

OPTIMISATION OF AN AGGREGATOR'S CUSTOMER PORTFOLIO BASED ON INTER-USER COMPATIBILITY

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1. INTRODUCTION

A demand aggregator (Fig. 1) is defined as the electricity system agent that manages, optimises and modulates the demand and export of energy to the system by small and medium-sized consumers and/or producers in local markets, through the management of generation or storage" and appears in Spain following the approval of Royal Decree-Law 23/2020 (Fig. 2).

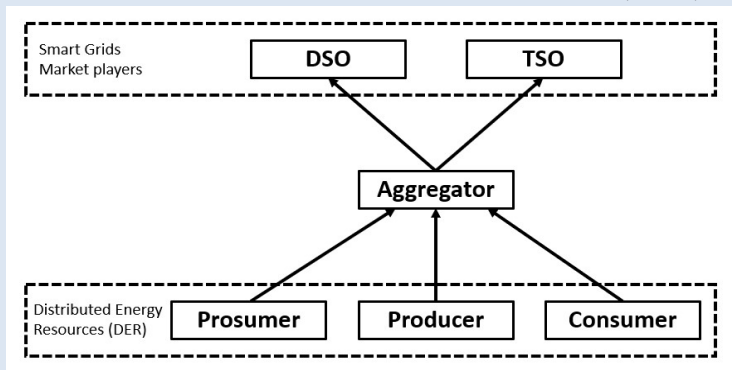


Fig. 1. Demand Aggregator



Fig. 2. Developments in Spanish legislation on the electricity market.

2. METHODOLOGY

The methodology developed (Fig. 3) is composed of five sections: characterisation of a new customer, compatibility analysis (Fig. 4), demand management, market price prediction and energy plan (Fig. 5) and was applied for a customer portfolio of 23 users.

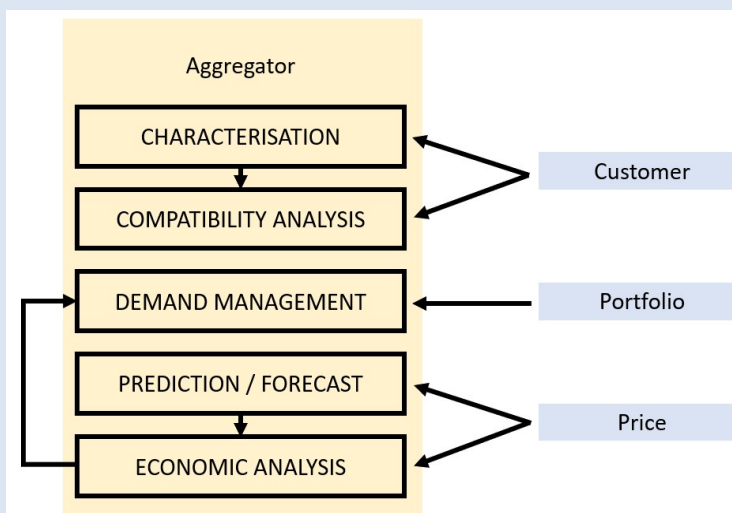


Fig. 3. Methodology

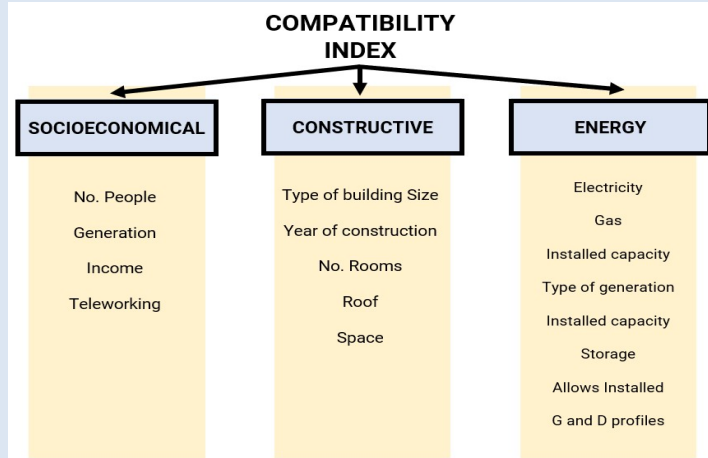


Fig. 4. Compatibility index

3. RESULTS

For a customer portfolio of 19 users with different profiles, the results were obtained:

- a market price prediction algorithm with an associated error of €8/MW.
- A compatibility index between users based on the maximisation of the aggregator's profit according to its customer portfolio.
- 5 hourly moments of energy purchase and 19 hourly moments of energy sale.
- an average daily profit of 235.81€, which means a profit of 86,070.65€/year.

CUSTOMER PORTFOLIO

- 11 residential profiles
- 3 commercial profiles
- 2 turistic profiles
- 3 public services profiles

VARIABLES

- D: Demand
- G: Generation
- EEA: Auxiliary equipment power
- EHNG: Net hourly energy generated
- EHA: Self-consumed hourly energy
- EHE: Surplus hourly energy
- EHR: Grid hourly energy

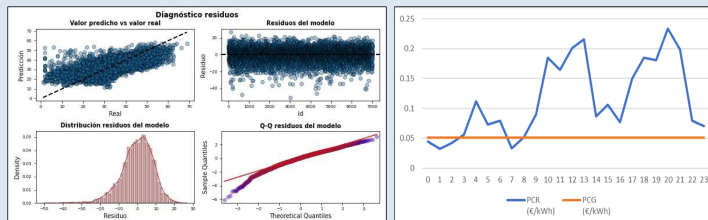


Fig. 5. Customer portfolio, demand Management and price forecast

4. CONCLUSIONS

- Storage systems offer enormous possibilities for energy management.
- it is necessary to know the market price with the most accurate prediction possible.
- Internet of Things (IoT) will greatly facilitate the work of the aggregator.