

Stefan Mischinger, 03.11.2017, Berlin

FLEXIBILITY FOR MARKETS AND GRIDS – RESULTS OF THE DENA-NETZFLEX-STUDY



AGENDA

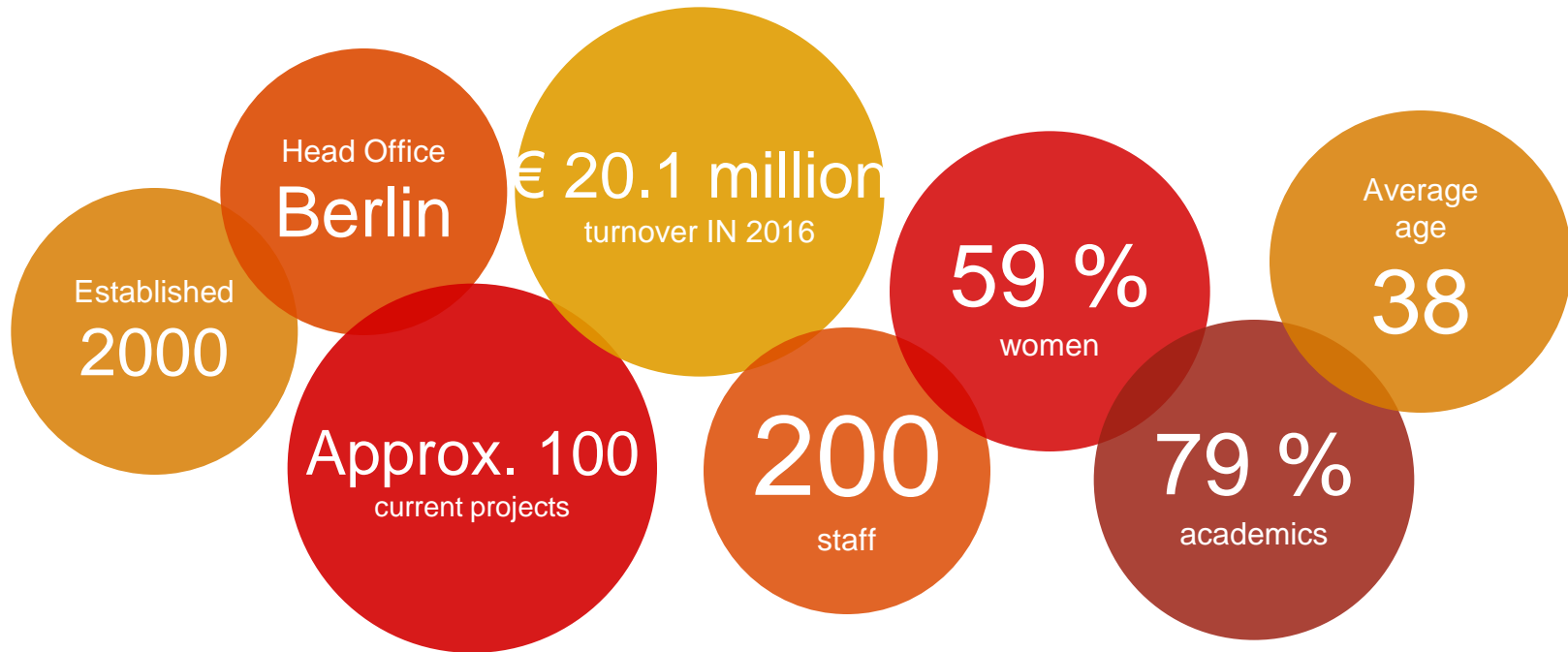


- **THE GERMAN ENERGY AGENCY**
- **CHANGES IN THE GERMAN ELECTRICITY SYSTEM**
- **POTENTIALS AND CHALLENGES FOR MARKET- AND GRID-FRIENDLY USE OF FLEXIBILITIES**

WE'RE MAKING THE ENERGY TRANSITION HAPPEN

- **Centre of Expertise**
for energy efficiency, renewable energy sources and intelligent energy systems
- **Intermediary**
between politics, industry and science
- **Serves multiple ministries**
and is in constant dialogue with market stakeholders
- **With clear objectives:**
 - Support for the Federal Government in its energy policy strategy
 - Communication focusing on issues concerning end users and suppliers
 - Realisation of energy efficiency and renewable energy potential, including system integration

FACTS, FIGURES AND DATES



dena in dialogue in 2016:

- 6.5 million page visits on dena websites
- Distribution of 225,000 publications
- Over 3,400 printed articles and around 1,100 articles in online media
- Around 4,800 visitors to dena events

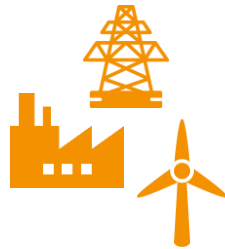
OUR FOUR PILLARS

ENERGY EFFICIENCY



Think tank and moderator for the establishment of the energy transition

INTELLIGENT ENERGY SYSTEMS



Integration, optimisation and think tank

STAKEHOLDER PROCESSES



Moderator at the interface between politics, commerce and society

INTERNATIONAL ACTIVITIES



Marketing the energy transition abroad

AGENDA

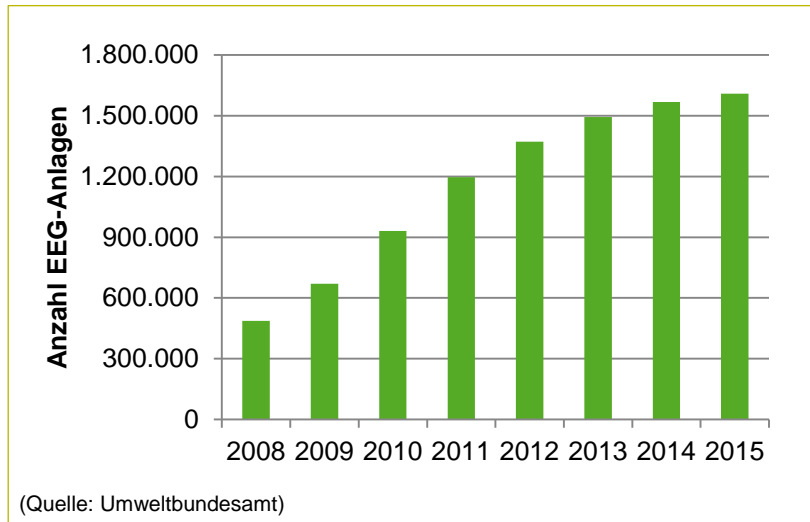


➤ **THE GERMAN ENERGY AGENCY**

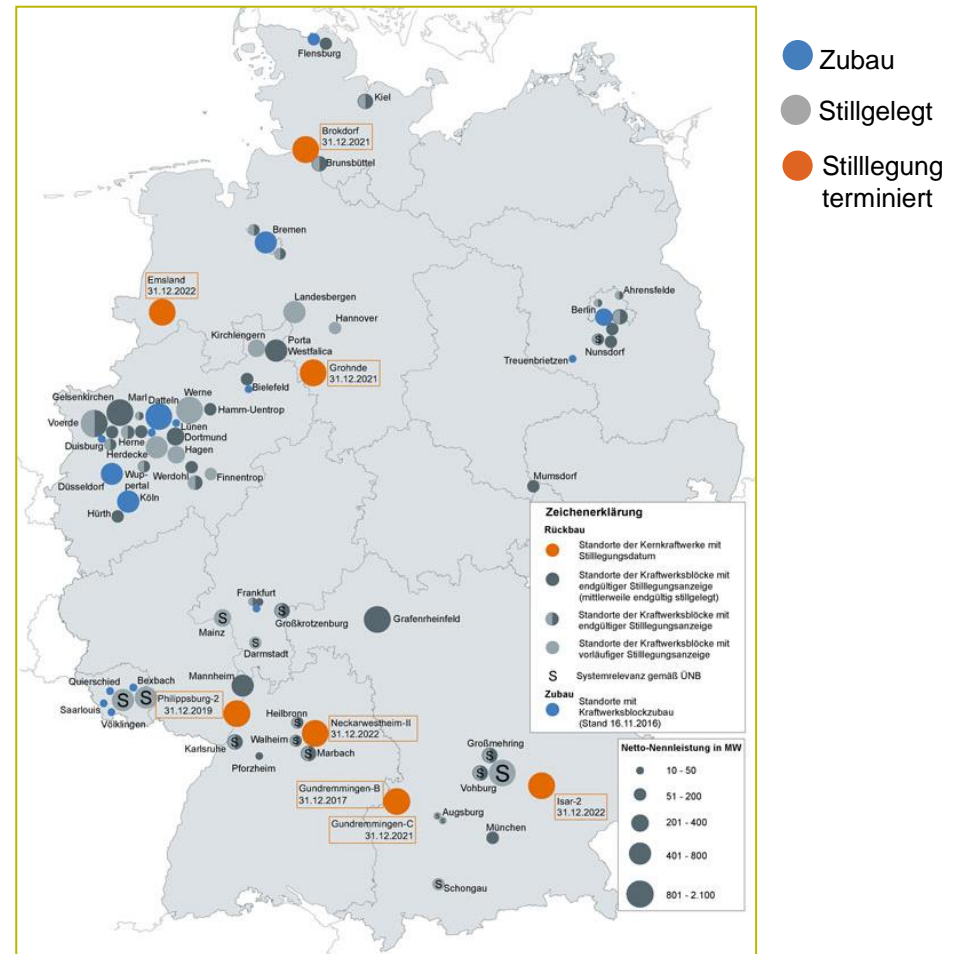
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CHANGES IN ELECTRICITY GENERATION DUE TO THE ENERGY TURNAROUND



- Since 2008, the number of renewable energy sources (RES) has quadrupled
- 95 % of the RES are connected to the distribution grid
- Decommissioning of conventional power plants is higher than the building of new blocks

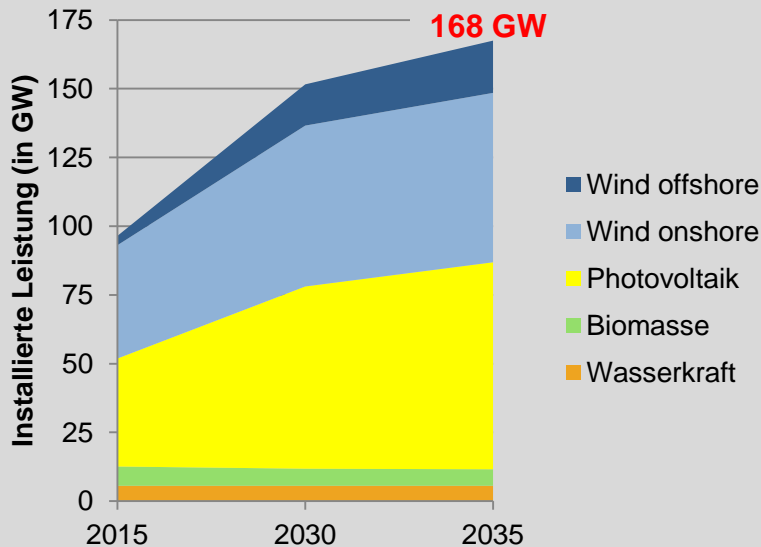


Quelle: BNetzA, Stand 20.02.2017

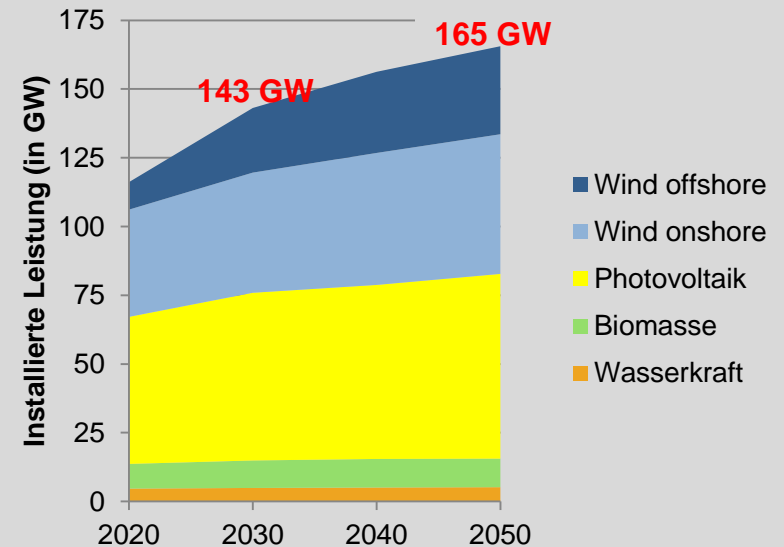
FUTURE ENERGY GENERATION IS INTERMITTENT AND DECENTRALIZED

- Today, 42 GW Photovoltaics, 45 GW Wind onshore and 4 GW offshore is connected to the German electricity grid
- In future, the installed capacity of RES will increase significantly

Entwicklung instal. Leistung EE gemäß Szenario B des Netzentwicklungsplan (Quelle: Netzentwicklungsplan 2017-2030)



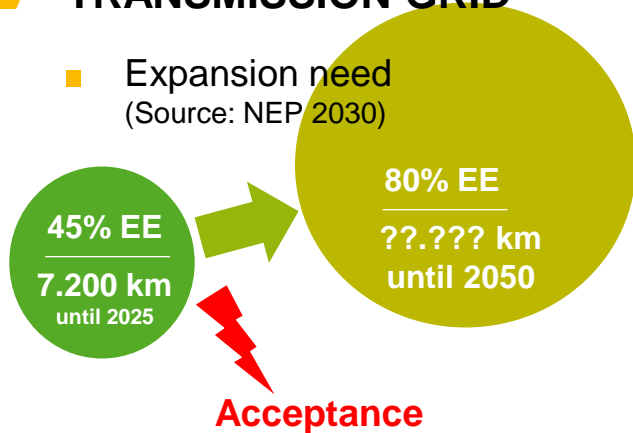
Entwicklung instal. Leistung EE gemäß Szenario 2011A der BMWi-Langfristszenarien (Quelle: Langfristszenarien, 2017)



INNOVATION IN GRID EXPANSION AND OPERATION IS NEEDED

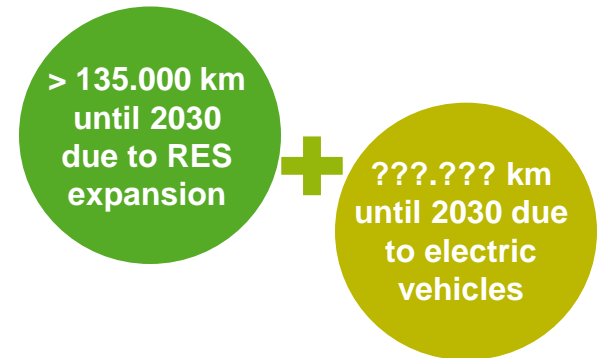
TRANSMISSION GRID

- Expansion need (Source: NEP 2030)



DISTRIBUTION GRID

- Expansion need (Source: dena-VNS)



Grid expansion

Grid operation

- Optimized usage of existing capacities needed
 - automatic system operation
 - active power flow management
 - curative n-1 criteria



- Optimized usage of existing capacities needed
 - DSO as aggregator
 - local balancing of loads and generation
 - ...

INCREASING FLEXIBILITY POTENTIALS IN THE ELECTRICITY GRID



18 large battery storages with total installed capacity of 128 MW in operation

Source: Büro F



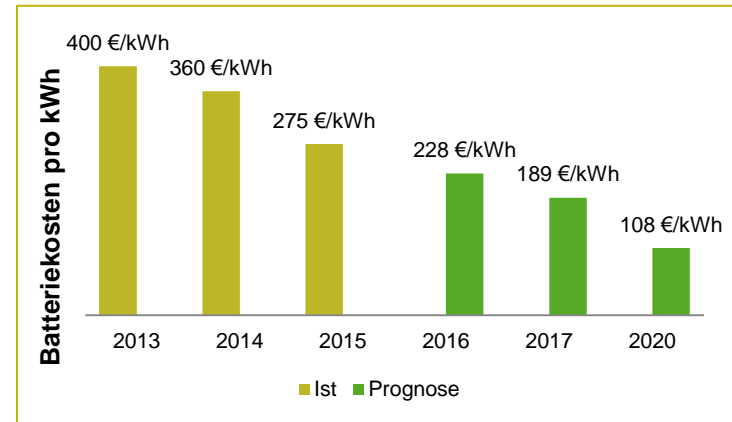
60.000 small storage systems for households in the market (increase 2015: 15.000; increase 2016: 25.000)

Source: BVES

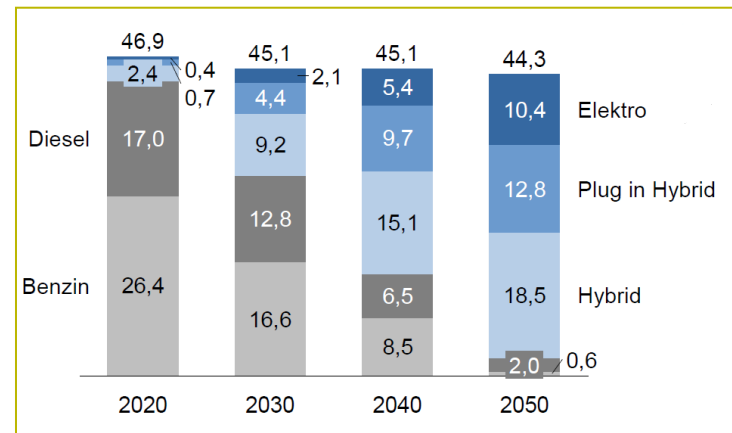


Around 600 existing projects regarding storages in industry

Source: BVES



Battery costs per kWh (Source: Statista)



Vehicle technology development (Source: Thüga)

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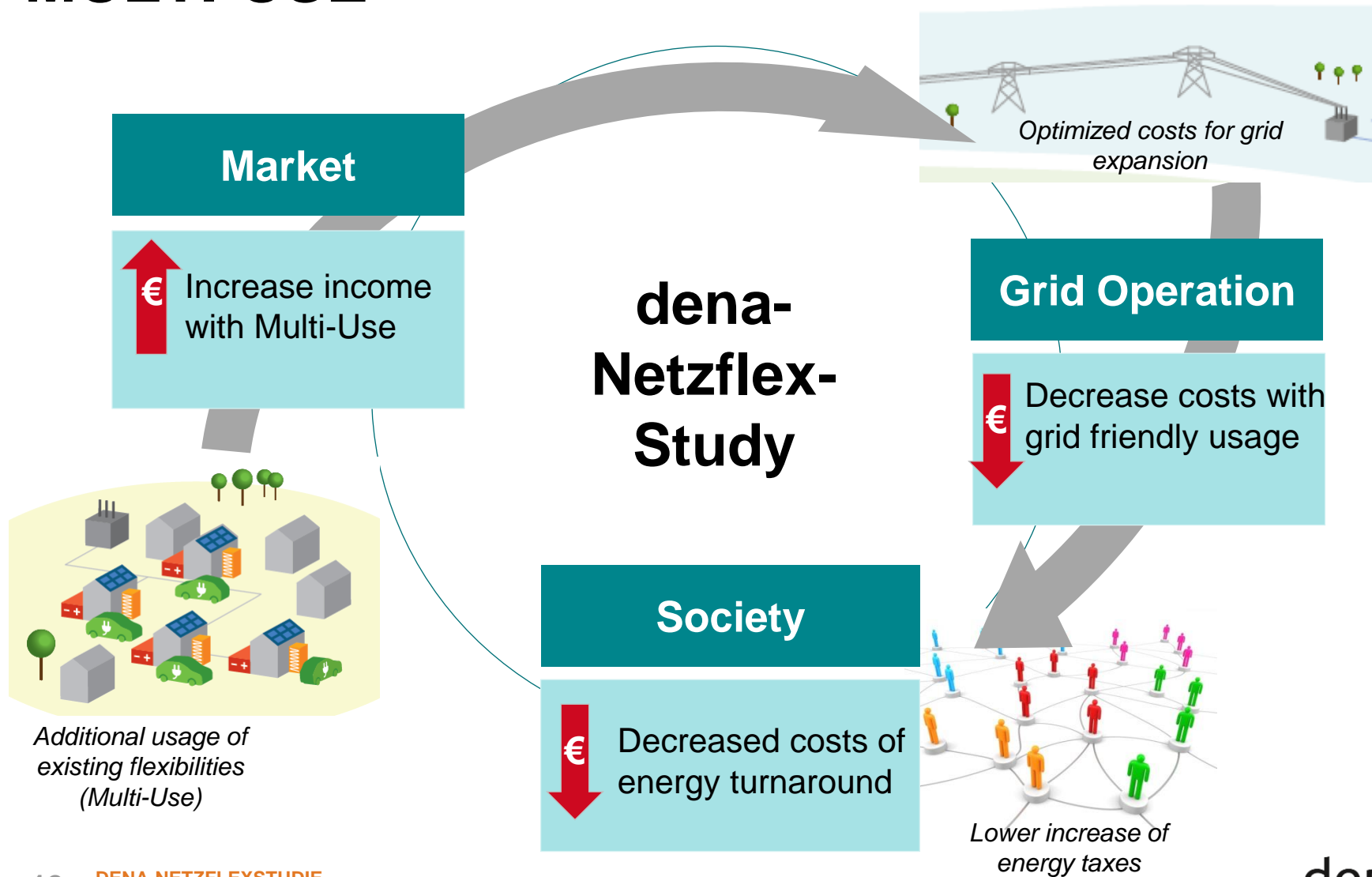


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POSSIBILITY FOR WIN-WIN-WIN WITH MULTI-USE



PARTNERS OF THE DENA-NETZFLEX-STUDY

PROJECT PARTNERS:



RESEARCH PARTNERS:

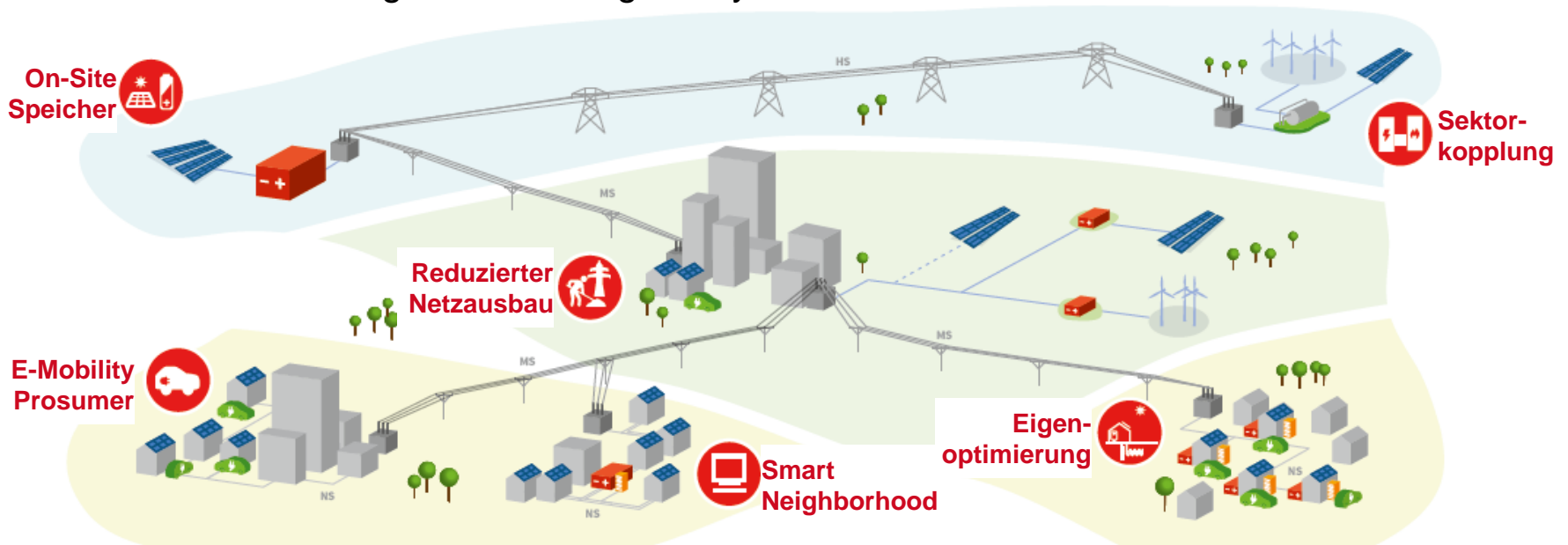


CASE-STUDY BASED ANALYSIS

➤ Identification of six representative case studies, which are examples for future usage of flexibilities in the distribution grid

➤ Analysis of different constraints:

- Economic optimum without constraints from grid or regulation
- Grid-friendly usage
- Preferred usage in actual regulatory framework



MULTI-USE FOR FLEXIBILITIES GENERATES ECONOMIC ADVANTAGE FOR USERS

➤ First Multi-Use concepts are available today

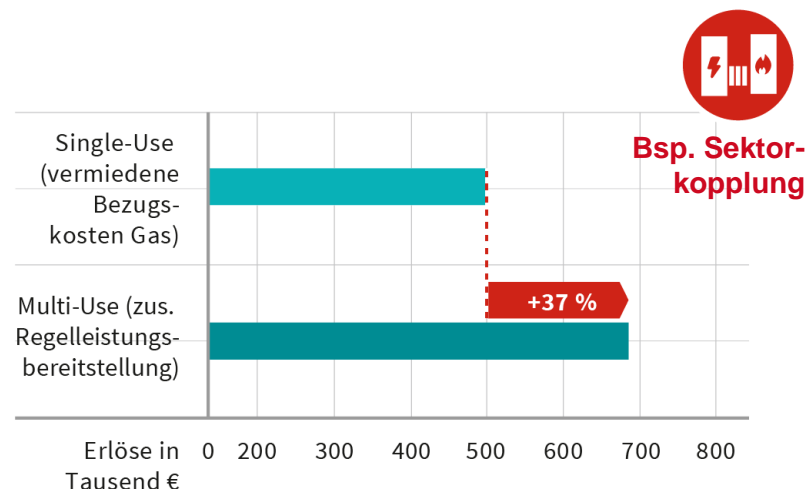
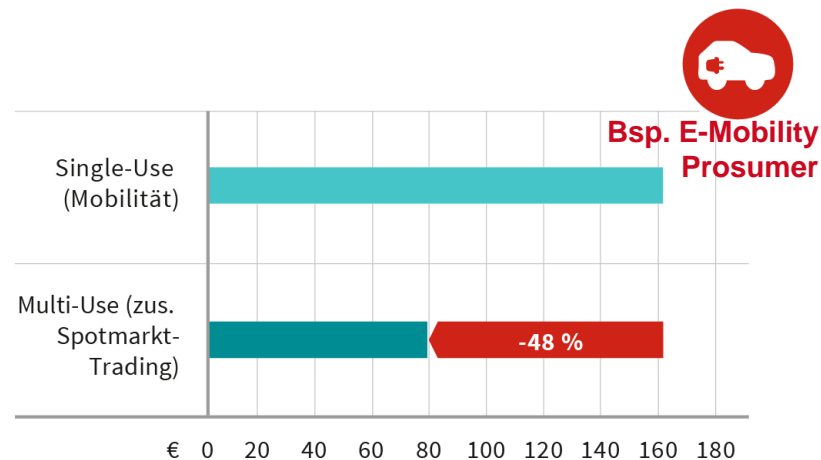
- e.g. combination of self-consumption-optimization and provision of balancing power

➤ Further additional applications

- Voltage control, congestion management, Redispatch, Spot market trading

➤ Multi-Use could lower the costs of electricity respectively increase income

➤ In most cases a changed regulatory framework is needed



MULTI-USE OPTIMIZES COSTS OF GRID EXPANSION

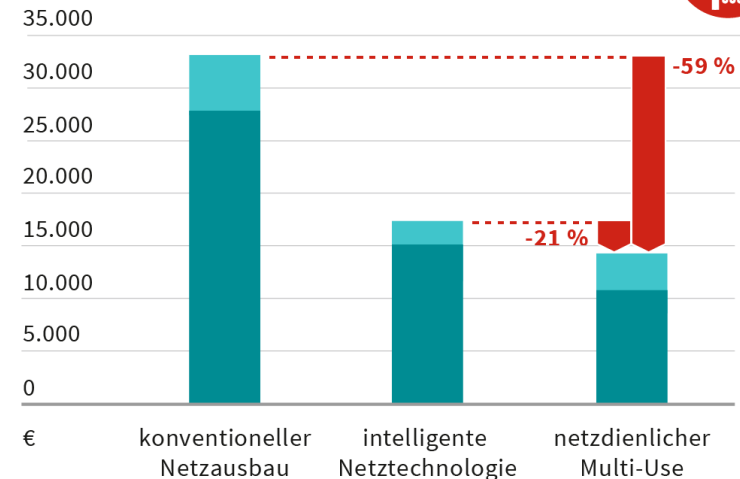
➤ Grid friendly Multi-Use can improve usage of existing grid capacities

- Five of the tested case studies shows the usage of existing flexibility is preferable compared to (conventional) grid expansion
- case-by-case analysis needed

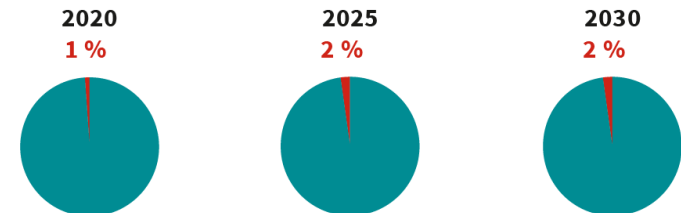
➤ Market oriented and grid friendly usage of flexibilities harmonizes very well

- 1,8 % of the analyzed points in time in 2020 and 3,5 % of the analyzed points in time in 2030 are affected by grid constraints

Bsp. Eigenoptimierung 



Bsp. Smart-Neighborhood 



■ Zeitpunkte mit rein marktorientierter Fahrweise

■ Zeitpunkte mit Einschränkung der Fahrweise aufgrund netzdienlichem Verhalten

NEED FOR DEVELOPING FURTHER THE REGULATORY CONSTRAINTS

➤ Set incentives for grid operators to choose the best/most favorable way to avoid grid congestions

- Expansion of the controllability of the distribution grids
- Establish equivalent treatment of invest and operation costs

➤ Activation of flexibility potentials

- Harmonizes taxes in different energy sectors (e.g. for electricity and gas)
- Create dynamic grid usage fees
- Development of flexibility products and platforms for local congestion management
 - Technical development in SINTEG projects
 - Regulatory framework must be build in same time to secure connectivity of SINTEG innovations



VIELEN DANK

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