

NEW 4.0

Norddeutsche EnergieWende



Gefördert durch:



aufgrund eines Beschlusses
des Deutschen Bundestages

www.new4-0.de

Northern German Energy Transition New 4.0 - 100% Renewables in Northern Germany

Prof. Dr. – Ing. Hans Schäfers 
October 5, 2017, Sonderborg, 100% Climate Neutrality

Energy situation of the Hamburg /Schleswig-Holstein region



4.5 Mio.
residents

Schleswig-Holstein as a region of production, Hamburg as region of consumption, 36 000 RES installed

Industry hub in Hamburg,
huge potential of
flexibilization



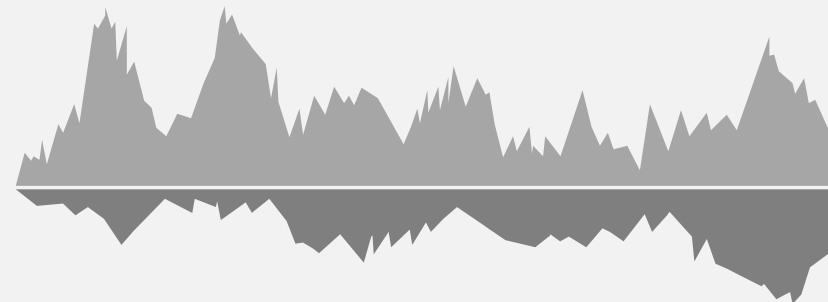
Wind energy production will
be quadrupled by 2035,
three times more compared
to electricity demand



Interconnector: Energy hub
north-Europe: Southlink,
northlink, west-coast-link,
offshore windfarms



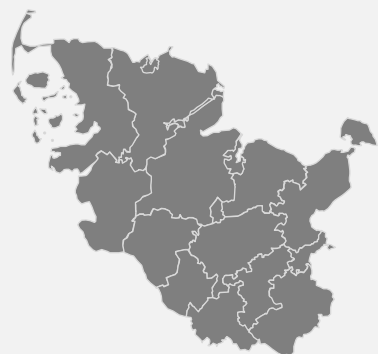
Disparities: extreme and increasing disparities between
production and load needs to be managed.



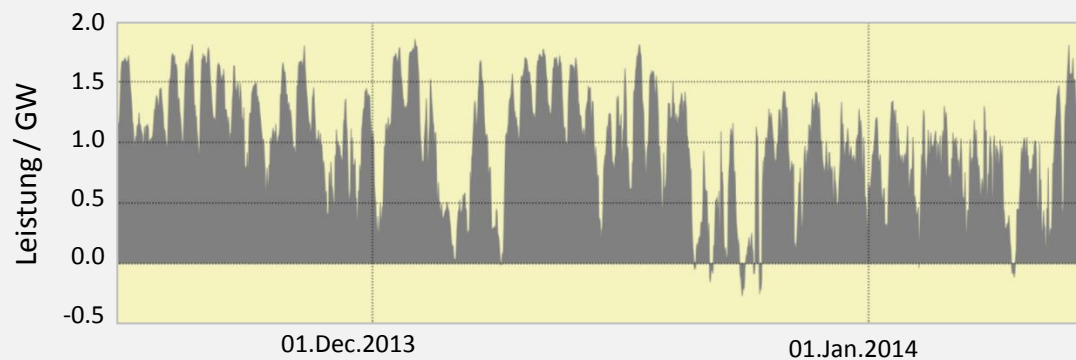
The model region provides representative the main challenges of the energy transition

Profile of the residual loads in the model region

Model region today:



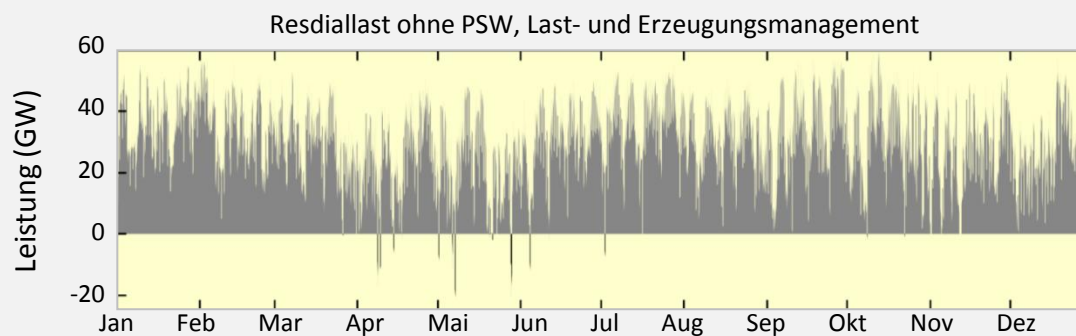
Fluctuation as expected for germany in 2020



Germany 2020:



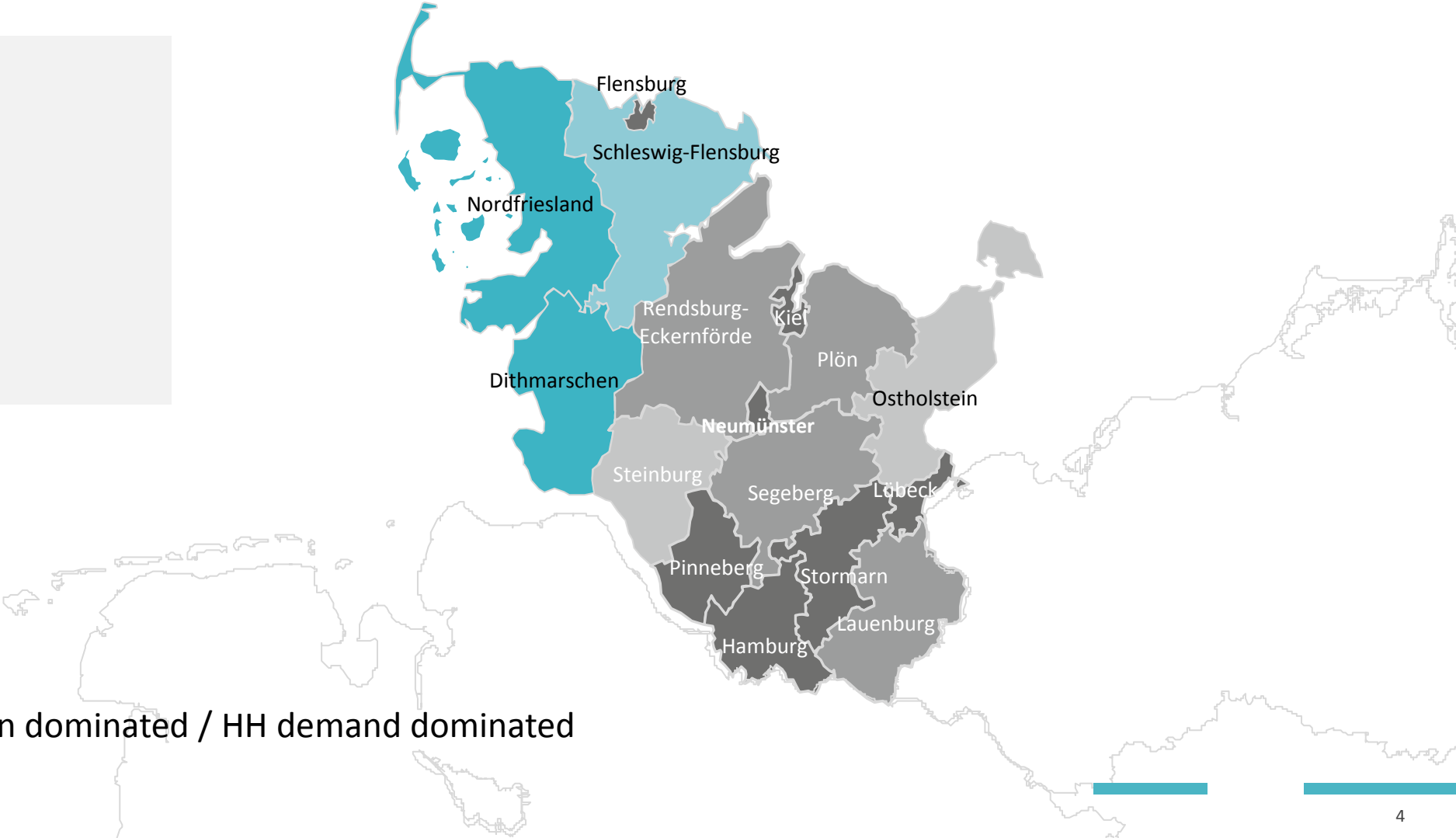
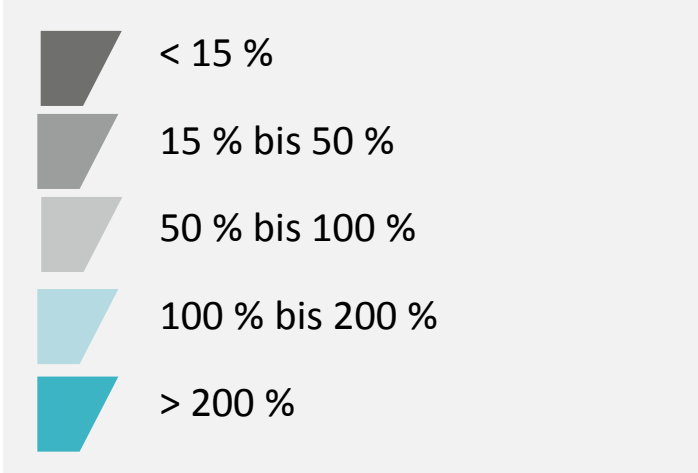
Sim. Of the fluctuation of the residual load for Germany in 2020



Quelle: Fraunhofer IWES / HAW Hamburg (Grundlage Wetterjahr 2007)

Share of Electricity from RES in Model Region

Share of RES in gross electricity generation



SH generation dominated / HH demand dominated

Rise of Grid Congestion in the model Region

➤ Congestion Management in 2015 (only SH):

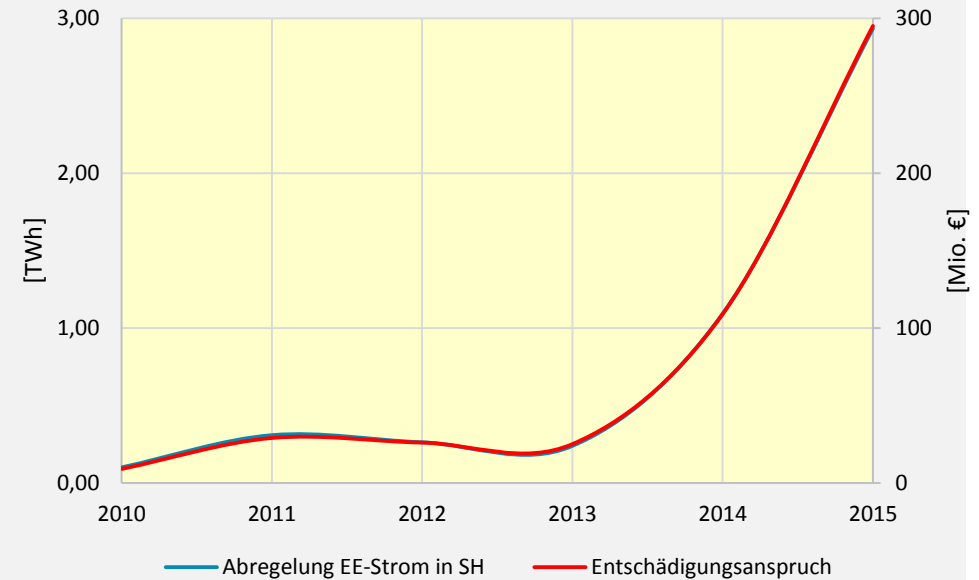
- ▶ Curtailed Energy: 2,9 TWh
- ▶ Compensation fees: 295 Mio. €
- ▶ Share in Elec. Gen. In SH: 14,4 %

➤ Cost of further Redispatch (z.B. Redispatch):

- ▶ Approx.. 200 Mio. € (2015 BA Tennet)

➤ Total Costs for System Stabilization:

- ▶ Approx.. 500 Mio. € /a → approx 2 bill. € during the project duration



Transformation of the Energy System



Goals 2035:

- Reliable, cost efficient, environmentally friendly supply of energy
- 100 % RE electricity supply, 50 % heat & mobility, 80 % CO₂ reduction



Conditions:

cost-efficiency,
market-oriented



security of supply,
system stability

De-carbonisation,
reducing CO₂ emissions



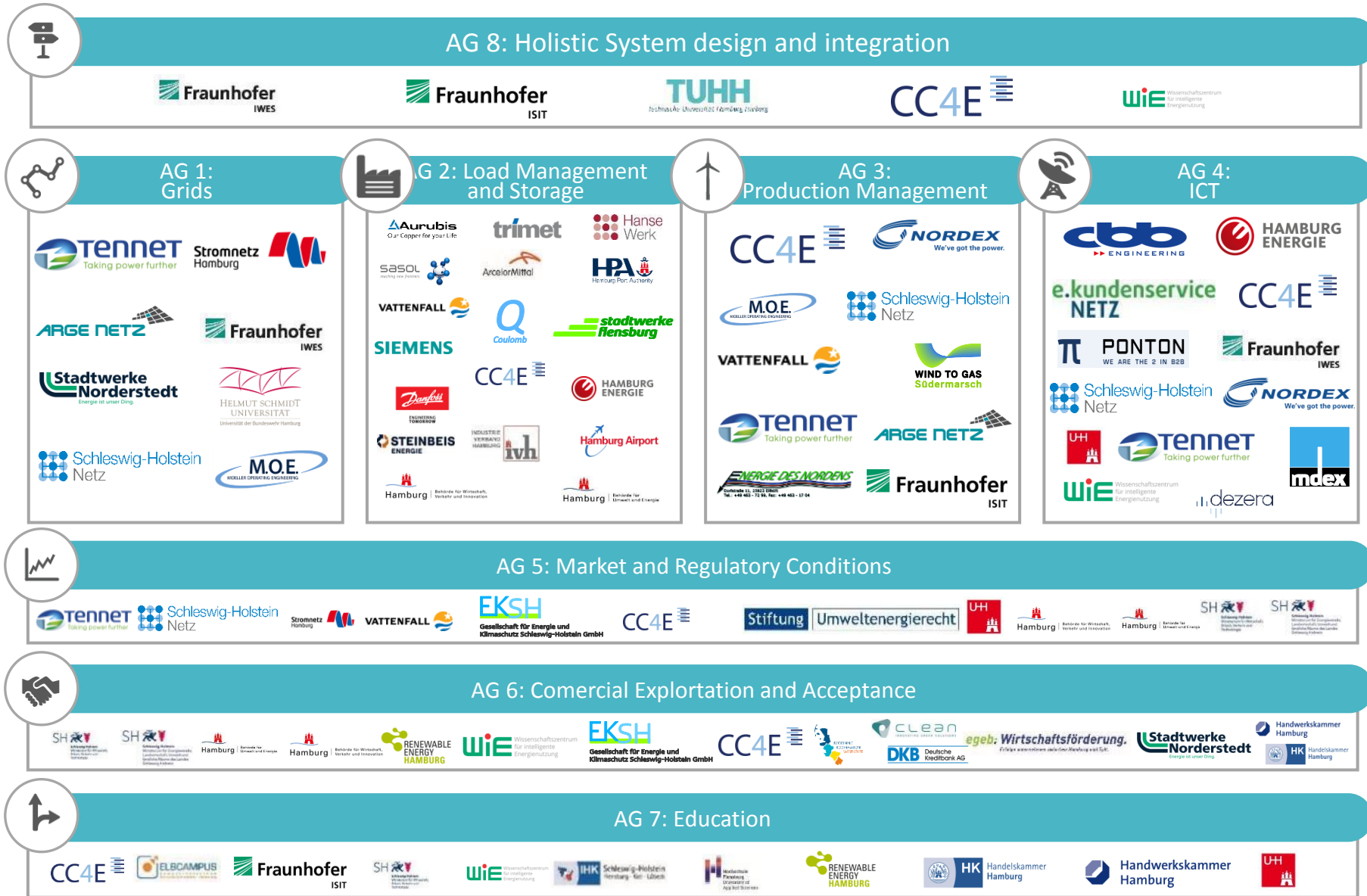
Effects:

Providing stimulations for innovations, new technologies, new markets and value chains, strengthening competitiveness, social acceptance and feasibility of the energy transition

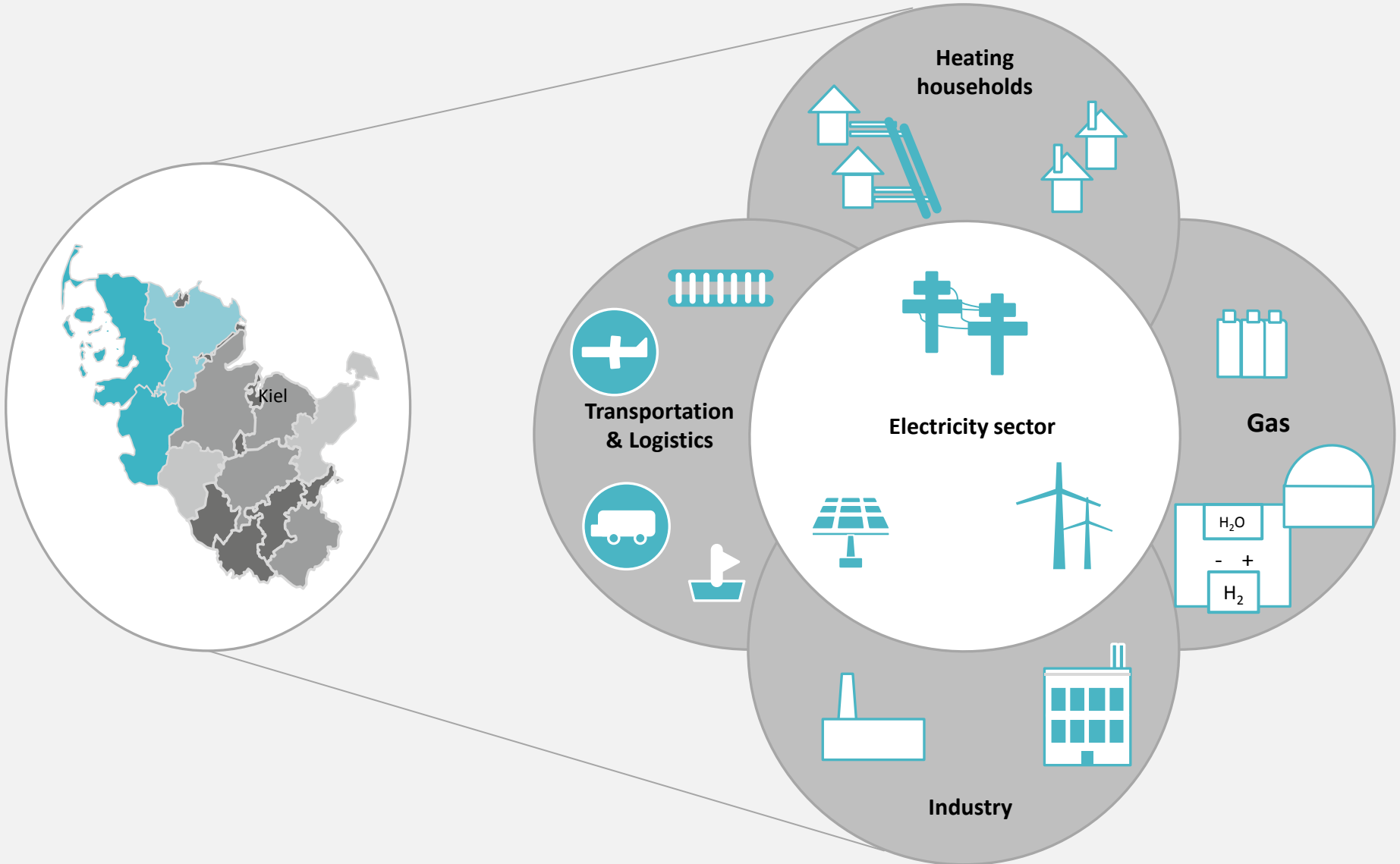
Partners



60 Partners & project structure

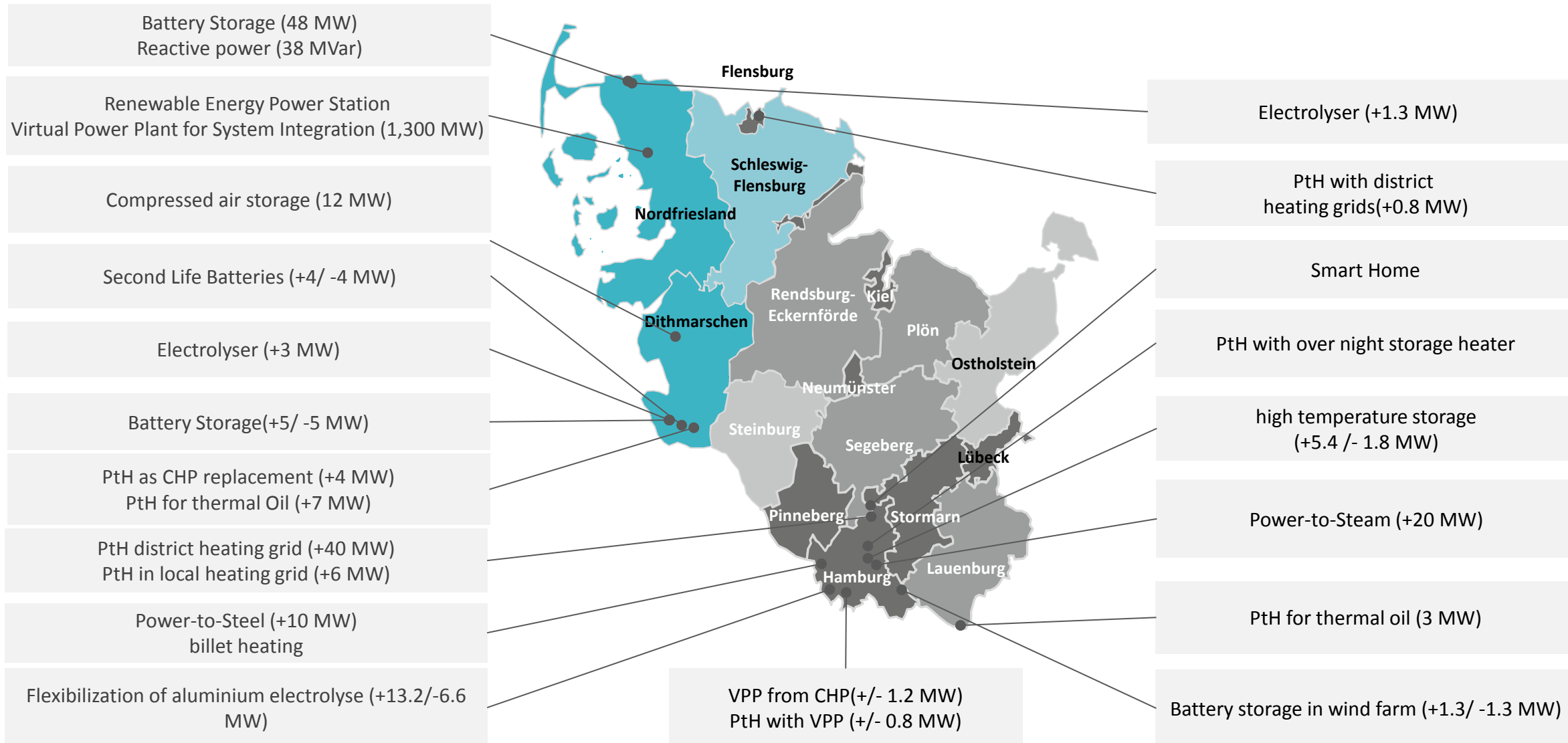


Sector linkage NEW 4.0 – Coupling of all life areas with RE



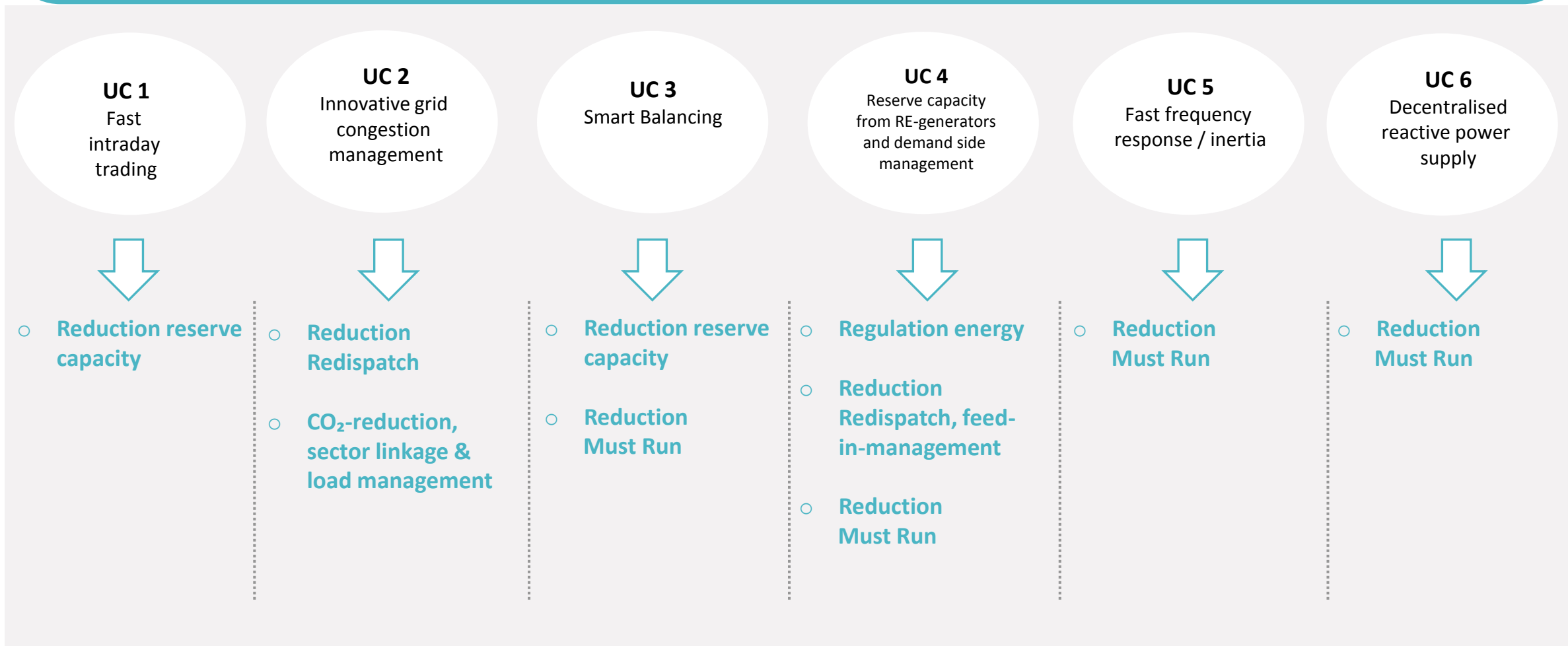
Strong network of demonstrators

300 MW flexibility, storage, 1,600 MW virtual power plants



6 Use Cases with climate change protection potentials

Reduction CO₂/conventional production Tasks of RE und flexibilization



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Thank you for your attention

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