TU Clausthal

ite gas supply

Transformation of energy systems - modeling a future mix of natural gas and renewables from a European perspective

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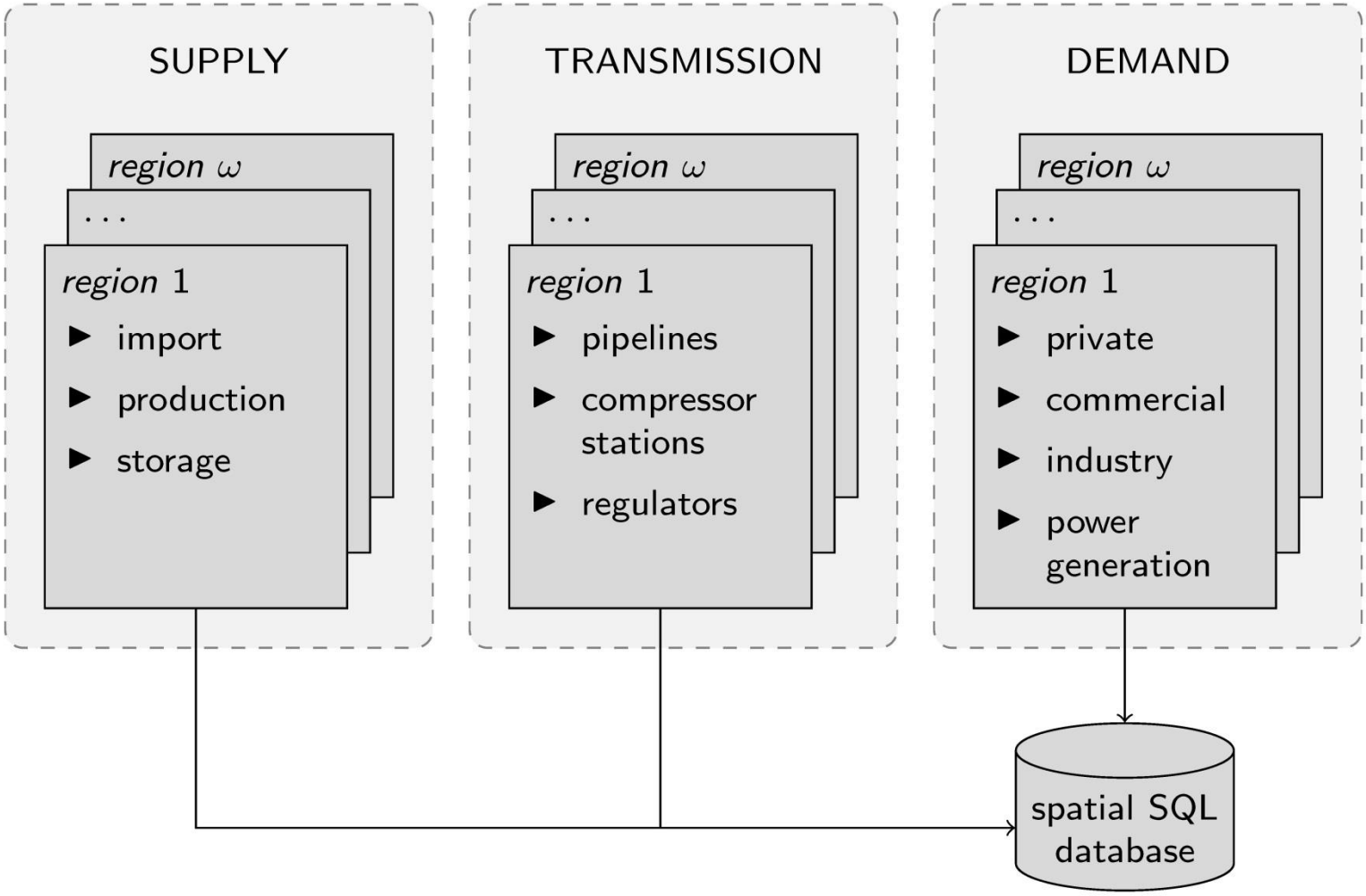
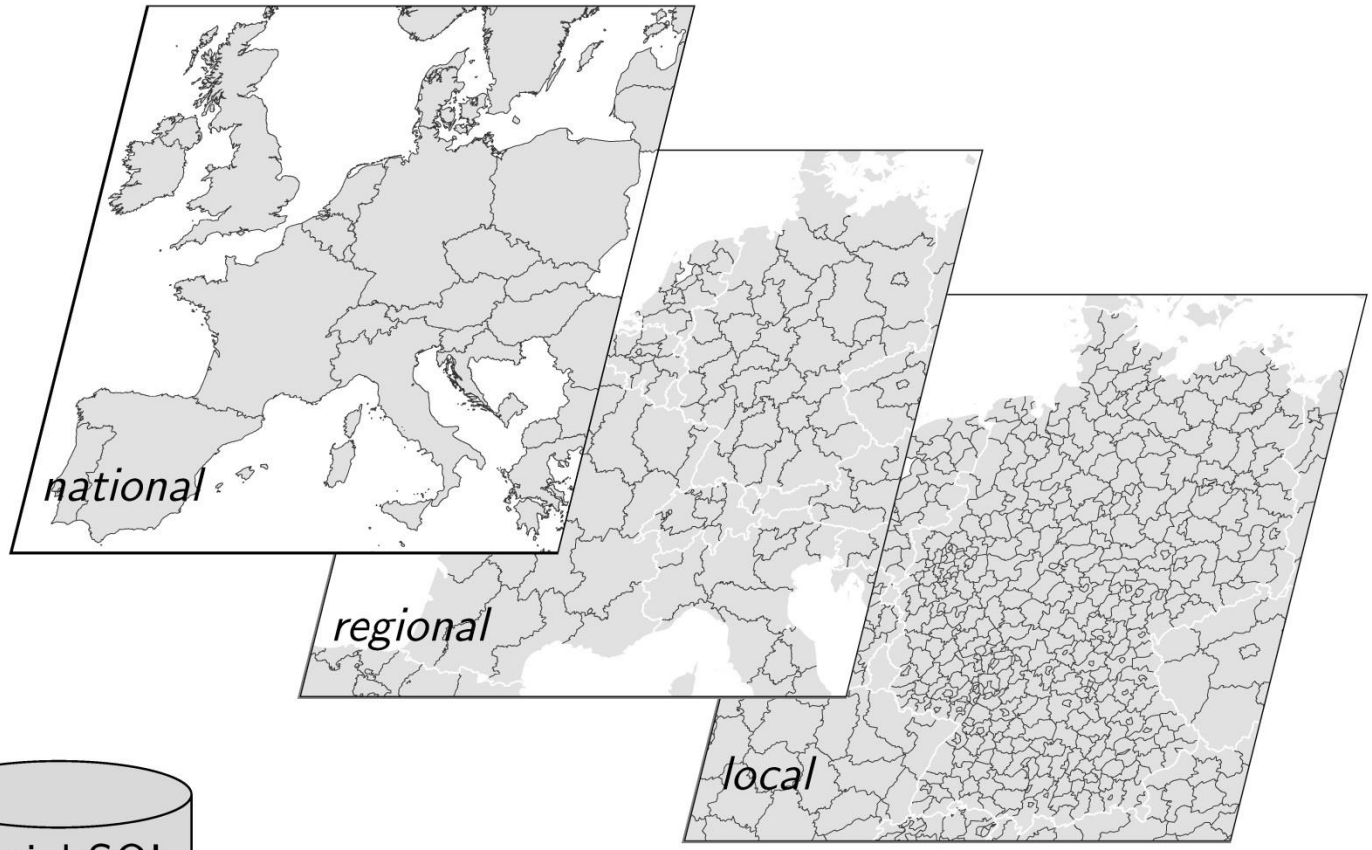
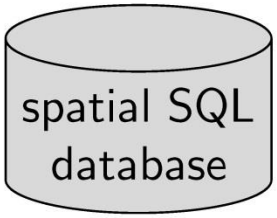
Spatial modeling - overview and data stream

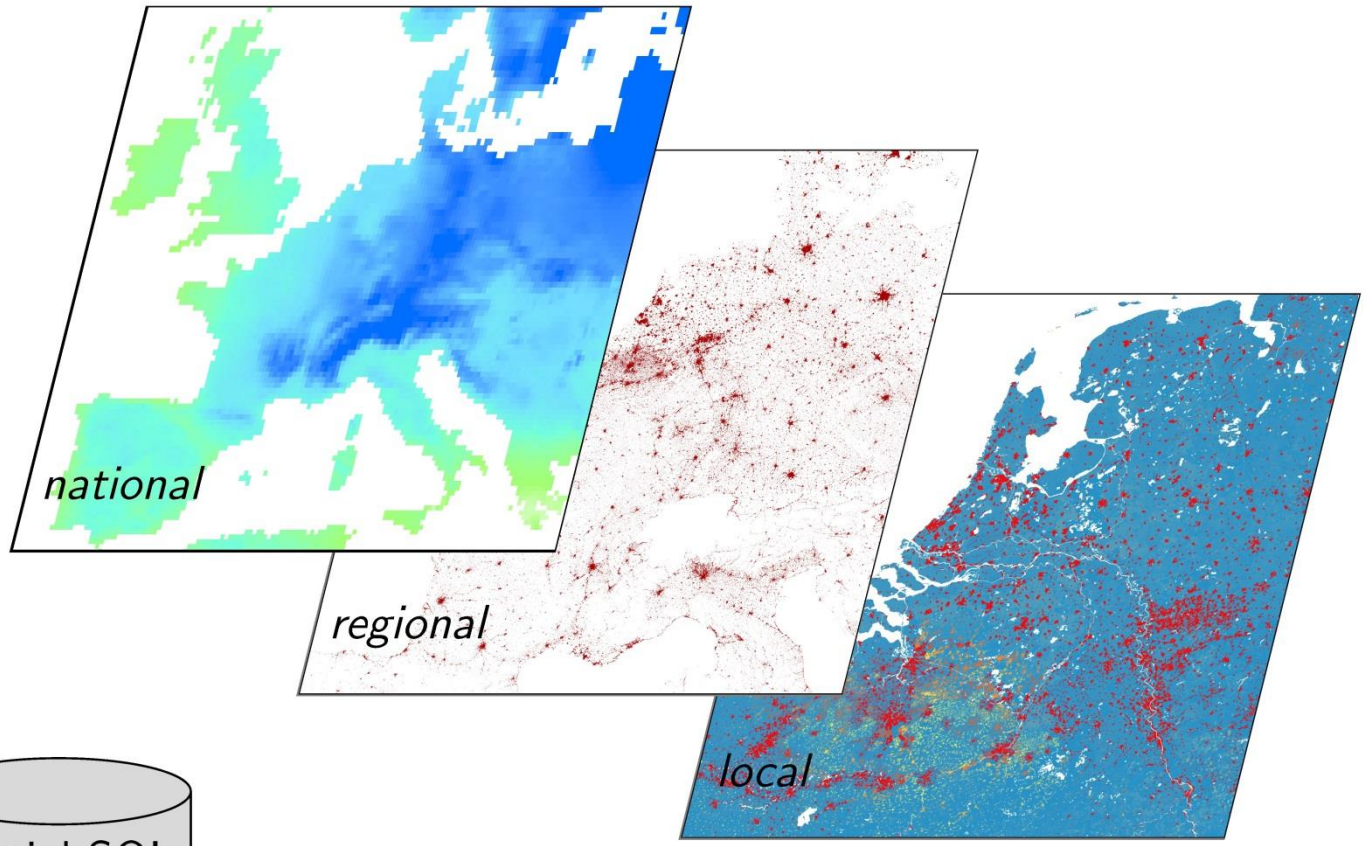


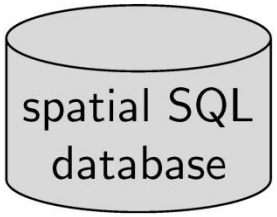
Regional granularity - area/admin data



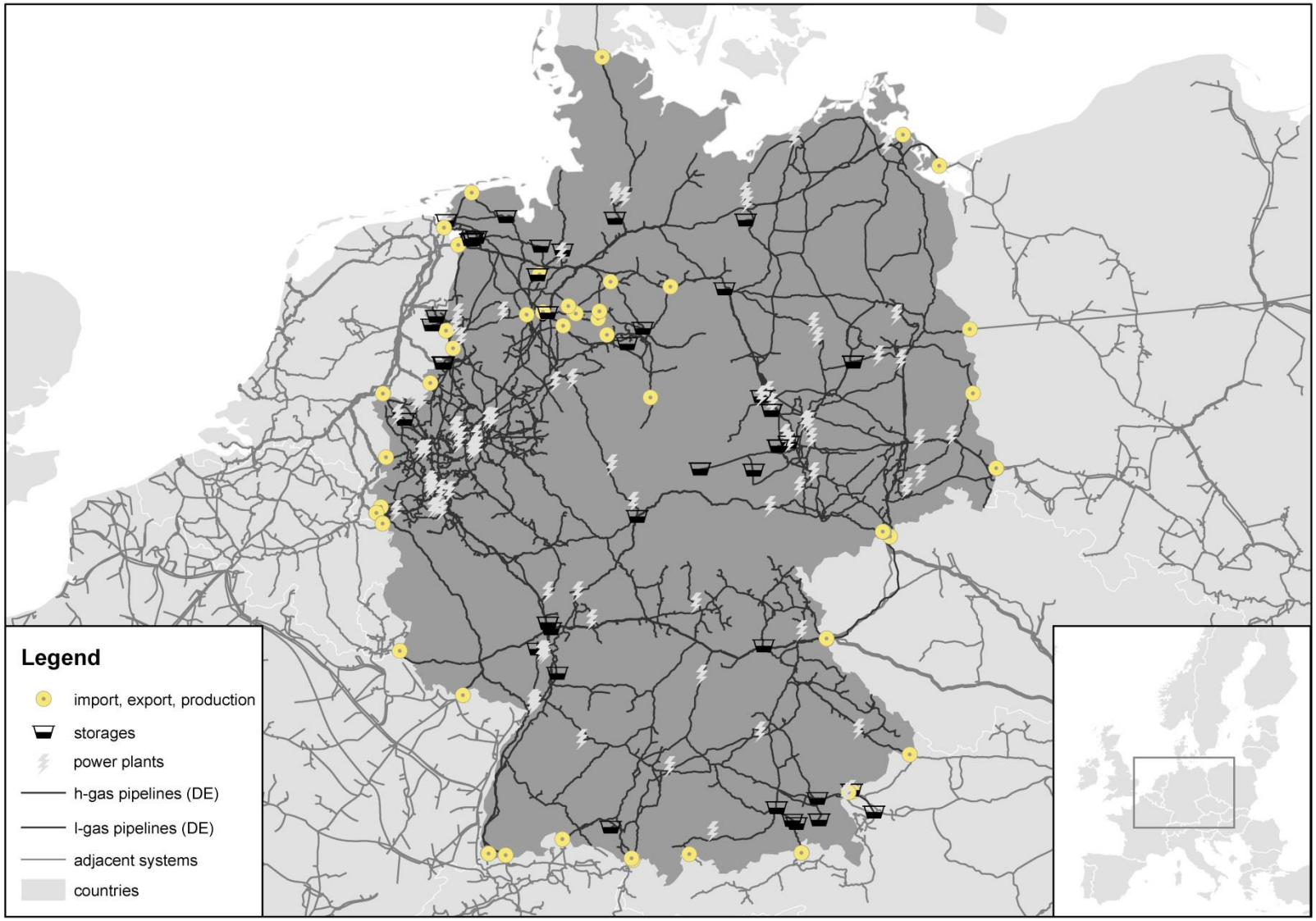


Regional granularity - raster data

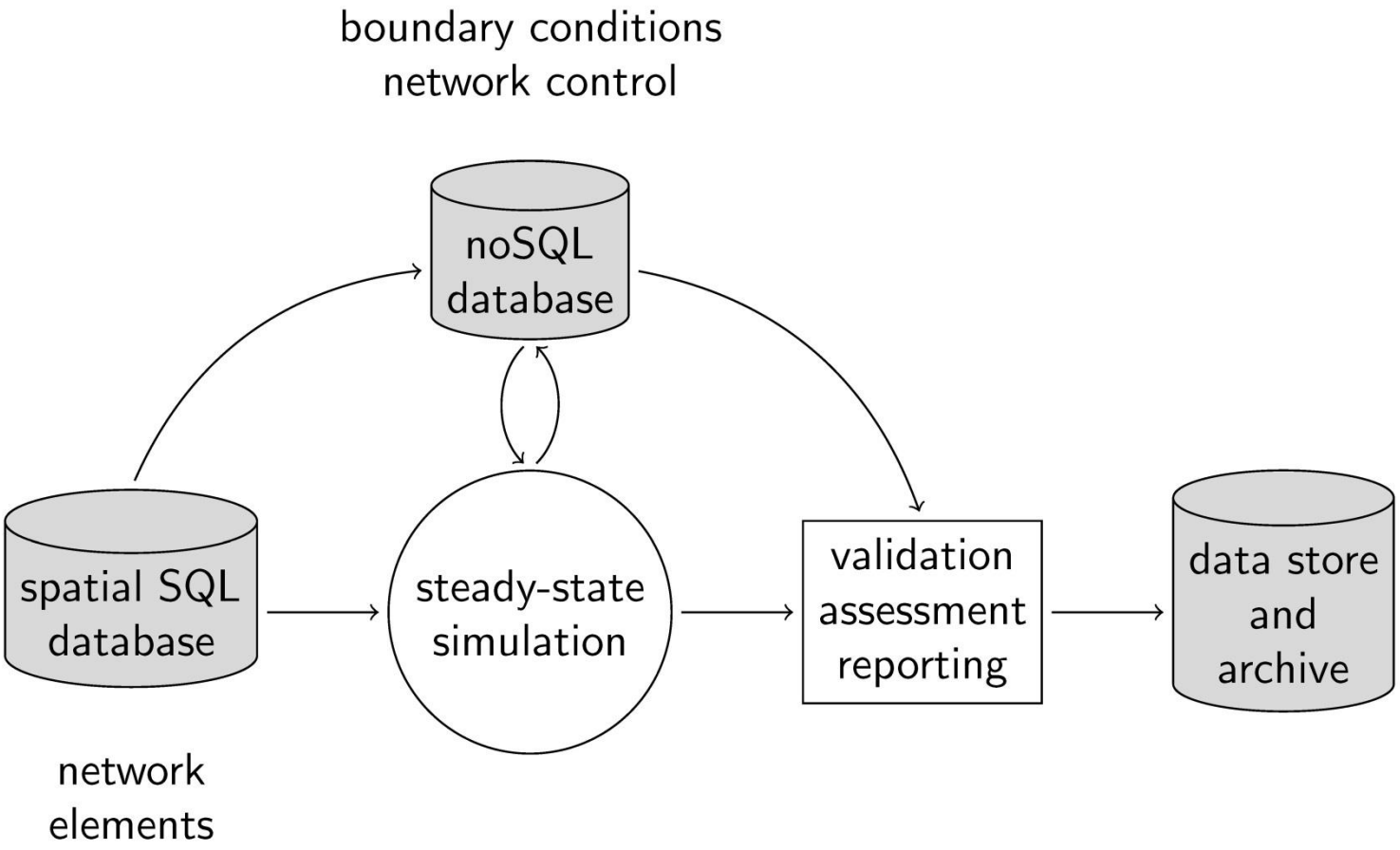




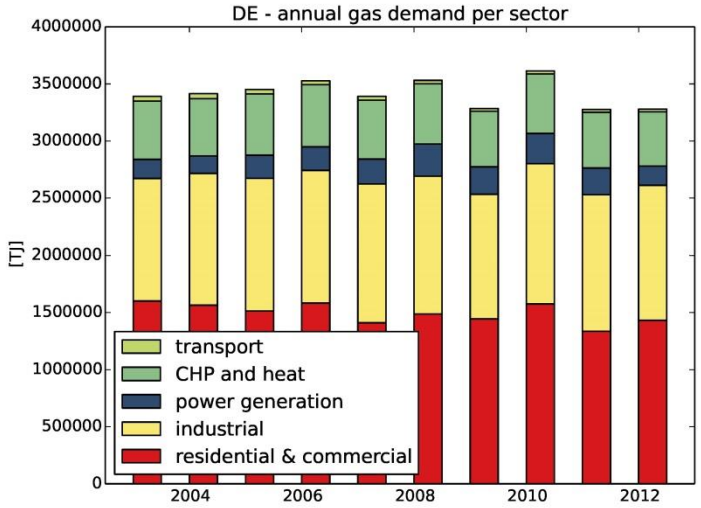
Gas transport model - selected elements

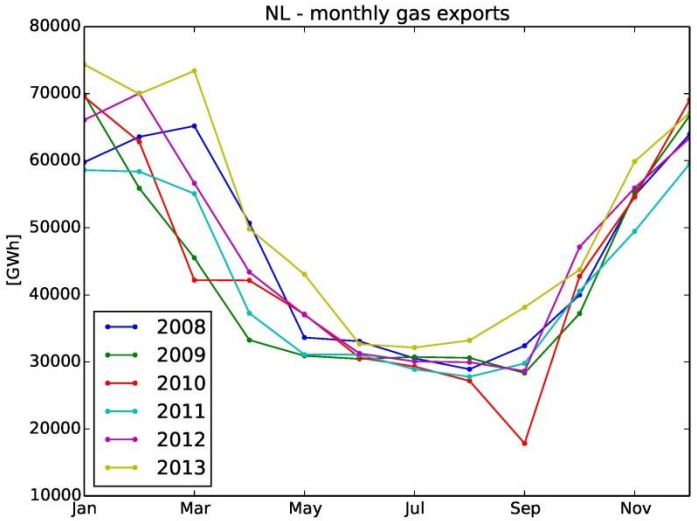


Gas transport simulation - overview

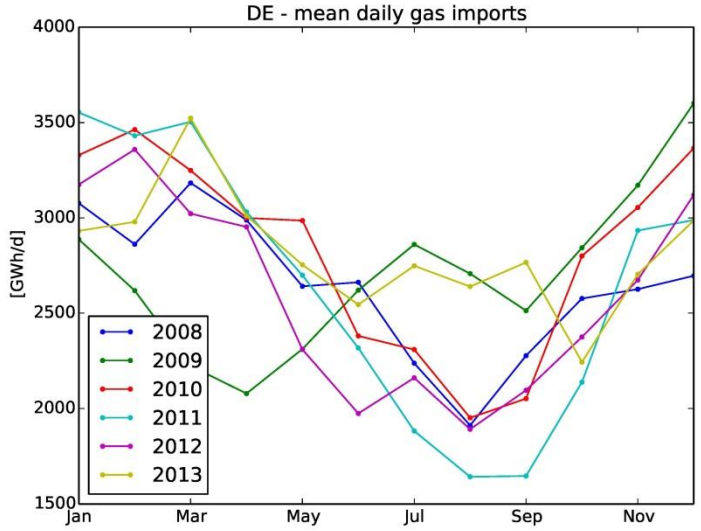


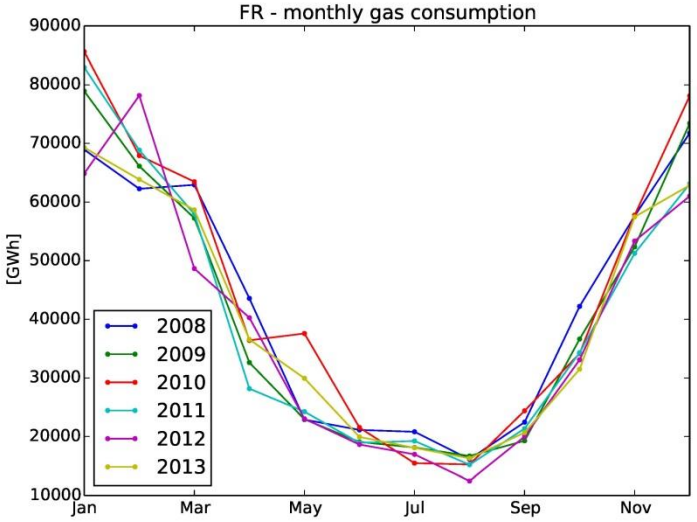
Regional flow - historical data





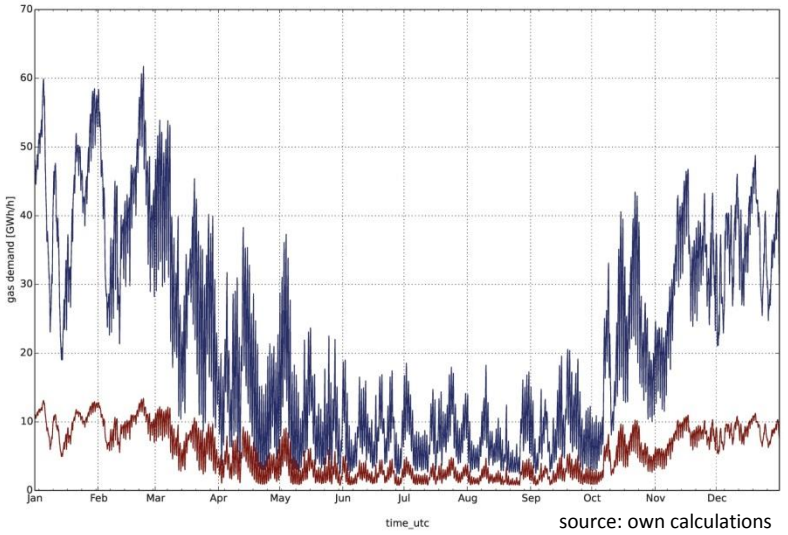
sources: own analysis, based on Eurostat



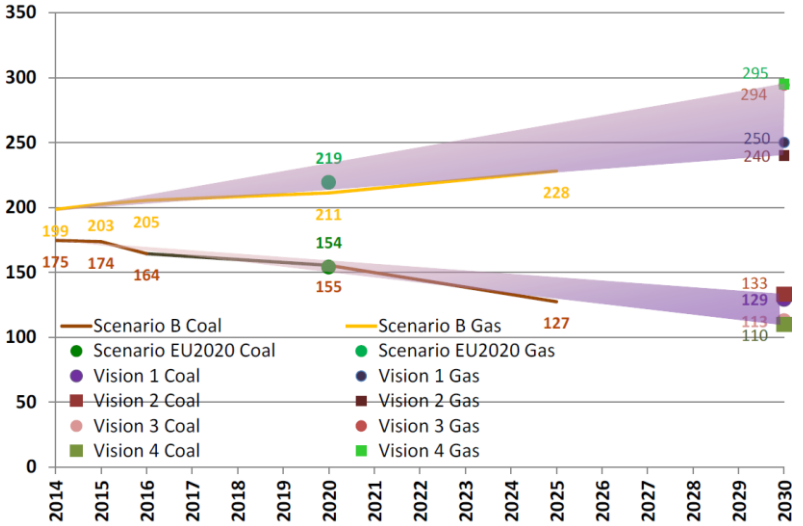


Modeling pressure and flow – temporal resolution

- historical data and projections
- regional demand based on structural data, e.g.
  - population, residential structure,
  - regional gross value (GDP), …
- different customer types and standardized load profiles for hourly load (8760 h/a)
- allocation of regional demand
- direct allocation of essential customers, e.g. power generation, district heating and industry
- specific pressure boundaries at import points, gas production and storages



source: own calculations



source: ENTSO-E

Summary and outlook

- assessment of gas transport infrastructure in high spatial and temporal resolution
- pressure and flow conditions are estimated via steady-state simulation
- model status fits to existing electricity transmission and market models
- current application in public funded research project

→ close modeling of transmission infrastructures, gas network and electricity grid (soft-link)

→ possible scenarios about future electricity supply and impact on gas infrastructure can be taken into account

→ realistic assessment of electricity storage demand and power-to-gas potential feasible

Backup