Dissertation

Market simulation including the combined heat and power system

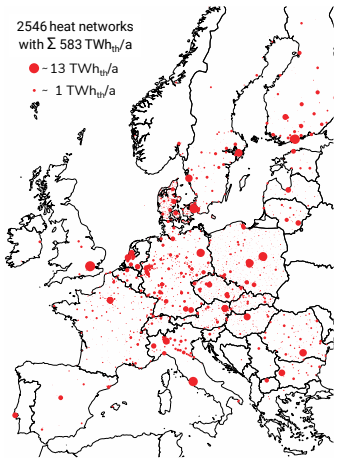
HOW WAS THE STARTING POINT?

Cogeneration and power-to-heat increase the temperature dependency of the unit commitment. The aim was to develop a coupled market model in a hourly resolution including the combined heat and power system in Europe.

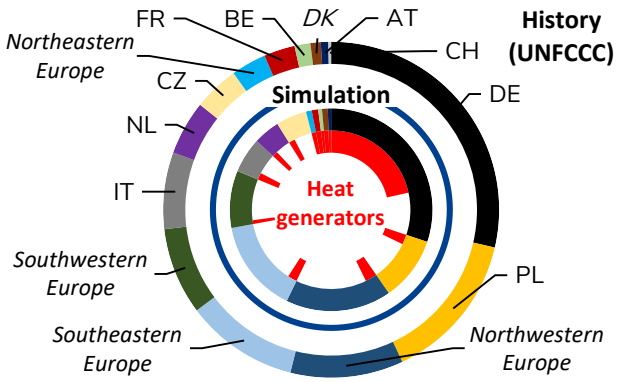
HOW WAS THE ANALYSIS, MODEL AND PROCEDURE?

A high spatial model resolution and a compatible high data quality were necessary for the large-scale mixed-integer quadratic optimization model. The combinatorial complexity was handled by a Lagrangian decomposition.

HEAT NETWORKS



CO_2 – HISTORY VS. SIMULATION



cursive ≙ aggregated visualized bidding zones

WHAT WERE THE RESULTS?

A model database was developed for heat consumers, heat storages, heat generators and heat networks. Based on optimization's a close-to-reality and annual unit commitment was derived for CO_2, power and heat. Exemplary results prove the suitability for transmission network planning.

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