Artificial intelligence assisted products

AI-nergy

PRODUCT PROCESS CHART
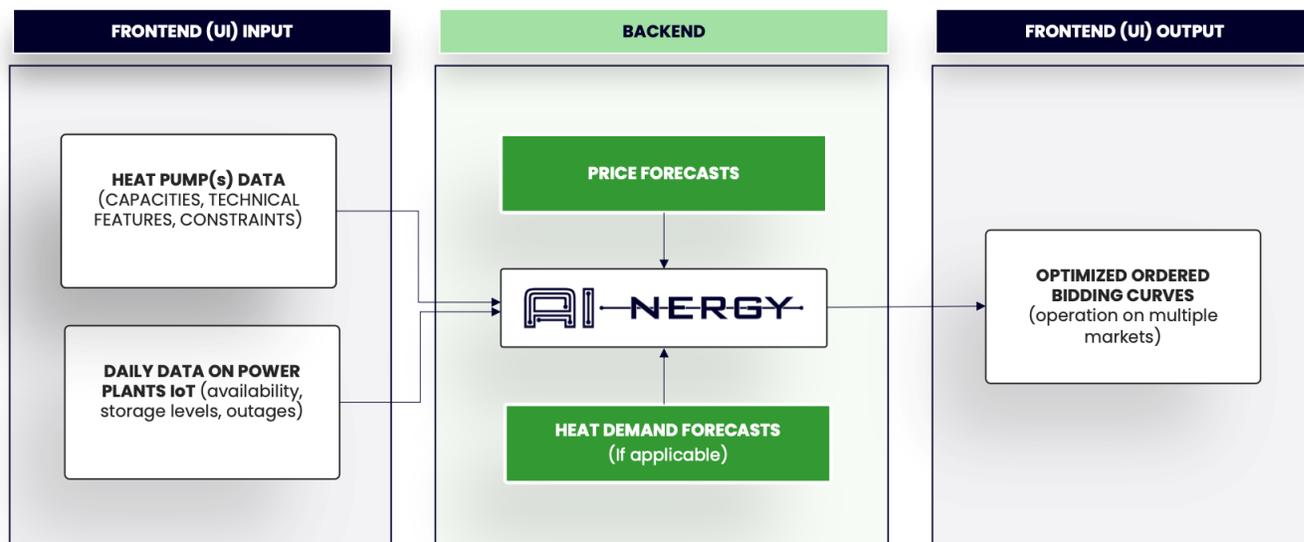
Figure 1: Scheme of the heat pump bidding product.

Summary of IoT Case

Two products from AI-energy focus on:

1. Market bidding (pooling) of large-scale (central) heat pumps,

2. Sizing and scheduling optimization of end-user heat pumps.

Bidding of large-scale heat pumps is done based on the forecasted heat demand and prices, using stochastic optimization. Bidding procedure also includes the operation on secondary (balancing) markets. A web-based application then delivers the optimal schedule for the operation of a day ahead. Often, it is very lucrative to provide services on different balancing and ancillary services markets than to focus purely on day ahead markets and this is what AI-nergy takes into account in its algorithms.

Sizing and scheduling optimization of end-user heat pumps is also done via a web based application. The system can be designed together with the potential PV and battery system for households, as well as with a charger for an electric mobility. The optimization engine improves its accuracy if the heat and electricity con-sumption data is available on a fine resolution.

The platform is run in the cloud, and it can potentially open an API towards the end users. The software architecture includes reading the technology data from databases, accessing the smart meter data via an API, reading IoT data on the status of the heat pumps and automatically generates scheduling procedures.

The technology is currently being tested on different cases, and is currently focused on case studies in Denmark. It is planned to expand to different EU countries in the future.

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FACTS ABOUT THE IOT CASE

IoT Category: Grid services, Optimize heat pump operation, sizing of heat pumps

Goal: Investment costs, operational costs, emissions

Beneficiary: End-users (customers and businesses)

Data required: Forecast, grid prices, energy consumption/demand

Data interface: LAN, WLAN

Transmission protocol for data: RestAPI

Analysis method: Energy balances (real-time), optimization, data-driven methods

Modelling requirements: Data-driven, white-box

Quality-of-Service: Real-time, day-ahead

Technology readiness level: TRL 5

Link to webpage:

www.ai-nergy.net