

Postdoctoral Call for Application

Subject: **Modelling and real time simulation of a micro-grid with high renewable energy penetration for islands**

Keywords: renewable energy power plant, island grids, storage systems, power converters, wind turbines, photovoltaic panels, ...

Contract: 12 months full-time which may be renewed.

Laboratory: ESTIA-Recherche, ESTIA Institute of Technology

Address: ESTIA, Technopole Izarbel - 64210 BIDART

Web Address: <http://www.estia.fr>

Contact: Pr. Ionel VECHIU

e-mail: i.vechiu@estia.fr

Tel: +33.5.59.43.84.74

Context

ESTIA is the engineering school of the Chamber of Commerce and Industry of Bayonne Basque Country. Public institution, ESTIA offers graduate programs in the fields of electrical engineering, mechanical engineering, information technology and industrial organization.

Trilingual school, ESTIA is a member of the "Conférence des Grandes Ecoles" and it is entitled to deliver the engineer degree.

In addition to the training mission, ESTIA develops:

- Collaborative projects with industrial companies from Aquitaine region, France and Europe,
- Projects of basic and applied research through ESTIA-Research laboratory,
- Expertise and consulting for companies on innovative topics.

Laboratory

The research work will be carried out within "EneR-GEA" team from ESTIA-Research in BIDART (Basque Country), France. The research orientations of this group are clearly positioned in the field of renewable energies, in particular on the following problems: "*how to make possible a better grid integration of the energy produced by the renewable energy sources*".

Subject

The post-doc subject is part of INSUL'GRID project whose objective is to develop a new type of hybrid "smart" power plant, able to combine real-time energy resources produced by different intermittent renewable energy systems and several storage technologies. Thus, the operator will be positioned as a responsible supplier of renewable electricity in charge with both the quality and the quantity of electricity injected into the network. The project aims to develop up to industrialization and tests in real conditions the tools and systems needed to design and drive a hybrid power plant able to supply electrical energy:

- Generated over 80 % by renewable energy sources,
- Compatible with the use and characteristics of the electrical grid, in any situation,
- A level of stability and reliability according with the standards,
- At a production cost similar or less than the "conventional" systems.

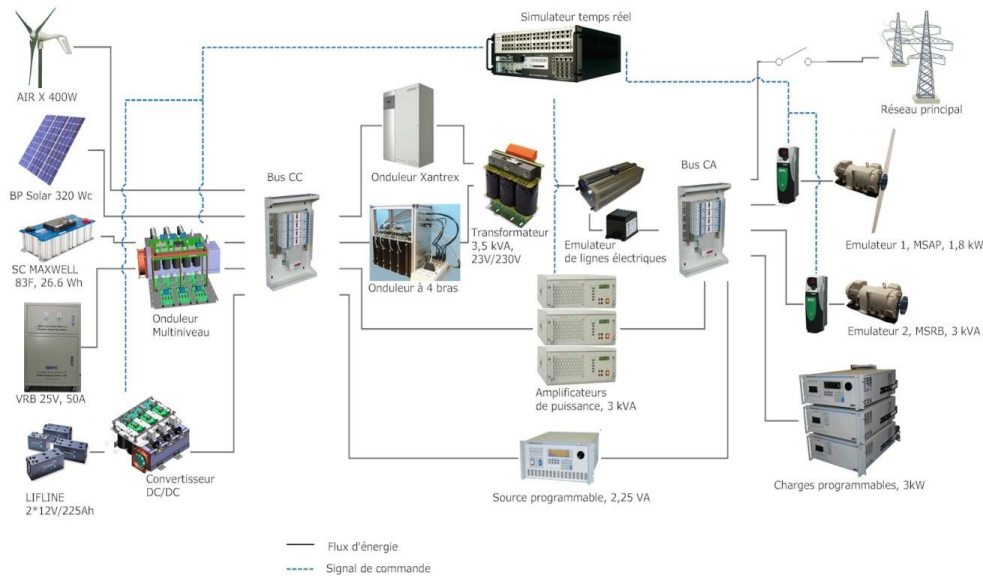
Missions

The Post-doctoral will strengthen ESTIA team already working on the INSUL'GRID project, labelled by CAPENERGIES, Derbi and Aerospace Valley involving six partners: two research laboratories and

four companies in renewable energy field. She/he will contribute to the development of a simulation tool multi-model with two different time steps in order to study the power quality problems, the real time energy availability but also the schedule. This tool must take into account all the models developed by different partners (the renewable energy production, the storage incorporating aging, the weather forecast, the electric conversion), quantitative and qualitative constraints and cost aspects. The purpose of these simulations is to validate the overall control law operating with two different time steps.

Assigned activities

- Specify the constraints imposed to the partners in order to fit their development into the simulation tool,
- Format the model of each subsystem,
- Electrical modelling including converters and their control,
- Master the software tool which will be designed in ESTIA under MATLAB/Simulink/OPAL-RT environment,
- Analyse the simulation dynamic behaviour of the power plant connected to the weak island grid in various configurations,
- Configure and perform tests on real ESTIA micro-grid (Figure below).



Experimental platform

Candidates Profile

PhD in Electrical Engineering or equivalent, you have a first experience in the field of power electronics and control applied to the renewable energy sources.

We strongly appreciate the following skills:

- Power electronics and controls,
- Modelling and simulation of dynamic systems under MATLAB/Simulink environment,
- Real-time simulation (OPAL-RT, dSPACE ...),
- Fluency in technical English.

Your rigour, sense of responsibilities and scientific curiosity will be your main assets for this post-doc.

Application Deadline

October, 2014: CV with a cover letter and all necessary documents to justify your skills (send by email)

Position Start Date: Available immediately

Application close when the position is filled