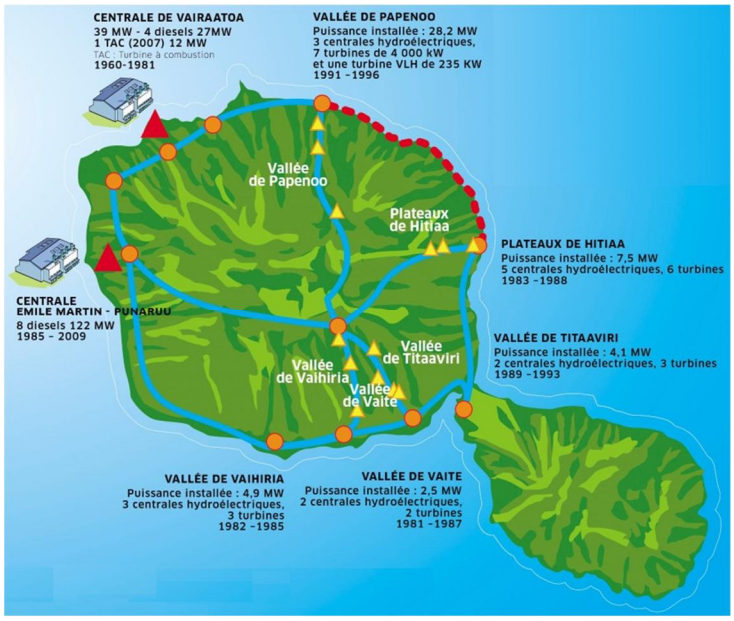
Internship Offer

Power System Analysis for the Feasibility of Solar Plant Connexion in an Islanded Network in French Polynesia

Context:

One of the objectives of the electrical grid is to securely transport the power from the producers to the consumers. In order to reduce the constraints on the grid and system losses, one natural way is to install generators closer to the points of consumption consumers. However, it is not systematically possible as the integration of new renewable-based Energy Resources into existing electrical grid creates new power flows and can lead to the violation of grid constraints in case of unappropriated sizing/siting of the equipment. It is especially the case for large photovoltaic installations with volatile generation profiles and high production peaks. Thus, some electrical constraints (e.g. overload and/or overvoltage) can occur if the power system is not well sized. Therefore, when new installed capacities are envisioned, power system analysis shall be carried out in order to assess the feasibility of different scenarios.



The Tahitian transmission grid and the main power plants

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Objectives:

The scope of the proposed internship is to implement such energy and power management analysis to investigate the impact of the connexion of solar generation in Tahiti island, in partnership with the local grid operator, Société de “Transport Electrique en Polynesie”.

The objectives of the internship are:

1. From the data provided by the industrial partner, implement a power system analysis tool in the form of an optimal power flow problem.
2. Investigate various scenarios in terms of location and capacity of newly installed photovoltaic plants. A specific attention will be attached to the occurrence of constraints violations (e.g. line overcharge) over the simulated period.
3. In case of constraint violation, propose and implement a solution to reduce or cancel the constraints. This could be provided by appropriate control schemes for generation curtailment and/or of charge/discharge of storage systems.

Desired Profile:

- Last year Master student in Electrical Engineering with a focus on Power and Energy Systems;
- Knowledge in Power Systems modelling and analysis and/or optimisation would be a plus;
- Good oral and written communication skills.

Details:

- Duration: 6 months.
- Modelling/Programming tools : Matlab or Python.
- Localisation: G2Elab, 21 Rue Des Martyrs, 38000, Grenoble
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