Power System Stability
Key Messages

Workshop „Renewables Grid Initiative“, Berlin

Plan, prepare, perform: Best practices for operating the system with high shares of renewables

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The power system is designed and planned to be robust against disturbances –

to solely consider the normal state is inadequate in power system planning!

Very high shares of RES and a progressive coal phase out are possible … but some challenges have to be mastered

- System supporting RES integration (by further development and national implementation of European grid codes) needs to be considered and done now to make it happen without endangering the system

- A stable system behavior during severe system disturbances is the main challenge

- Prior implementation of the proposed coordinated set of measures is necessary to solve them - requiring both political and public support

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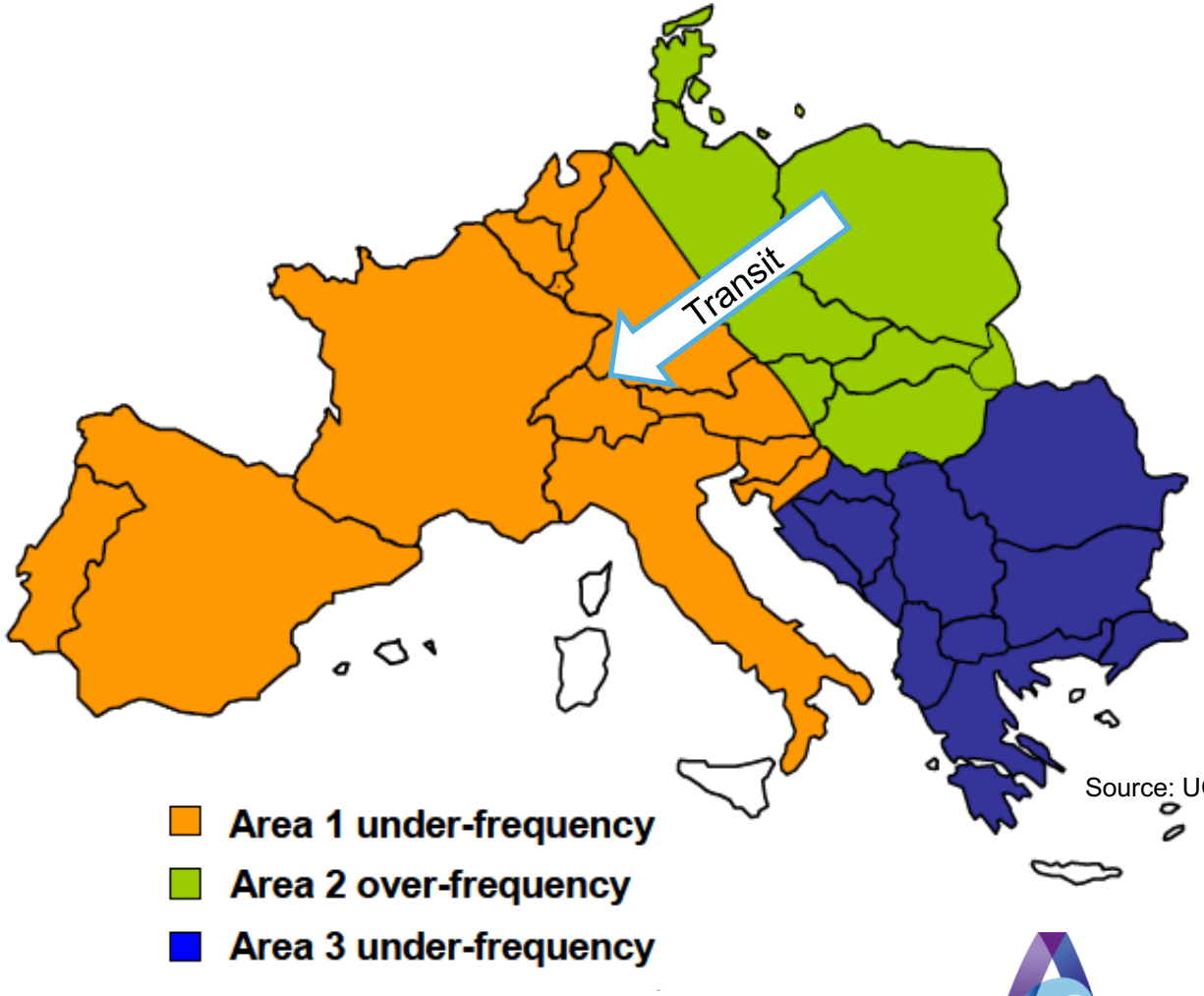
Today, we wouldn‘t master the 2006 System Split scenario

Power system transformation since 2006

- Small-sized renewable generation at different locations
- Substitution of conventional power plants
- Highly utilized transmission grid

- Germany would be highly affected in case of System Split scenario (Central Europe)



Source: UCTE Final Report

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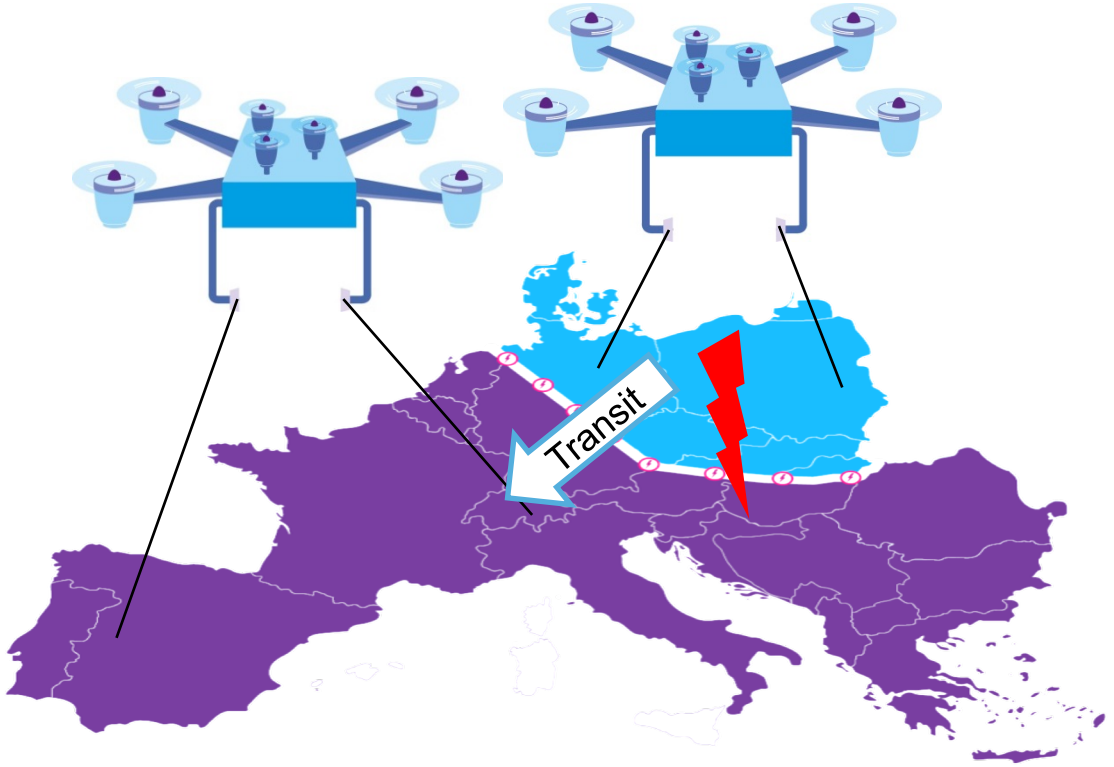
A System Split occurs, …

… if an area is fully separated following a major disturbance.

- Instantaneous reaction of the small-sized renewable generation units is very important
- Mastering the major disturbance depends on:

➢ Power exchange with neighbouring areas prior to separation

➢ System inertia within separated areas



Analogy drone – System Split
Each drone represents one area.
As long as areas are interconnected, total demand can be met by all drones all together.

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Power system stability ensures the ability to take remedial actions following major disturbances

Stability of the system is a consequence of the behaviour of connected network users (sub-systems):

Overall system can only be stable, if sub-systems are stable

- Every network user should contribute to system stability
- Defined rules (Grid Codes)
  as well as checking the compliance is necessary

Quelle: FNN

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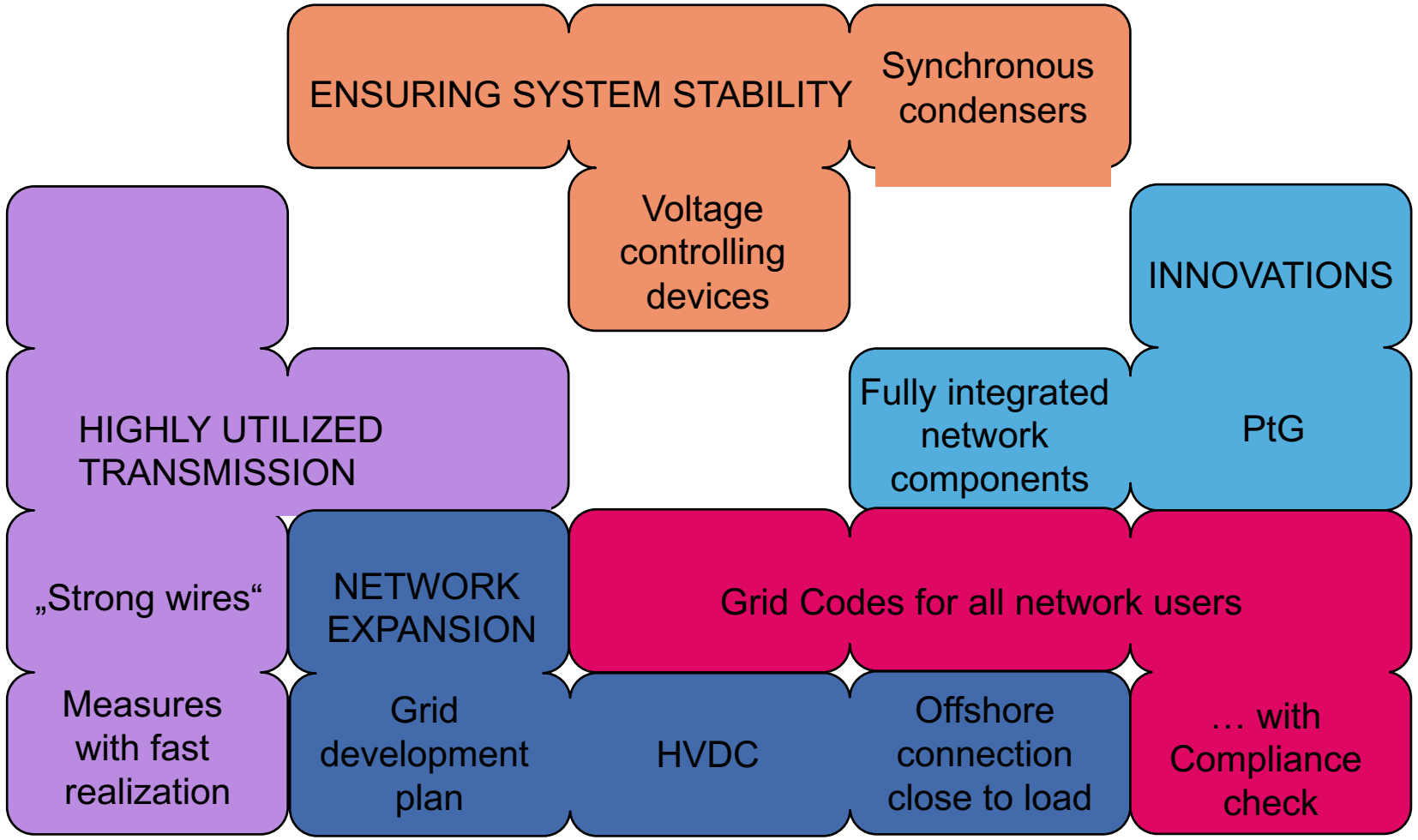
All building blocks are essential for today‘s !**and**! future energy system



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