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Data exchange between distributed energy resources and active customers for stable grid and energy saving by efficient storage

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GOAL OF THE STUDY

To facilitate the data exchange between distributed energy resources and active customers for stable grid and energy saving by efficient storage.

CHALLENGES

With the rise of decentralized generation, smart grids, new network users, demand response, and storage have become more essential compared to the traditional concept of centralized energy generation and distribution.
The energy produced by DER such as photovoltaic, wind, etc. is not efficiently used.
Reduced possibility of accurate forecasting leading to unstable energy prices.
A huge energy storage capacity is required in order to shift the demand.

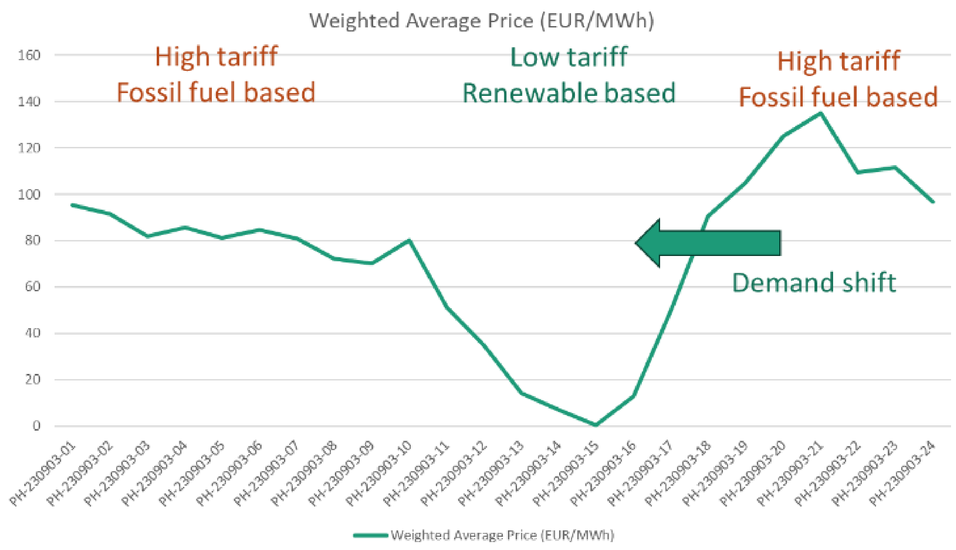

Fig. 1. The basic idea of shifting the demand to renewable energy

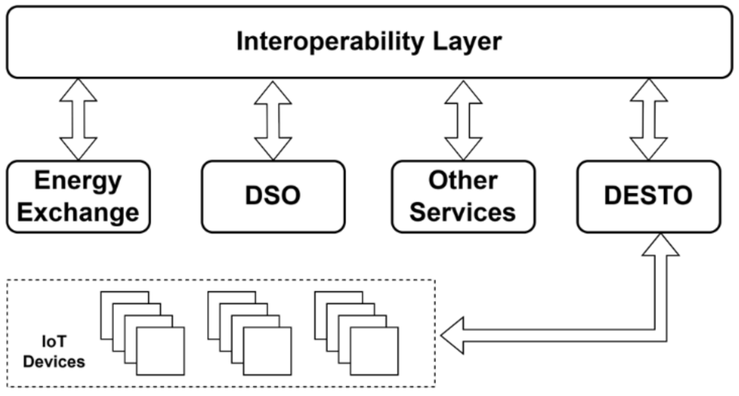

Fig. 2. High level interaction between our service (DESTO) and the DSO

METHODOLOGY OF THE INVESTIGATION

Based on demand side management, so the customers can respond to price changes and incentive offers to make informed decisions about their energy consumption.

The proposed solution explores some methods and technologies for building an interoperable interface between the IoT devices related to energy consumers and producers in order to allow reliable operation and savings based on demand side management and energy storage.

After rescheduling the load, the achieved average energy saving is 55 %. The methodology for that calculation is to use real data about the price from the energy exchange and to change the power consumption accordingly.

MAIN RESULTS FROM THE STUDY

The ability to respond to special requests from the Smart Grid.

Effective energy management and optimizing the operation of appliances by scheduling them in specific modes and at preferred times.

Ability to store energy for better grid reliability and efficiency supporting distributed Energy Resources (DER)

Reduction of energy consumption for the customers.

CONCLUSIONS

The proposed solution demonstrates with real data and in operational environment that significant savings could be achieved by implementing smart grid technologies.

The proposed solution was designed for end consumers to reduce their energy costs, but also engages Distributed Energy Resources (DER) such as photovoltaic, wind, cogeneration, water, geothermal, etc. and could be scaled up to EU level introducing the possibility of smart GRID for supporting the balance of the EU energy market.