

Inferring technical power plant characteristics from market observations: parameter estimation for European gas-fired plants from open data

Philipp Castro, Jie Xu, Christoph Weber, Jonathan Berrisch, Florian Ziel
University of Duisburg-Essen, Essen, Germany

Extended Abstract

[Download file](#)

Abstract Summary

Reliable energy system modeling requires realistic technical parameters for thermal power plants, yet many models still rely on stylized averages or heuristic assumptions, particularly for flexibility-related characteristics. This paper proposes a transparent and scalable framework to estimate plant-level operational parameters from publicly available data.

The empirical strategy follows a modular approach. In a first step, core operational constraints are recovered from observed generation patterns using quantile-based methods, hysteresis state definitions, and data filters. In a second step, economic parameters are inferred by linking observed dispatch behavior to electricity prices and fuel costs within a stylized profit-maximization framework.

We demonstrate the approach in a case study of non-CHP gas-fired units across several European countries. Overall, the framework provides computationally efficient, model-ready parameter estimates derived from open data.

Presenting Author Biography

Since 02/2024

University of Duisburg-Essen
Research Associate (Wissenschaftlicher Mitarbeiter), Chair of Energy Economics (Prof. Weber), Essen

09/2020 – 07/2023

University of Mannheim
M.Sc. in Economics

10/2017 - 08/2020

University of Cologne

B.Sc. in Economics