M4SE Math for Smart Energy

Optimization of energy storage within households

H2020 SOCIETAL CHALLENGES: Secure, clean and efficient energy

PRODUCTIVE SECTOR: Energy Environment

PROBLEM DESCRIPTION

New problems emerged with the rise of photovoltaic panels, wind turbines and the ability to own its energy production: Network disturbances, regulated consumption in function of spot prices and waste of non-consumed or non-selled energy.

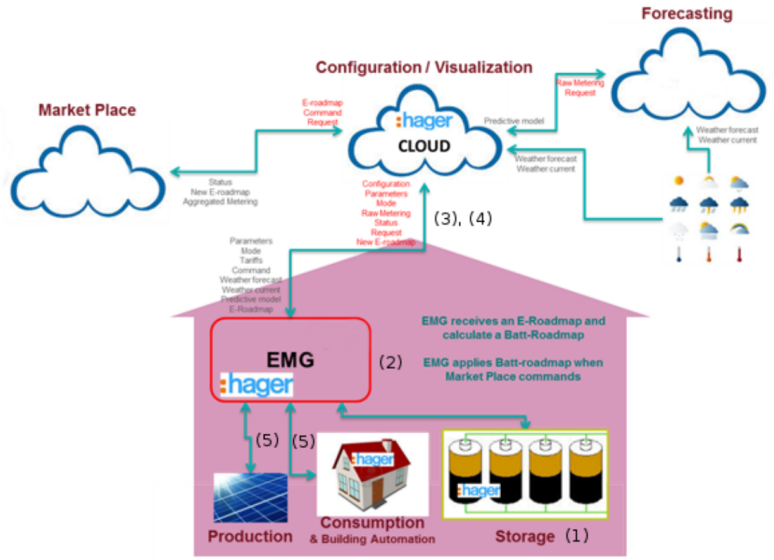
CHALLENGES AND GOALS

Control energy storage via energy buffers (batteries) and rejection in the electrical network with respect to distributors consigns (eroadmap). Minimizing energy costs, maximizing energy resale during free schedule.

MATHEMATICAL AND COMPUTATIONAL METHODS

This project involves an optimization problem with constraints as well as knowledges (predictive data):

- Minimize a cost function to fit the eroadmap in function of real energy production.
- Introduce constraints in the problem (Battery types, household production law imposed by governments).
- Add predictive data (weather prediction, house energy knowledges,...) in the model to handle free schedule.



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Results and Benefits

A prototype algorithm has been proposed within an AMIES PEPS contract (6 months) and a master internship. Solving a blocking problem, it proposes a strategy to fit the eroadmap including predictive data. The company implemented the patented algorithm in its EMG controller for production.

Reduce energy waste, control consumption, optimize energy resale

Energy storage to reduce energy wastes, guaranty safe electrical network for distributors, control energy resale for households

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