



CENIT-DENISE Project

Summary for EPRI Pre-Conference Workshop

Nice, France

December 09 2008

The DENISE Project



DENISE: Intelligent, Secure and Efficient Energy Distribution

Description

National consortium of **16 companies and 9 research institutions** united to perform research and development of enabling technologies and information systems oriented to **solve the challenges of a new generation of active energy distribution networks**. The project goes from 2007 to 2010 and manages a budget of 24 million euros.

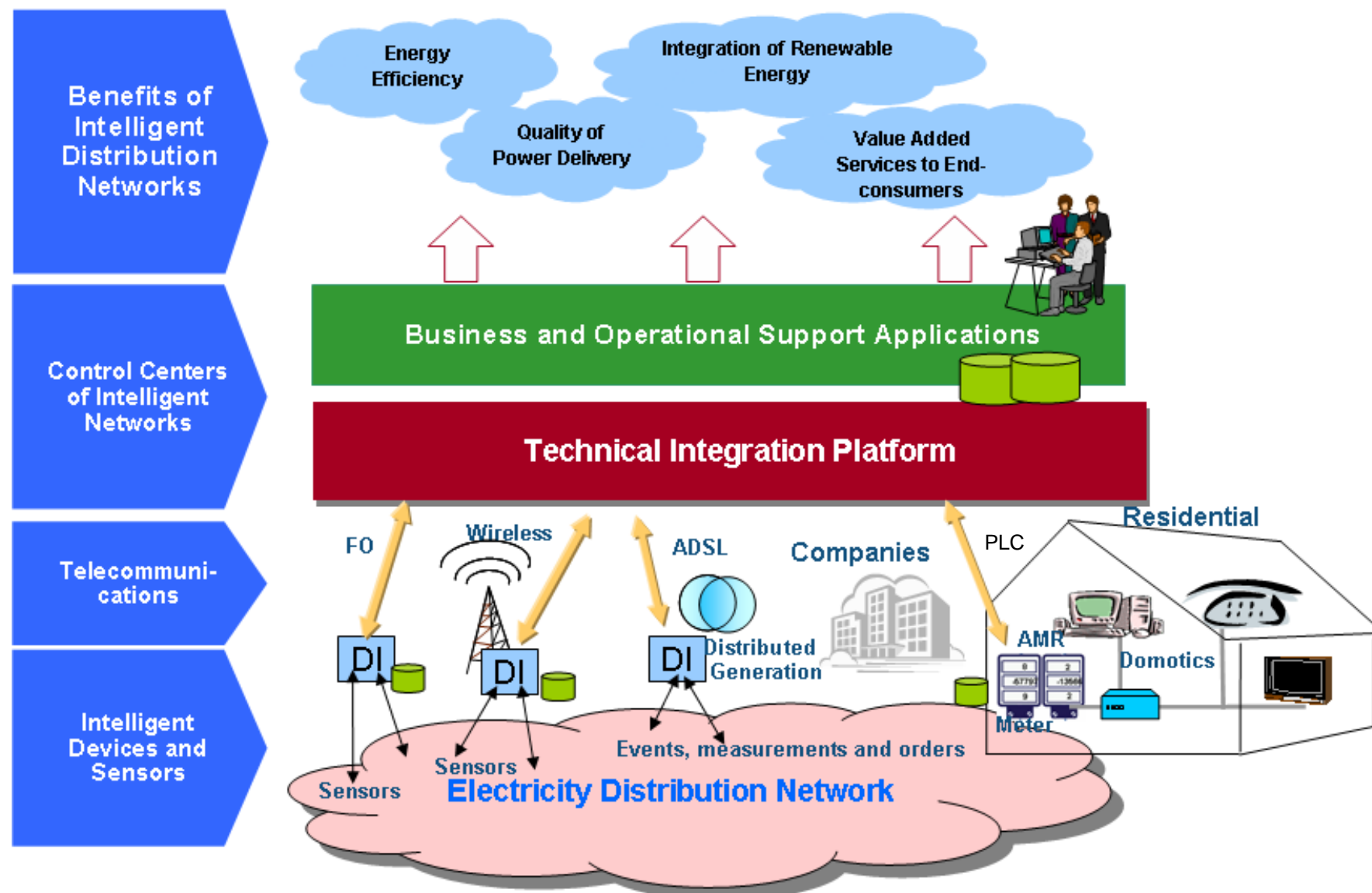
The Spanish Research Initiative on Smart Grids



Objectives

- Identify future scenarios of active distribution networks
- Research and develop enabling technologies, algorithms, and hardware
- Apply to network operation, energy efficiency, distributed generation, and DSM

DENISE – Our vision



DENISE: Workgroups and Activities



WG 4: Energy Efficiency and Integration of DG

4.1 Active Consumption (EE and DR)

4.2 Integration of Distributed Generation

4.3 Efficient Management of Supply and Demand



WG 2: Logic and Intelligence

2.1 Universal Integration Platform (PLATINUM)

2.2 Simulation Environments

WG 5: Network Reliability



5.1 Automated Operation

5.2 Localizing Faults and Service Recovery

5.3 Predictive Maintenance

WG 3: Devices and Telecoms



3.1 Electronic Devices for Smart Grids

3.2 Communication Technologies

3.3 Integration and Validation



WG 1: General Issues

1.1 Project Office

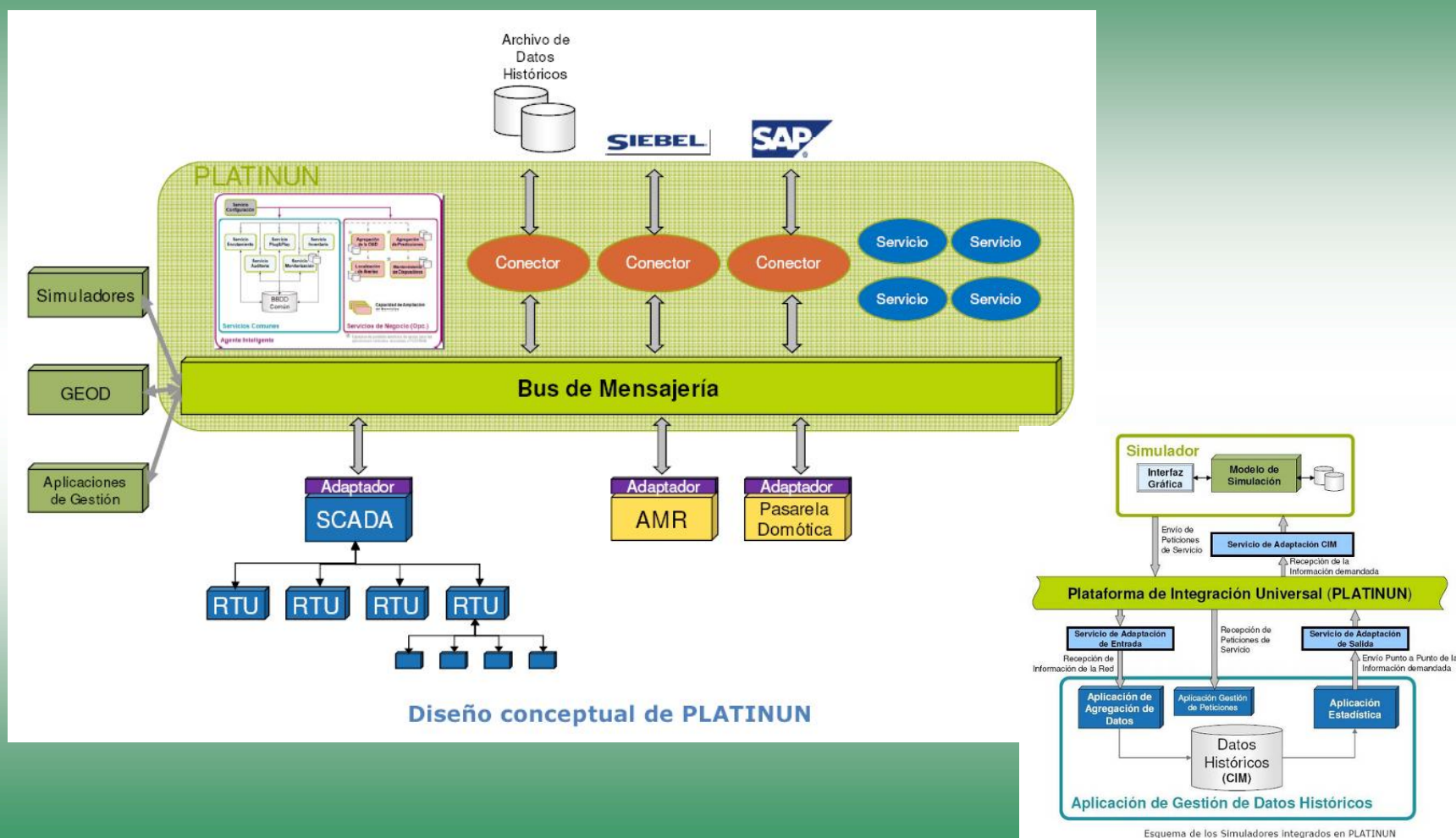
1.2 Definition of Future Scenarios

1.3 General Reference Framework

1.4 Dissemination of Knowledge and Results

WG 2: Logic and Intelligence

Vision of PLATINUN



SIMULATION ENVIRONMENTS

Entorno de Simulación DENISE

Comercializador



▪ objetivos

A partir de un subconjunto de la red de distribución, deduce los costes teóricos asociados para hacer llegar la electricidad a cada punto de suministro.

▪ usuarios previstos

- comercializador
- distribuidor

Cliente



▪ objetivos

Permite simular distintos perfiles de carga del cliente, para obtener una mejora en su tarifa.
En caso de tratarse de un nuevo cliente, aconseja al mismo el nodo de conexión más oportuno teniendo en cuenta la tarifa y la calidad de servicio.

▪ usuarios previstos

- cliente
- comercializador

Generación Distribuida



▪ objetivos

Simulación de la reconfiguración y funcionamiento en isla de la GD.
Desarrollo de modelos de generadores distribuidos de cada tecnología.

▪ usuarios previstos

- comercializador
- operador
- planificador
- cliente
- distribuidor

Operador



▪ objetivos

Esta herramienta permitirá, en base a una situación de inicio, la simulación de las repercusiones que genera un cambio en la configuración de la red.

▪ usuarios previstos

- operador

Planificador



▪ objetivos

Este sistema estudia cómo influye en la calidad, en las inversiones y en la estabilidad global de una red de distribución la inclusión nuevos equipos y líneas, pudiendo de esta manera calcular la manera más óptima de realizar una ampliación de la misma.

▪ usuarios previstos

- planificador

Soon to come demonstration project...

SmartCity



Plugging Smart to the Grid

*Corporate Direction
of Services and Technology*

Main Objective

Project “Smart City” targets to develop a demonstrator for the next generation grid for electricity distribution. Within this new Grid, customers and Distribution companies cooperate for the achievement of the **energy challenge**. This is achieved by Increasing the usage of **renewal energy sources**, and by connecting the generators closer the final customers, just betting for a more rational and efficient consumption.

Specific Objectives

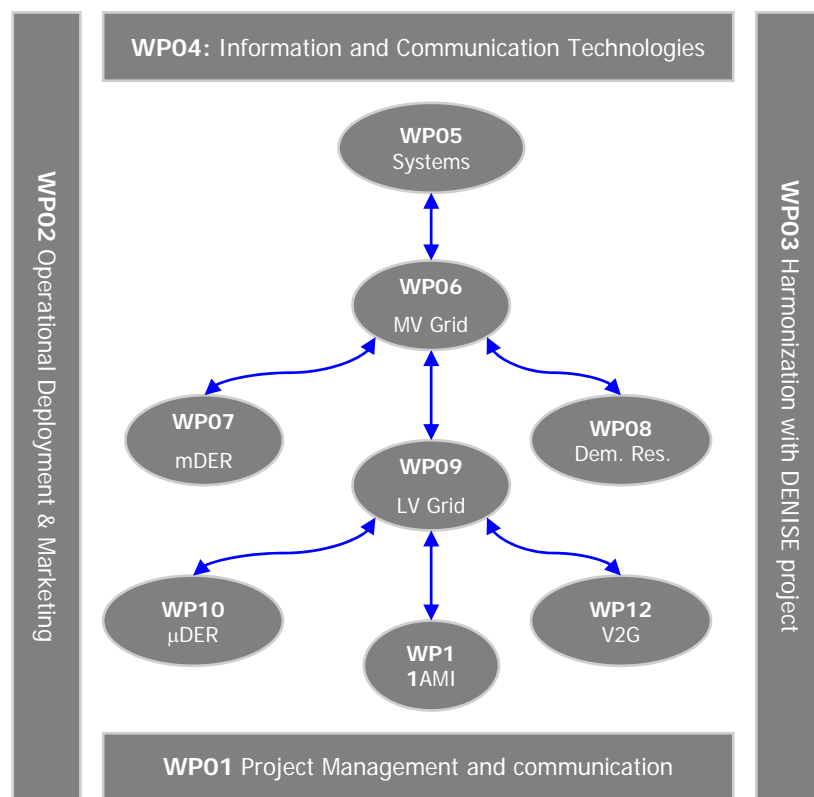
1. Validation and practical implementation of conclusions from DENISE project.
2. Include micro-generators and micro-storage in LV grid in order to minimize power delivered through the LV feeders. Optimizing the usage of renewable energy sources.
3. Include mini-generators and mini-storage in MV grid in order to minimize power delivered through the MV feeders. Optimizing the usage of renewable energy sources.
4. Active Demand Response through **direct action on loads** and **passive demand response** acting in **consumer's habits**.



SmartCity



Plugging Smart to the Grid



Global Work Packages

WP01: Project Management and communication Plan

This WP includes mainly the activities related to the project Office. They are for example coordination and control of the project plan, management of involved resources. Risks management, communication plan, etc.

WP02: Operational Deployment and Marketing

Coverage analysis of the deployment. Identification and communication with final customers and other stakeholders. Identification and communication with citizens. Citizens must feel involved in the project and know how smart their new city will be.

WP03: Alignment with DENISE project

Supervise and adjust the scope and development of the project in order to harmonize with theoretical conclusions from DENISE project, and thus avoid any contradictions. Feedback between both projects and obtain conclusions.

WP04: Information and Communication Technologies

To Define the more suitable information and communication Technologies in order to integrate all the required services within the project. This includes the definition of requirements, protocols, data models and semantic of configuration in order to achieve interoperability. This WP also includes the deployment of a real time communication network.

Specific Work Packages

WP05: Enterprise Management Systems

To Implement the information systems in the control center with the functionality of AMS, WMS, OMS, GIS, EMS, DMS, DSM, CIS and NMS, between others, and interconnect them through PLATINUM BUS defined in the scope of DENISE project.

WP06: MV grid automation

To implement the grid intelligence within the MV segment. To develop a distributed system composed by multiple interconnected devices and the control device described within WP07. The core of this intelligence is a controller installed within the HV SS feeder. It will coordinate the monitoring, protection, control and regulation functions of all the devices within the MV grid.

WP07: mini Generation and mini Storage (mDER)

To Install a reduced set (around 4 elements from 300 to 800 kW) but heterogeneous of co-generators and storage within the MV grid. Includes power systems (measurement and regulation) and protection switchgear.

WP08: Energy efficiency and demand response

Active control of specific loads. Can be connected within MV grid or within LV grid. Inside this Work Package are specially relevant the control of street lights and some special loads such as big air condition/heating systems used in some big facilities (sport assets, swimming pools...)

WP09: LV grid automation

To implement the grid intelligence within the LV segment. To develop a distributed system composed by multiple interconnected devices. The core of this intelligence is a controller installed within the MV/LV TC LV feeder. It will coordinate the monitoring, protection, control and regulation functions of all the devices within the LV grid.

WP10: micro Generation and micro storage (μ DER)

To Install a reduced set of generation and storage home points within the LV grid. Around 40 elements from micro-windmills, batteries, photovoltaics and micro CHP (from 5 to 20 kW). Includes power systems (measurement and regulation) and protection switchgear

WP11: smart metering framework (AMI)

To deploy of a smart meter system in real time for home customers. Communication technologies mix broadband PLC and low power wireless.

WP12: Vehicles to Grid (V2G)

To deploy a small park of electric vehicles manages in consumption and in generation. Then, vehicles are considered like special loads that can be controlled or like small generators with a specific capacity and availability.

Thank you for your attention



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