



Bundesnetzagentur

# Flexibility in the electricity system: an overview

Dr. Christine Müller, Economic Advisor

Flexibilität für die Energiewende

Paris, 27.09.2018



[www.bundesnetzagentur.de](http://www.bundesnetzagentur.de)

# Agenda



Flexibility from different perspectives  
Focus: Grid flexibility at the DSO level  
Conclusions

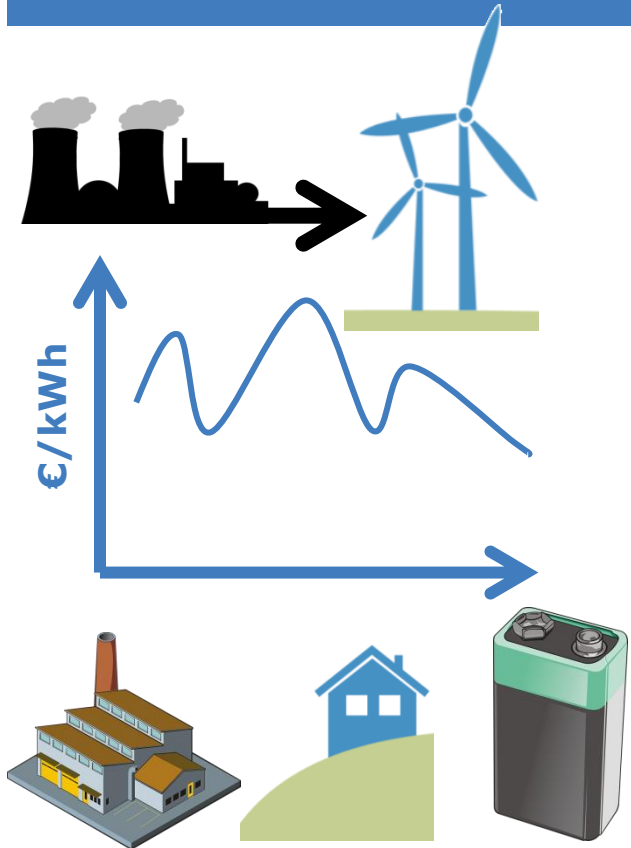


market perspective

grid perspective



## market perspective



No lack of flexibility.

Importance of a  
level-playing-field.

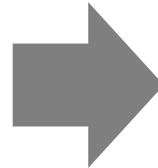
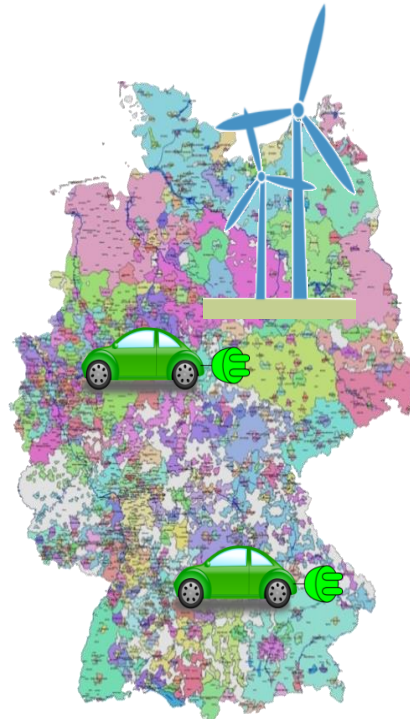
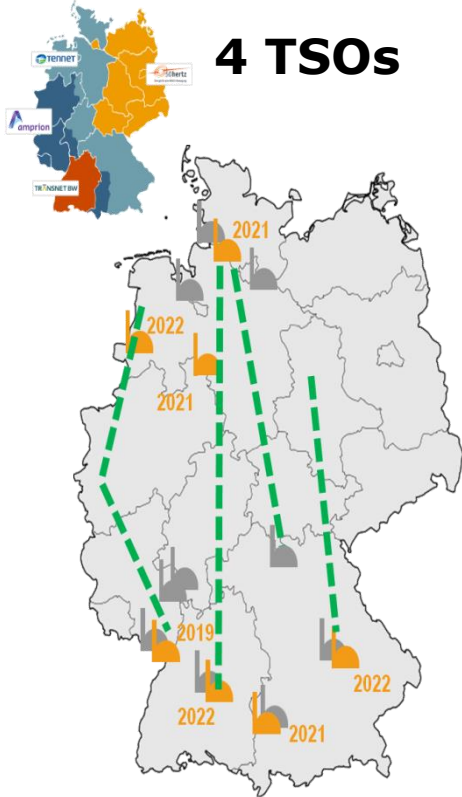
Quelle Windrad und Haus: [https://www.netzausbau.de/SharedDocs/Downloads/DE/Publikationen/Poster\\_BFP\\_worum\\_gehts.pdf?\\_\\_blob=publicationFile](https://www.netzausbau.de/SharedDocs/Downloads/DE/Publikationen/Poster_BFP_worum_gehts.pdf?__blob=publicationFile)  
Quelle Kraftwerk: <https://pixabay.com/de/silhouette-atomkraftwerk-akw-1311985/>  
Quelle Batterie: <https://pixabay.com/de/stock-batterie-adobe-3323975/>  
Quelle Elektroauto: <https://pixabay.com/de/eco-friendly-elektrofahrzeug-149801/>  
Quelle Industrie: <https://pixabay.com/de/fabrik-adobe-adobe-photoshop-3323977/>



## grid perspective

**4 TSOs**

**> 880 DSOs**

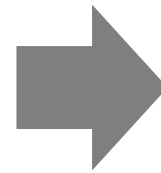
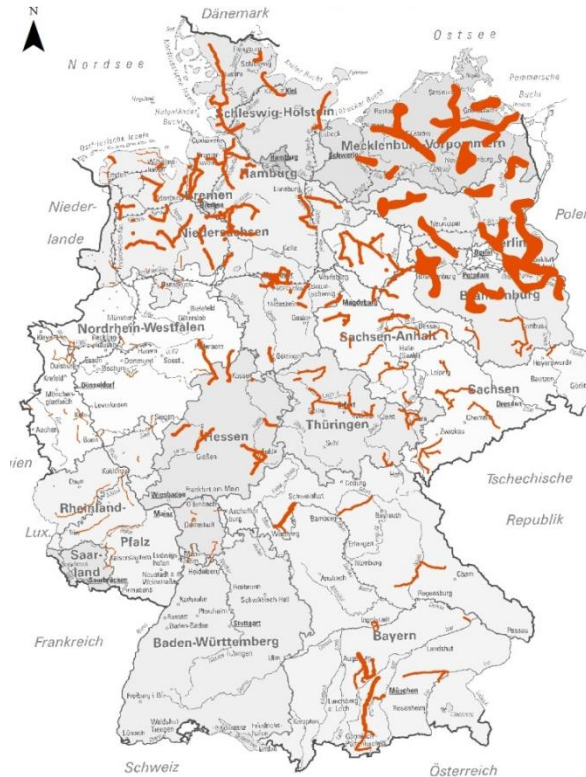


Grid expansion is the remedy of choice.

But: there may be phases in individual networks when/where network capacity is not (yet) sufficient. Here, congestion arises and temporarily requires grid flexibility.

Quelle Windrad und Haus: [https://www.netzausbau.de/SharedDocs/Downloads/DE/Publikationen/Poster\\_BFP\\_worum\\_gehts.pdf?\\_\\_blob=publicationFile](https://www.netzausbau.de/SharedDocs/Downloads/DE/Publikationen/Poster_BFP_worum_gehts.pdf?__blob=publicationFile)  
Quelle Kraftwerk: <https://pixabay.com/de/silhouetten-atomkraftwerk-akw-1311985/>  
Quelle Batterie: <https://pixabay.com/de/black-batterie-adobe-3323975/>  
Quelle Elektroauto: <https://pixabay.com/de/eco-friendly-elektrofahrzeug-149801/>  
Quelle Industrie: <https://pixabay.com/de/fabrik-adobe-adobe-photoshop-3323977/>

## grid perspective



Take heterogeneity into account.  
Thorough analysis of the actual need of grid flexibility.





generation-driven  
congestion



load-driven  
congestion



generation-driven  
congestion



curtailment of RES

alternative options:  
loads, storage\*



load-driven  
congestion



controllable loads

conditional vs.  
unconditional  
network use\*\*

\* see Bundesnetzagentur's Flexibility Paper for further details

\*\* to be discussed





- Prevent potential discrimination.
- All DSOs using grid flexibility must implement legal, informational and functional unbundling.
- No provision of grid flexibility from plants owned or operated by DSO (such as storage).
- DSOs may conclude a contract with a storage operator or other providers of grid flexibility.
- Contracts with third parties must be non-discriminatory and compliant with unbundling.
- A transparent and non discriminatory exchange of information is pivotal.



- Two issues with current regulatory approach:
  - Bias towards capital-intense solutions
  - Classification of costs for curtailment of renewables as non-controllable costs
- In our regulatory approach, we should strive towards a level-playing-field and technological neutrality.



No lack of flexibility in the market.  
Importance of a level-playing-field.

Situation at the network level is very heterogeneous. Thorough analysis of the actual need of grid flexibility. No aim by itself.

Differentiate between generation and load driven situations where DSOs require grid flexibility (no "one size fits all-solutions").

Strong requirements on regulatory framework  
(unbundling, transparency).

Incentive regulation requires technological neutrality.



- Paper as input to structure the ongoing discussion on flexibility.
- Distinction: market perspective und network perspective
- Key questions:
  - Which parts of the electricity system require flexibility?
  - Where are obstacles to providing flexibility?
  - What are appropriate means to tap potential flexibility and which constraints should apply?
- 10 theses on flexibility.
- Download via Bundesnetzagentur's website



[https://www.bundesnetzagentur.de/EN/Areas/Energy/Companies/GridDevelopment/Flexibility/Flexibility\\_node.html](https://www.bundesnetzagentur.de/EN/Areas/Energy/Companies/GridDevelopment/Flexibility/Flexibility_node.html)



# Thank you for your attention.

Dr. Christine Müller  
Economic Advisor

+49 228 14 5727  
[christine.mueller@bnetza.de](mailto:christine.mueller@bnetza.de)