Master project, 2018-2019

— *Consumption and production forecast algorithm for a smart grid* —

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Problematic and context

The penetration level of renewable energy sources is increasing. Unlike the centralized power plants, they are intermittent and uncontrollable. Therefore, to maintain the balance between production and consumption, we need to manage the consumption in function of available production. This internship is a part of the project MAESTRO (Modèle Appliqué des Énergies Supervisées en Temps réel par du Renouvelable Optimisé or applied model of real-time supervised energy using optimized renewable sources), which goal is to manage controllable load in order for the integration of new technologies such as electric vehicles and renewable sources. In order to achieve that goal, it is necessary to forecast the production as well as the consumption. Numerous studies has already been done concerning forecasting algorithms. The challenge of this internship comes from the granularity of the information used and needed as the algorithm will be applied for a community and not on a national or regional level.

Objective

The objectif of this internship is to define a methodology for the forecast of consumption and production. It will take into account different parameters:

- The electrical grid parameters
- Temperature
- The wind speed and irradiation level
- Historical data of the seasons, days and hours
- The price of energy
- Etc.

This algorithm will be based on historical data received from smart meters. Its performance will be evaluated on different level of the distribution grid: on an entire department, a community, a primary substation, a distribution substation.

Work steps

- Bibliographic project on the methods for consumption and production forecast.
- Choice of a methodology using different criteria.

Implementation of the algorithm in different level of the distribution grid: on an entire department, a community, a primary substation, a distribution substation.

- Results analysis and validation
- Conclusion and report

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