District Heating and Cooling: Current Research Activities at EBC

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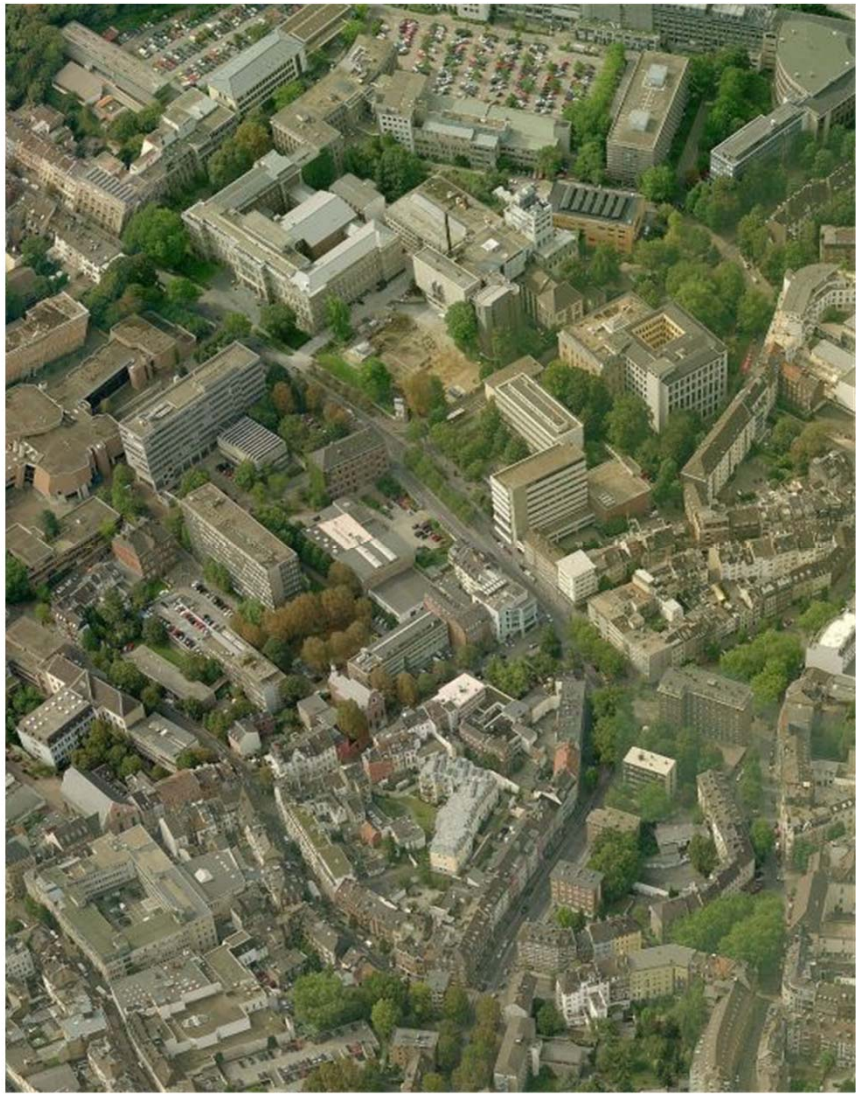
Optimization of Individual Buildings

System boundaries at building level:

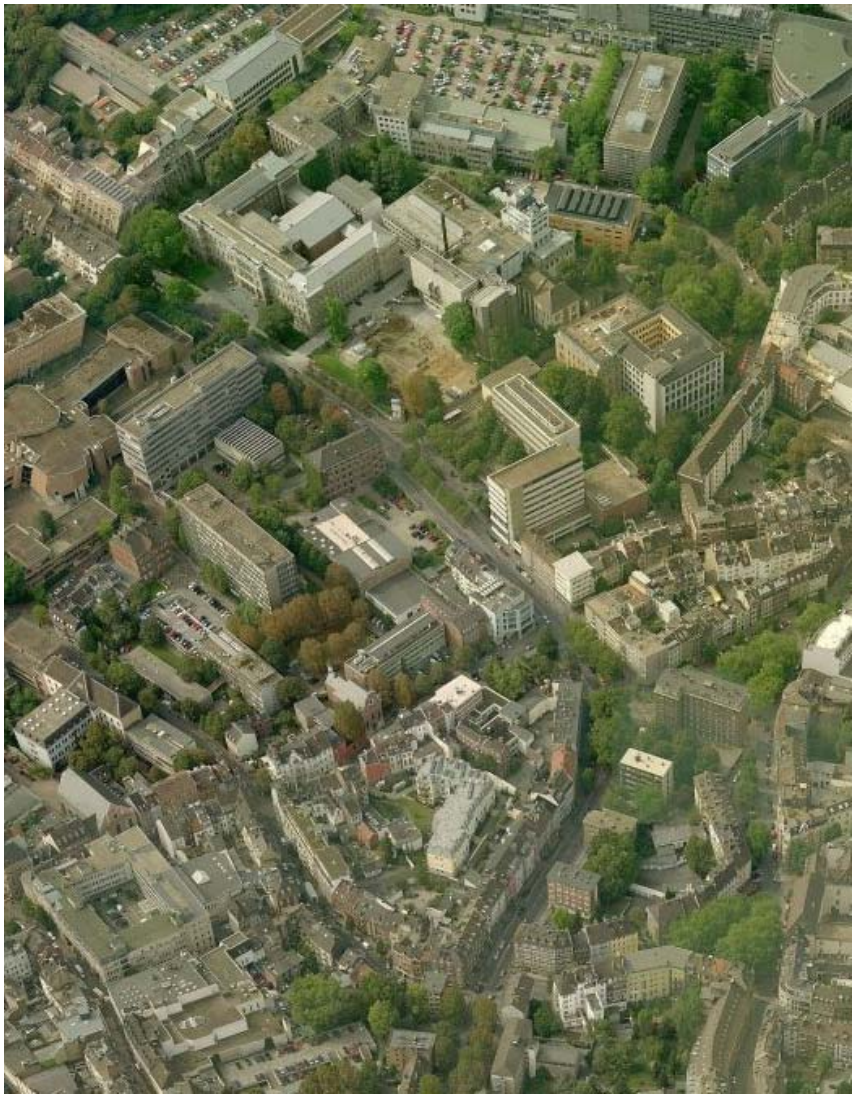
- Isolated system
- Evaluating efficiencies of single components
- Working towards a local optimum



Optimization of City Districts

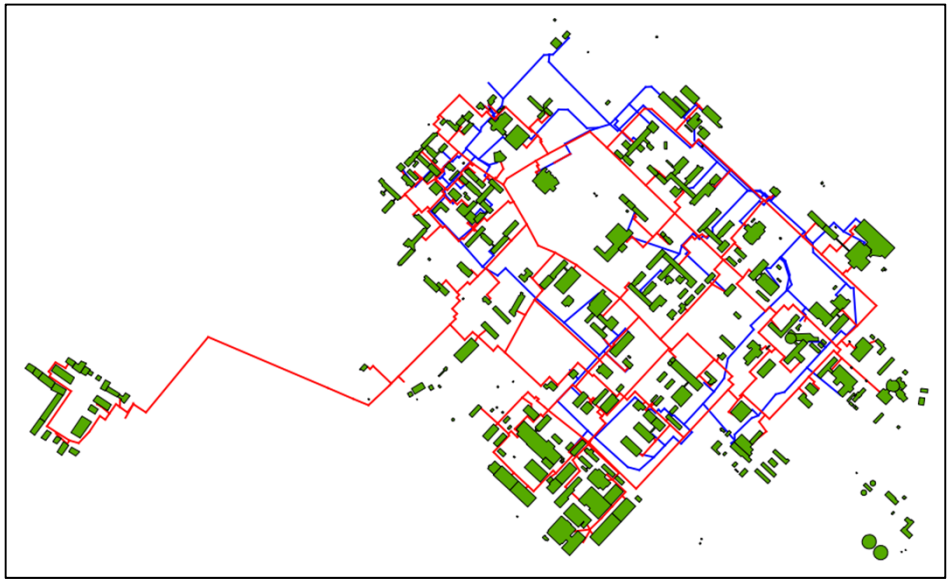
System boundaries at district level:

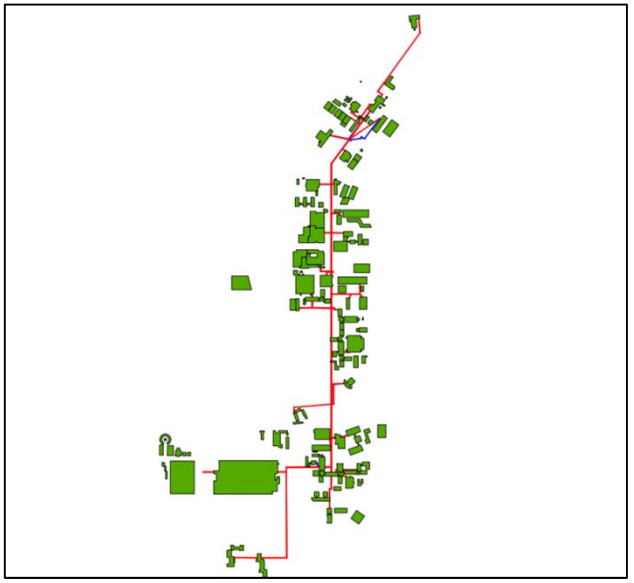
- Higher-level dependencies and interactions
- Evaluating improvement efforts for overall efficiency
- Working towards a global optimum



Understanding the city as an Urban Energy System

Optimization of Reference Districts





Campus	Forschungszentrum Jülich	Melaten (RWTH Aachen)
Area	2,2 km²	1,25 km²
# Buildings	~ 200	~ 50
Thermal Grid	> 40 km	> 10 km
Heating	CHP	Gas boilers
Cooling	Compression Chillers	Absorption Chillers

Modular Modeling Approach

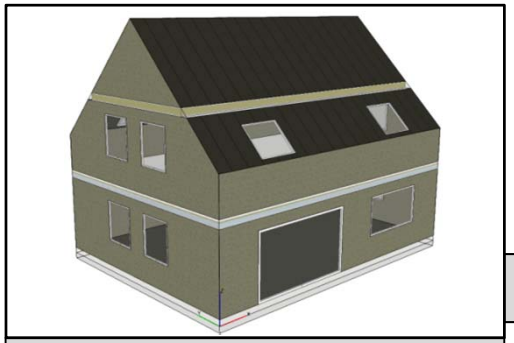
Heat Generation

Heating Network

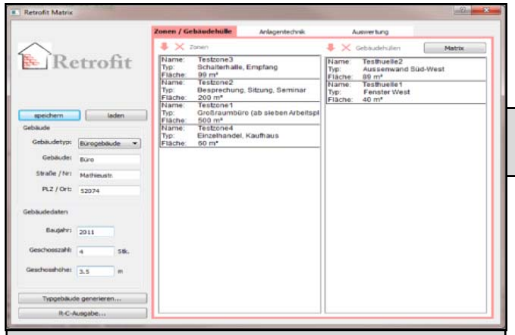
Buildings

Automated Parameterization of Building Models

Enables the simulation of entire building stock and retrofit options with minimized manual effort



Detailed Data



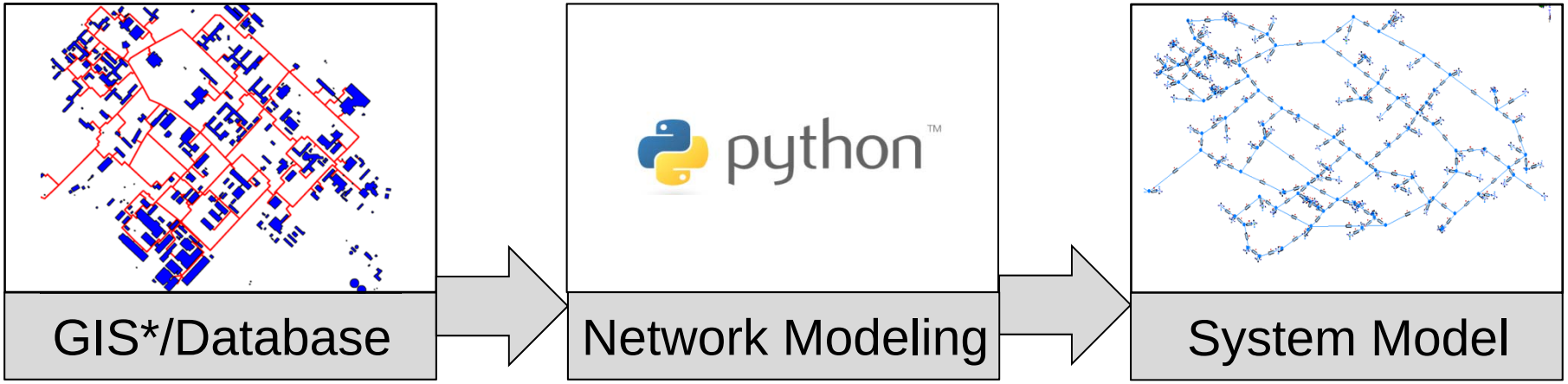
Base Data

MODELICA

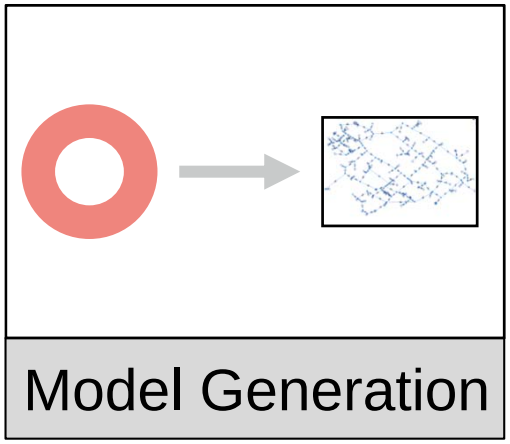
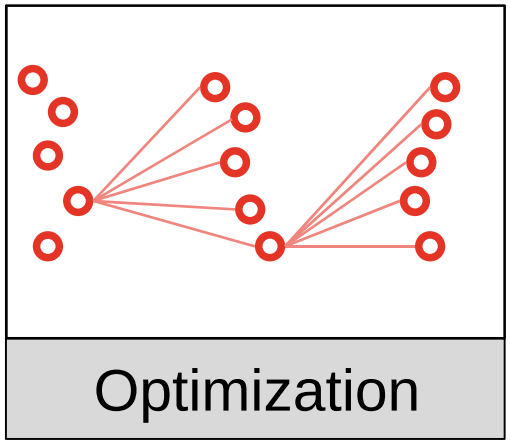
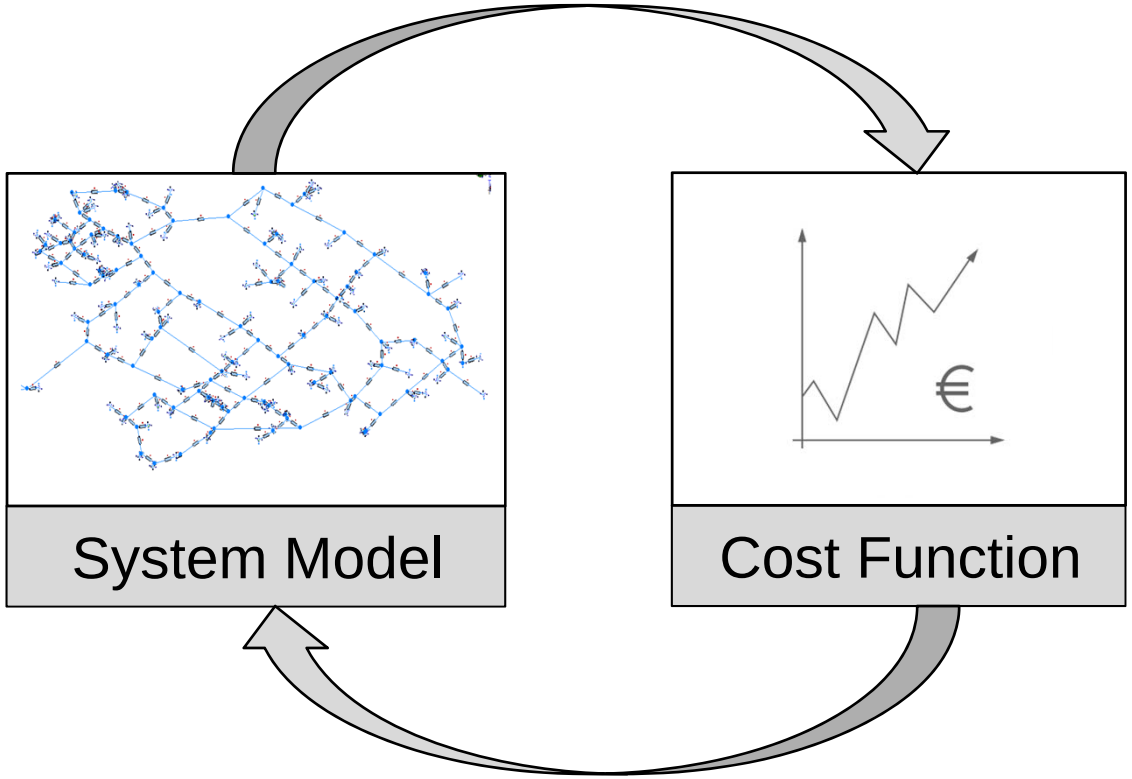
Building Model

Automated Network Model Generation

An automated network modeling routine creates a holistic pyhsical model of the entire district energy system



* Geographical Information System

Optimization for Design and Operation

Coupling of the system model with optimization algorithms