Spanish most relevant SmartGrid demonstration project.

*Mr. Asier Moltó Llovet*
Overview of the presentation

- Who is REE?
- The challenge of the Demand Side Management
- Demand Response experiences
- Conclusion
Who is Red Eléctrica de España?

Red Eléctrica is the Spanish transmission system operator (TSO)

- Red Eléctrica was the first company in the world dedicated exclusively to power transmission and the operation of electrical systems. A pioneer in its field, the company occupies a position of leadership today in these activities.

- Red Eléctrica is the first European TSO establishing a Demand Side Management Department in coherence with its commitment of the development of a smarter electric grid adapted to the next decade challenges.
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Spanish energy context

Spanish electric system is still dependant on fossil fuels, but presents a continuous introduction of energy coming from renewable sources.

**2010 generation share**

Combined cycles, nuclear and wind were the most used technologies in 2010.

**Spanish generation share evolution**

In recent years has increased the participation of wind and combined cycles, basically at expense of production based in coal.
The challenge for the system operation

As a TSO, Red Eléctrica manages a daily load shape which presents high ratio peaks vs off-peak demands.

1. High ratio peak vs off-peak
2. Low demand level
3. High wind energy production
4. On some occasions wind production is curtailed, when demand is very low and interconnection capabilities are very limited
“Smart Grid” is the process “to transform the functionality of the present electricity transmission and distribution grids so that they are able to provide a user-oriented service, enabling the achievement of the 20/20/20 targets and guaranteeing, in an electricity market environment, high security, quality and economic efficiency of electricity supply” (ENTSOE)
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SmartGrid R&D projects

This process requires projects dealing not only with the technology development but also with the deployment.

**Demonstration projects**
- GAD Project: 30M€ to demonstrate Demand response services within residential sector
- AGREGA Project: To develop DSM services through aggregation within medium industry sector
- TWENTIES DEMO2 Project: To develop a VPP

**Electric vehicle**
- VERDE Project: 40 M€ SEAT VE prototype and smart integration into the grid
- DOMOCCELL Project: To develop a smart system for EV charge in public parking

**Deployment projects**
- PRICE Project: Smartgrid project using smartmeters deployment in the Corredor del Henares area
- SmartCity Malaga & Barcelona: ENDESA Smartmeters deployment
From a TSO perspective, the main challenge is to ensure that system operation needs are taken into account.
GAD project

Targets

1. ¿What loads?
2. ¿What customers?
3. ¿System operation?
4. ¿Algorithms?
5. ¿Economical and regulatory model?
6. ¿Architecture?
7. ¿What appliances?
GAD Project. Loads and appliances

User interface (ORBIS)

Transformer equipment (ORBIS)

Plugs and smart lines (ZIV)

Smart appliances (FAGOR – ALTRA)

Smart meter (ZIV)

Load controller (ORBIS)
Management tools

New tools for demand management (GAD project)
Some results for REE

For REE, GAD services may become a very relevant operational tool helping to improve efficiency of spanish electric system.
AGREGA Project

To demonstrate that medium industry can provide a DSM service through aggregation
VERDE project is oriented to develop an electric car as well as its smart integration into the electric system.
DOMOCELL Project: To develop a smart system for EV charge in public parking.

VERDE Project: 40 M € SEAT VE prototype and smart integration into the grid.

AGREGA Project: To develop DSM services through aggregation within medium industry sector.

TWENTIES DEMO2 Project: To develop a VPP demonstration projects.

GAD Project: 30M € to demonstrate Demand response services within residential sector.

SmartCity Malaga & Barcelona: ENDESA Smartmeters deployment.

PRICE Project: Smartgrid project using smartmeters deployment in the Corredor del Henares area.

Deployment projects
The National Meters Substitution Plan implies the substitution of current meters for smart meters with remote management and measurement.

Towards the future grid…

11 years—From 2008 to December 2018

Updated February 2012

This plan means the substitution of 26 M meters
PRICE project

This project has 4 areas: **RED** (monitoring and automation), **GEN** (in house energy efficiency), **GDI** (Distributed generation) and **GDE** (DSM)
PRICE project

The project involve 500,000 inhabitants with 200,000 meters and 1500 distribution grid substation (50% IBDL y 50% GNF)
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Conclusion

Demand side management will have a key role in the future system operation

Electricity offer

- Higher integration of smaller scale and intermittent generation from renewable energies
- Forecast and operation tools
- Integration in Control Center

Electricity Demand

- Industrial Demand Management
- Storage
- Information
- Electric vehicle