InnoGrid2020+

The European Research & Development Dissemination Seminar

23 - 24 February 2012

Grid4EU

Large-Scale Demonstration of Advanced Smart Grid Solutions with wide Replication and Scalability Potential for EUROPE

A European SmartGrid Project under EC FP7 Research Program

Carried by 6 DSOs (cover more than 50% of the metered electricity customers in Europe)

VATTENFALL · IBERDROLA · RWE · Enel · ČEZ DISTRIBUCE · ERDF

RWE

Demonstrate that European MV networks can use the concept of autonomous, self-organising nodes to serve the need of both the DSOs and the served clients

Location: In the municipality of **Reken, North-Rhine Westphalia, Germany**

Other Partners involved: ABB, tu technische universität dortmund

Objectives :

- Multi-agent system as an industrial solution for network operation, thus allowing:
  - **Integration** of an increasing number of decentralized energy resources (windmills, solar panels…) in the medium and low voltage networks
  - Achieving **higher reliability, shorter recovery times** after grid failures
  - **Avoiding** unknown **overloads**
  - Fulfilling the needs of **surveillance** and remote-control in MV-networks

VATTENFALL

Validate that the control of LV distribution networks using AMR events allows for more distributed generation while improving customer power quality

Location: In **Uppsala, Sweden**

Other Partners involved: ABB, eMeter, KTH, TELVENT

Objectives:

- The aim is to validate that the control of the Low Voltage distribution networks **using AMM** (Automatic Meter Management) **and intelligent equipment** in the Low Voltage Network **allows for more distributed generation** while **improving customer power quality**
- Show how to monitor and control the Low Voltage network to enable **Active Demand, Distributed Generation** and **Energy Efficiency** ambitions

ERDF

A smart grid pilot testing and validating massive integration of Distributed Energy Resources (DER) and electricity storage

Location: in **Carros near Nice, France**

Other partners involved: ALSTOM Grid, EDF ARMINES

Objectives:

- Design a smart grid in a district with a **high level of solar generation, electricity storage** and **load management capabilities**, and test different situations **of local optimization** of the MV/LV network (1)
- Study **how customers are becoming active** and **adapt their consumption** / generation of electricity to face distribution network or global electricity system's constraints, especially at peak hours
- **Assess the costs and benefits** of the smart district for the various players involved

(1) including local safe islanded operations to face emergency situations

ČEZ DISTRIBUCE

Demonstrate that existing distribution networks having smart metering and CHP Units can be upgraded to allow automatic islanding while ensuring enough power supply

Location: in **Vrchlabí, Czech Republic**

Other partners involved: ABB, CURRENT, CISCO, SIEMENS

Objectives:

- Demonstrate that existing distribution networks having smart metering and CHP units can be upgraded to allow for automatic islanding while ensuring enough power provision
  - **full smart meters deployment**, including launching of an **information customers web portal**
  - installation of **generation capacity of 1,6 MW** in DER (CHP units)
  - automation of the existing MV and LV grid
  - running of **automatic island operations** ensuring sufficient power supply to the area during the island operations

IBERDROLA

Enhance the observability and control of the low and medium voltage distribution networks building on a multi-layer solution for smart metering implementation

Location: In **Castellón, Spain**

Other partners involved: CURRENT, Itron, Landis+Gyr, SIEMENS, ZIV, ORMAZABAL

Objectives:

- Usage of intelligent meters information for better **knowledge of the network status** (immediate knowledge of **outages**, of electrical magnitudes out of limits, of power quality)
- Monitoring the LV lines at the SS, to evaluate overloads, unbalances, etc. (nowadays they are not monitored)
- **Evaluate losses** (technical and non-technical) by comparing SS totals with the accumulated of the customers, hour per hour
- Reinforce high-voltage (HV) network control by monitoring electrical magnitudes and implementing effective fault detection and automatic restoration
- **Give customers better information** of their consumption, and inform them about the network situation (ex. Disturbances)

Enel

Increase the Medium Voltage (MV) network's hosting capacity for DER, introducing Active Control and Demand Response of MV generators, controllable loads and storage

Location: in the area of **Forlì, Emilia Romagna – Cesena, Italy**

Other partners involved: CISCO, SELTA, SIEMENS, RSE

Objectives:

- Implement **Active Control** and **Demand Response** of Decentralized Energy Resources (DER), such as generators, controllable loads and storage to **increase** medium voltage network **hosting capacity of renewable generation**
- Help the medium voltage distribution network to **become more flexible** with advanced network operation and energy management capabilities
- Demonstrate advanced solutions under **real operating conditions** and on **large scale**

Some key figures:

- 27 partners from 10 European Union Member States, the US and Switzerland
- Over 25 Third Parties involved in the project
- With a budget 54 M€ and 25 M€ of maximum grant for EC
- 4 years duration from November 2011 to December 2015

A solid Consortium → **To achieve**

Main Objectives

- Develop and test innovative technologies
- Define standards through the set up of demonstrators
- Guarantee the scalability of these new technologies
- Guarantee the replicability over Europe
- Analyse SmartGrid Cost-benefits (B-Case)

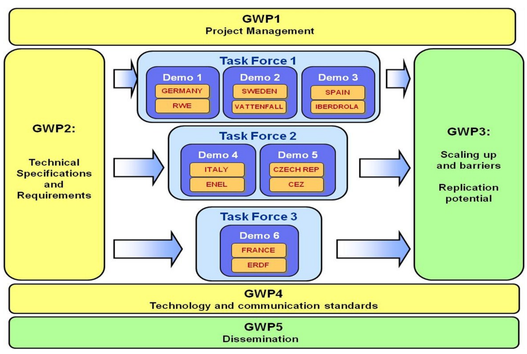
Interactions and synergies between the 6 Demonstrators

	VATTENFALL	IBERDROLA	RWE	Enel	ČEZ DISTRIBUCE	ERDF
DER			▼	▼	▼	▼
Active Demand	✚	✚	✚	✚	✚	✚
Storage				◆	◆	◆
Electric Vehicle		▲	▲	▲	▲	
Innovation Power Management at MV level		●	●	●	●	●
Innovation Power Management at LV level	★	★	★	★	★	★
Micro-grid (Islanding)					▱	▱
Climate	Cold & Stormy *Continental/Oceanic*	Mild *Mediterranean*	Moderate *Continental*	Dry *Mediterranean*	Cold *Continental*	Warm & stormy *Mediterranean*
Population Density	Urban	Urban	Semi-urban	Rural	Semi-urban	Semi-urban / urban

● Innovation Power Management at MV level · ★ Innovation Power Management at LV level · ▼ DER · ◆ Storage · ✚ Active Demand · ▱ Micro-grid (Islanding) · ▲ Electric Vehicle

Project structure : 6 Demonstrators within 3 task forces + 5 General Work Packages

The interest of the project is to operate **coordination** between the different demonstrators, in order to **avoid uselessly duplicating mutual work** and to define the conditions required by the **replication and the scaling-up** of the results at a regional, national and European level



Task Force 1

How to improve existing distribution networks in order to integrate more DER and Active Demand into the electric system?

Task Force 2

How DER and Active Demand can contribute to increase the flexibility and the resilience of existing distribution networks?

Task Force 3

How to maximize smart districts benefits through the use of future distribution networks architecture and operation?

For Further information, please contact :

Coordinator - ERDF : Rémy GARAUDE VERDIER (remy.garaude-verdier@erdfdistribution.fr) / **Technical Director—ENEL :** Jon STROMSATHER (jon.stromsather@enel.com)