
We are looking for a master student to work on

Microgrid node management hardware

Background

One of the pillars of the Power Electronics Innovation Center (PEIC) is the integration of Renewable Energy Sources (RES), such as wind and sun, into the electric grid. Such RESs are shifting the energy generation paradigm to a more distributed power system where the actors will be prosumers, both generating and consuming electrical energy. Such distributed approach may optimize the power flow within the electrical grid by forming microgrids, where local generating units supply local loads, without connection to the AC grid. Inverters interfacing both RESs and storage systems to such microgrids will form the local AC microgrid imposing voltage and frequency, equally share both active and reactive power among all the generating units in the microgrid and manage an optional resynchronization to the AC grid.

Thesis goal

The goal of this thesis is the development of the hardware to manage and measure the power flow in an AC microgrid branch.

Your tasks

- Electronic CAD design of the management and measurement of the power flow in an AC microgrid branch
- Development of the communication interface between the developed hardware and the microgrid central control unit
- Digital implementation of the power flow measurement algorithm (active, reactive power, voltage, frequency)
- Laboratory validation of the developed hardware in a microgrid environment

Necessary skills

- Knowledge of power system dynamics (Attendance to the course Sistemi Elettrici di Potenza)
- C programming skills (e.g. Attendance to the course Laboratory of Power Converters and Electrical Drives is sufficient)

What you will learn

- Knowledge of an electric CAD software (Altium designer) for PCB development
- Knowledge of measurement techniques for AC systems
- Experimental skills in terms of i) testbench setup including power supplies and oscilloscopes, ii) use measurement systems, and iii) organization and execution of experimental tests

Duration of the thesis: 6 months

Application

We are looking forward to receiving your application. Please include your CV and a short motivation letter about why you fit the position (Italian or English). Send your application to: fabio.mandrile@polito.it.