

■ Algorithm Engineering

■ Route Planning

■ Graph Clustering

■ Graph Drawing

■ Geovisualization

■ Energy Networks

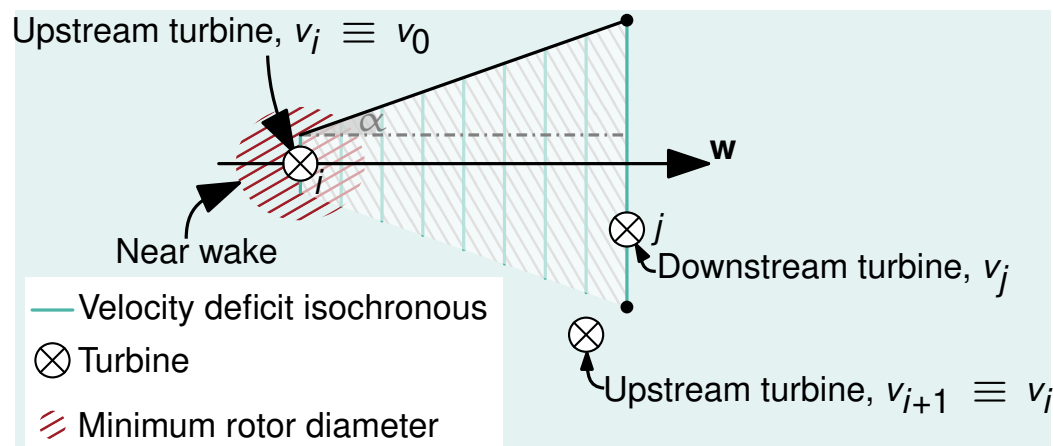
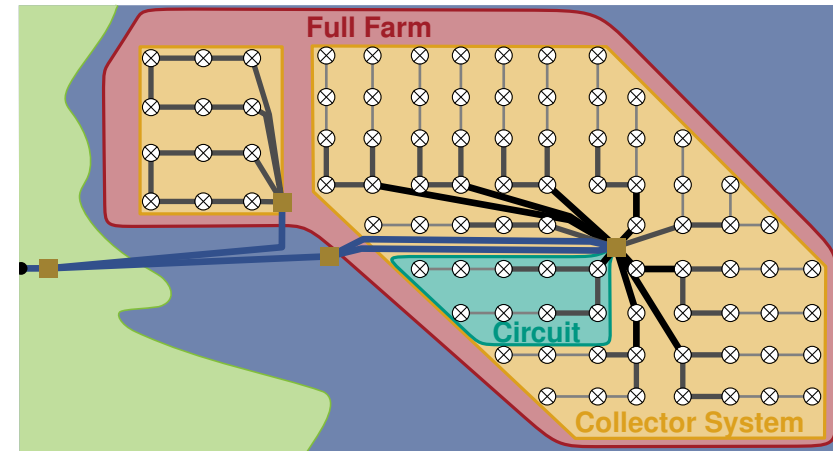
■ Social Network Analysis

■ Sensor Networks

■ . . .

Wind Farm Cable Placement

- placement of turbines and substations is fixed
- different cable types
- find a cost-efficient cabling in the wind farm



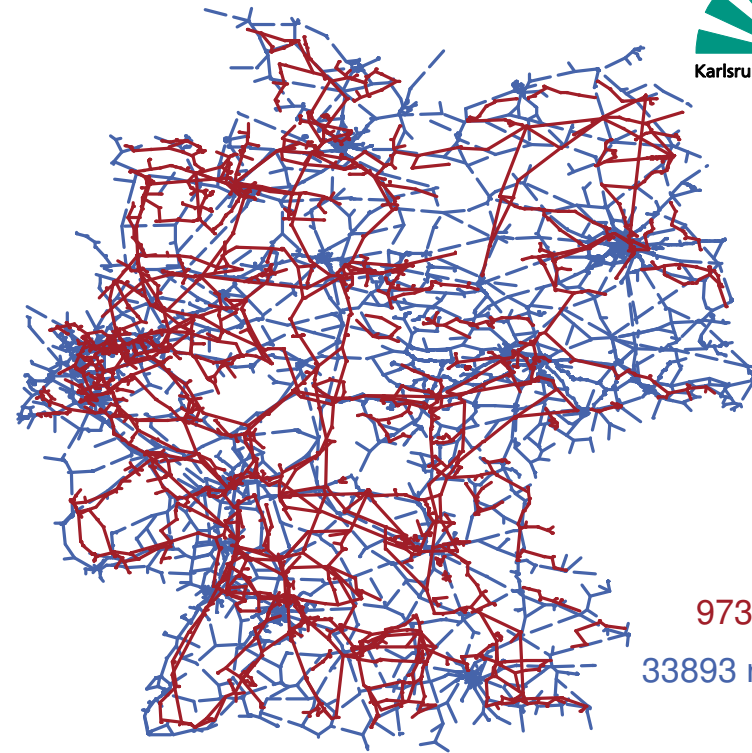
Wind Turbine Placement

- given an arbitrary area, turbine type and wind distribution
- place turbines in the area such that the output is maximized

Projects

Transmission Network Expansion

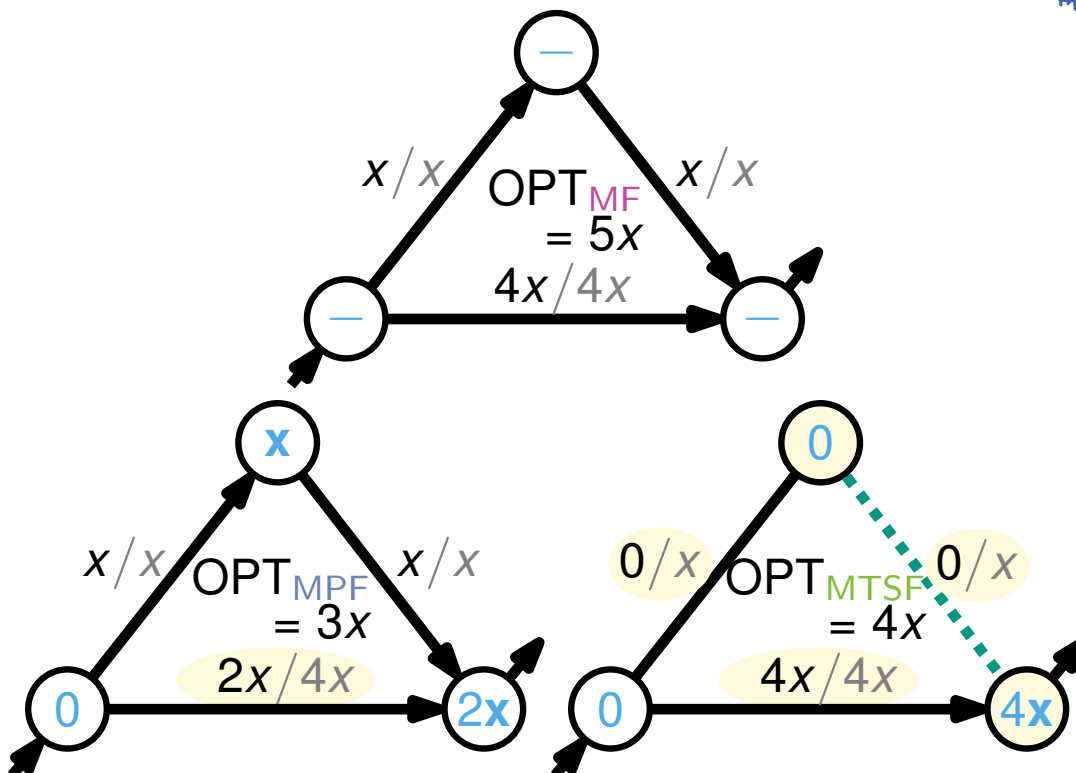
- given a power grid
- extend the power grid to
 - maximize the throughput
 - minimize generation costs



9736 power lines
33893 railway edges

Placement of Control Units

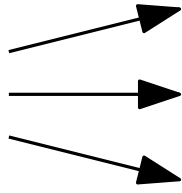
- given a power grid
- place switches or FACTS to
 - maximize the throughput
 - minimize generation costs



Scalability Challenge

Given:

complex physical
model



- many constraints
- dynamic scenarios
- not linear

medium-sized instances
already problematic

Scalability Challenge

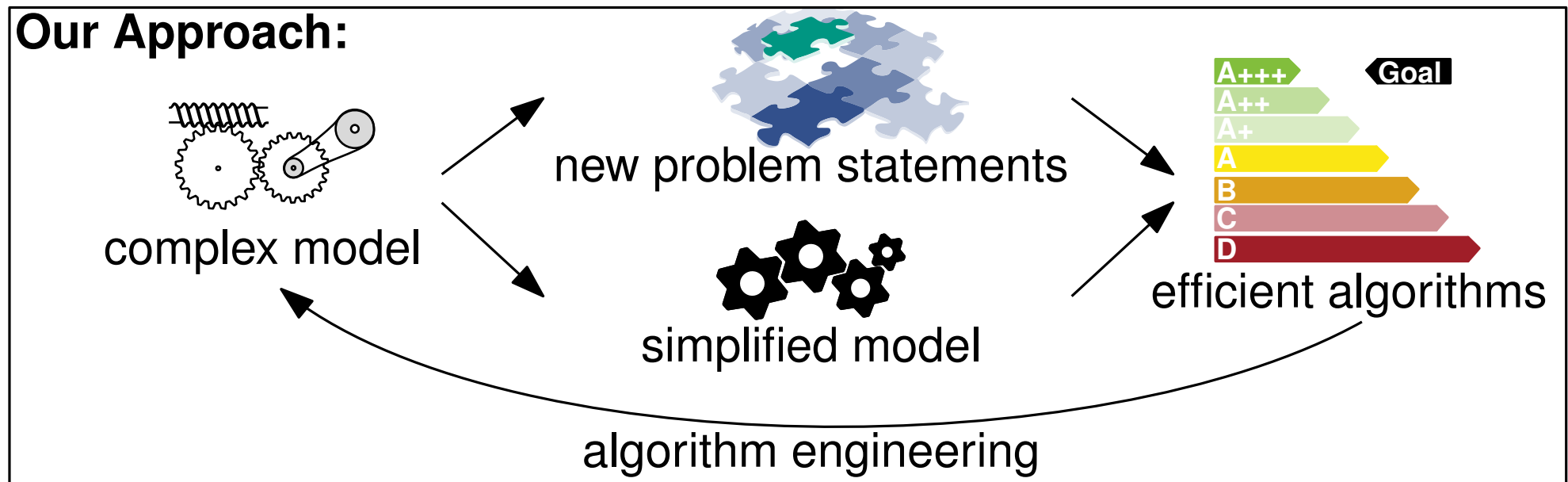
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Our Approach:



Scalability Challenge

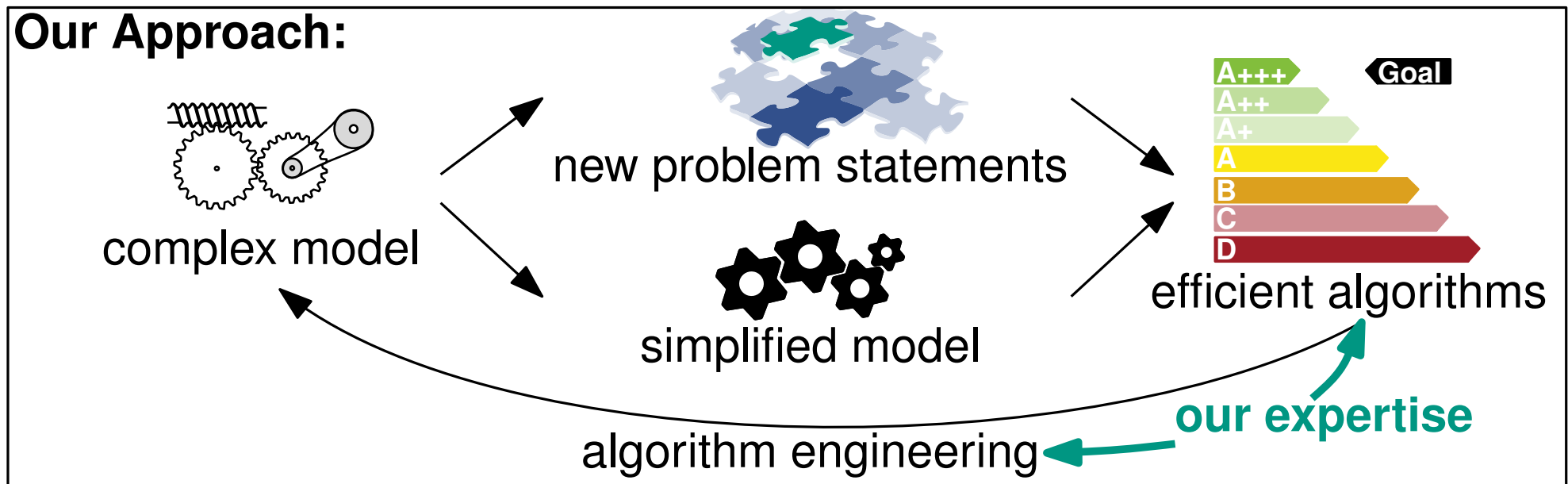
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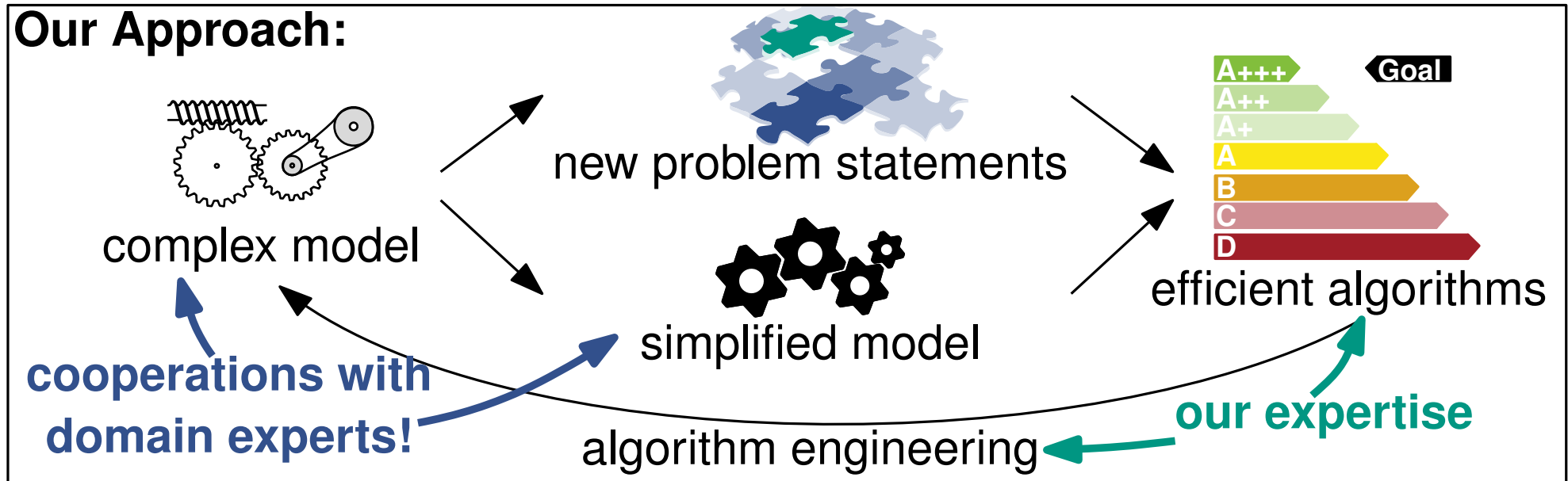
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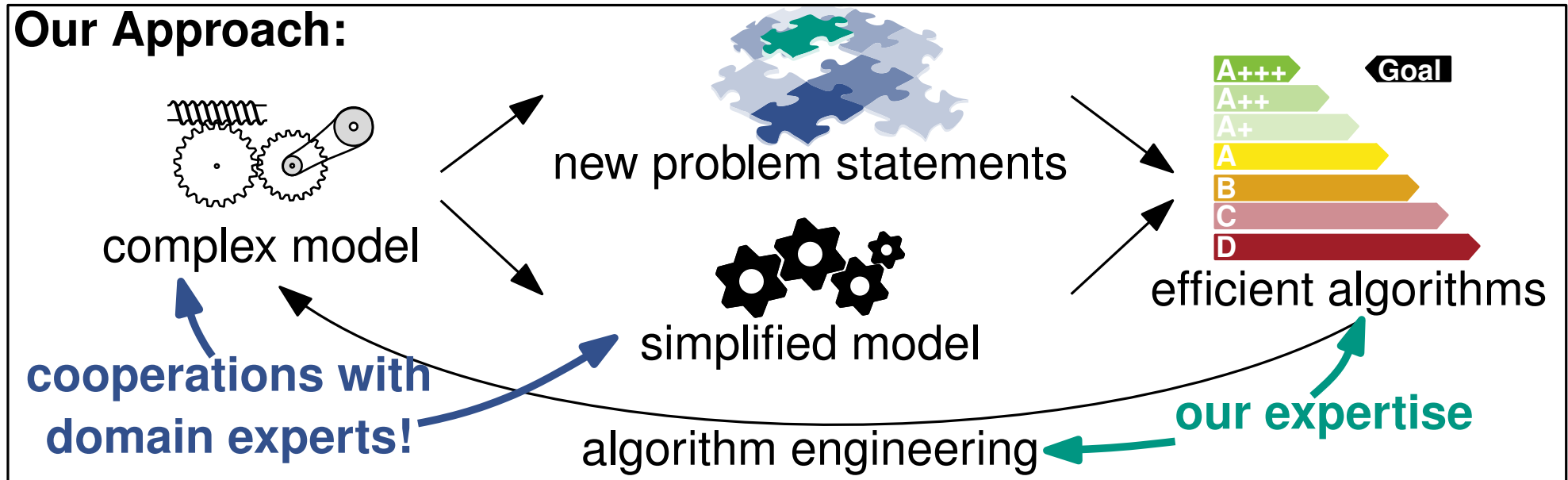
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Our Approach:



Application: Energy Networks

- placement of switches and FACTS
- wind farm planning
- load peak shaving