

PUBLIC SELECTION BASED ON QUALIFICATIONS AND INTERVIEW FOR THE AWARDING OF NO. 1 EARLY STAGE GRANT LASTING 12 MONTHS FOR CONDUCTING RESEARCH PURSUANT TO ART. 22 OF LAW NO. 240/2010 AT THE DEPARTMENT OF ENGINEERING AND APPLIED SCIENCES (A.R.F. 09/E2 - ELECTRICAL ENERGY ENGINEERING - A.D. ING-IND/33 - ELECTRICAL POWER SYSTEMS) - TYPE B PICA CODE 19AR001

announced with decree of the Rector Rep. no. 140/2019 of 06.03.2019 and posted on the official registry of the University on 13.03.2019

RESEARCH PROJECT

"Smart grid for domestic electrical loads management"

Research structure: Department of Engineering and applied sciences

Duration of the grant: 12 months

Scientific Area: 09 - Industrial and information engineering

Academic recruitment field: 09/E2 - Electrical energy engineering

Academic discipline: ING-IND/33 - Electrical power systems

Scientific Director: Prof.ssa Mariacristina Roscia

In addition to ensuring continuity of service, electricity distribution networks must manage energy flows in a sustainable and efficient manner. The aim of the project is to study the intelligent distribution networks (Smart Grid), through a high introduction of generation distributed by RES, in order to make it energetically independent, remaining connected to the network and ensuring continuity also through the EVs.

A network needs to be developed that can efficiently and efficiently manage energy flows, both consumed and self-produced, promoting the concept of smart communities, smart homes and smart grids. The project also provides the study for the management and interaction of energy generators (conventional or renewable) and distributed storage systems (flywheels, electric car batteries), from the domestic level to the level of the distribution network.

In particular, optimization systems must be studied for a new electric scenario, where it becomes fundamental for electricity suppliers and producers to redefine their offer and the customer experience.

The topics to be developed and studied are the following:

- Analysis of new criteria for the management of the intelligent and sustainable electricity grid: implementation of dispatching functions of energy flows on a smart grid island, such as the minimization of losses and the possibility of interconnecting renewable sources to the grid.
- EVs storage: development of a sustainable model of LV integration between photovoltaic production, EVs storage, for the creation of a smart island that minimizes energy exchanges with the network.
- Optimization of energy flows between Smart Grid and Prosumers: in Smart Homes, through the introduction of smart metering and smart devices, a new control system must be developed, in order to manage energy flows, even self-produced by RES, in an increasingly efficient and economic way.
- Interaction of the electricity market with the smart grid: a model of exchange between Prosumers and smart grids, also through systems that use Blockchain and Smart Agent.