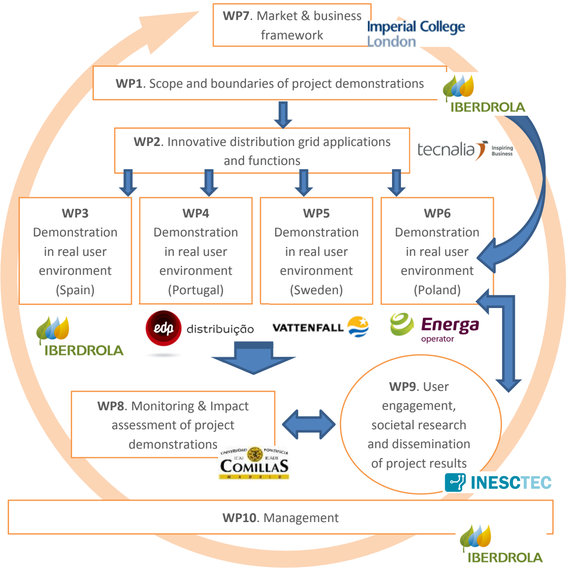
Structure



Partners

IBERDROLA · edp distribuição · VATTENFALL · Energa operator · tecnalia Inspiring Business · Imperial College London · Universidad Pontificia Comillas · INESCTEC · ZIV · withUS · NOS · powel · Schneider Electric · GE · ATENDE · Politechnika Gdańska · Instytut Energetyki · ITE · Energiaren Kudeaketa Ente Vasco de la Energía

Project Information

Topic	LCE-07-2014: Distribution grid and retail market
Call	H2020-LCE-2014-3
Funding scheme	IA – Innovation Action
Duration	01/01/2015 – 31/12/2017 (36 months)
Budget	15,7 M€ (11,9 M€ EU grant)
Project Coordinator	Iberdrola Distribución Eléctrica
Partners	19 from 7 European countries (ES, PT, SE, PL, UK, FR, NO)
Demonstration sites	4 Demonstration sites (ES, PT, SE, PL)

Website **upgrid.eu**

Real proven solutions to enable active demand and distributed generation flexible integration, through a fully controllable **LOW Voltage** and medium voltage distribution grid

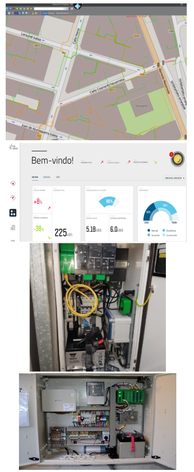
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 646.531

Project Motivation

UPGRID project focuses on addressing the constraints and needs arisen from *poor observability of LV grid, local accumulation of distributed generation, risks and difficulties in managing the distribution network, aging infrastructure* and *social and environmental restrictions that inhibit the grid development*. To be successful, **UPGRID proposes an open, standardised and integral improvement of the LV grid**.

Expected Outcomes and Impacts

- Functional specification of **LV dispatching**
- **Achieve sound LV network** representation
- Deployment of **mobility tools** to support LV **field crews**
- Integration and processing of **meter events** in the Outage Management System (OMS)
- **Deployment of equipment** in secondary substation (SS) and MV feeders to achieve a **supplier independent** solution for further deployment
- LV grid **remote control** operation over **PRIME** infrastructure
- **Multiservice PRIME subnetwork**
- Combined use of AMI and **Home Energy Management Systems** for **Active Demand Management**
- Improvement of **consumer capacity building** web-based systems
- New steps towards an **open market** for services (providing information to other agents through IT): **DSO as an "enabler"**
- Assessment of optimal **business models** for market participants
- **KPI framework** definition to evaluate impacts



Spanish Demonstrator

Location: Bilbao, North of Spain

Technical objectives

- ✓ Have a **sound LV network representation**
- ✓ Develop a **dispatch tool** to support **LV** network operation
- ✓ Improvement and extension of the **PLC PRIME**-based communications: **remote control** operation of LV grid
- ✓ Extend present smart metering deployment for **LV** grid **visibility**, **controllability** and **operation**
- ✓ **Improve** the different factors that impact on **global quality** of the **LV grid**: consumer oriented

Demo developments

LV Network Management System (LV NMS)

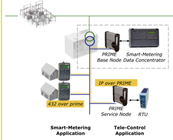
Desktop solution *Mobile solution*

- Import LV network topology & info from GIS: CIM based
- LV Outage Management capabilities
- Integrated with current systems

Meter events analysis and processing

- Motivation of field actions for voltage improvements
- Refinement of supervision meters inventory: inconsistencies detection and solving
- Detailed voltage measuring: Virtual register tool

PRIME based functionalities



- Optimize IP support over PRIME
- New PRIME Gateway device *(Base and Service Node)*

Consumer empowering

- Empowering consumers by providing information, perception and control through a web tool solution

Collaboration in transversal components

- Load & generation forecasting, Demand side mgmt., Support tool for maintenance crews and MV estimators

Demo developed leveraging on bidelek project

Key figures

1.075 secondary substations (SSs)
> 3.500 LV feeders supervised
> 190.000 consumers
Urban area

Demo partners

IBERDROLA, GE, ZIV, tecnalia, CIRCUTOR

Portuguese Demonstrator

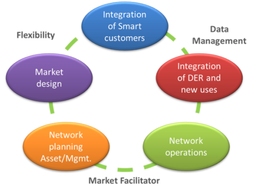
Location: Lisbon (Parque das Nações)

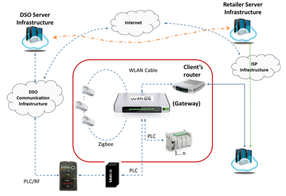
Technical objectives

- ✓ **LV state estimation**, voltage control, **flexible load DR**
- ✓ Calculation of **non-technical losses** using field data
- ✓ Consumption and generation **forecasting**
- ✓ **Events and alarms** integration and processing
- ✓ Field teams support using **mobility solutions**
- ✓ Calculation and system integration of **grid indicators**
- ✓ Single **GIS based platform** to assist LV grid operation
- ✓ Create a **market hub** connecting market players
- ✓ Enable **flexibility services** to/from market players

Expected results and impacts

- ✓ Increase **observability** + **controllability** of the LV grid
- ✓ Develop the existing **Smart Grid infrastructure**
- ✓ Enhance DSO **market facilitator** role
- ✓ Facilitate an **open market** for services
- ✓ Increase the **flexibility** of the grid
- ✓ Improve DSO **data manager** role





Social objectives

- ✓ Combined use of AMI and HEMS: **Demand Response**
- ✓ **Customer empowerment** + **increase awareness**
- ✓ Promote **customer engagement** in electricity market
- ✓ Societal research on the **socio-economic impact** of Smart Grid

Key figures

2 primary substations / 140 SSs
13.450 consumers
16 EV charging stations / 7.728 public lighting post
Urban area

Demo partners

edp distribuição, NOS, INESCTEC, with us

Swedish Demonstrator

Location: Åmål, Sweden

Typical rural network with a mix of forest and agricultural landscape

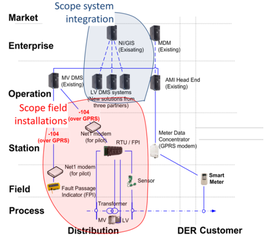
Technical objectives

- ✓ **MV/LV monitoring** solutions testing in real Vattenfall system applications
- ✓ **Interoperability** of equipment with system environment
- ✓ Improved **Quality of Supply**
- ✓ "Pre-study" for future Smart Grid implementation within Vattenfall Distribution

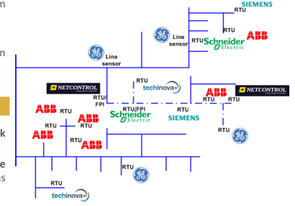
Expected results and impacts

- ✓ UPGRID results as an input for the **LV network monitoring business case** and **decision support**
- ✓ The ultimate goal of the Swedish Demo is to **prepare** for the **full-scale deployment** of Smart Grid solutions in the Vattenfall networks and IT environment

Systems and components involved



Overview of demo components



Key figures

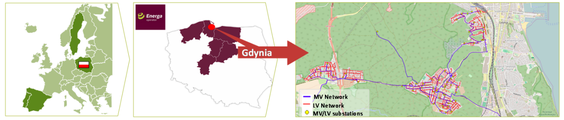
51 SSs (16 with intelligent equipment)
530 consumers
2 MV feeders (10 kV)
Rural area

Demo partners

VATTENFALL, GE, Schneider Electric, powel

Polish Demonstrator

Location: Gdynia, North of Poland



Technical objectives

- ✓ SCADA/DMS LV, GIS, AMI systems **integration** using the **CIM standard**
- ✓ Increase MV and LV network **observability** and **LV network management** improvement
- ✓ Improve **reliability** of LV power supplies
- ✓ **Distributed generation management** in LV network

Social objectives

- ✓ **Distribution of UPGRID results** among interest parties and informing them about Smart Gr potential
- ✓ Increase **consumer satisfaction** regarding quality supply and DSO technical support

New LV SCADA/DMS functions — **Smart Grid** — New control and monitoring devices

Key figures

55 SSs
14.700 consumers
38 km MV cables and 102 km LV cables
Overhead & underground LV network

Demo partners

Energa operator, ATENDE, Politechnika Gdańska, Instytut Energetyki