

9 - Forecast for Building management flexibility

The intelligent use of flexibility will become a key component for sustainably combining the energy transition and security of supply! Everyone can contribute to this – with the help of the intelligent use of data.

A single-family homeowner has several options to economically leverage their energy flexibility. Two key approaches include:

- Self-consumption optimization using a battery (Flexibility Product 1)
- Participation in the balancing energy market by providing the battery for grid-supporting services (Flexibility Product 2)

The challenge: When should each product be used – and for how long? This decision should not be made manually, but rather fully

automated. The two products mentioned are just a subset of several flexibility options that are generally available.

 Challenge Owner



 Postdate

21.08.2025

What is being done?

The goal of the project is to develop an intelligent, data-driven system that automatically determines which flexibility product should be used, when, and for how long. The system aims to maximize both the customer's economic benefit and the contribution to grid stability.

Why is this important?

The energy landscape is rapidly evolving – becoming more decentralized, digital, and dynamic. This opens up new opportunities for end users to actively participate in the energy market, provided they have the right tools. This project demonstrates how an intelligent system can:

- Maximize the **economic return** from existing assets
 - Reduce **technical complexity** for the user
 - Support **grid operators** in stabilizing and optimizing the power grid
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How is it implemented?

The project follows a multi-layered, data-driven approach:

1. **Consumption Forecast:** Predicting the energy usage of key building systems for the next 14 days
2. **Production Forecast:** Estimating PV generation over the same period
3. **Market Forecast:** Assessing the potential revenue from battery participation in the secondary balancing market

4. **Profitability Analysis:** Calculating savings from optimized self-consumption

5. **Decision Algorithm:** Developing a decision tree model that automatically determines when and how the battery should be used to maximize total value for both the customer and the grid

What are the advantages of the project?

- **For End Customers:** Simple, automated marketing of their energy assets – no technical expertise required
 - **For Energy Providers:** Insights into integrating flexibility into existing business models; leveraging building infrastructure as an active grid element
 - **For Research & Development:** Valuable experience in building intelligent, self-learning systems for flexibility management
 - **For the Energy Transition:** Contributing to more efficient use of decentralized energy systems and improved grid stability
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 Github Project URL

<https://gitlab.com/edhd/2025/forecast-for-building-management-flexibility>

Let's start hacking!

Team - Challenge 9

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