ENCOURAGE architecture: support for heterogeneous smart grids

Eleven European companies and universities work together for the development of the ENCOURAGE platform, an intelligent system of embedded technologies for the optimization of energy in buildings using advanced smart grid technologies.

The ENCOURAGE (Embedded iNtelligent COntrols for bUildings with Renewable generAtion and storaGE) project presented the main architectural decisions taken in the scope of the project's first phase, both at ENERGYCON 2012 (IEEE International Energy Conference and Exhibition), and at the European Conference on Nanoelectronics and Embedded Systems for Electric Mobility (eMotion in Smart Cities).

The ENCOURAGE architecture is designed to be highly modular and distributed, with high emphasis on interoperability and scalability. The requirements of portability, fault tolerance and independence between the different ENCOURAGE applications, are also taken into consideration.

Interoperation between the system applications and with external entities/applications is entrusted to an abstraction created by a communication bus using standardized data models. Scalability is provided by engineering a core platform middleware that interconnects ENCOURAGE applications over a cloud-based infrastructure.

An ENCOURAGE system supports multiple different gateways in each home or building. For example one controlling energy production and another controlling home automation devices, which are then logically aggregated in the middleware as a single entity and exposed to the control applications. These entities can also be macro-aggregated for combined energy management.

This allows ENCOURAGE to build onto the current practice, innovating in its modularity, scalability and support for seamless interoperability of heterogeneous (both new and legacy) systems by abstracting from the technologies within the buildings. The middleware is based on a distributed publish/subscribe architecture, thus easily allowing transparent and scalable implementation of distributed applications.

The ENCOURAGE applications work together to create the necessary synergies for a functional and effective platform to empower Smart Grid applications. The ENCOURAGE platform will promote extended market opportunities since independent applications can be provided by any entity which is capable of offering the services envisaged by the higher layer functionalities - Energy Brokerage and Business Intelligence, and Supervisory Control.

About ENCOURAGE

The ENCOURAGE project (www.encourage-project.eu) aims to develop embedded intelligence and integration technologies that will directly optimize energy use in buildings and enable active participation in the future smart grid environment.

The primary application domains targeted by the ENCOURAGE project are both non-residential buildings (e.g. campuses) and residential buildings (e.g. neighborhoods). The goal of the project is to achieve 20% of energy savings through the improved interoperability between various types of energy generation, consumption and storage devices, inter-building energy exchange and systematic performance monitoring.

The project is funded partly by the European Commission (Artemis Joint Undertaking) and partly by contributions from national funds. The project involves 11 partners from Spain, Portugal, Italy, Ireland and Denmark.

ENCOURAGE Facts:

Project Duration: 36 months

Start date: June 1, 2011

Total Costs: 6,37 million EUR

National Funding: 1,76 million EUR

Artemis JU contribution: 1,06 million EUR

Project Partners

Aalborg University (AAU), Denmark

Energi Nord, Denmark

Seluxit, Denmark

Advantic Sistemas Y Servicios, Spain

GNERA, Spain

Atos Origin, Spain

Esvall Projet SA , Spain

ISA, Portugal

ENEL Engineering and Research, Italy

eZmonitoring, Ireland

CISTER/ISEP, Portugal

To follow the Encourage project development, please consult the project website (http://www.encourage-project.eu) for the latest news.