

**Title: "Development of advanced tools to aggregate, evaluate, manage and simulate Distributed Energy and Demand Resources into a Liberalized Electrical Energy Market".**

**Spanish R+D project. Ministerio de Ciencia e Innovación**

**Time schedule: (January 2011- December 2013)**

**SUMMARY:**

Electrical power systems have suffered in the last years a number of pressures that will determine the operation of their more complex level: the power distribution system. Among these determining factors we can identify the increase and fluctuations of price in fossil-fuels, the growth in the demand of electric energy and the intensity of the use of energy, the liberalization of electricity markets, the concept of electricity as a commercial product –reliability-, the growing legal environmental concerns, and the competition with other energy sources. In the present decade, new factors will play a more relevant role, namely: the weight of distributed generation in the generation mix –with a particular relevance of renewable energy sources; the need to ensure energy and environmental sustainability in times of economic recovery –an important concern from a social viewpoint; and the possibility to store energy in the network and offer new products in deregulated energy markets, which might promote an increased end-user involvement and awareness of the rational and efficient use of energy.

On the other side, the growing of renewable generation resources, will produce a loss of flexibility in the generation-side. This loss of flexibility could be reestablished through a higher flexibility of demand, and this is one of the main objectives of this proposal.

The development of new tools, methodologies and commercial devices should provide customers, distribution companies, commercializers, aggregators, independent system operators (ISO) and authorities –regulators, and thus society as a whole, with a competitive advantage to solve these problems. This project is mainly aimed at creating and developing methodologies and advanced tools to improve Demand-Side flexibility and competitiveness of Power Distribution Systems, both for the supply and the demand sides. For the supply, this may be achieved by a smart operation and integration of renewable and alternative sources, whereas for the demand, a flexible management of energy consumption grasping at the opportunities offered by new uses and electro-technologies could be useful to this aim. In short, this would imply implementing software concepts and hardware tools to manage comprehensively electric power distribution systems from the two classical approaches, i.e., demand and supply, but this time on an equal footing and with similar opportunities in the new liberalized markets through the improvement of resources for medium and small users.