Evi Monique Kasper

Profile Summary

Aspiring PhD candidate and experienced *Research Associate* in the field of energy systems, with a strong background in the simulation and analysis of electrical distribution grids, grid transparency, and the use of energy flexibility. Skilled in data analysis and modeling using Python (*pandapower*) to simulate real grids in collaboration with German distribution grid operators and research partners. Strong communicator with a proven ability to translate technical results into practical insights and to foster collaborations between academia and industry. Currently pursuing a cooperative research project focused on grid-sensitive energy community coordination.

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Skills

- Python, pandapower, GitHub
- Microsoft Office
- Modeling, simulation, and optimization of electrical distribution grids
- Power grid congestion management and flexibility integration

Flexibility Management Approaches for LV Grids: Comparing §14a EnWG, Dynamic Operating Envelopes, and Grid-Sensitive Energy Communities

Paper ID: 403 - Abstract

The increasing integration of distributed energy resources such as photovoltaic systems, electric vehicles, battery energy storage systems and heat pumps into low-voltage (LV) distribution grids presents significant technical and regulatory challenges. This paper compares three prominent flexibility management approaches with respect to their suitability for managing grid congestion, enhancing grid stability, and enabling the energy transition in Germany: (1) §14a of the German Energy Industry Act (EnWG), (2) Dynamic Operating Envelopes (DOEs), and (3) Grid-Sensitive Energy Communities (GrECs). Through a detailed review of technical implementations, regulatory frameworks, and prosumer participation levels, we identify the strengths and limitations of each method. §14a EnWG offers a reactive and centralized curative measure suited to immediate congestion relief. DOEs provide a proactive, market-integrated mechanism leveraging real-time grid conditions to dynamically allocate import and export limits. GrECs exhibit a broader range of methods and approaches due to the absence of a unified definition. They typically employ proactive mechanisms that generate individual schedules for community members to prevent grid congestion. Their acceptance among prosumers is higher, as side constraints can incorporate economic objectives. DOEs and GrECs face similar challenges, particularly the lack of regulatory adaptation and the requirement for advanced digital infrastructure. The paper concludes that §14a EnWG provides immediate grid relief and its scalability is limited; while DOEs and GrECs offer adaptability and market benefits but demand regulatory and infrastructure advances, whereas GrECs also involve higher implementation and communication challenges.

Work Experience

Research Associate, *Institute of Sustainable Energy Systems, Offenburg University of Applied Sciences* **2023–present**

Education

Master of Science in Electrical Engineering and Information Technology, *University of Applied Science Karlsruhe* **2020–2022**

Bachelor of Engineering in Electrical Energy Engineering and Physics, *University of Applied Science Offenburg* **2016–2020**

Awards

◇ Concurrent support program Network² of NetzeBW GmbH **2021–2022**

◇ Deutschlandstipendium (Germany Scholarship) Awarded by the Federal Ministry of Education and Research (BMBF) **2018–2019**