

INTEGRATED **SMART GRID** CROSS-FUNCTIONAL SOLUTIONS FOR **OPTIMIZED SYNERGETIC ENERGY DISTRIBUTION**, UTILIZATION STORAGE TECHNOLOGIES



Issue 1 - Jul. 2017

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Dear reader,

It is a great pleasure for us to release this first issue of inteGRIDy's newsletter. It has been 6 months since the project started and we are gaining momentum, so it is the perfect time to present the project's key expected outcomes and objectives.

inteGRIDy is a 4-year Innovation Action devoted to test state of the art while mature smart grid technologies through the definition and implantation of a scalable Cross-Functional Platform validated in 10 different pilots located in 8 different EU states. This platform is conceived to optimize the Distribution Grid operation, fostering the stability and coordination of distributed energy resources and enabling collaborative storage schemes within an increasing share of renewables.

During the past months, the work spin around the analysis of obstacles and barriers, market needs, use case requirements, evaluation metrics,

functional/technical specifications, standards and business models. Succeeding on a thorough study of all aforementioned items will pave the way for all future technical achievements.

We are proud to detail in this first newsletter the insights regarding all 10 inteGRIDy's pilots. They constitute the project main outcomes and the means used to validate all technological achievements. They all respond to a particular need detected on the pilot area and aim at solving it through the common approach of the Cross-Functional Platform and embedding advance technical features.

As the project consortium comprises 30 partners, several newsletters will be used to formally present them all, being this first issue devoted to introduce the first 5 members, in alphabetical order. Atos, as project coordinator, would like to warmly welcome all readers. We remain at your disposal for questions and comments at contact@integridy.eu.

OVERVIEW INTEGRIDY

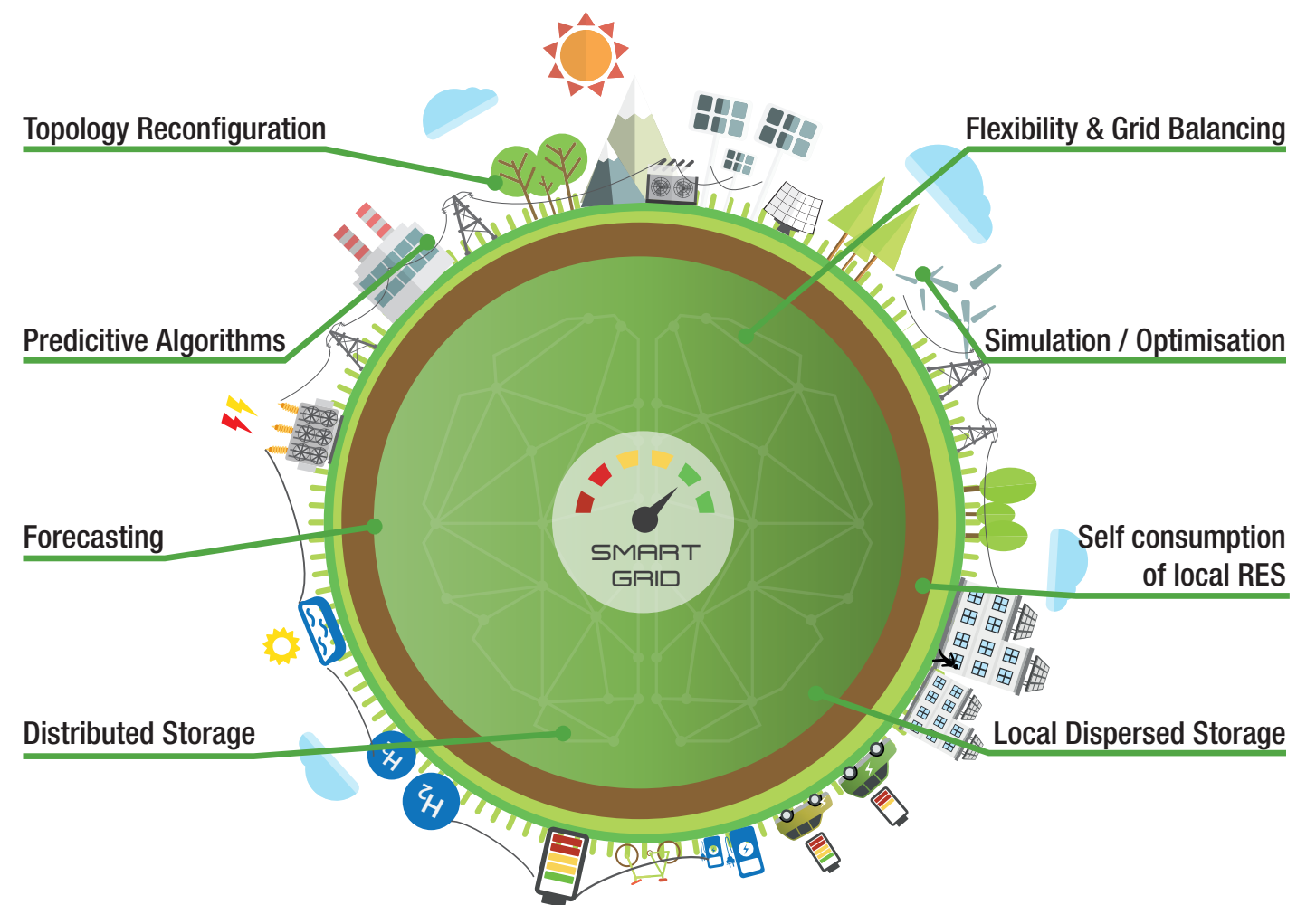
INTEGRIDY AIMS:

To integrate cutting-edge technologies, solutions and mechanisms in a scalable Cross-Functional Platform (CFP) of replicable solutions to connect existing energy networks with diverse stakeholders with enhanced observability of both generation and consumption profiles.

WHICH WILL FACILITATE:

The optimal and dynamic operation of the Distribution Grid, fostering grid stability and coordinating Distributed Energy Resources (DERs), Virtual Power Plants (VPPs) and collaborative Storage schemes within a continuously increased share of Renewable Energy Sources (RES).

GRAPHICAL REPRESENTATION OF PROJECT:



OBJECTIVES:

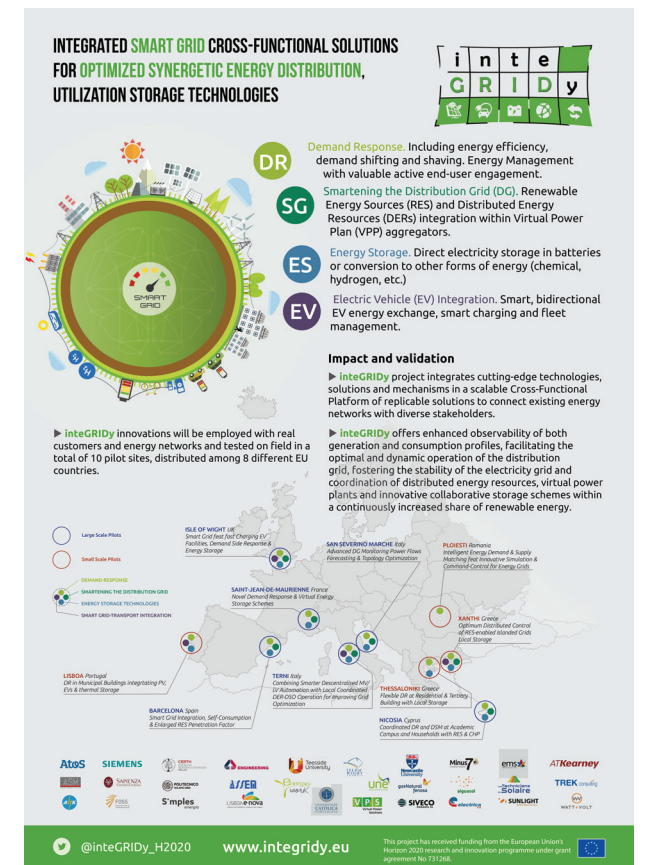
- Facilitate the decarbonisation of the electricity grid and the integration of large shares of distributed renewable generation, deploying innovative Demand Response (DR), storage, or E-vehicles (EV) management and Smart Grid (SG) technologies.
- Integrate innovative smart grid technologies/concepts with a scalable and replicable Cross-functional Modular Platform, enabling optimal and dynamic operation of the distribution system's assets.
- Use modelling and profiling extraction techniques for network topology representation, innovative DR mechanisms and Storage System characterization, supporting automated scenario-based decision making.
- Use predictive algorithms and scenario-based simulation for innovative Operation Analysis Framework of the DG enabling avoidance of Renewable Energy Sources (RES) curtailment and enhancing self-consumption and net metering.
- Demonstrate an integrated Decision Making and Optimisation Framework featuring a grid balancing and stability engine, optimization-based energy synergies to ensure energy security.
- Deliver integrated Visual Analytics tools, with innovative HMIs and Services for stakeholders and end-users, allowing monitoring and control of distribution network in real-time context.
- Implement and Deliver added value end-user applications for all stakeholders and new business models involved in the smart grid value chain, enabling, also, their participation in energy markets.
- Contribution to the transformation of the energy market situation in Europe in order to comply with the ongoing energy related activities for standardization and regulatory frameworks.
- inteGRIDy system deployment, integration and validation in real-life large-scale demonstration pilot use cases.

EXPECTED TECHNICAL IMPACT:

- Interoperability and efficient data collection and monitoring of grid's distributed assets.
- Network topology and Demand Response modeling.
- Predictive algorithms and forecasting tools.
- Visual Analytics using Human Machine Interaction.
- Security access control framework, based on standardization, privacy and data protection.
- Innovative Business models dynamizing the market.

DISSEMINATION MATERIAL AND CHANNELS:

You can find InteGRIDy dissemination material available in website. Different **posters**, presentations and **brochures** have been created so far.



You can also follow our project in social networks.



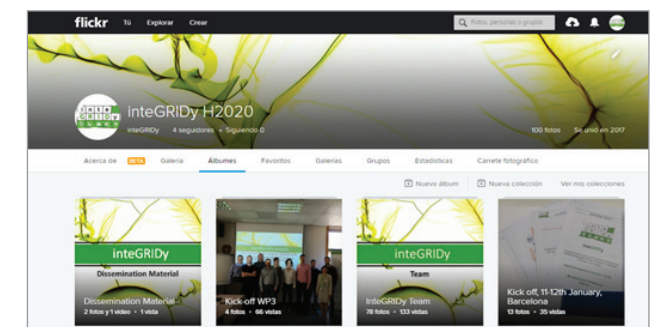
Twitter https://twitter.com/inteGRIDy_H2020



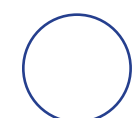
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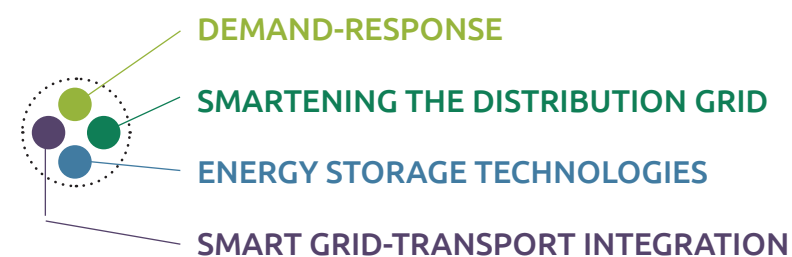
DEMONSTRATION PILOT SITES



Large Scale Pilots



Small Scale Pilots



ISLE OF WIGHT UK

Smart Grid feat fast Charging EV Facilities,
Demand Side Response & Energy Storage

SAN SEVERINO MARCHE Italy

Advanced DG Monitoring Power Flows
Forecasting & Topology Optimization

PLOIESTI Romania

Intelligent Energy Demand & Supply Matching
feat Innovative Simulation & Command-
Control for Energy Grids

SAINT-JEAN-DE-MAURIENNE France

Novel Demand Response & Virtual Energy
Storage Schemes

XANTHI Greece

Optimum Distributed Control of RES-
enabled Islanded Grids Local Storage

LISBOA Portugal

DR in Municipal Buildings integrtating PV, EVs
& thermal Storage

BARCELONA Spain

Smart Grid Integration, Self-Consumption &
Enlarged RES Penetration Factor

TERNI Italy

Combining Smarter Decentralised MV/LV
Automation with Local Coordinated DER-DSO
Operation for Improving Grid Optimization

THESSALONIKI Greece

Flexible DR at Residential & Tertiary
Building with Local Storage

NICOSIA Cyprus

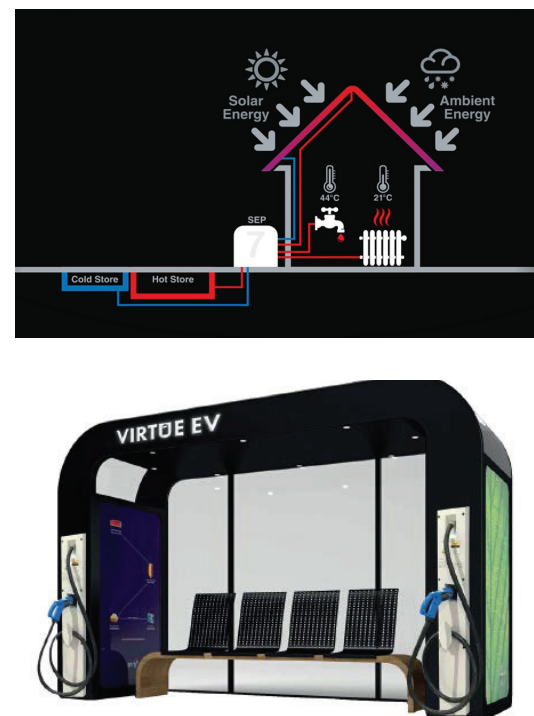
Coordinated DR and DSM at the University
Campus and Households with RES & Storage

1 - PILOT: ISLE OF WRIGHT



Improve the grid design, storage, EV penetration and RES installation on a self-sufficient island

The pilot on the Isle of Wight will use network data and predictive analysis to develop a smart grid architecture that will allow the Island to overcome grid constraints and become self-sufficient in low carbon power generation. It will also consider the commercial arrangements that will enable the functioning of load shifting and grid balancing services on a regional basis. Three technologies will be demonstrated at scale using the inteGRIDy platform – a home heating system utilising thermal storage provided by Minus 7 (M7), a rapid EV charging system that provides energy storage, DSR functionality and building energy management provided by EMS (UK) Ltd and an IoT-based BMS system provided by Siemens.



3 - PILOT: SAN SEVERINO MARCHE



Enhance the distribution grid with topology optimization process based on forecasting power flows

The pilot project is related to the distribution grid of San Severino Marche, a small town sited in the center of Italy. In the past, the area reported a hydro resources exploitation while, recently, photovoltaic generation penetration rises year after year. Vice-versa, the energy needs of the loads are quite limited. In the project an accurate estimation of the state of network will be activated in order to support the DSO in operating the network. Generators will be consequently managed by the remote control system of the DSO and exploited in order to optimize the grid reliability and efficiency. Finally, a coordinated management of distributed energy storage will be tested, both in a final user perspective (improving the energy behaviour of LV users) and in the grid perspective (provide ancillary service to the local grid or to the national one).

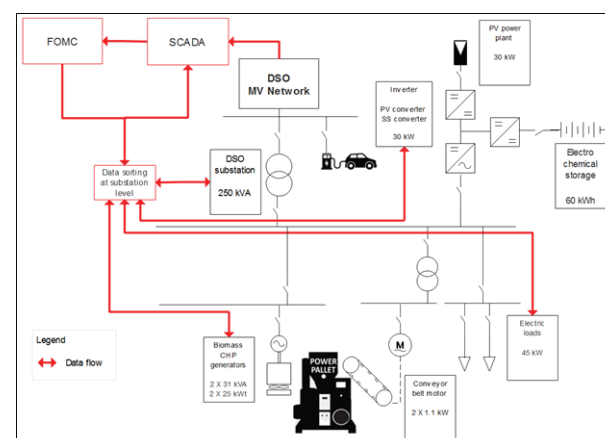


2 - PILOT: TERNI



Integrate offline micro grid owned by local farmers cooperative with MV grid

The Terni pilot site is located in Central Italy, at the boundary of the power distribution network owned by ASM TERNI, the local DSO. It consists of a microgrid (a 30 kWp rated PV plant, power storage batteries and two 31 kVA – 25 kWt biomass CHP generators) that will be connected to the local smart grid in order to develop a hybrid cooperative business model between the DSO and the microgrid based on the use of flexibility as a service.

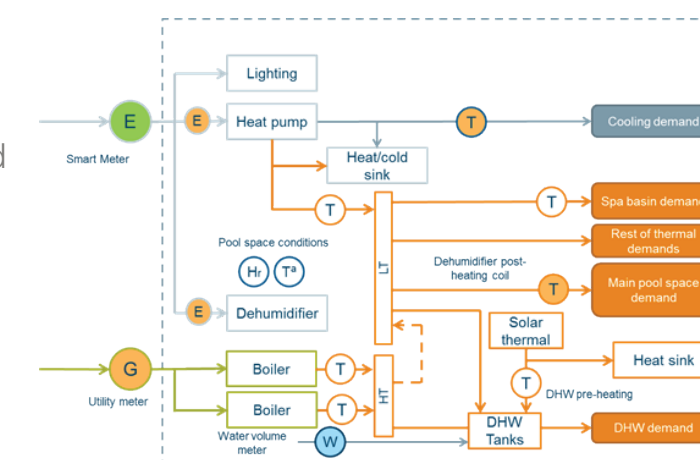


4 - PILOT: BARCELONA



DR optimization and storage solutions to help grid penetration of RED. Sports centre building

The scope of the pilot site in Barcelona will include a sport centre that is currently undertaking a major refurbishment in the framework of GrowSmarter, an H2020 funded project. The pilot intends to quantify the demand response potential of buildings with significant flexible assets: in that specific case indoor swimming pools will be heated by electric heat pumps that could be optimized to give services to the system operator. Photovoltaic system and electric storage will be installed as additional flexible assets to locally optimise building operation.



5 - PILOT: ST-JEAN



Integration of DER into the distribution grid without threatening its stability. DR in buildings and Power-to-Heat for VES

Following the future strategy of INNED to operate a fully decarbonized grid in 2030, the main aim of the pilot activities in the St-Jean pilot site in France spins around the integration of increasing volumes of distributed renewables into the distribution grid without threatening its stability and reliability. To this end the pilot activities will focus on the introduction of novel technologies and business models for Human-Centric DR in Buildings (control of HVAC and lighting loads without compromising building occupants' comfort and health) and VES (through the application of Power-to-Heat solutions).



7 - PILOT: LISBOA



Control system for buildings and accounting system to promote integrated prosumer management

The Campo Grande 25 building, in Lisbon, is the municipality's biggest consumer of electric energy, with an annual consumption of about 3 GWh. In order to more dynamically respond to the energy needs, the Lisbon pilot goal is to implement a smart energy management system on its major energy consumers, recurring to the PV produced energy forecast, the integration with dynamic tariffs and the DR shift enabled by the storage capacity of cold in ice tanks and electricity in EV batteries.



6 - PILOT: NICOSIA



Implementation of a micro grid between UCY campus and households, including DR and DSM strategies

Two different field cases will be demonstrated in Cyprus. The first one regards the microgrid within the campus of University of Cyprus, incorporating all existing and future renewable technologies, energy storage systems, infrastructure, departments and facilities of the university. The target is to implement the proposed solutions in order to contribute to the transformation of the campus into an energy self-sufficient microgrid. The second case concerns dispersed prosumers within Cyprus, focusing on controlling their electrical demand in a more efficient way.



8 - PILOT: XANTHI



Optimum Distributed Control of RES-enabled Islanded Grids with Local Energy Storage

This pilot demonstrates the optimum energy exchange at RES-enabled islanded grids with local battery stacks and hydrogen production, storage and usage. The pilot is hosted at the premises of SUNLIGHT (Xanthi, Greece) and operates unattended. There are multiple autonomous nodes that are powered by PV arrays wind generators and fuel cell, while the energy exchange is DC oriented. The research activities will be performed in collaboration of CERTH/CPERI and SUNLIGHT and will demonstrate flexible energy management strategies in a distributed manner and a novel synergy of virtual storage with EV charging, empowered by advanced Model Predictive Control (MPC) methods for supervisory control of the network.

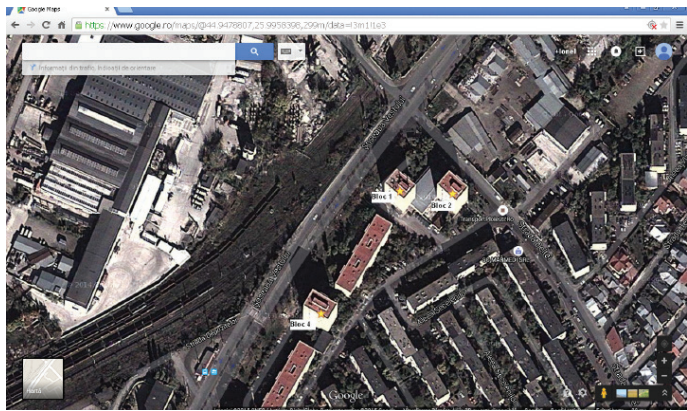


9 - PILOT: PLOIESTI



Energy information system (AIS) for control and command distribution of information in a 3-building smart grid

The pilot case in Ploiesti, Romania, is a small scale pilot that involves three buildings with residential apartments and a commercial area on the ground floor. The pilot involves both normal customer appliances (LED lighting, air conditioning systems, etc.), as well as large scale appliances like an elevator. The pilot is based on Building Type Intelligent Energy Demand and Supply Matching feat innovative simulation & command-control for energy grids.



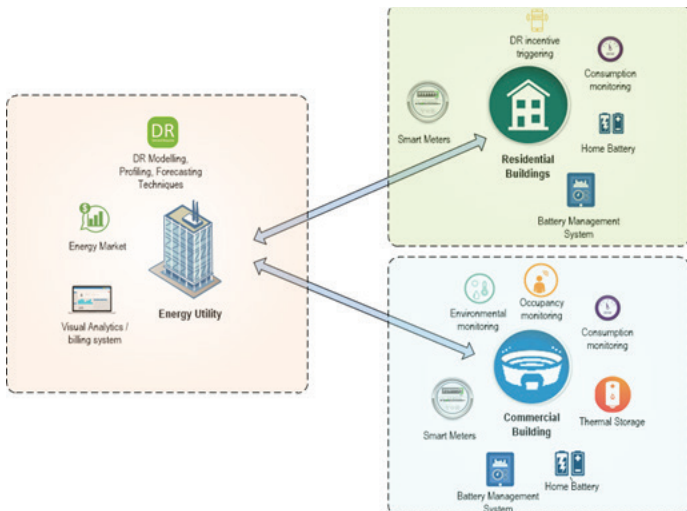
The purpose is to ensure a true DR smart grid, where building energy management and controls systems (EMCSs) can function based on critical peak pricing (CPP) or other Demand Response (DR) programs that could be implemented, on an otherwise inexistent centralized infrastructure.

10 - PILOT: THESSALONIKI



DR management scheme for different consumer profiles (buildings, football stadium and hotel) and flexible storage types and management methods

Thessaloniki pilot focuses on the demonstration and assessment of different Demand Response techniques and the sustainability of related business models that can be offered by a Utility/ESCO company to residential consumers (not prosumers) and commercial customers. In both cases, the utilization of battery energy storage systems will also be evaluated. The goal is to develop efficient, practical and reliable optimization DR mechanisms for residential and commercial customers, minimizing their electricity payment and maximizing their welfare, while achieving more uniform electricity load profiles with reduced peak power.



PARTNERS



Atos Spain SA (Spain)

www.atos.net

ATos SE (Societas Europaea) is a leader in digital services with 100,000 employees in 72 countries. Serving a global client base, the Group provides Consulting & Systems Integration services, Managed Services & BPO, Cloud operations, Big Data & Cyber-security solutions, as well as transactional services through Worldline, the European leader in the payments and transactional services industry.

Atos is the coordinator of the project inteGRIDy. Atos also have a major role in the dissemination and exploitation activities on the project. Atos, being a large industrial player with a strong convoking power, the capacity and practice in organizing innovation workshops, and being able to offer the appropriate infrastructure, is significantly active with respect to stakeholders' engagement.



ASM Terni Spa (Italy)

www.asmterni.it

ASM Terni is Public Company fully owned by the local municipality (City of Terni). The activity of the company is related to very essential public services in the City of Terni area as: Production and distribution of Electric Energy, management of public street lighting, environmental Health, drinkable water distribution and water treatment plant and gas distribution.

In inteGRIDy project, ASM Terni contributes to the elicitation of requirements, the definitions of Business Scenarios and the identification of stakeholders. A significant contribution is given also in what concerns the National Legislation. In preparation of the Pilot in Terni, ASM Terni undertakes the task of integrating and interconnecting filed devices. Further contributions are expected in Evaluation and Impact assessment and dissemination among possible interested subjects.



Azienda San Severino Marche SpA (Italy)

www.assemspa.it

Azienda San Severino Marche SpA (ASSEM SPA) was founded by resolution of the City Council of San Severino Marche of 29/3/1919 with the original task to produce and distribute electricity and to manage the public lighting service. Subsequently, on 1996, the City Council entrusted ASSEM SPA also of the management of the water service, putting in place the foundations for the integrated management of the entire water cycle. In 2000, also the distribution and sale services of natural gas in the area of San Severino Marche were assigned to ASSEM SPA and it was converted from Special Company to a joint-stock company.

ASSEM SPA is involved as Distributor System Operator (DSO) in all the project tasks regarding the grid improvement and its analysis, considering the previous experience of ASSEM SPA about smart grid development and the effort and the strategic importance of the topic for the company. The main role is the deployment of inteGRIDy framework at San Severino Marche pilot area, its monitoring and topology optimization. ASSEM SPA is also involve in the overall evaluation, leading in particular the assessment of the inteGRIDy impact to the grid stability, flexibility and balancing.



A.T. Kearney is a leading global management consulting firm with offices in more than 40 countries. Since 1926, there have been trusted advisors to the world's foremost organizations.

They have risen to the challenge of analyzing multiple and fragmented sources of data and dispatching commands by putting dedicated resources in place to deliver an agile business intelligence and connectivity application 'HELIOS'. The platform ubiquitously connects to a variety of data sources to harvest all the data that is required to analyse, optimise and automate the implementation of efficiency algorithms in real time and at a regional scale.

The objective in inteGRIDy project is to create clear and compelling financial mechanisms, oriented to RES+storage smart integration in the MV/LV grids towards an EU and worldwide energy security using RES. As far as Cost Benefit Analysis is concerned, ATK apply a systematic approach to estimating the strengths and weaknesses of alternatives that satisfy transactions, activities or functional requirements. As for Cost Effectiveness Analysis will take the form of an economic analysis that compares the relative costs and outcomes (effects) of two or more courses of action.

Founded in 1999, the SME AIGUASOL team is made up of more than 20 professionals with a high level of technical and scientific experience. AIGUASOL provides engineering and research services, promoting innovative solutions to reduce the impact associated with energy consumption (experience in urban planning, construction, industrial processes and power generation, with a focus on energy planning, savings measures, energy efficiency, process integration and renewable energy implementation).

The main role of AIGUASOL in the project is to provide with know-how the consortium on the

basis of the simulation tools AIGUASOL mainly uses (TRNSYS and Modelica) and identify ways these tools can be integrated or exchange information with the rest of the tools developed (build up of individual modules), towards building a common platform for the detailed analysis of a topology when integrated with DR Flexibility and Storage systems as in the case of demos. Moreover, will support the demo activities in the Sport Centre of Barcelona, under the supervision of GNF, undertaking the roles of engineering and commissioning of the specific demo activity.

PROJECT NEWS



11.01.2017 InteGRIDy project has been officially launched

The project, coordinated by Atos, started on the 1st of January 2017. For 4 years, 30 partners will seek to connect innovative services, technologies and emerging mechanisms of intelligent electric networks through the deployment of a scalable and replicable platform. This platform will allow the connection of the current energy network with the different market players, as well as providing improved capabilities for the monitoring of consumption and generation profiles



19.01.2017 - InteGRIDy project joins BRIDGE initiative

InteGRIDy project was presented and participated in the BRIDGE Working Group and Coordination meetings in Brussels in January 2017.

BRIDGE is a European Commission initiative which gathers more than 30 Horizon 2020 Innovation Actions in the field of smart grids and energy storage. The initiative aims at identifying and structuring issues of transversal nature encountered in the demonstration projects that may constitute obstacles to innovation. The work is organised according to four main areas of interest, addressed by four Working Groups on Data Management, Business Models, Regulations and Customer Engagement.





07.03.2016 – 09.03.2019 WP3 Workshop in Lisbon

The Lisbon School of Business and Economics housed an InteGRIDy workshop, where the first steps of the project were discussed, particularly within Work Package 3 (WP3), which deals with Analysis of Environmental, Business Models & Financial Mechanisms and their links with the other work packages.



21-22.06.2017 inteGRIDy with BRIDGE initiative at the EUSEW2017

The BRIDGE initiative participated in the EU Sustainable Energy Week (EUSEW) with a session focussed on the main messages to policy makers from the demonstration projects, with a particular emphasis on the latest legislative proposals of the European Commission, “Clean Energy for All Europeans”, published in November 2016.



Also, the BRIDGE initiative had a networking slot Wednesday 21st June where the initiative and its activities presented.

InteGRIDy project participated in all this activities with the presence of our coordinator Andrea Rossi.

NEXT STEPS AND EVENTS



14.09.2017 1ST International Conference InteGRIDy

Hosted by Politecnico di Milano, the event will give an opportunity for a dialogue among the ongoing European H2020 R&I Projects on innovative technologies for smart grid on MV/LV in the topics of Demand Response and intelligent distribution grid. The event will also open the discussion among representatives from National Authorities for Energy and European DSOs.



Free participation
Please [register](#)
for the event:



> [Register for the event](#)

AGENDA

- 09:00 h** Introduction by: Prof. Maurizio Delfanti, Politecnico di Milano
Welcome by: Andrea Rossi, ATOS, Massimo Bertoncini/Diego Arnone, Engineering
- 10:00 h** Session 1 – Ongoing policy developments in the field of the design of the internal electricity market
EC member from DG Energy, Changing the European energy markets: discussion on the winter package .
- 11:00 h** Coffee Break
- 11:30 h** Session 2 – Roundtable among national energy authorities
Discussion on the legislative proposal for a recast of the Internal Electricity Market Directives and Regulations: how can we harmonize the European landscape?
- 12:45 h** InteGRIDy survey break
InteGRIDy survey on elicitation of Stakeholders, Market needs and implementation priorities
- 13:00 h** Lunch Break
- 14:00 h** Session 3 – Presentation of the ongoing H2020/National R&I Demo Projects as key drivers of innovation supporting technologies for smart grid on MV/LV
- 16:00 h** End of International Conference

Atos

SIEMENS



ATKearney



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