HEMS, which curtails the PV output based on the real network conditions/voltage, we can better exploit the LV network capacity and enable integration of RES, especially PV, also in weak or congested network. In addition we have tested the island mode operation and will further develop this capability.		PETROL - technology provider, supplier and aggregator, University of Ljubljana - community builiding, Elektro Celje - DSO	At the end of the project we aim to have a defined and marketable HEMS (Home Energy Management System) product and a service for smart villages and energy communities.	X-FLEX	www.compile-project.eu	Please write to me in a separate mail so we can gather the best pictures.	

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