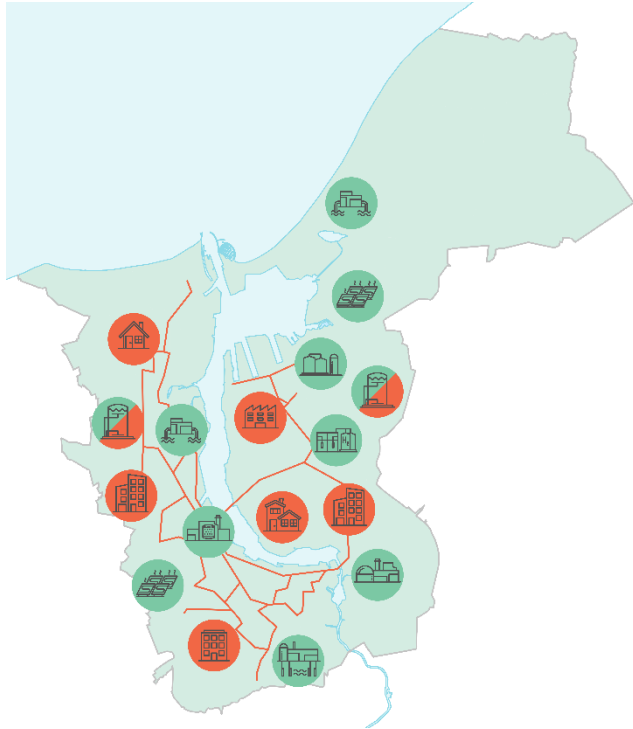




Conrad Gierow, Raphael Wittenburg, Dr.-Ing. Dorian Holtz

Forschungszentrum für Verbrennungsmotoren und Thermodynamik Rostock

Vorgesehenes Gesamtmodell



- Reduktion des Fernwärmenetzes auf Hauptstränge
- Berücksichtigung von Leitungslängen und Höhenprofil
- Integration aggregierter Verbraucher
- Integration dezentraler Erzeuger und Speicher

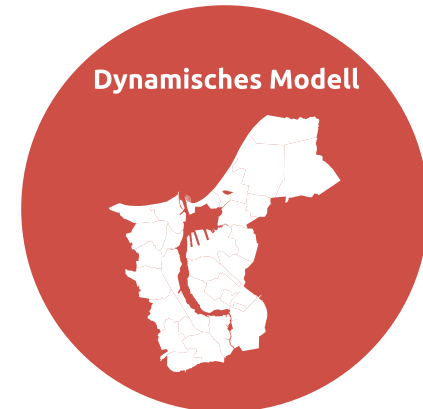
Grundlagen

- Physikalische Modellierung mit Modelica (objektorientierte, domänenübergreifende Modellierungssprache)
- Akausale gekoppelte Modellkomponenten sind eindimensional diskretisiert (Finite-Volumen-Methode)
- Thermodynamische Bilanz- und Zustandsgleichungen werden numerisch gelöst

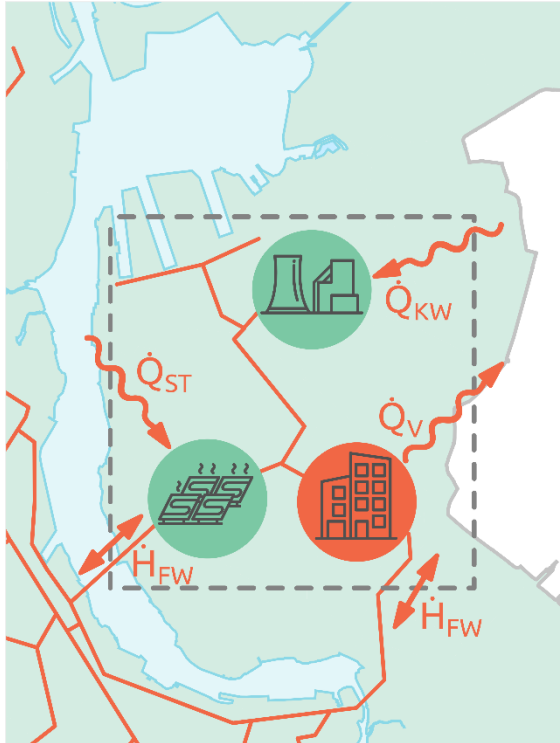
I. Modellansatz anhand Literatur



II. Parametrierung aus Dokumentation



Thermodynamische Grundgleichungen



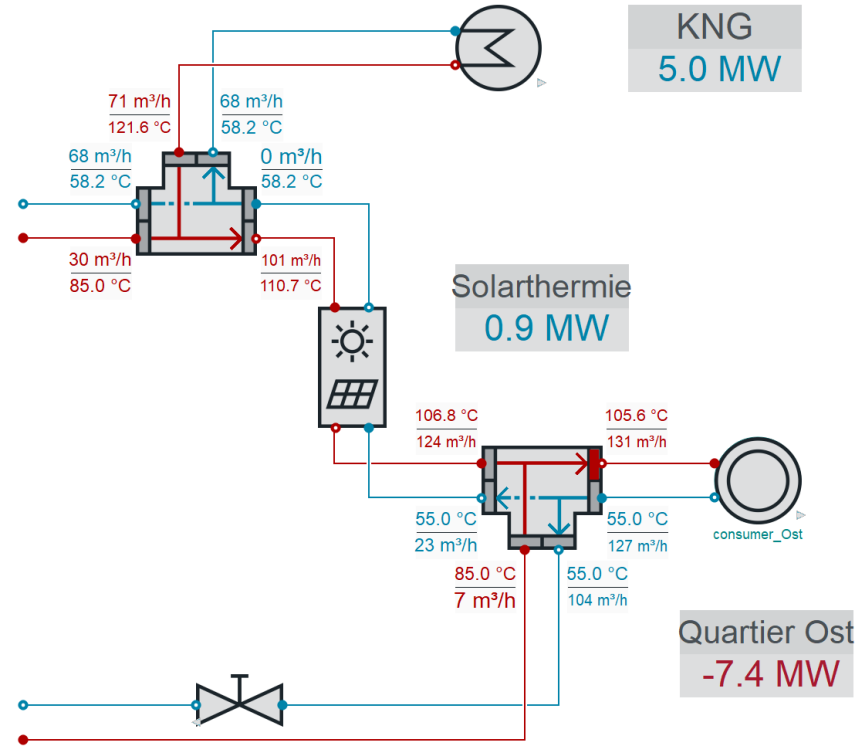
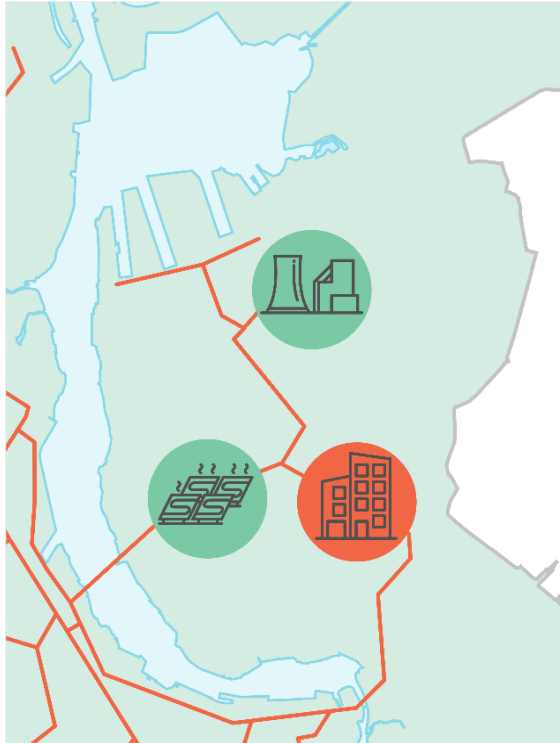
Massenbilanz

$$\frac{dm}{dt} = \sum_{i=1}^N \dot{m}_i$$

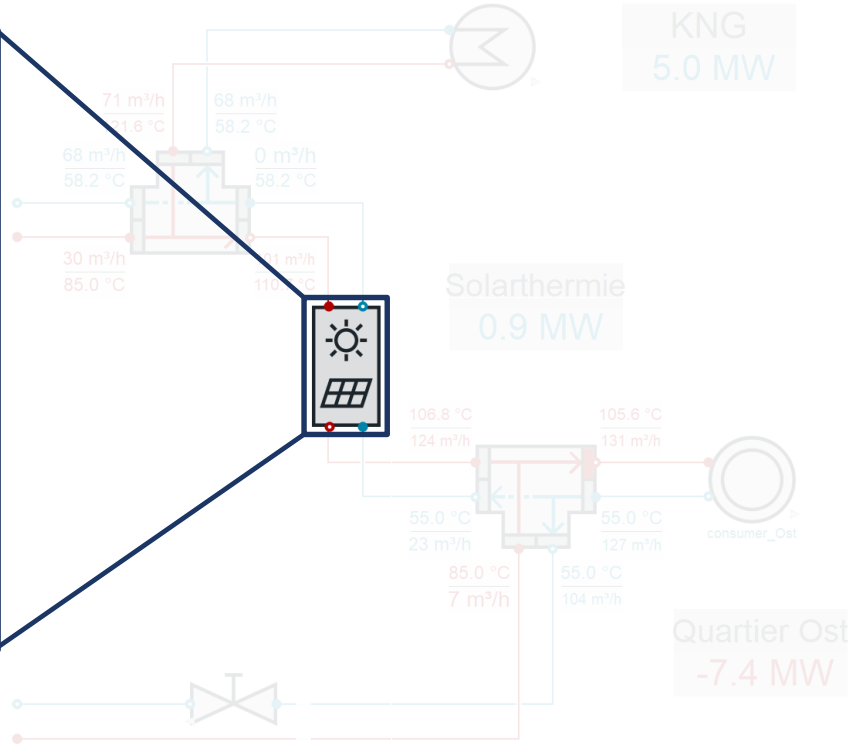
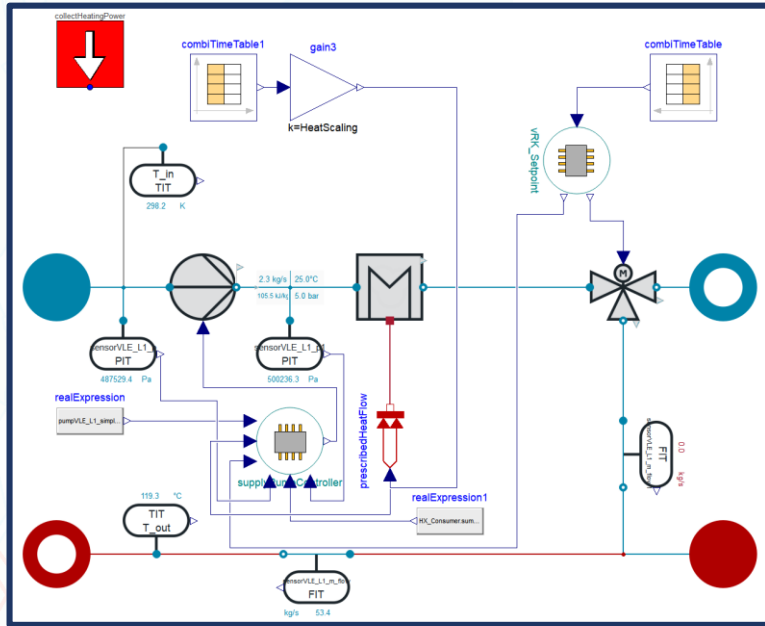
Energiebilanz

$$\frac{dE_A}{dt} + \frac{dU}{dt} = \sum_{i=1}^M \left(h_i + \frac{c_i^2}{2} + gz_i \right) \dot{m}_i + \sum_{j=1}^N \dot{Q}_j + \sum_{k=1}^O \dot{W}_j$$

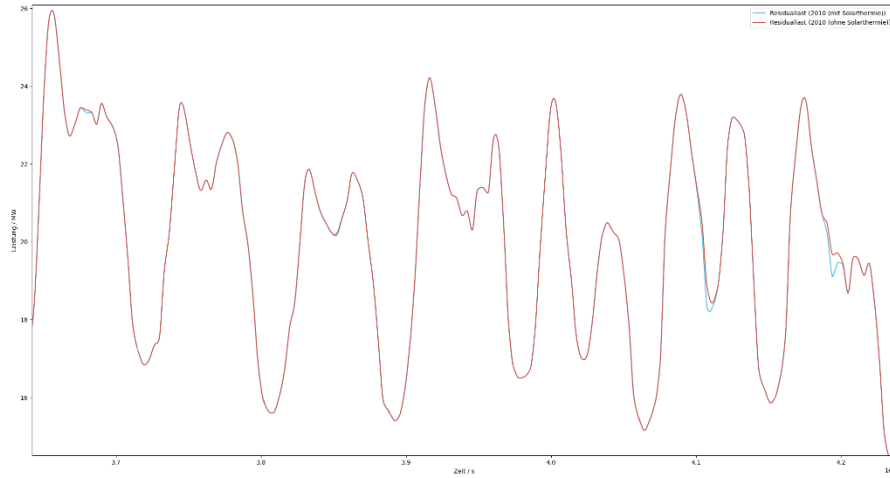
Modellschema



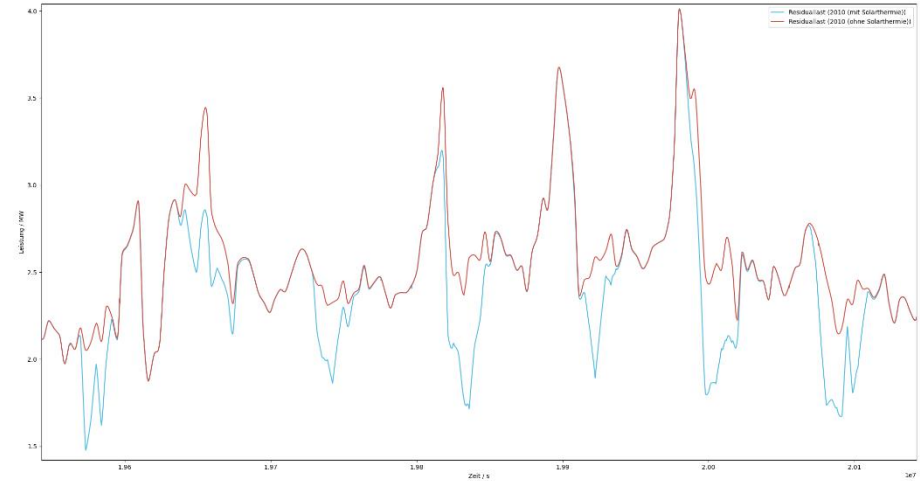
Modellschema



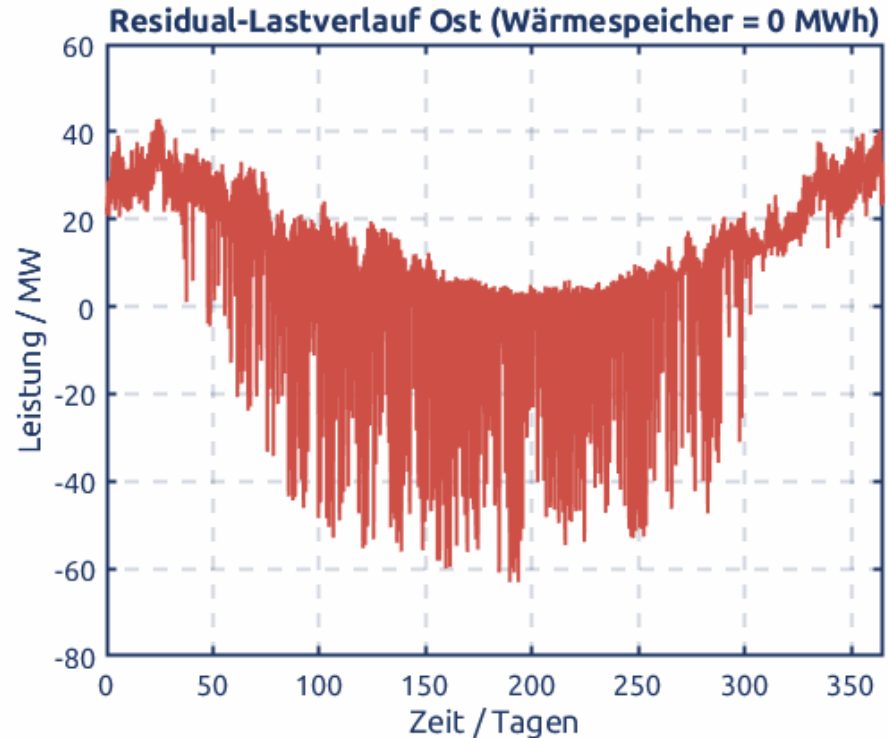
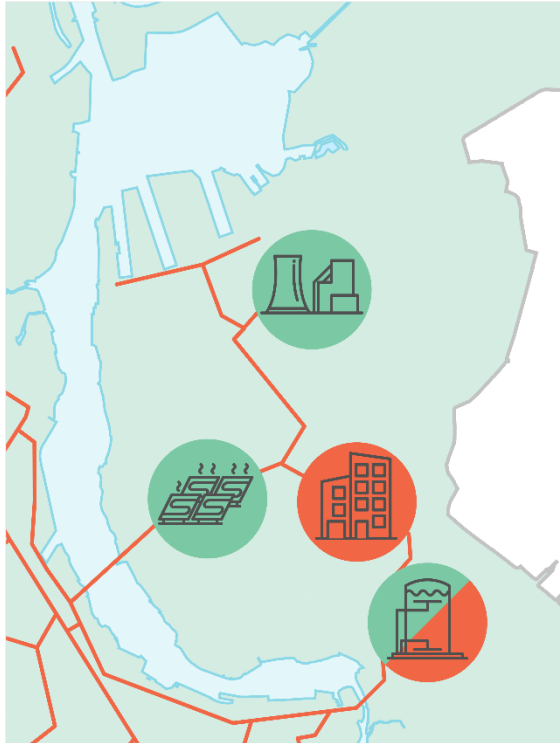
Winterwoche



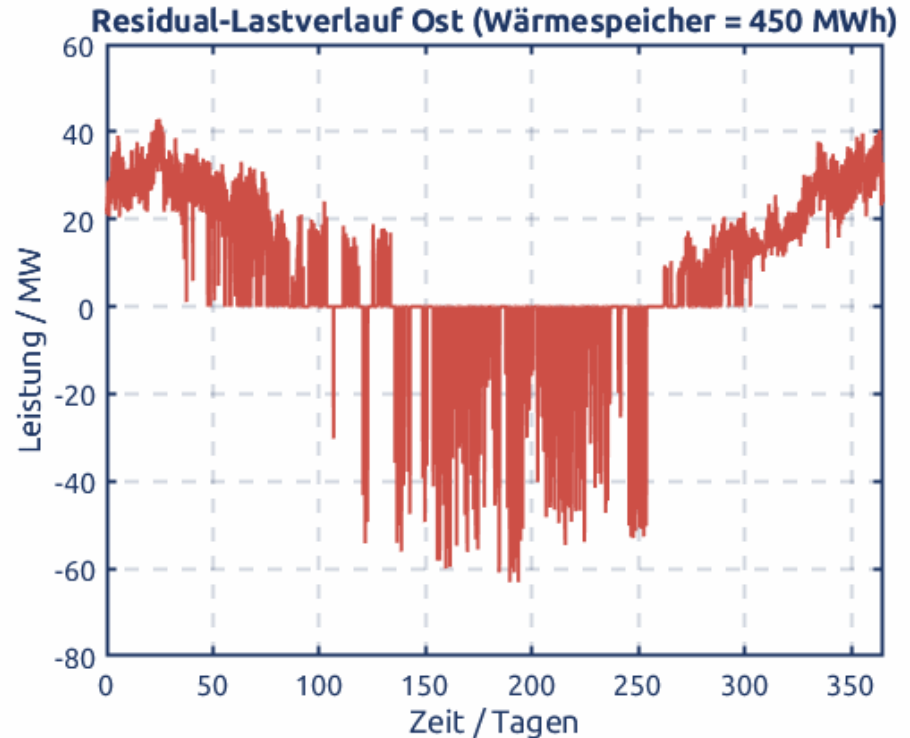
Sommerwoche



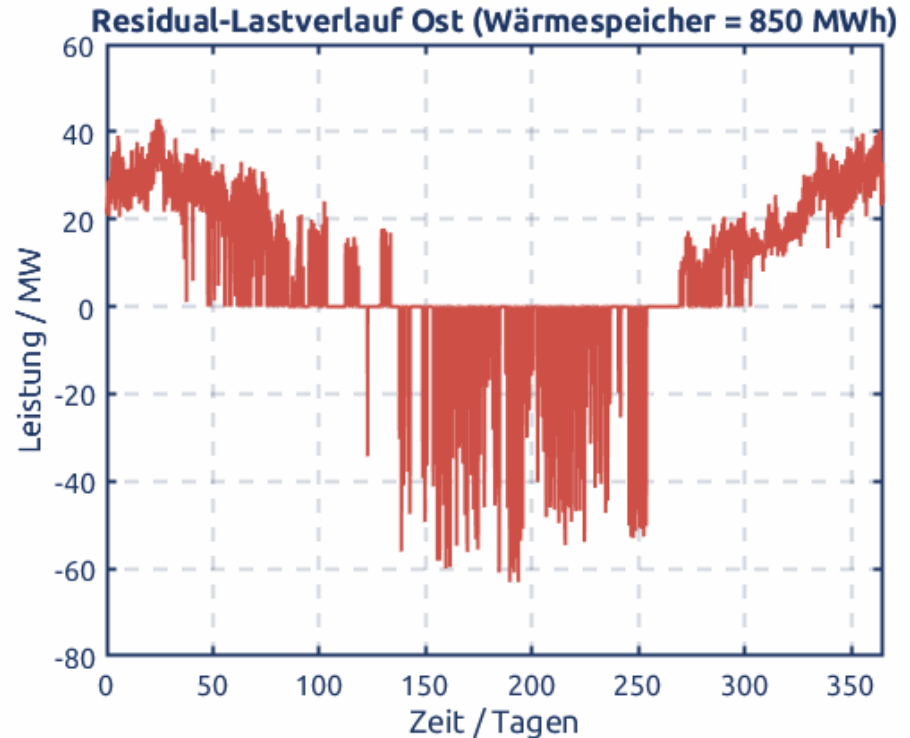
Wärmespeicherintegration im Quartier Ost



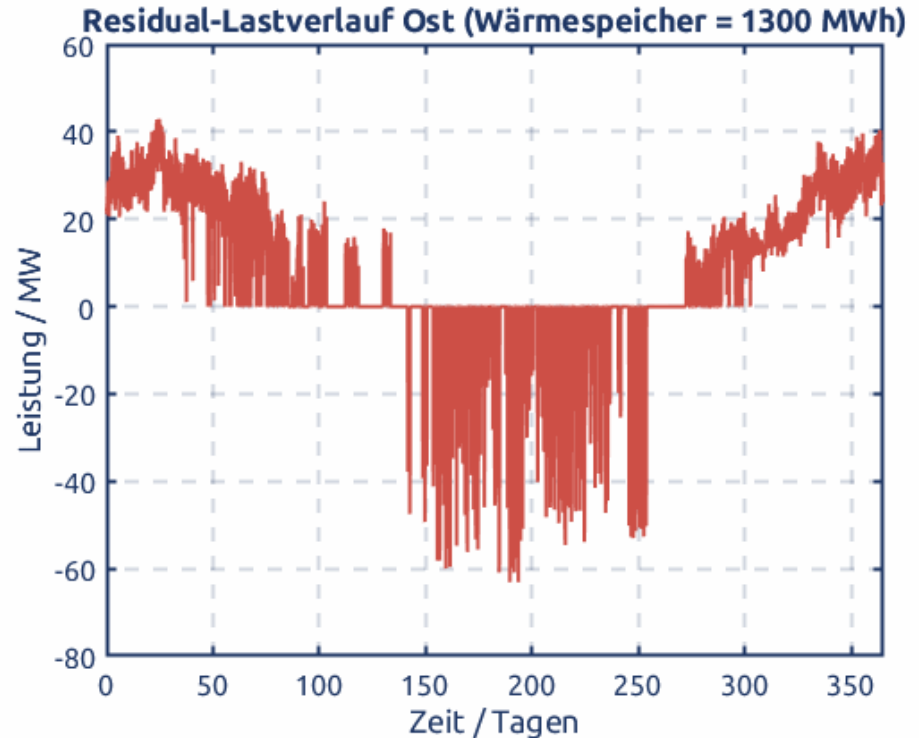
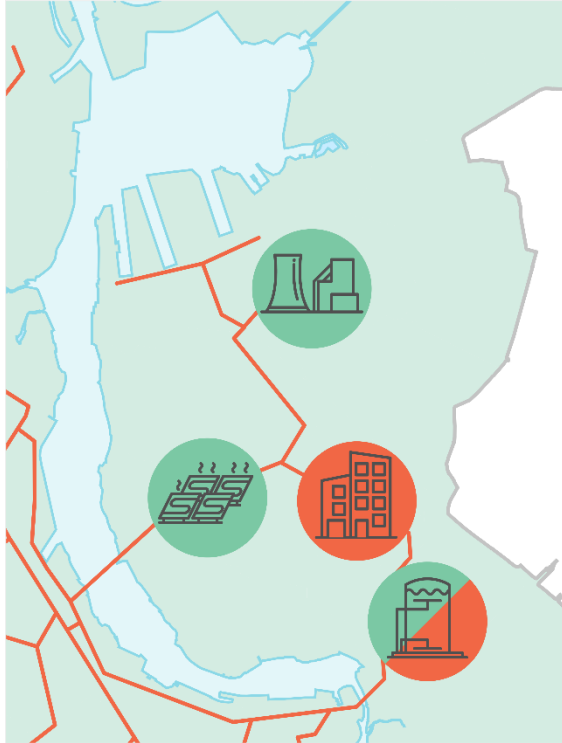
Wärmespeicherintegration im Quartier Ost



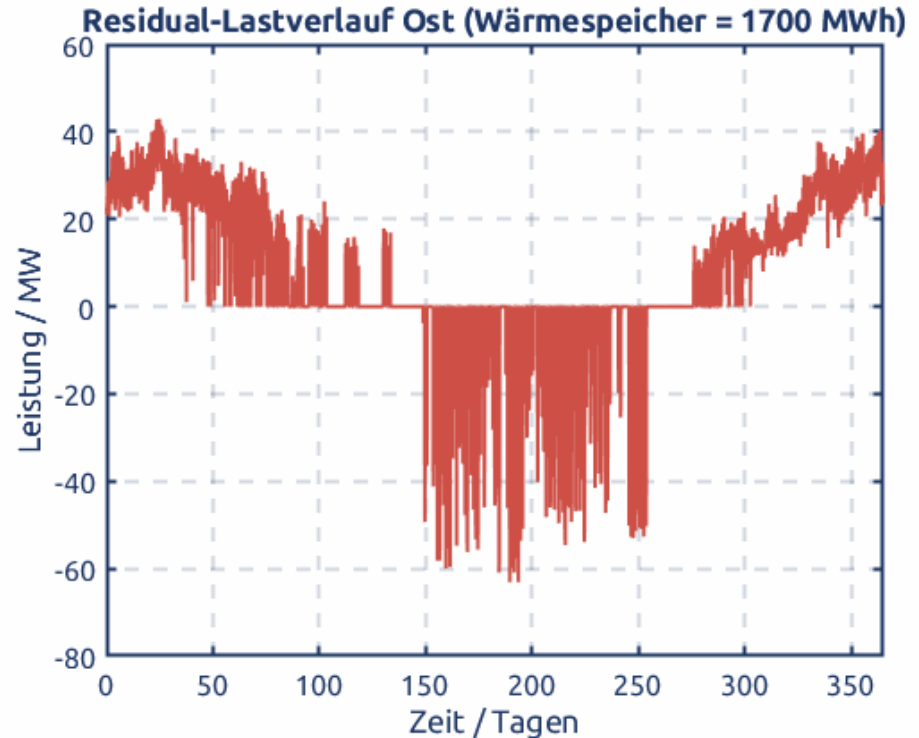
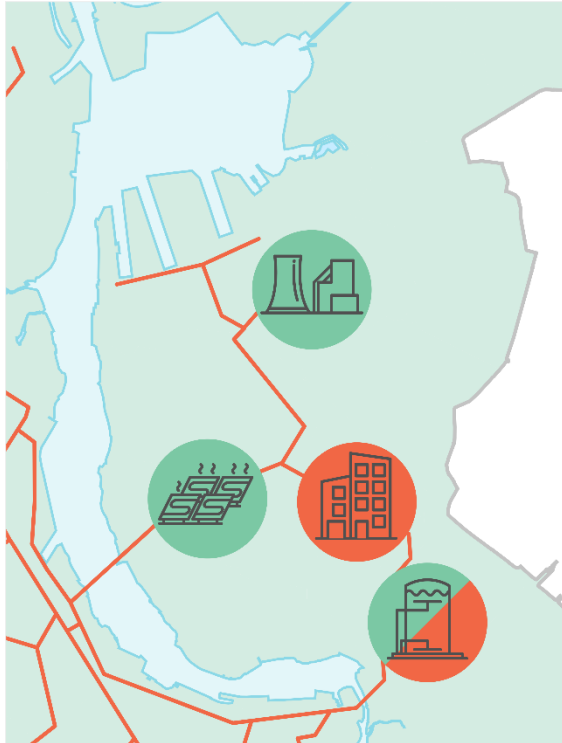
Wärmespeicherintegration im Quartier Ost



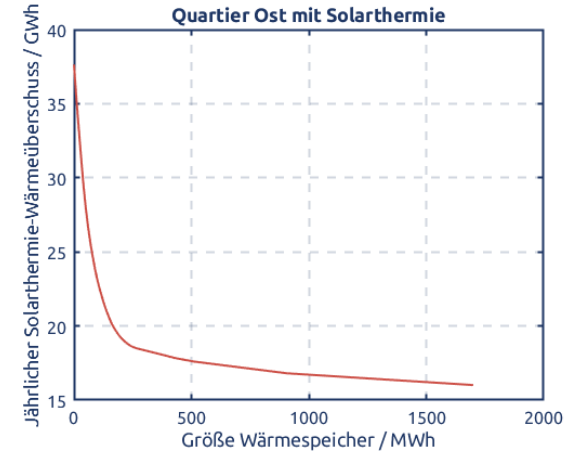
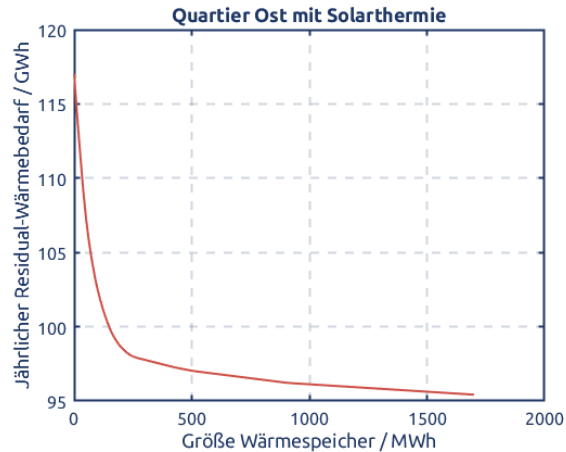
Wärmespeicherintegration im Quartier Ost



Wärmespeicherintegration im Quartier Ost



Wärmespeicherintegration im Quartier Ost





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