

PLANNING THE DISTRIBUTION SYSTEM DEVELOPMENT WITH A PROPER COORDINATION OF TSO AND DSO (RT5b)



Frankfurt, 08.06.2011

Successful integration of rapidly growing infeed of renewable energy requires integrated TSO and DSO network planning

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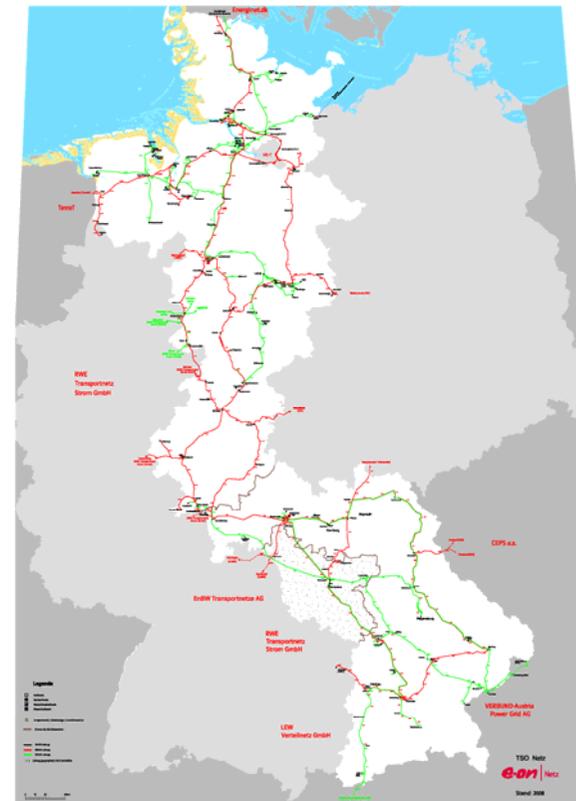
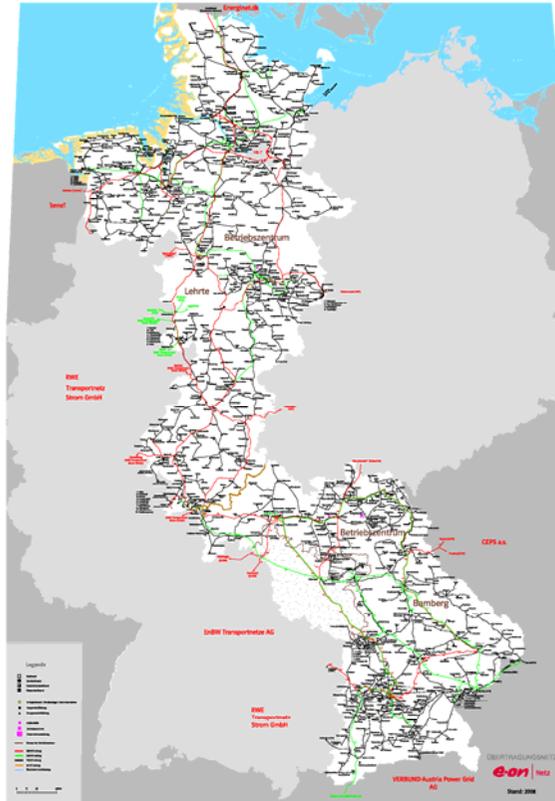
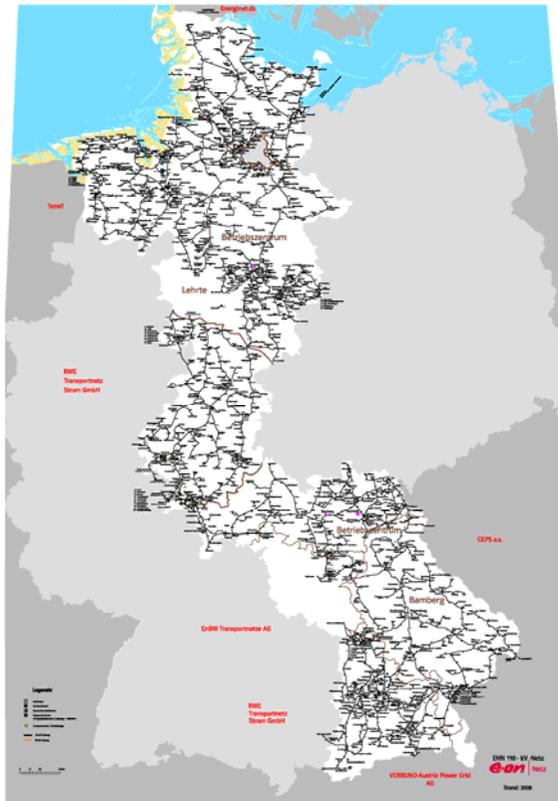
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E.ON Netz: 110-kV grid-operator since the separation of TSO in 2009

E.ON Netz
110 kV

2009
110 kV - 380/220 kV

TSO
380/220 kV

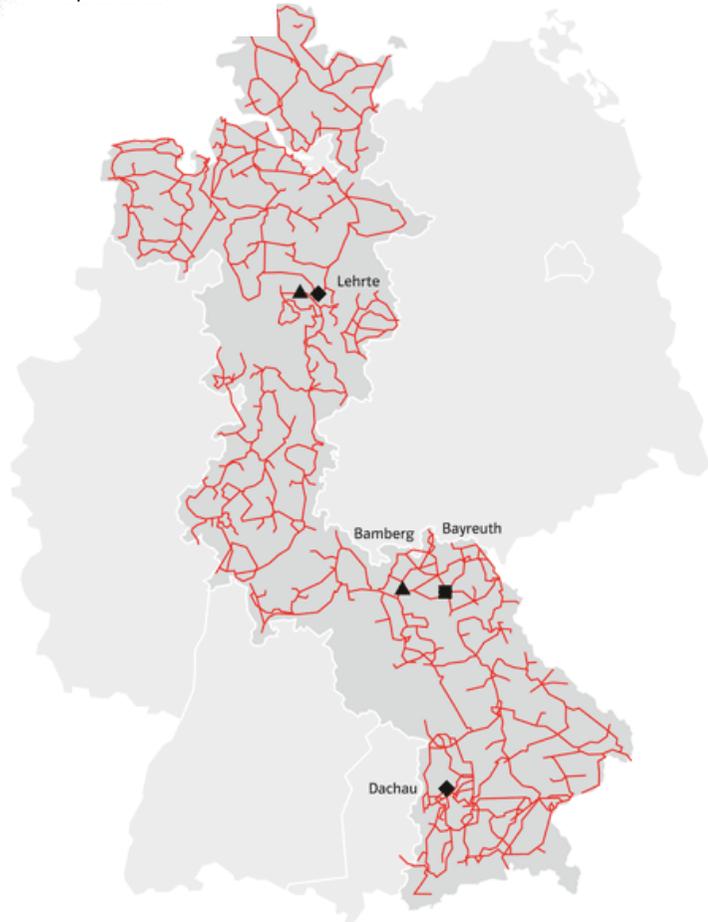




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The national distribution network of E.ON Netz

- Company management
- ▲ Service center
- ◆ Grid operation control center



E.ON-Netz – Fact Sheet

Substations: approx. 900

E.ON Netz / TenneT Substations: approx. 90

National distribution system operator

190 customers

Connections to other DSO

Integration of renewable energy

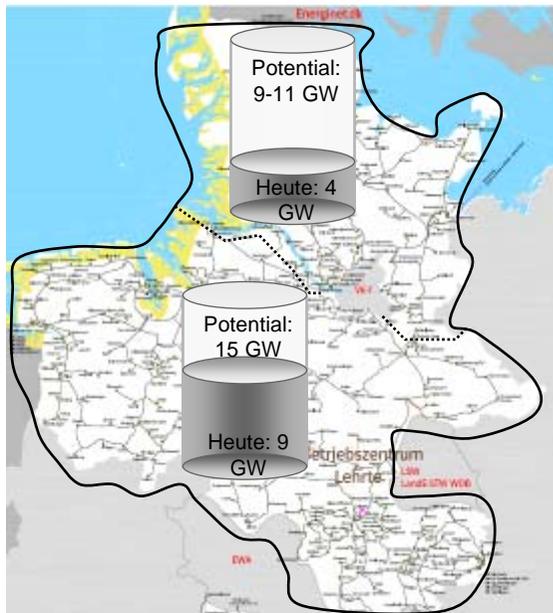
Employees: approx. 850

Area: approx. 140.000 km²

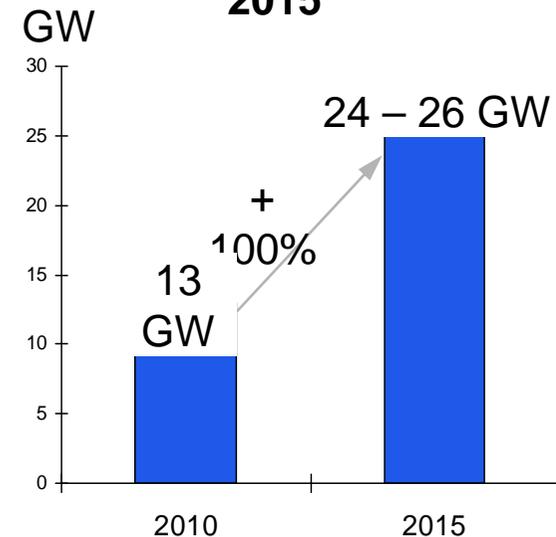
Line length (110 kV): approx. 22.000 km

Challenges (1)

- Nearly half of the electricity generated by wind in Germany enters the E.ON Netz territory
- Focus northern Germany: Doubling of renewable infeed by 2015 forecasted
- Expansion of renewable infeed requires synchronized grid expansion



E.ON Netz forecast for additional infeed of renewable energy until 2015

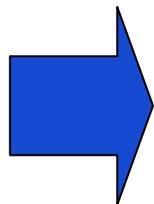




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Challenges (2)

- ❑ Distribution systems become “collection” systems
- ❑ Schleswig Holstein: Distribution system designed for 3000 MW load, renewable energy infeed: 9000 MW is committed scenario for 2015
- ❑ Installation of renewable energy generation in LV/MV distribution systems
- ❑ Regional balance between load and infeed by expanding high voltage distribution grids
- ❑ Surplus infeed requires new TSO - DSO interfaces (substations)
- ❑ Nationwide / European Transportation by TSO

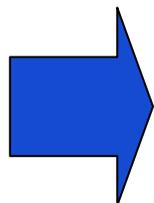
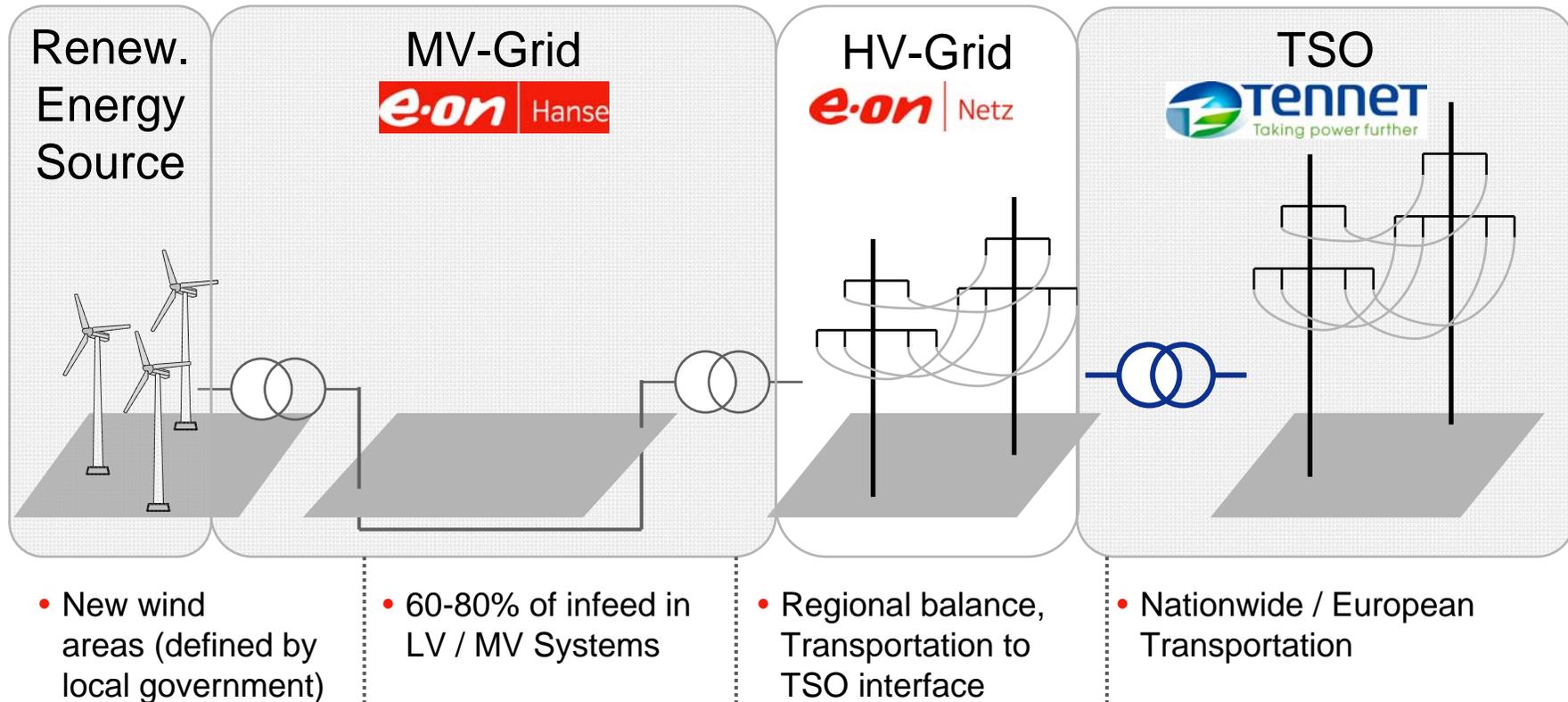


Successful Integration of renewable energy requires DSO – TSO Coordination



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DSO – TSO Coordination in Schleswig Holstein

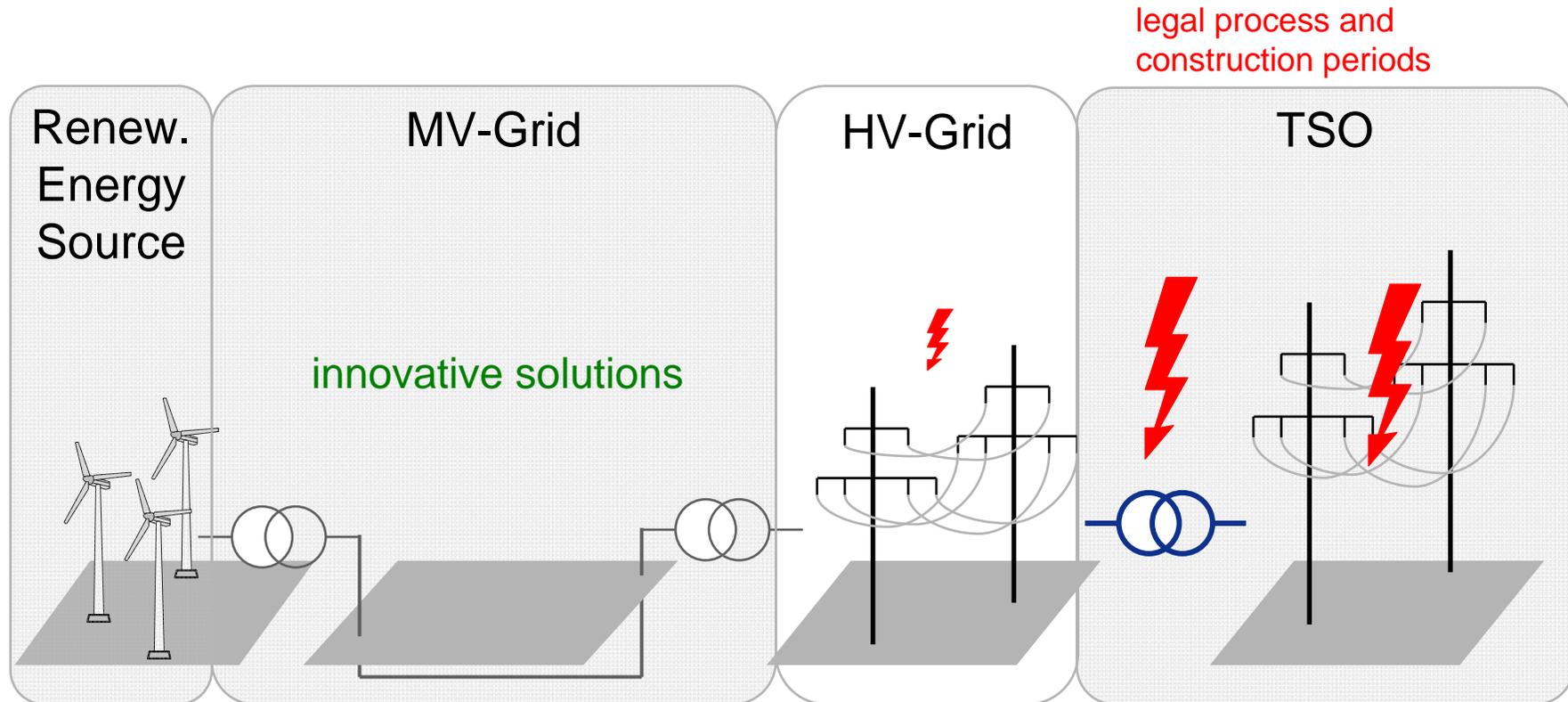


Long Term effects of legal process for construction of HV / EHV lines and construction periods for HV / EHV Substations require sustainable coordinated planning

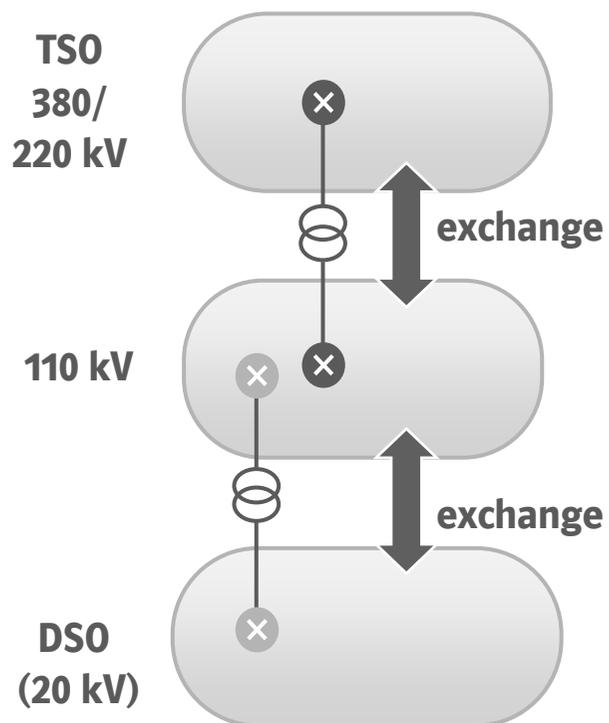


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Delay of HV / EHV network expansion increases risk of shutdown of installed renewable capacities (EISMAN)



DSO-TSO Information Exchange



1

Legal background



On which legal basis?

2.1

Information
exchanged



Which data is exchanged?

2.2

TSO - DSO
agreements



Exchange - how often?



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Legal Background: EnWG (German Energy Act)

§ 12 TSO Responsibilities:

...

(2) ... *TSOs* have to provide relevant information to guarantee secure and efficient operation coordinated expansion to *DSOs* and

...

(4) ... *DSOs* have to provide to *TSOs* (immediately on demand) relevant information to guarantee optimized operation, maintenance and expansion

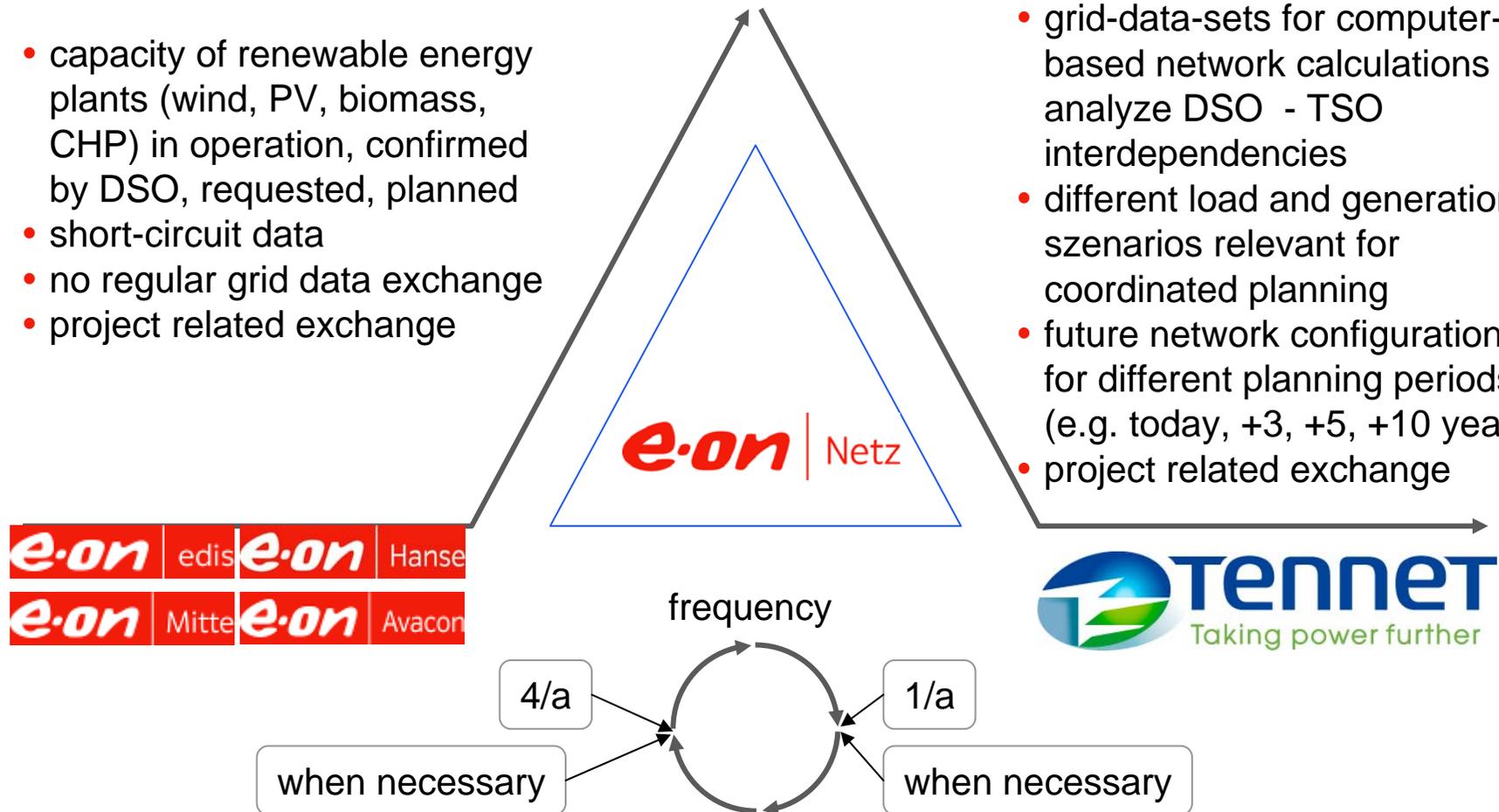


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Information Exchange based on bilateral agreements

- capacity of renewable energy plants (wind, PV, biomass, CHP) in operation, confirmed by DSO, requested, planned
- short-circuit data
- no regular grid data exchange
- project related exchange

- grid-data-sets for computer-based network calculations to analyze DSO - TSO interdependencies
- different load and generation szenarios relevant for coordinated planning
- future network configuration for different planning periods (e.g. today, +3, +5, +10 years)
- project related exchange





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What makes network integration of renewable energy successful

- ❑ Stable, politically confirmed forecast scenarios for renewable energy infeed (Regionalized; t+5 years and t+10 years)
- ❑ DSO – TSO coordinated network development scenarios
- ❑ DSO's / TSO's / Regulator's / Government's / other stakeholder's commitment to network development measures
- ❑ Coordination of renewable energy development and network development
- ❑ Regulatory framework for financing network development