SUCCESS CASE 18.2024

neoflex

GRID-ORIENTED FLEXIBILITIES

THE CHALLENGE

The increasing number of decentralised energy resources and the growth of controllable loads, especially electric vehicles (EVs) and heating pumps, cause new challenges for the stable operation of energy grids. One issue concerns the difficulty in **predicting the feed-in of decentralised energy resources** and the **consumption of partly flexible loads**.

For DSOs, **flexibility management** to reduce power peaks is one possible alternative to grid reinforcement that offers additional flexibility and more resilience for the low voltage (LV) grid. A centralised and grid-oriented flexibility management system is being developed by E.ON, but its successful implementation requires wide-range observability at the LV level. The current challenges are:

- The required **wide-range observability** is **not yet implemented**.
- The **communication connection** between the DSO and the flexible assets is still **partly unreliable**.

THE SOLUTION

To overcome these challenges, E.ON has developed the **neoflex** (*grid-oriented flexibilities*) solution consisting of:

- A **decentralised function** to control flexibilities in a grid-friendly way.
- An algorithm based on real-time and historical voltage measurement data.
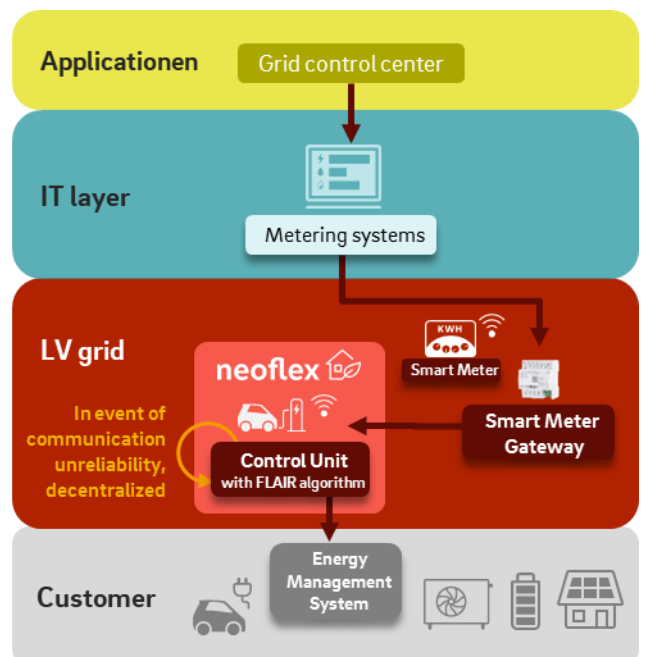
The neoflex algorithm is designed to run in a control unit or, in the future, in smart meter gateways. While the system's functioning is **independent of communication reliability**, its integration with the smart meter gateway remains possible. In Germany, this represents an additional fallback solution for centralised control of flexible loads. At the same time, neoflex could be implemented internationally as a new stand-alone solution.
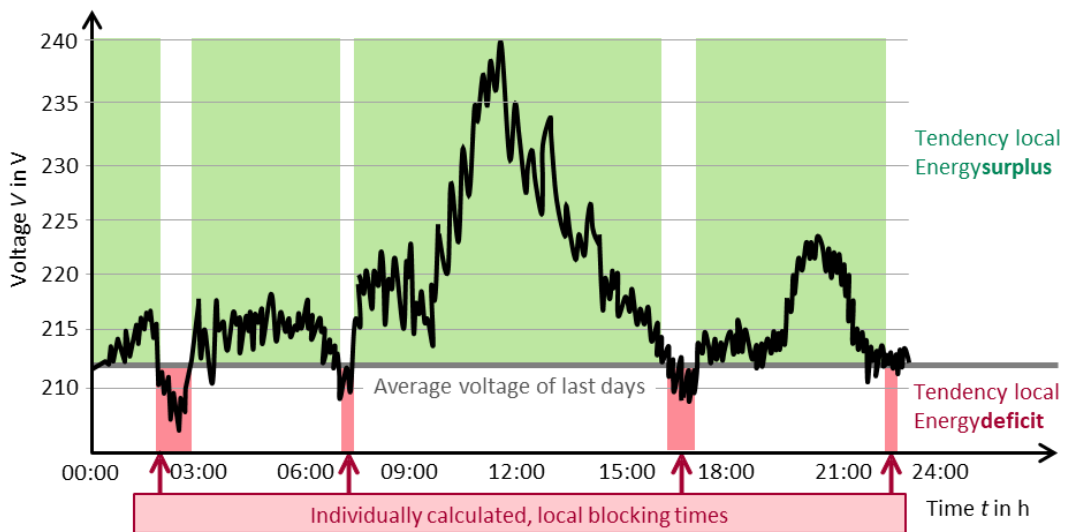
The neoflex algorithm calculates the local and individual blocking times per household based on voltage measurement data.

KEY SUCCESS FACTORS

- Enhancing **LV grid stability and resilience** in rural and urban areas.
- Improving **grid planning and operation security** with and without reliable communication.
- Offering a non-discriminatory, flexible and usable function.
- **Real laboratory testing** as the only way to prove the concept (simulations are not sufficient).

WAY FORWARD

The next planned steps include:

- German **standardisation** of decentralised functions for flexibility assets.
- Optimisation for **international use** of the function and international real laboratory testing according to diverse and changing requirements.
- Further development of the decentralised algorithm for **smart meter gateways** as a virtual control unit.
- Optimisation and learnings from **wide-range** use of control boxes equipped with the decentralised function.

Sources:
[1] S. Baumgartner, „Dezentrales Flexibilitätsmanagement für die Versorgungssicherheit des Verteilnetzes," Dissertation, Technische Universität München, 2024, unpublished.
[2] S. Uhrig, S. Schramm, S. Baumgartner, G. Kerber und S. Hartmann, „Field testing of a local and automatic control for flexible loads," in CIRED 2020 Berlin Workshop, Berlin, 2020.