The Renewables Case

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Large scale renewables integration requires close cooperation between TSOs
System Challenge on October 4th 2017
Grid situation of 50Hertz

Wind power (7:00 pm)
DE: ~18,3 GW
50Hertz: ~10,5 GW

Measures at 50Hertz (7:00 pm)
2,7 GW Redispatch
1,0 GW Countertrading
0,8 GW Renewables Curtailment

Large scale remedial actions would be impossible without cross border cooperation.
System challenge on October 4\textsuperscript{th} 2017
A normal windy day in Germany

Around noon on October 4\textsuperscript{th}, around 2/3 of the German load was covered by RES.
Grid situation on October 4th 2017 – 15h

Grid congestion could only be relieved by cross-border redispatch of up to 3.5 GW

Scheduled flows

Physical flows (after redispatch)

Planned Export of Germany: 12 GW

Realized Export of Germany: 8.5 GW

System operations are very much interlinked and have to cope with volatile power flows.
Grid congestion on October 4th 2017

- Results from TSC
  Day Ahead Congestion Forecast (1st run)
- Expected grid situation without remedial actions at 15h
- Distributed congestion on multiple lines

As multiple grid elements are congested at the same time, redispatch measures must be coordinated.
Challenges for the Transmission System

- The European grid was built neither for renewables nor for intense cross border trading
- Urgently required grid extension does not keep pace
- Loop flows complicate the situation and impact welfare allocation
- National system operations and electricity supply structures heavily influence the whole interconnected system
- Distributed generation and flexibility (e.g. redispatch) potential on distribution level have to be taken into account

- More and more cross border redispatch (MRAs) is needed
- Coordinated operations for phase shifting transformers needed
- More mid-term coordination needed (adequacy, switching, …)
50Hertz relies on efficient multilateral remedial actions coordination facilitated by TSC

- TSC provides a virtual control room based on sophisticated software for TSO operators
- This creates a common system view and makes impact of actions visible for all
- The virtual control room is based on merged grid data from all TSOs (DACF, IDCF)
- Joint security analysis has become successful daily routine and is continuously further improved
Outlook

- Further **enhancement of TSC** (five services to be fully implemented, further services to be identified and prioritized)
- Strong focus on **Capacity Calculation** required, new context with Flow Based Market Coupling in CORE region
- Tight **cooperation between TSC and Coreso** has been launched (target: act as one RSC for certain tasks!)
- **Cooperation between TSO and DSO** influencing requirements for services from TSC

- Further harmonization where supporting the EU market – allowing for local solutions where required for local differences. The common market must not be jeopardized!
- Strengthen the service provider role – not messing up responsibilities and liabilities!