

The climatic and geopolitical upheavals of this century push us today to rethink our way of life and thought. IPCC experts have warned us for a few decades and weather phenomena corroborate regularly: we have to get out of our conventional patterns of development, they find their limits by exhausting and poorly distributing the resources of our fragile planet. In France, the LAW n ° 2015-992 of August 17, 2015 relating to the energy transition for green growth advocates the evolution of the habits of energy consumption but also that of the methods of production of energy: it is necessary to pass of a consumption mainly based on the exploitation of fossil fuels to a consumption where renewable energies a more important place.

This new energy supply is significantly undermining traditional energy production and distribution infrastructures. These were originally designed and organized to deliver energy unidirectionally from large power plants to consumers. With the massive development of alternative energies such as photovoltaics, wind power and biomass, there is a decentralization of production sources and the need for more local management. It is here that the concepts of Smart Grid and micro-grids closely related and complementary appear in the foundations of this new energy architecture.

At the level of a company (micro-grid), the energy transition must be seen as an opportunity to optimize its consumption, which questions the energy resources in place.

This work is part of the development of a smart energy management tool.

The objective here is to produce component models that will be integrated into an energy management platform (heatpump, power converter, air compressor for example). Electrical and thermal flows will have to be taken into account in these modelizations to approach as well as possible the behavior of the associated physical systems. A state of the art will have to be conducted to find the appropriate equations for the different components.