Federal Ministry
for Economic Affairs
and Climate Action

MITTELSTAND
GLOBAL
ENERGY SOLUTIONS
MADE IN GERMANY

Developments in Market & Regulation in Germany

Gerrit Lühring
Senior Expert Policy & Regulation
BVES Energy Storage Systems Association

AHK
Deutsch-Griechische
Industrie- und Handelskammer
Ελληνογερμανικό Εμπορικό
και Βιομηχανικό Επιμελητήριο

implemented by
renac
renewables academy

BVES

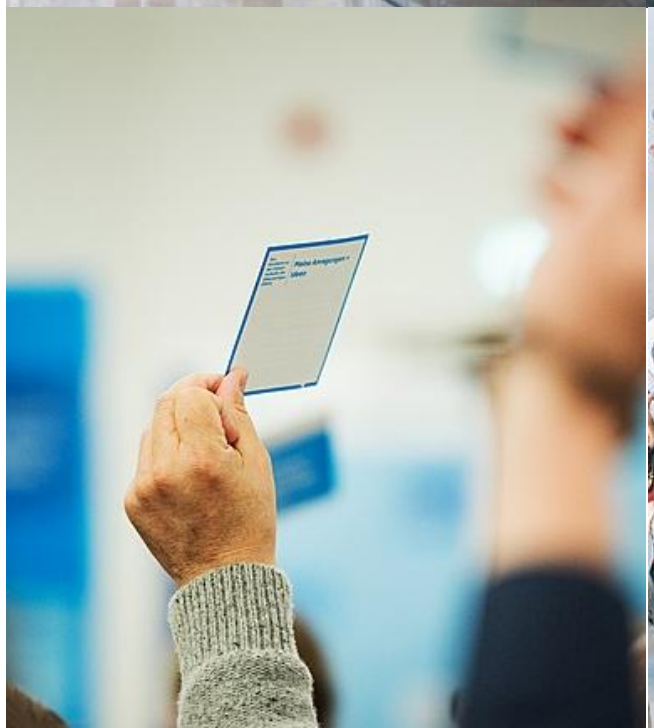
Energy Storage Systems Assoc.

Founded in 2012 by **industry-pioneers**

350+ (international) member companies in:

- **Technology**
- **Project development**
- **Finance**
- **Research**

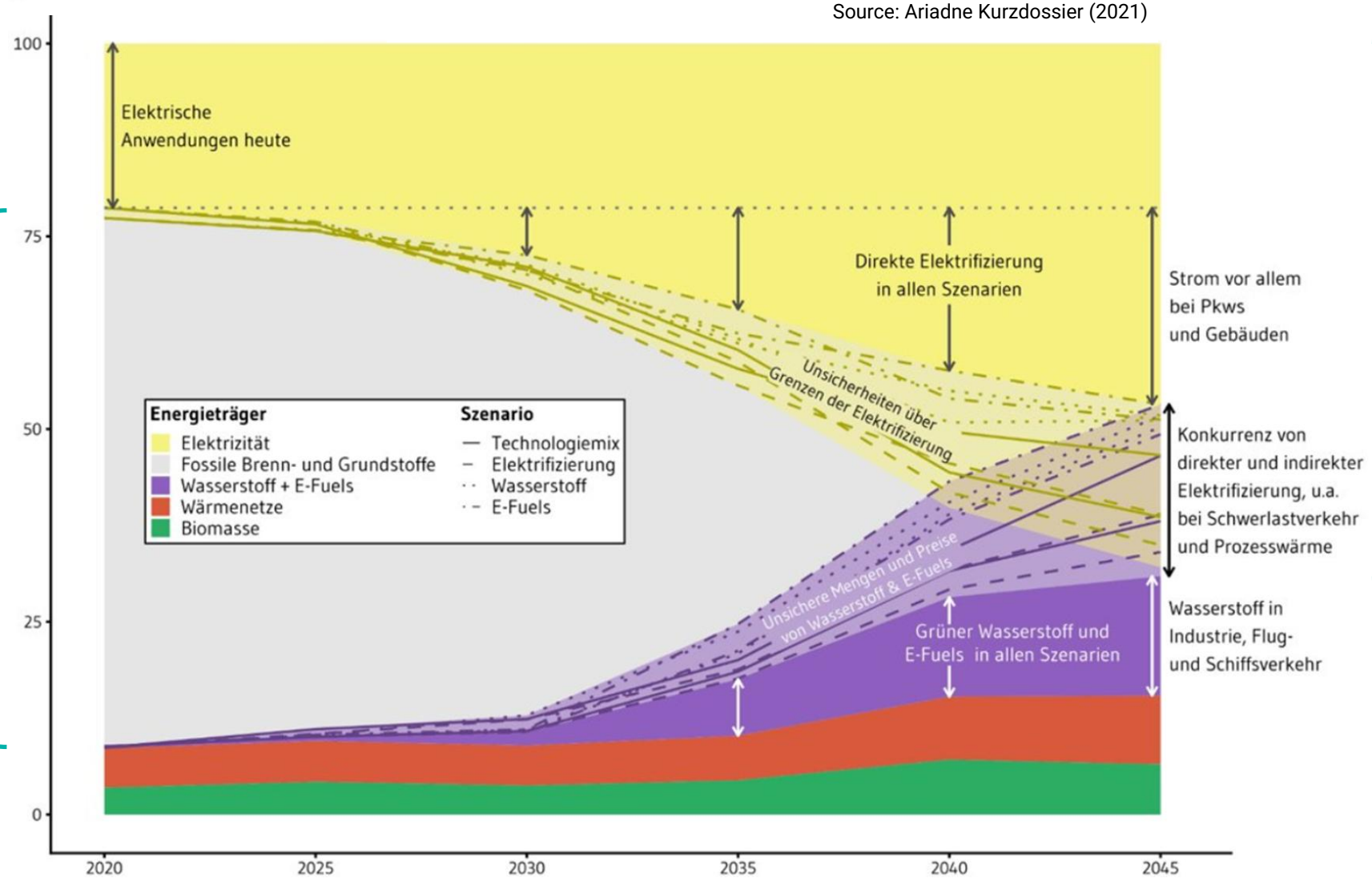
We are a **dialogue partner** for politics, administration, science and the public. With **targeted lobbying** at the interfaces of political decision making, we are working for the improvement of the regulation and policy framework for energy storage (nationally and internationally).



ENERGY TRANSITION MEANS (MOSTLY) ELECTRIFICATION

a shares of final energy

Source: Ariadne Kurzdossier (2021)



Only 20% of total energy consumption is electricity!

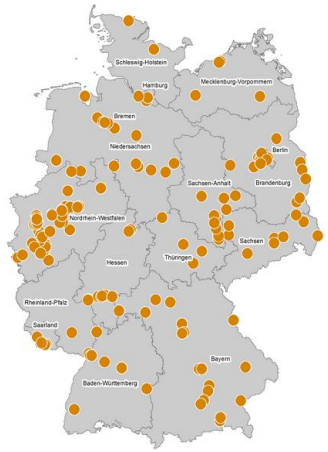
~ 80 % fossil fuels

~ 75 % via electrification

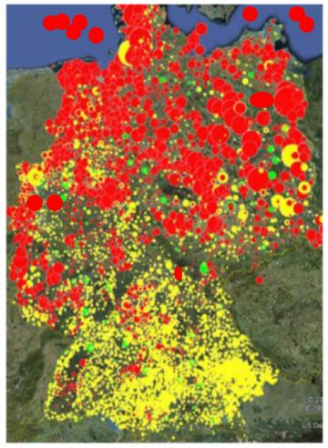
~ 25 % via H2, biomass, etc.

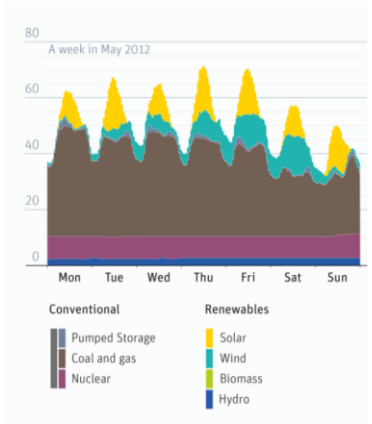
WHAT‘S THE CHALLENGE?

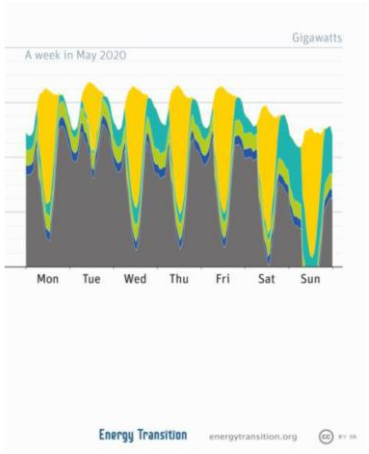
CONVENTIONAL



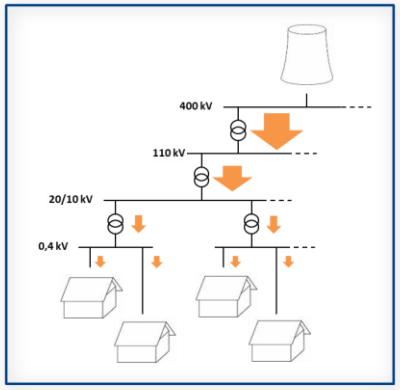
RENEWABLE



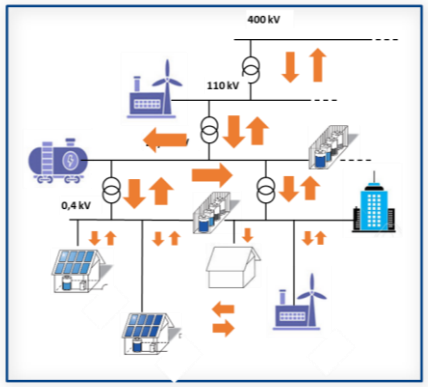


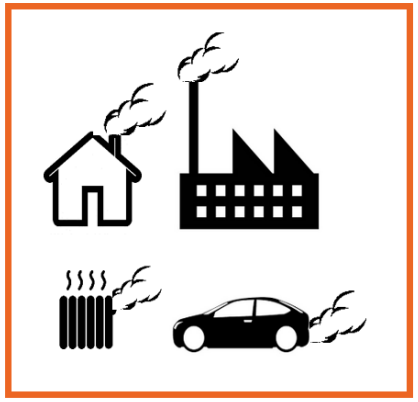


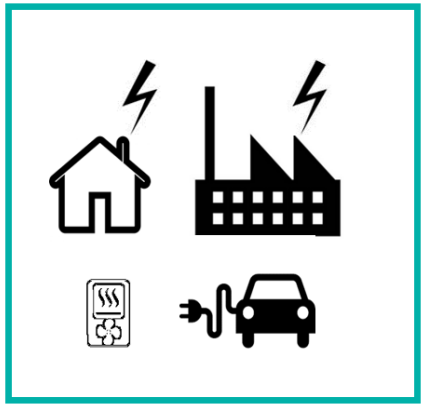
CONVENTIONAL



RENEWABLE

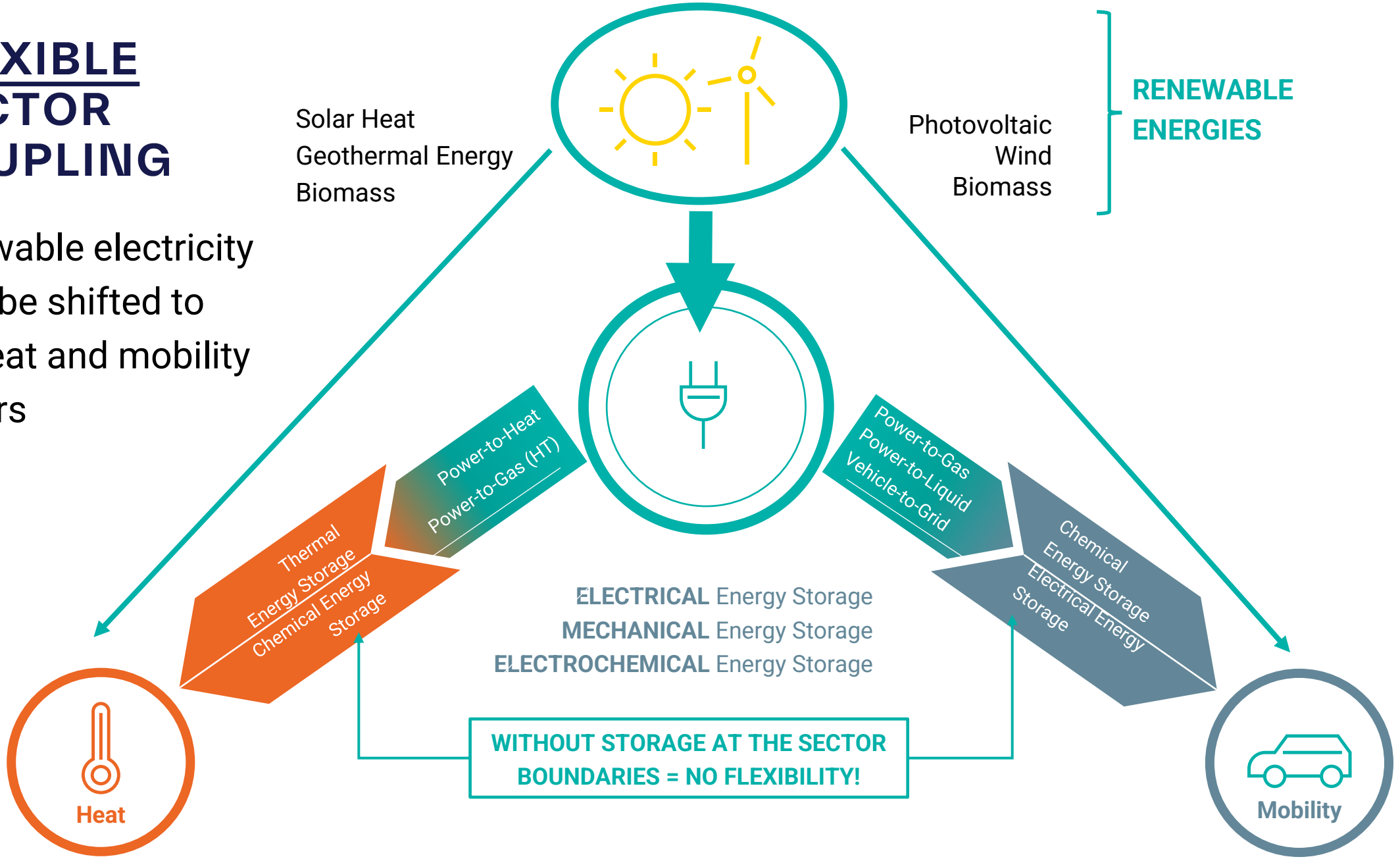






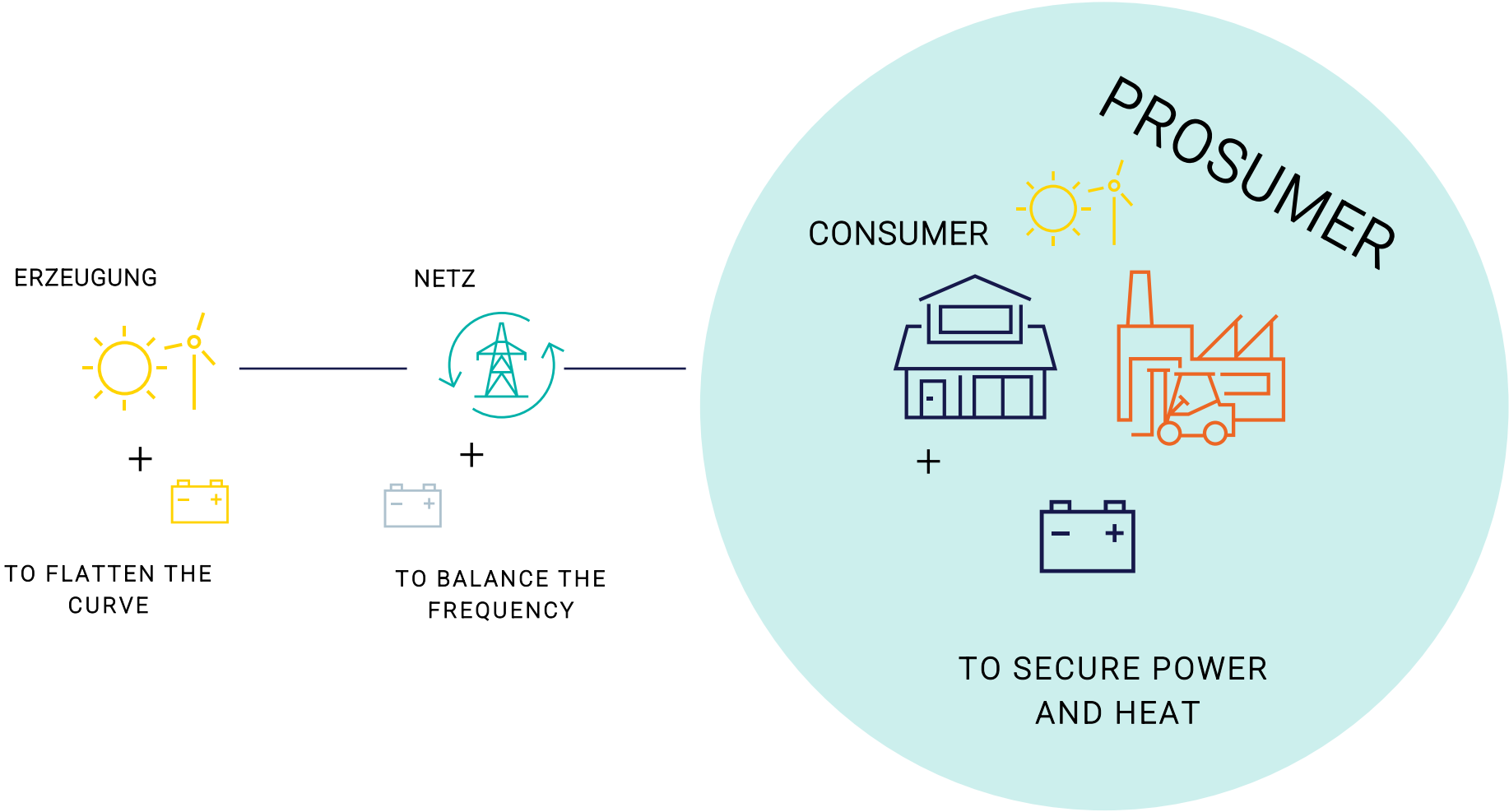
FLEXIBLE SECTOR COUPLING

Renewable electricity must be shifted to the heat and mobility sectors

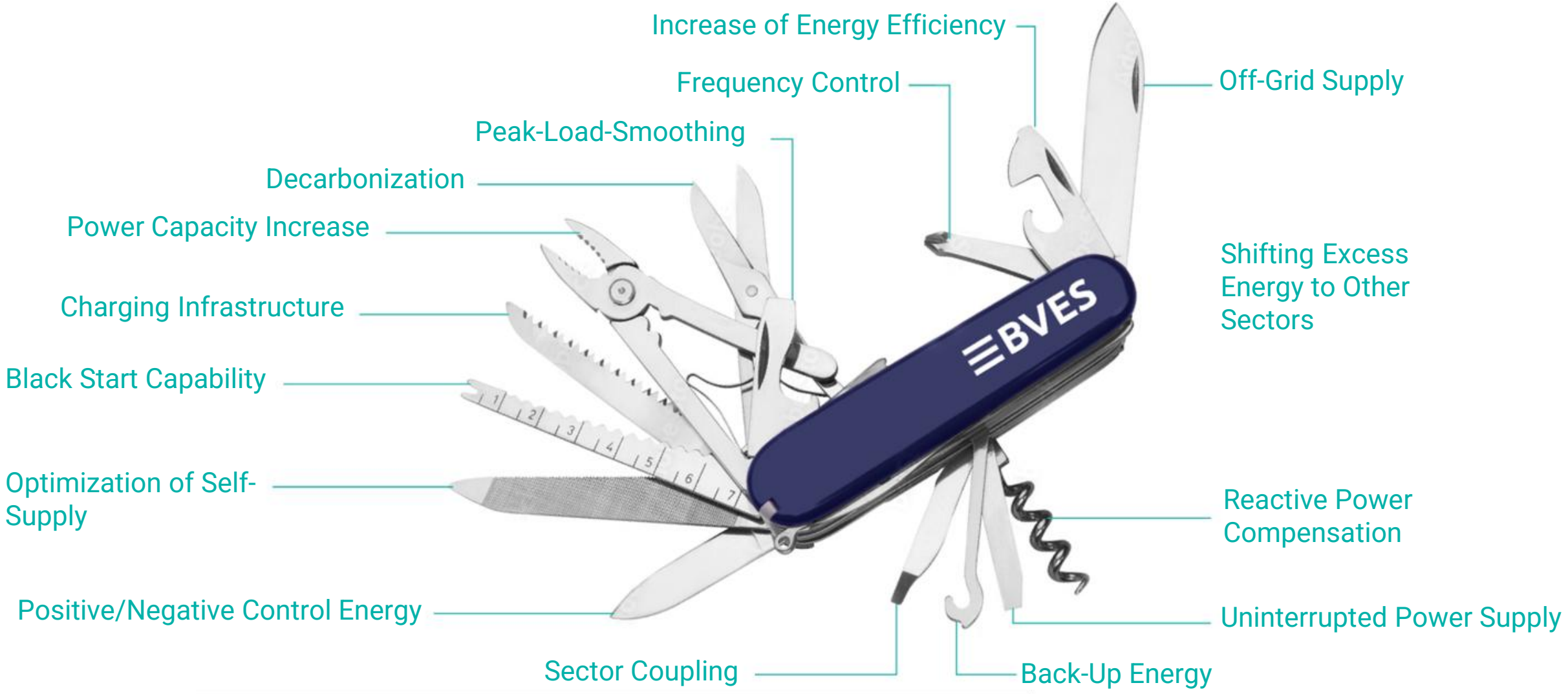


FLEXIBILITY

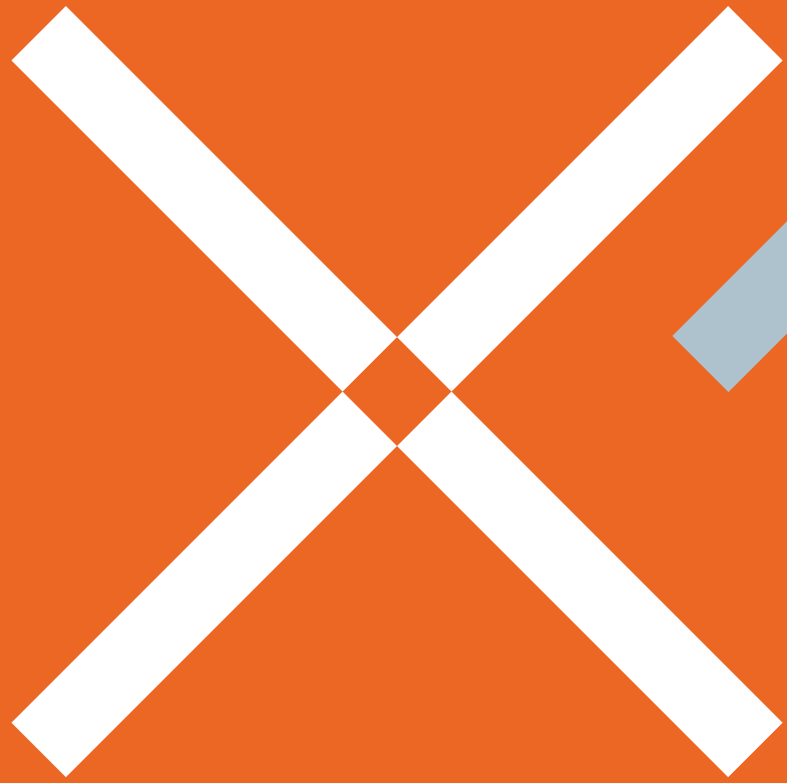
TO SECURE A RENWABLES-BASED ENERGY SYSTEM AND THE ENERGY DEMAND – FLEXIBILITY IS NEEDED



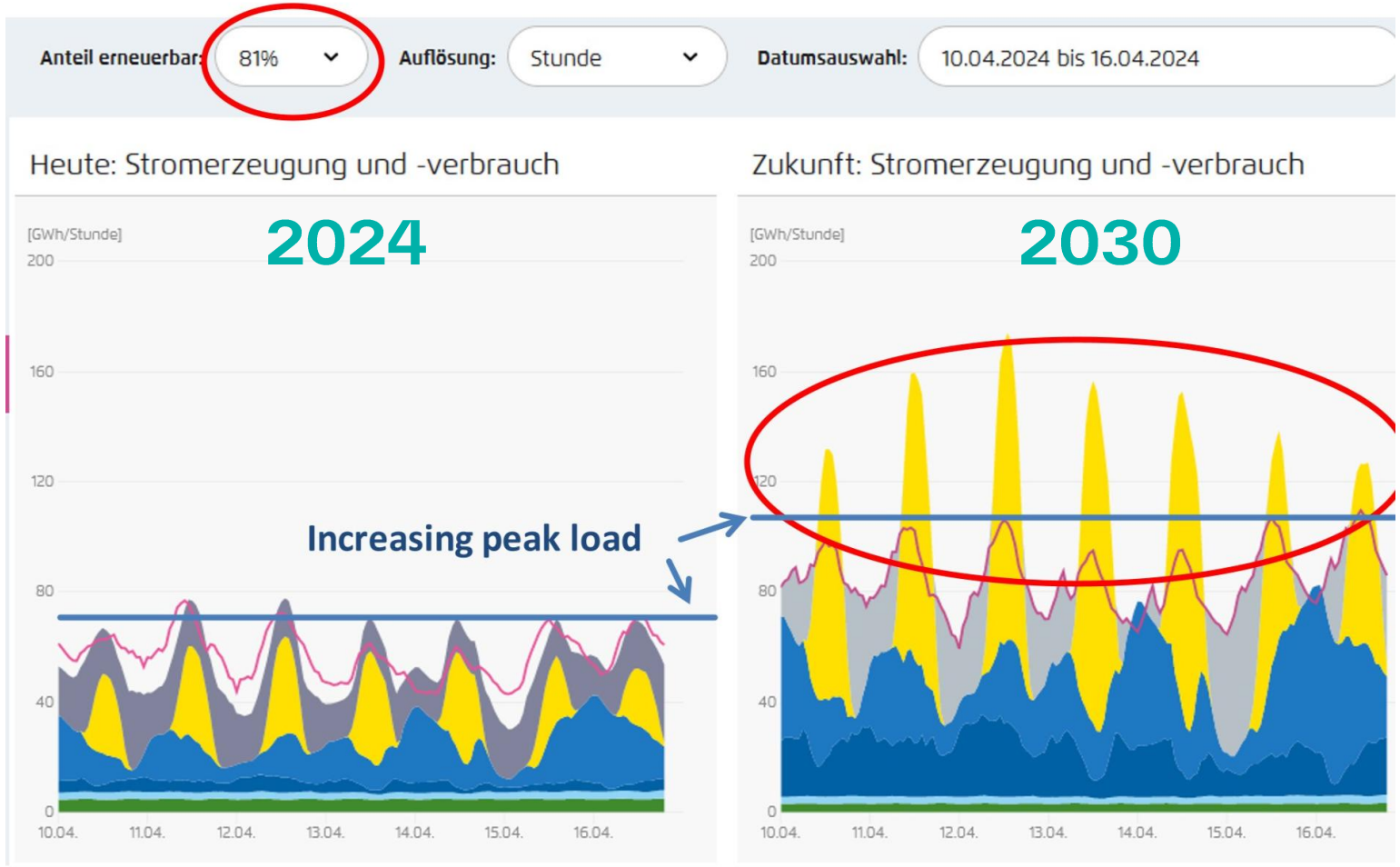
MULTI TOOL ENERGY STORAGE – FOCUS ON POWER



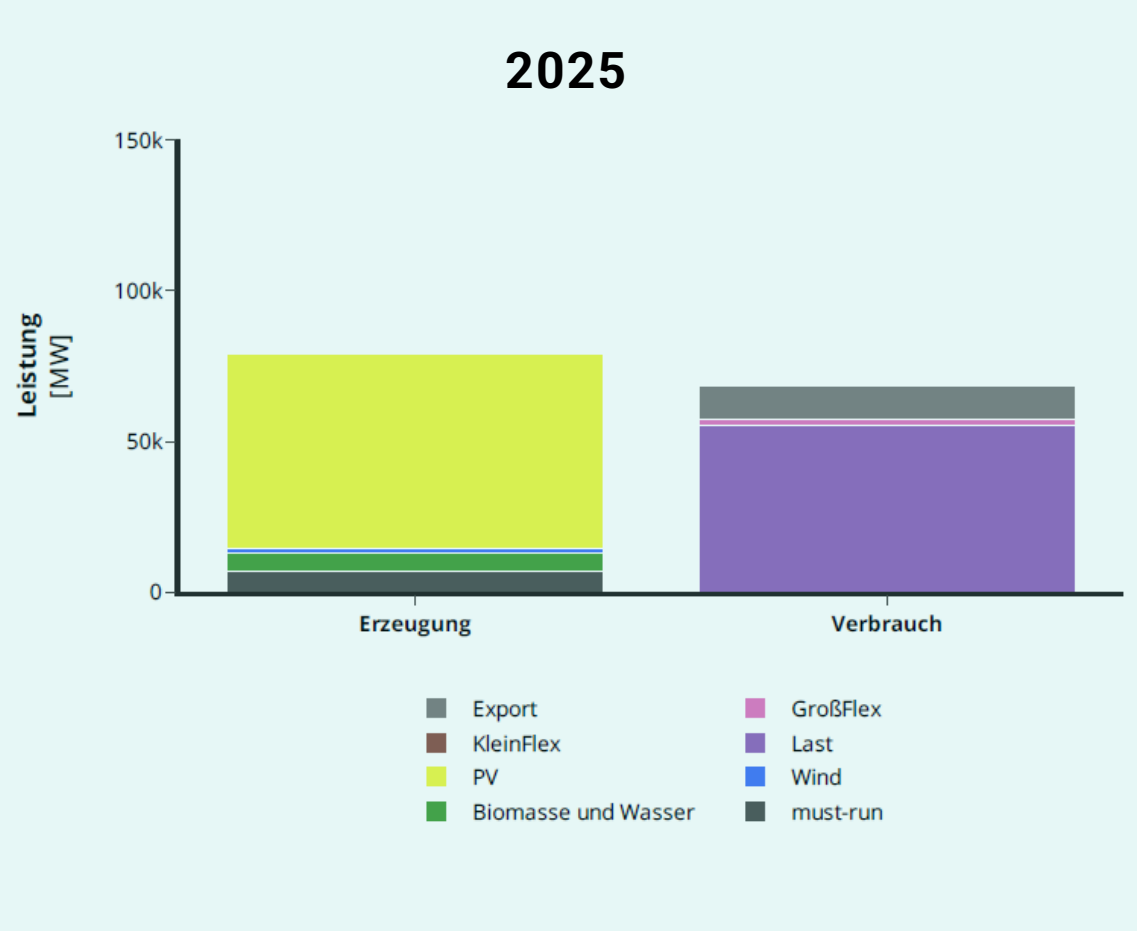
CHALLENGES

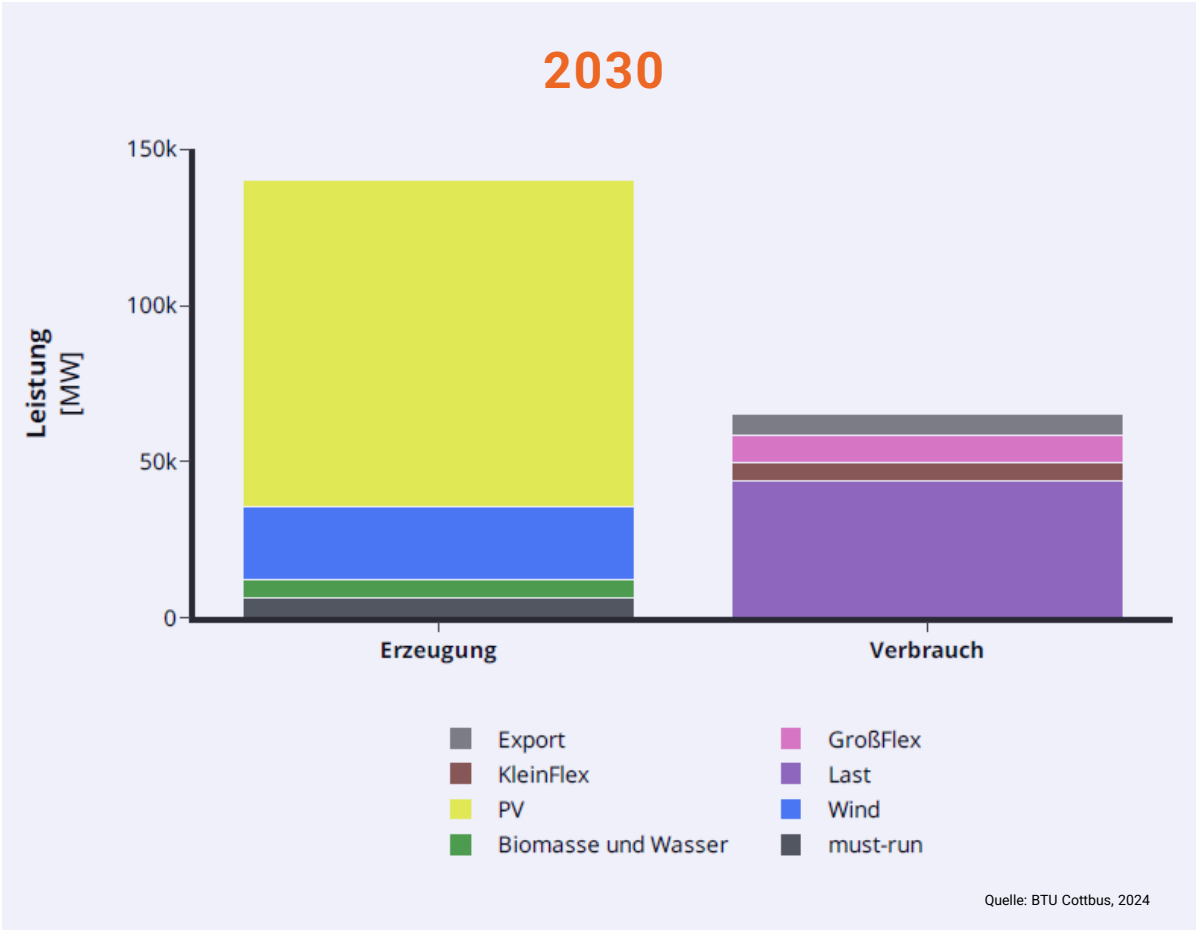


MAKING USE OF RENEWABLE ENERGY PRODUCTION BECOMES A CHALLENGE



PRODUCTION IN GERMANY 2025 | 2030

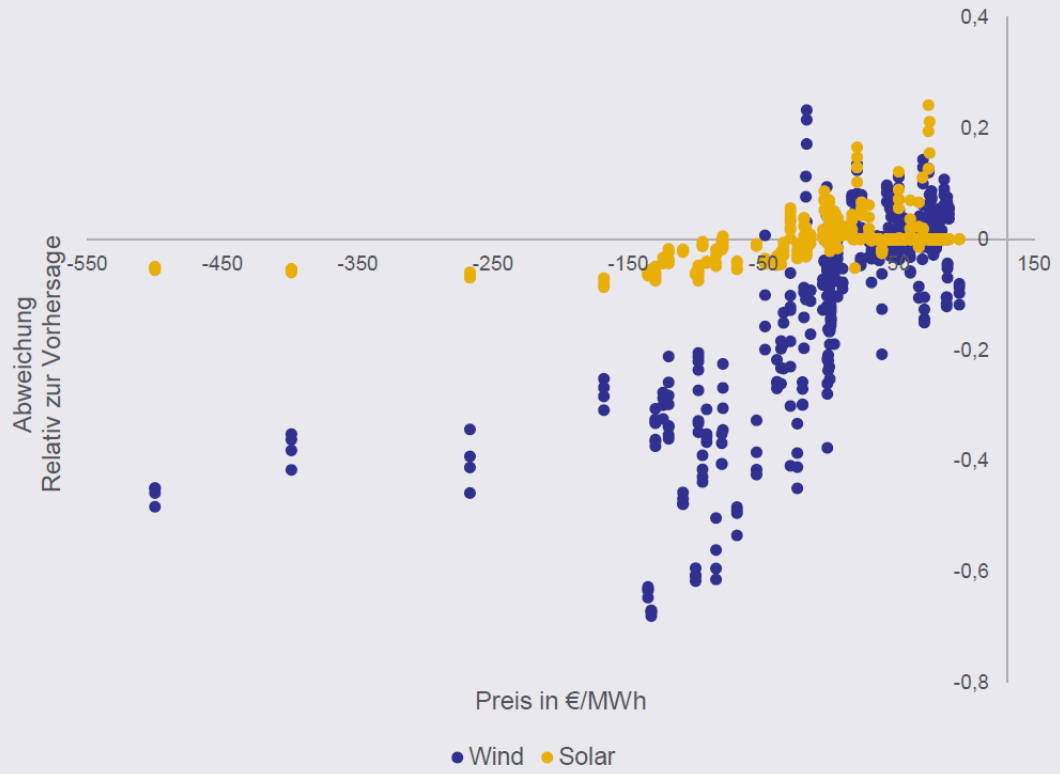




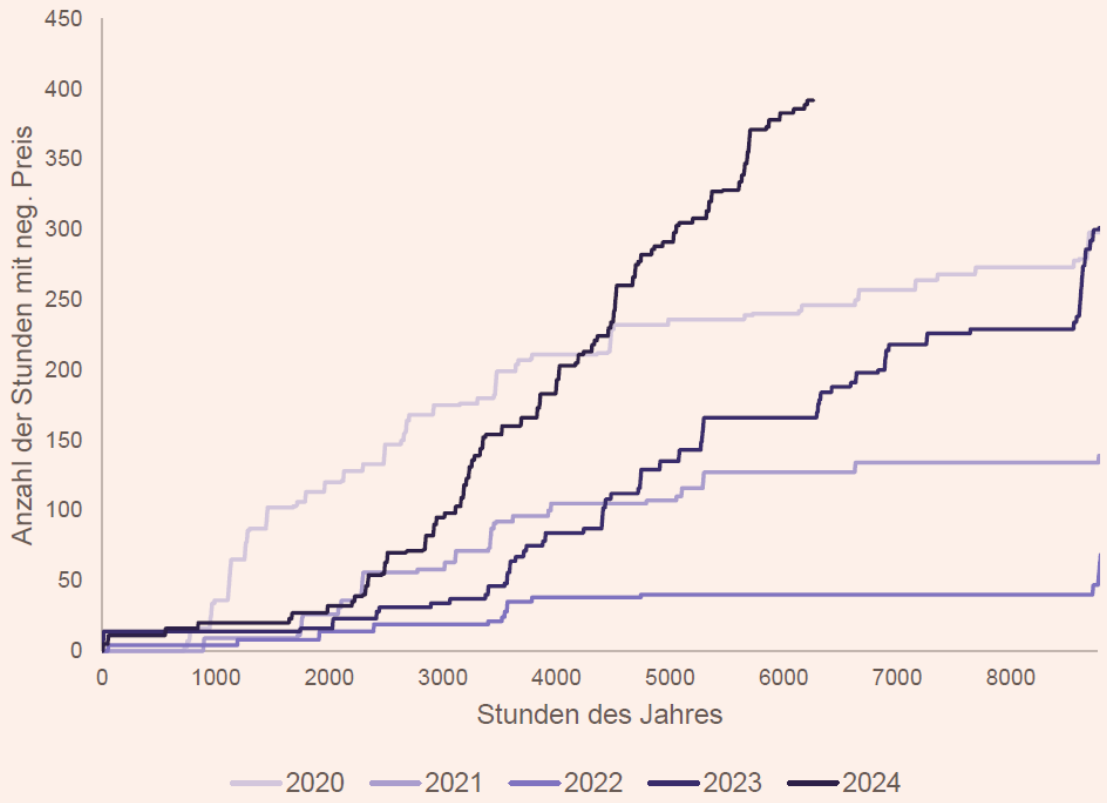
Quelle: BTU Cottbus, 2024

INCREASING PRODUCTION SURPLUSES
PROBLEM OR CHANCE?

NEGATIVE STUNDEN IN 2023

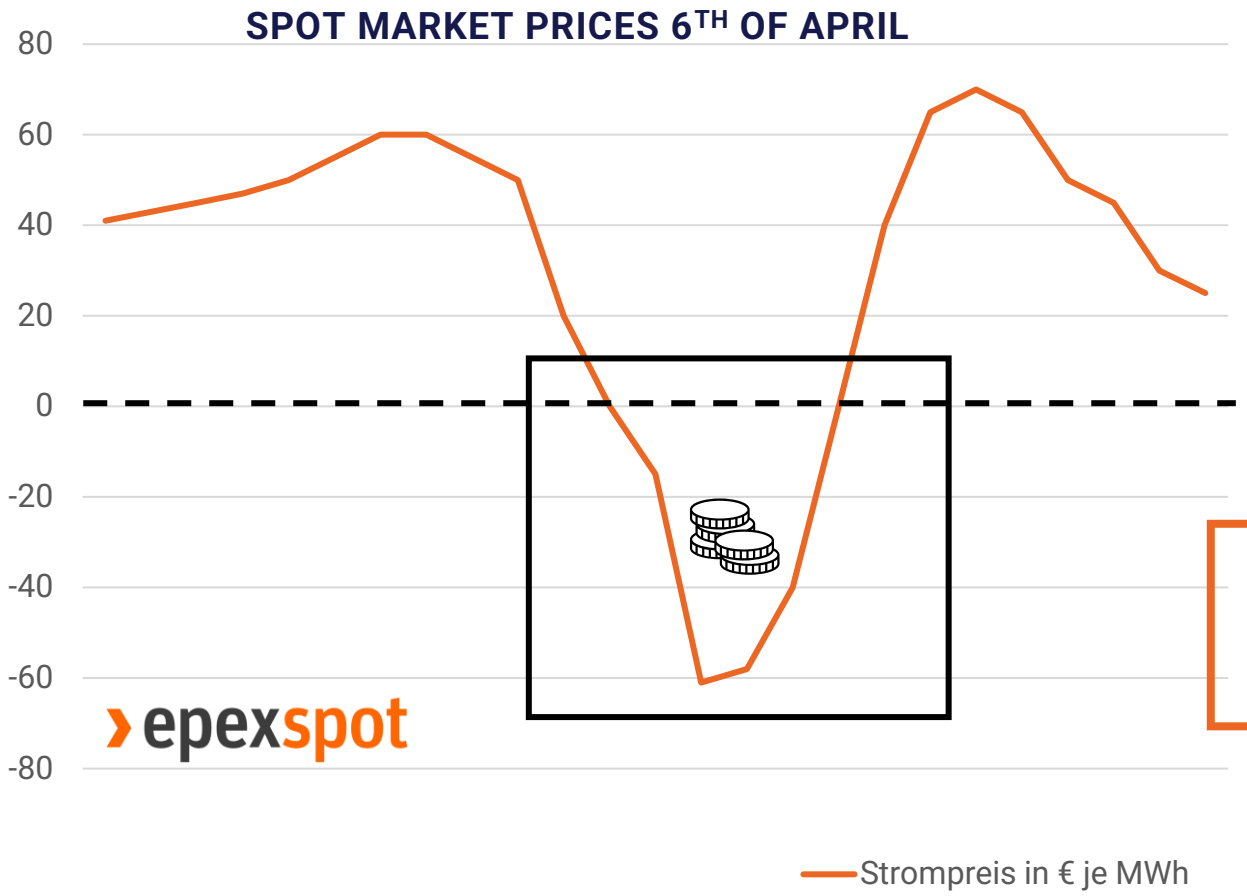


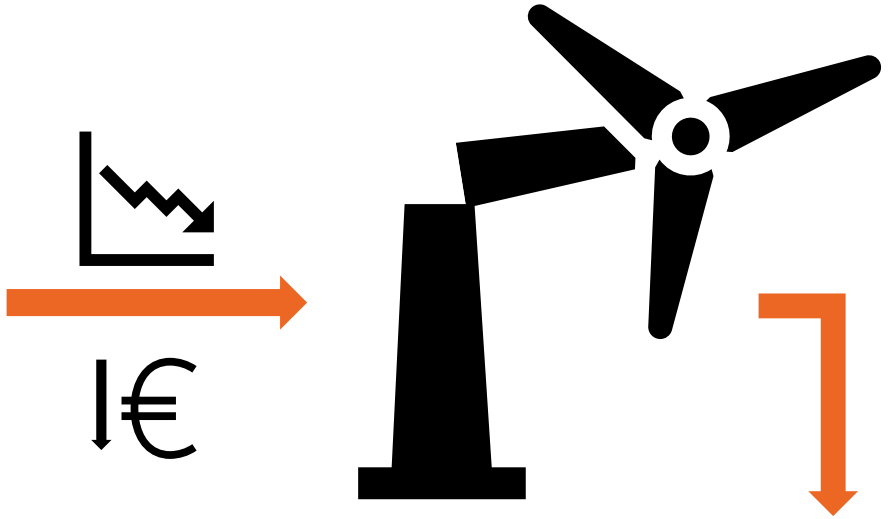
ENTWICKLUNG STUNDEN MIT NEGATIVEN PREISEN



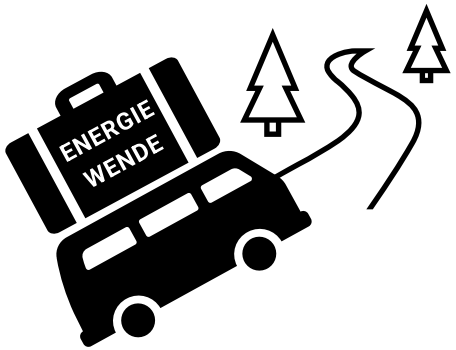
Quelle: BTU Cottbus, 2024

PRODUCTION SURPLUS
CONSEQUENCES WITHOUT LOAD ABSORPTION BY STORAGE





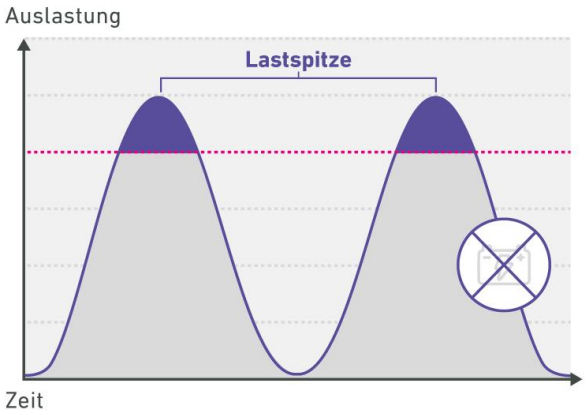
NO REMUNERATION FOR NEGATIVE PRICES STARTING 2025



UNLESS…

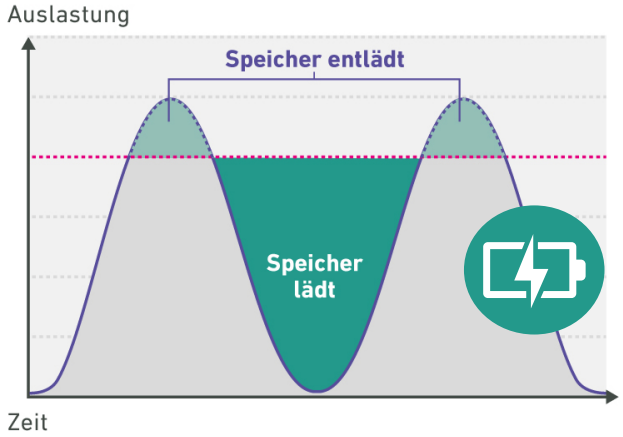
SURPLUS ENERGY
USE IT!

WITH OUT STORAGE

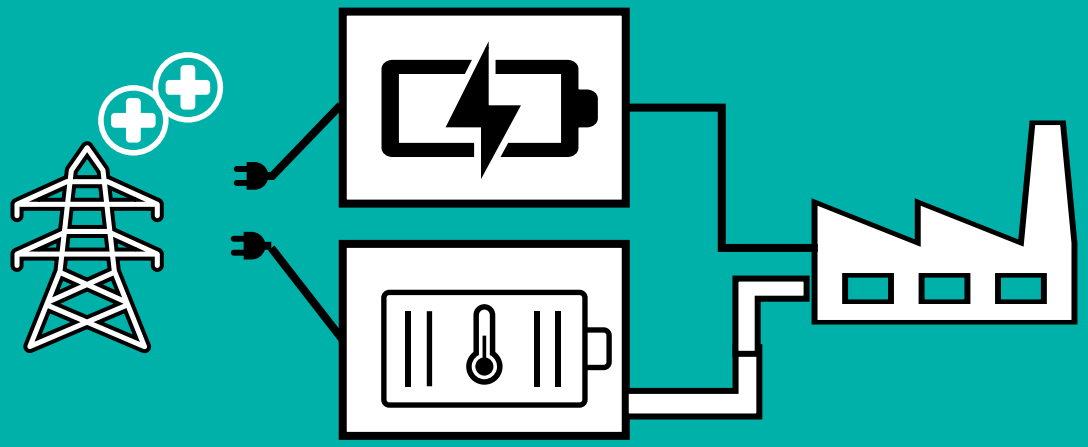


WITHOUT STORAGE

WTH STORAGE



WITH STORAGE



REGULATORY TRENDS AND MARKET DEVELOPMENTS

12 November 2024

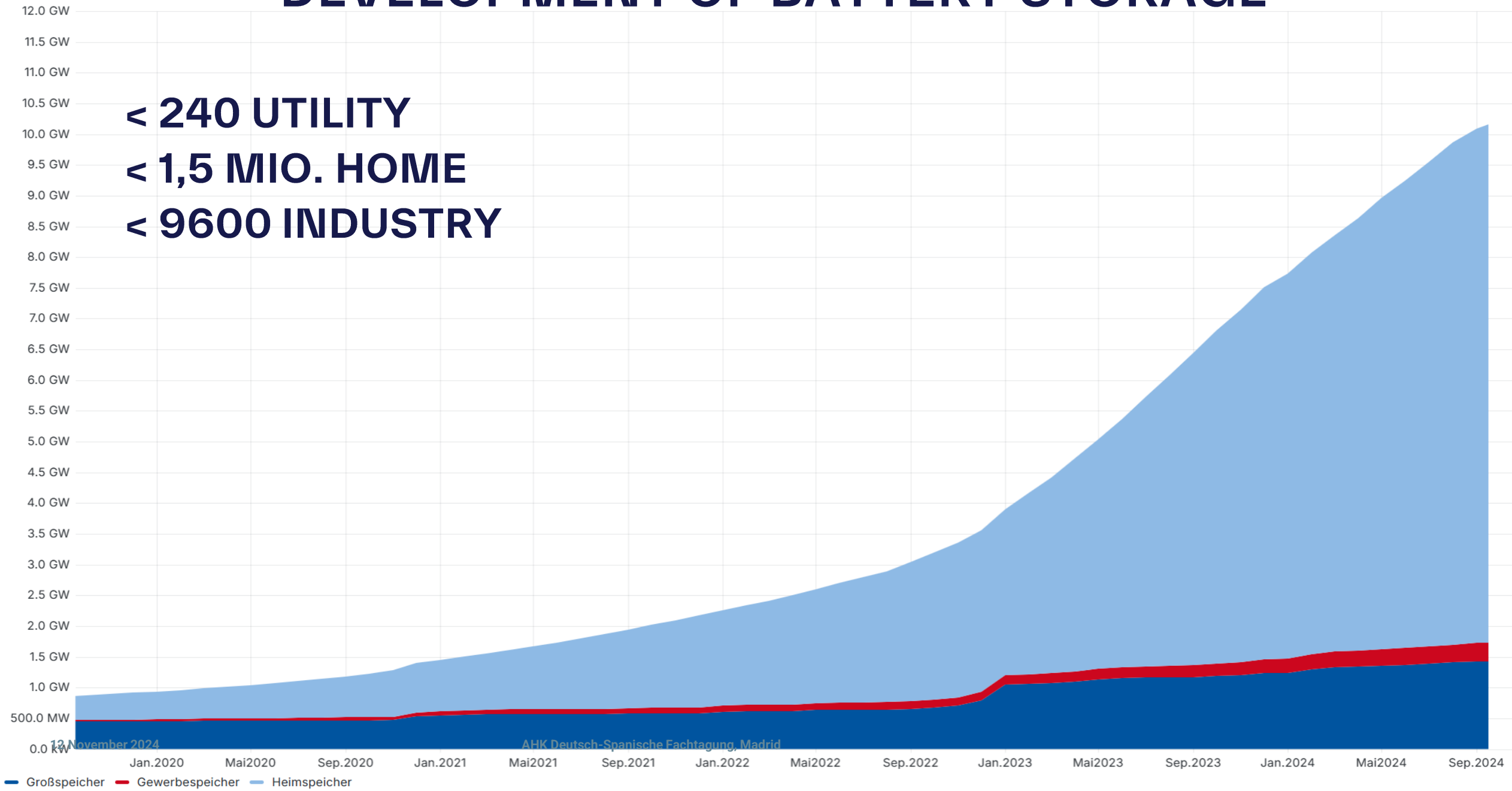
AHK Deutsch-Spanische Fachtagung, Madrid

DEVELOPMENT OF BATTERY STORAGE

< 240 UTILITY

< 1,5 MIO. HOME

< 9600 INDUSTRY



UTILITY SEGMENT

Continued strong growth in large-scale battery storage systems

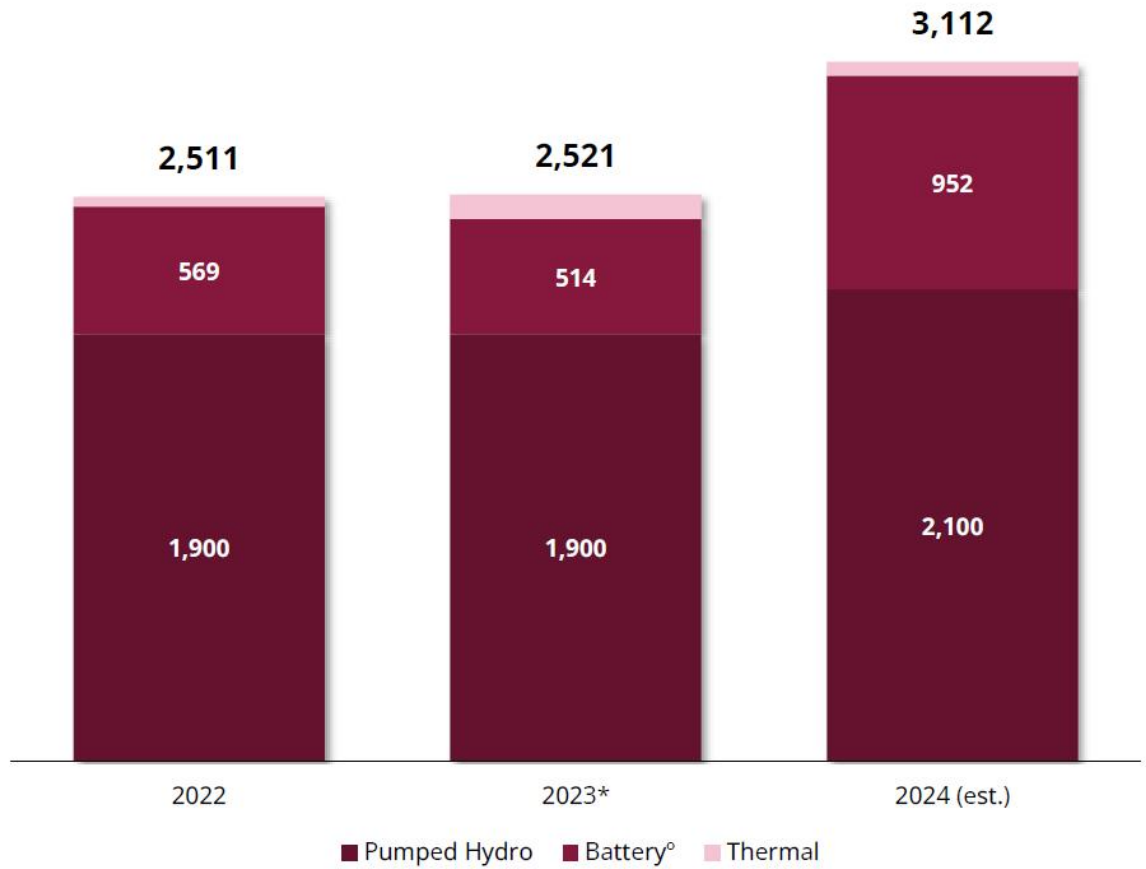
Developments in 2023

- Total capacity and power of large-scale battery storage grow to 1.5 GWh and 1.3 GW respectively.
- **High demand for large-scale battery storage systems** due to highly volatilie spot market prices.
- Pumped hydro revenues constant; heat storage and battery storage systems growth driven by new large-scale projects.

Expectations for 2024

- **Significant increase in revenues for large-scale battery** storage systems expected due to co-location and arbitrage potential in spot markets.
- **Pumped hydro** with future growth opportunities: plans for new facilities and expansion of existing ones.

Revenues Utility Segment (€M)

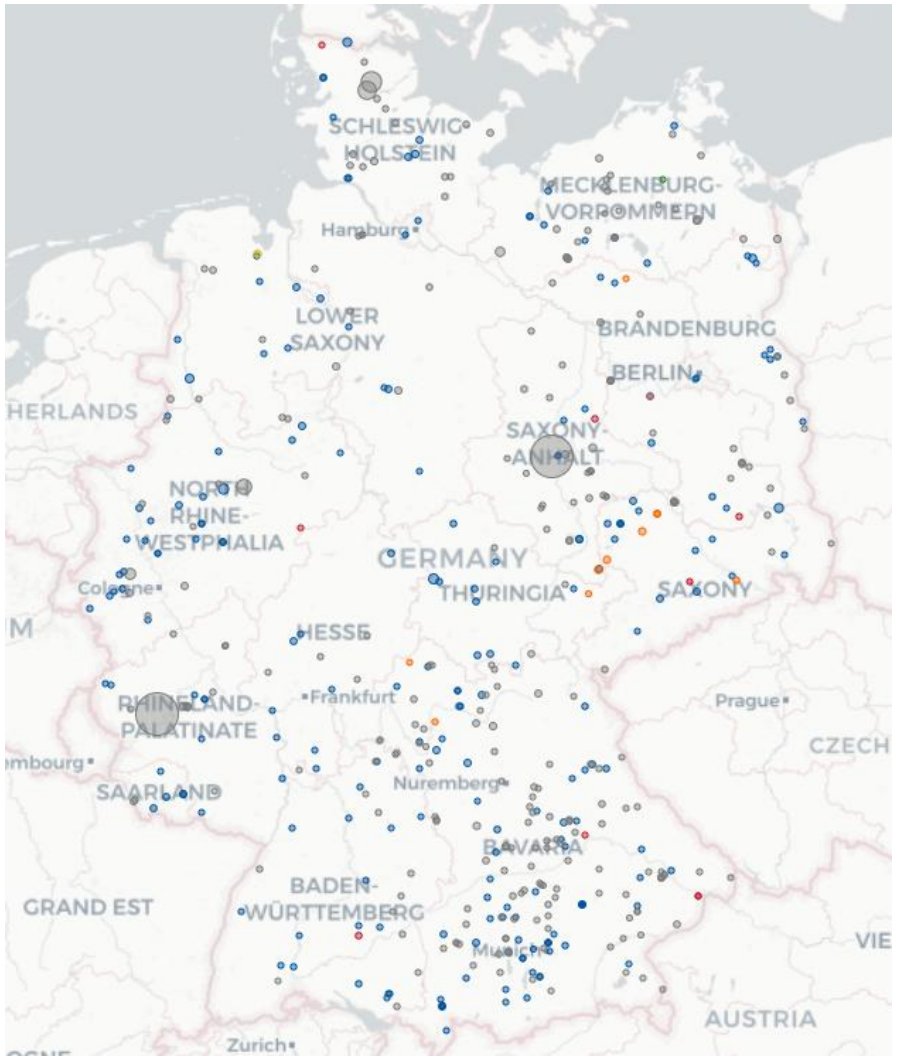


Source: 3EC

* Some figures still preliminary

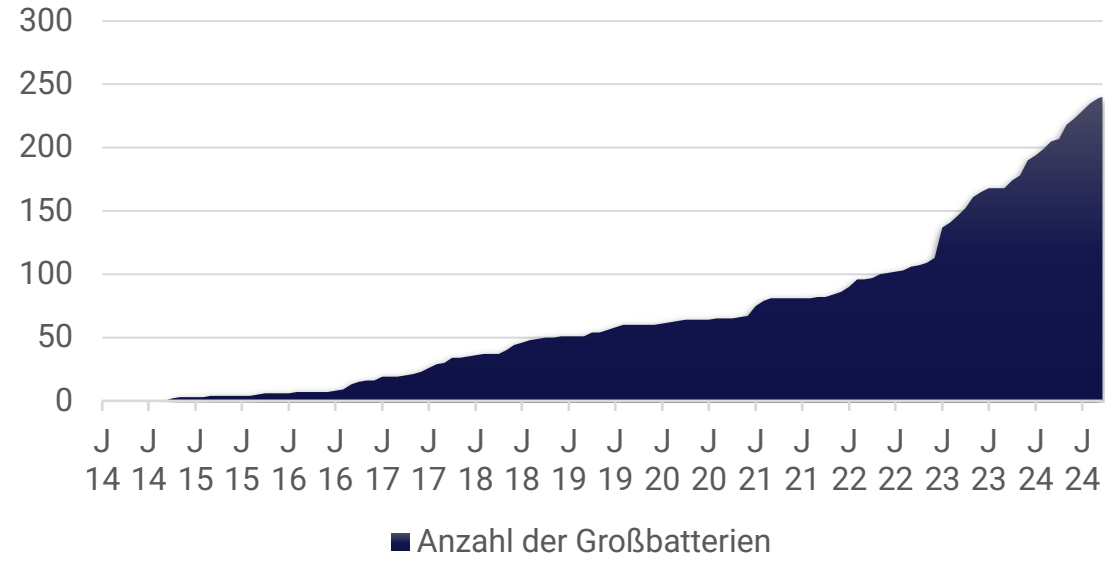
° Revenues from arbitrage activities not included

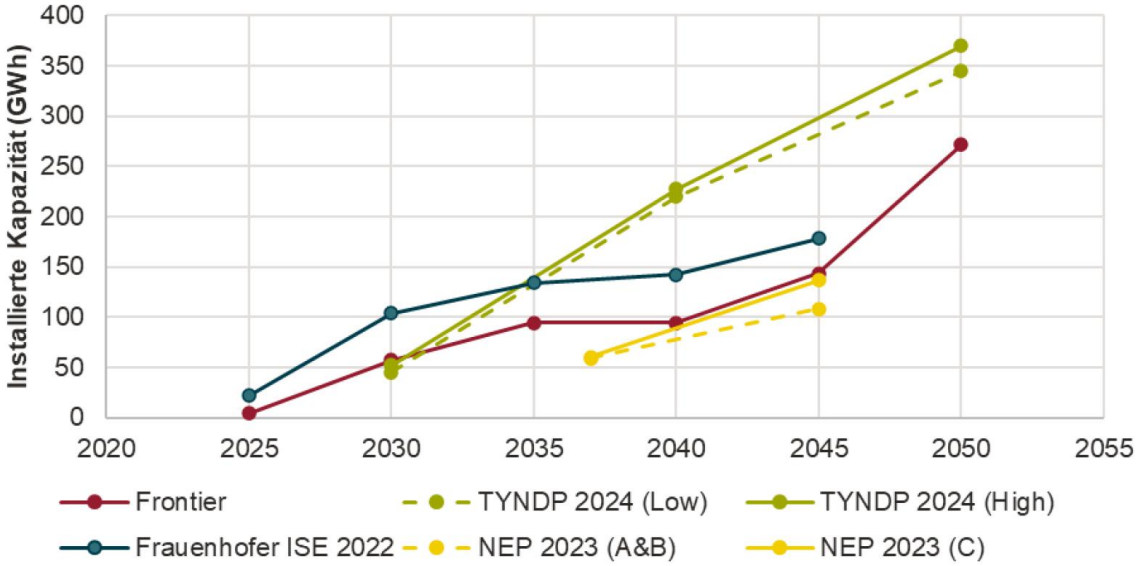
UTILITY SCALE
BATTERIES DEPLOYED



Regionale Verteilung von Großspeichern

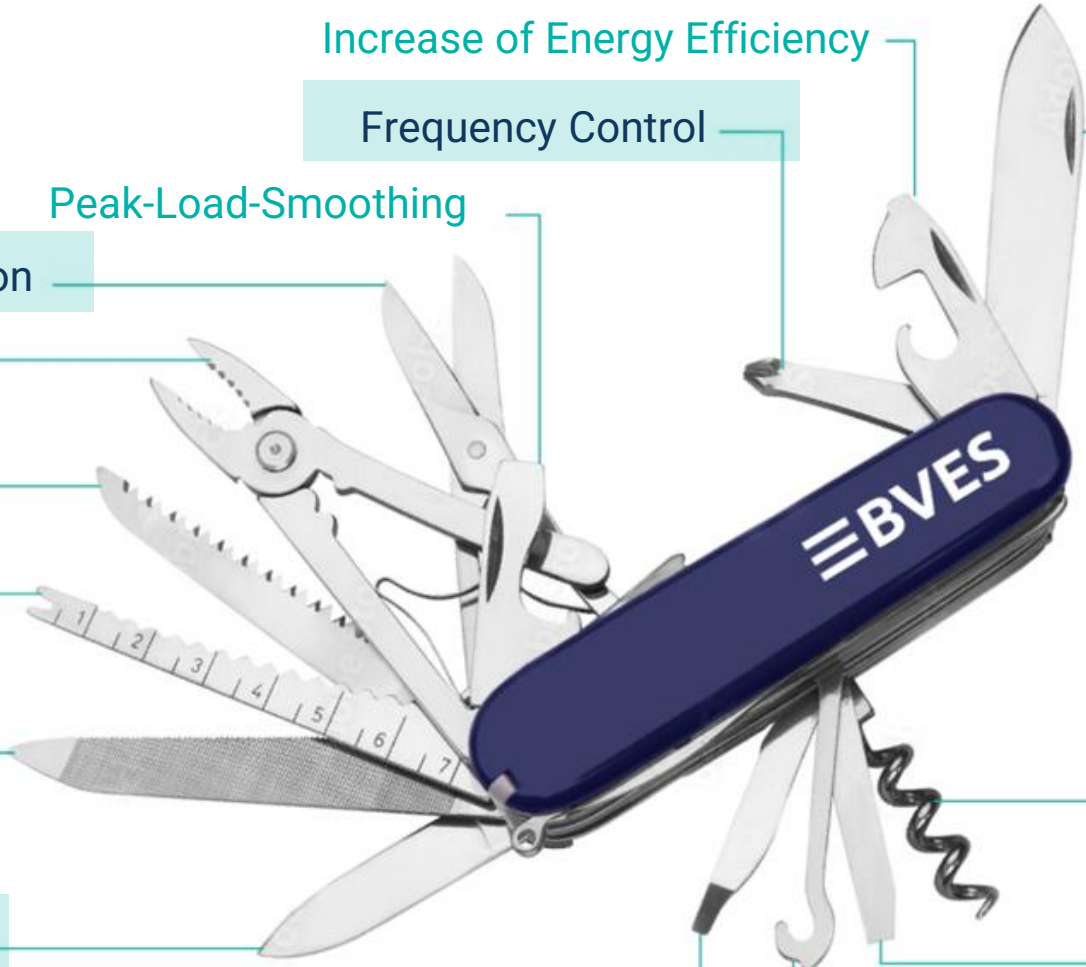
Quelle: RWTH Aachen, Marktstammdatenregister, 2024





Quelle: Frontier Economics, Entso-E TYNDP 2024 Draft Supply Inputs; NEP (2023) 2037/2045; Fraunhofer ISE (2022)

MULTI TOOL ENERGY STORAGE – FOCUS ON UTILITY SCALE



Increase of Energy Efficiency

Frequency Control

Off-Grid Supply

Peak-Load-Smoothing

Decarbonization

Power Capacity Increase

Shifting Excess Energy to Other Sectors

Charging Infrastructure

Black Start Capability

Optimization of Self-Supply

Reactive Power Compensation

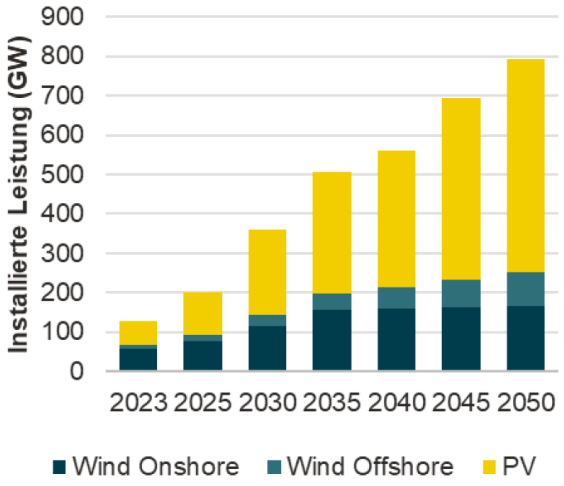
Positive/Negative Control Energy

Uninterrupted Power Supply

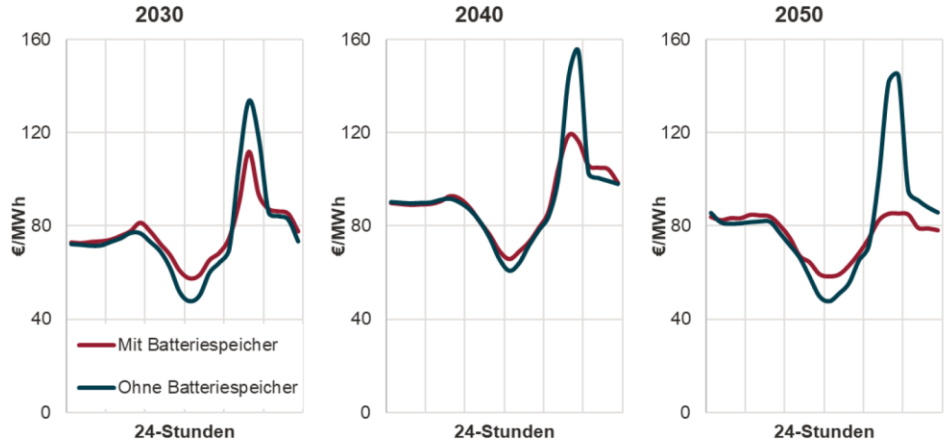
Sector Coupling

Back-Up Energy

UTILITY SCALE STORAGE
SYSTEMIC BENEFITS

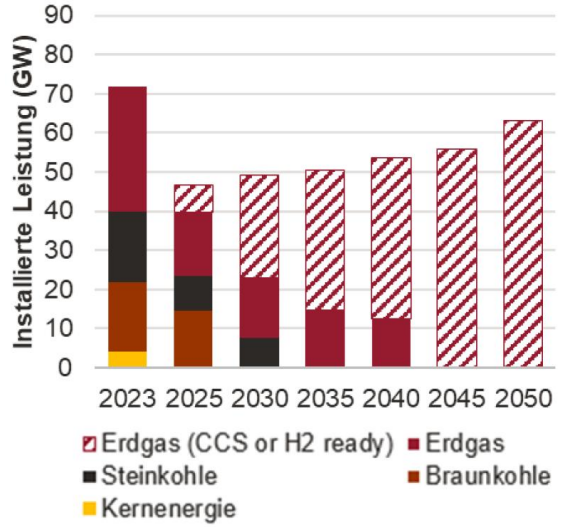


Development of renewable production

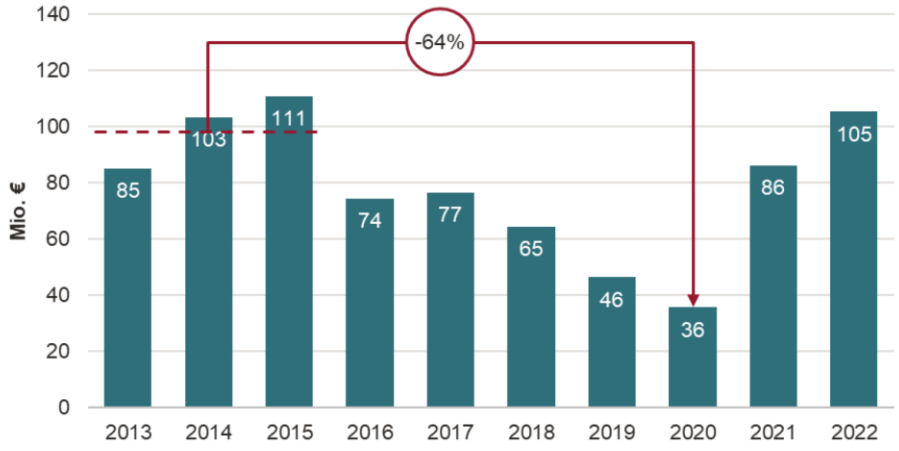


Average daily price trend

Quelle: Frontier Economics



Development of the capacity of controllable thermal power plants



Development of the costs of primary control power

Quelle: Frontier Economics, auf Basis von BNetzA Monitoringbericht
Hinweis: Sondereffekte 2021 und 2022

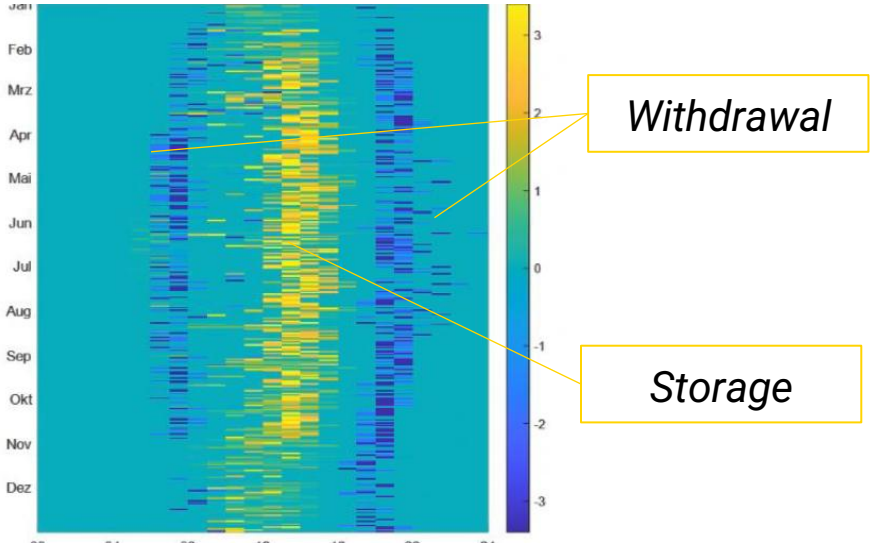
CO-LOCATION
THE CASE FÜR STORAGE NEXT TO RENEWABLE ENERGY PRODUCTION

MAKES A LOT OF SENSE BUT…

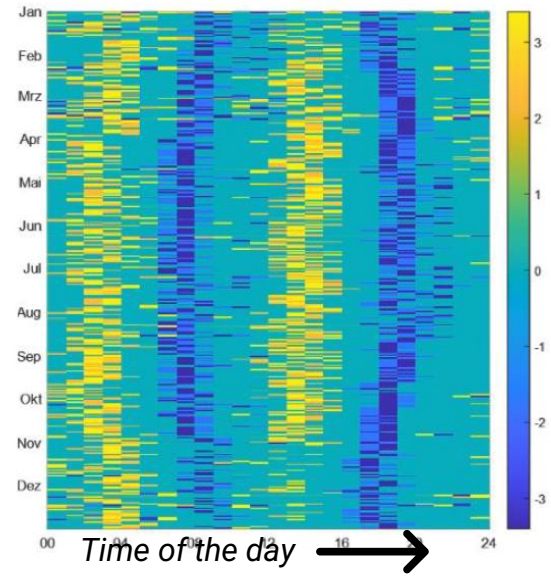
WHERE IS THE BUSINESS-CASE?

- Renewable Energy is currently mostly deployed within the EEG
- Within the EEG: Limited access for storage to energy markets
- Mostly optimisation of feed-in and forecast

Restricted Storage



Unrestricted Storage



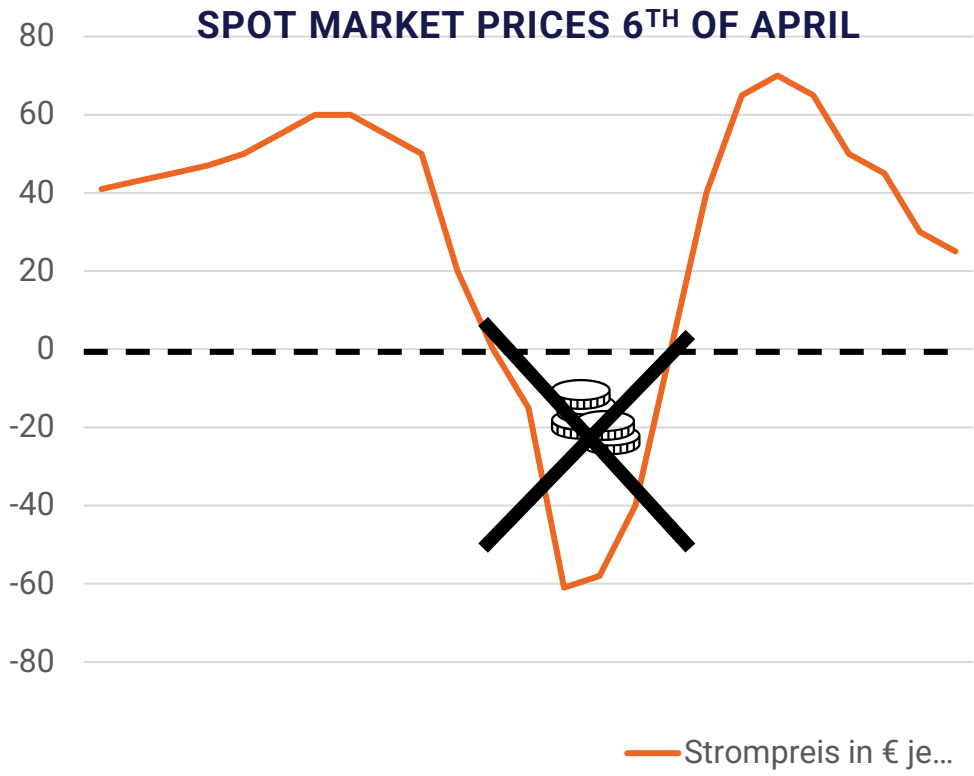
CO-LOCATION
CURRENT TRENDS

CURRENT TRENDS

- Installing storage next to PV-Plants and operate it as stand-alone
- Using available capacities of grid-connection

UPCOMING

- No renumeration for negative prices starting 2025
- Multi-Use within EEG coming Mid 2026
- Optimisation of grid usage:
  - Flexible grid connections / cable pooling
  - Digital grid connection process
  - Reservation mechanisms



COMMERCIAL & INDUSTRIAL SEGMENT

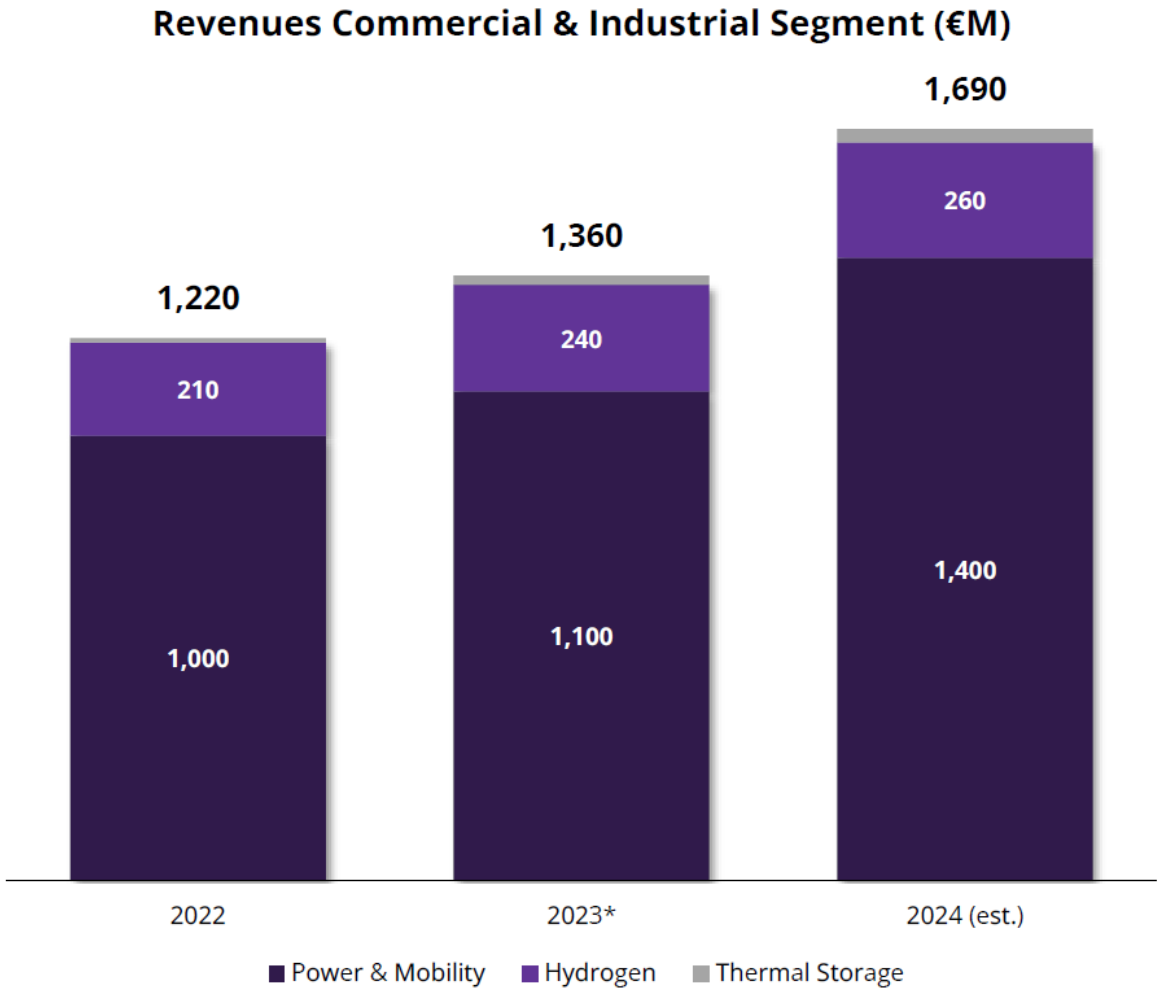
Segment with lower revenue levels and lagging growth rates

Developments in 2023

- Slight year-on-year increase in sales; drivers, above all, charging infrastructure, own generation use, insufficient grid capacity.
- Hydrogen applications also increasing, demand especially in 1-10 MW range.

Expectations for 2024

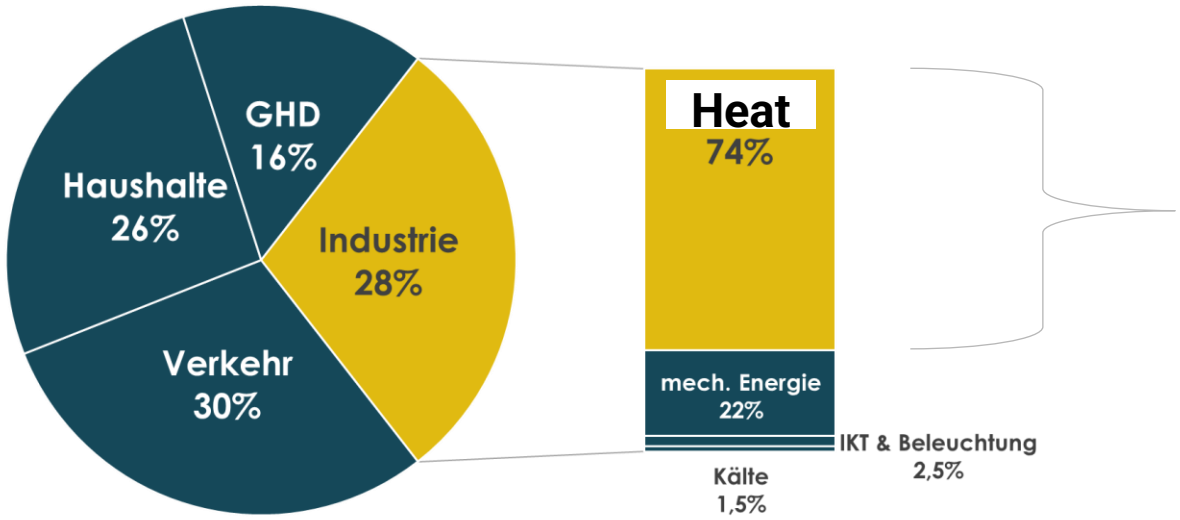
- Estimated **increase in sales of 20%** to avoid sharply rising network costs, higher self-sufficiency efforts.
- **Great potential for "behind-the-meter" storage** due to lack of market flexibility.
- Heat storage continues to be project-related, with growth perspectives e.g. in **district heating planning**.
- **Biggest obstacles:** investment security, approval processes, lack of incentives for flexibilization/decarbonization (heat).
- **Large-scale projects for hydrogen** in context of field tests/IPCEI projects with significant growth prospects from 2025 onwards.



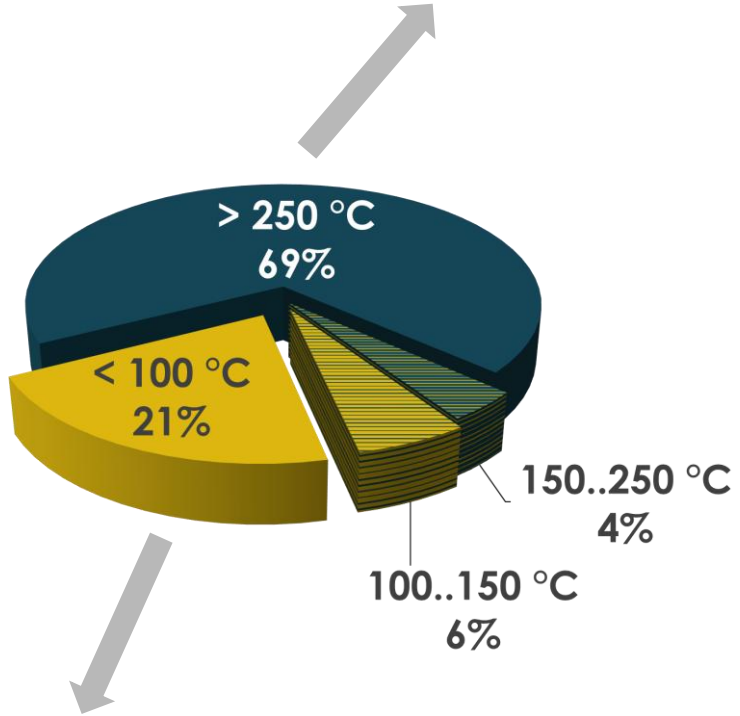
Source: 3EC

* Some figures still preliminary

ENERGY TRANSITION IN THE INDUSTRY MEANS MOSTLY HEAT TRANSITION



Temperature range > 250 = greatest impact



Temperature range < 100 = „low hanging fruits“

Datenbasis: Energiedaten BMWi, 2019

MULTI TOOL ENERGY STORAGE – FOCUS ON HEAT

Seasonal Heat Storage

Waste Heat Recovery

Process Optimization

Mobile Heat-Transportation

Thermal Heat

Decarbonization

Electricity Storage – PtHtP

Fuel-Switch

Process Heat

Steam Production

Optimization of Self-Supply

Quality of Process Heat

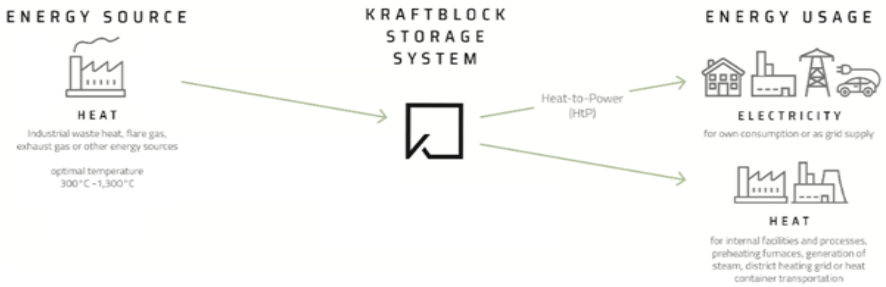
Electrification

Load Shifting

Positive & Negative Controlenergy

Sector Coupling

INDUSTRY/HEAT
BEST PRACTICE



Application: Power-to-heat storage system to decarbonise process heat in potato chip production

Technology: Granules with heat transfer media such as air, flue gas, liquid salt or thermal oil, up to 1,300°C storage temperature

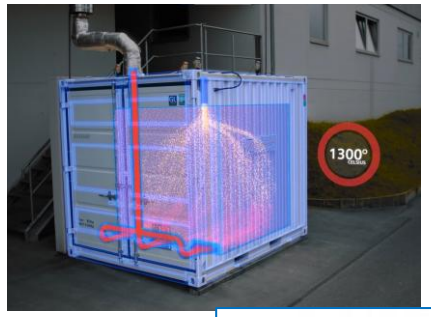
Company: Kraftblock GmbH

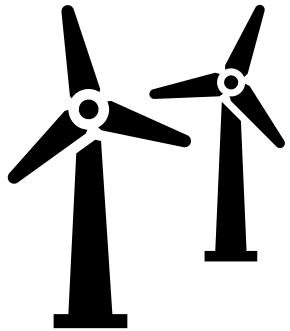
Capacity: 22 MW, > 150 MWh

Storage temperature: > 800°C

Concrete benefit: replacement of gas boiler, enable renewable process heat delivery 24/7, 8,500 t CO_2 reduction/year, enable use of local renewable resources

Further Information:
https://kraftblock.com/de/applications/industrielle-abwaerme.html





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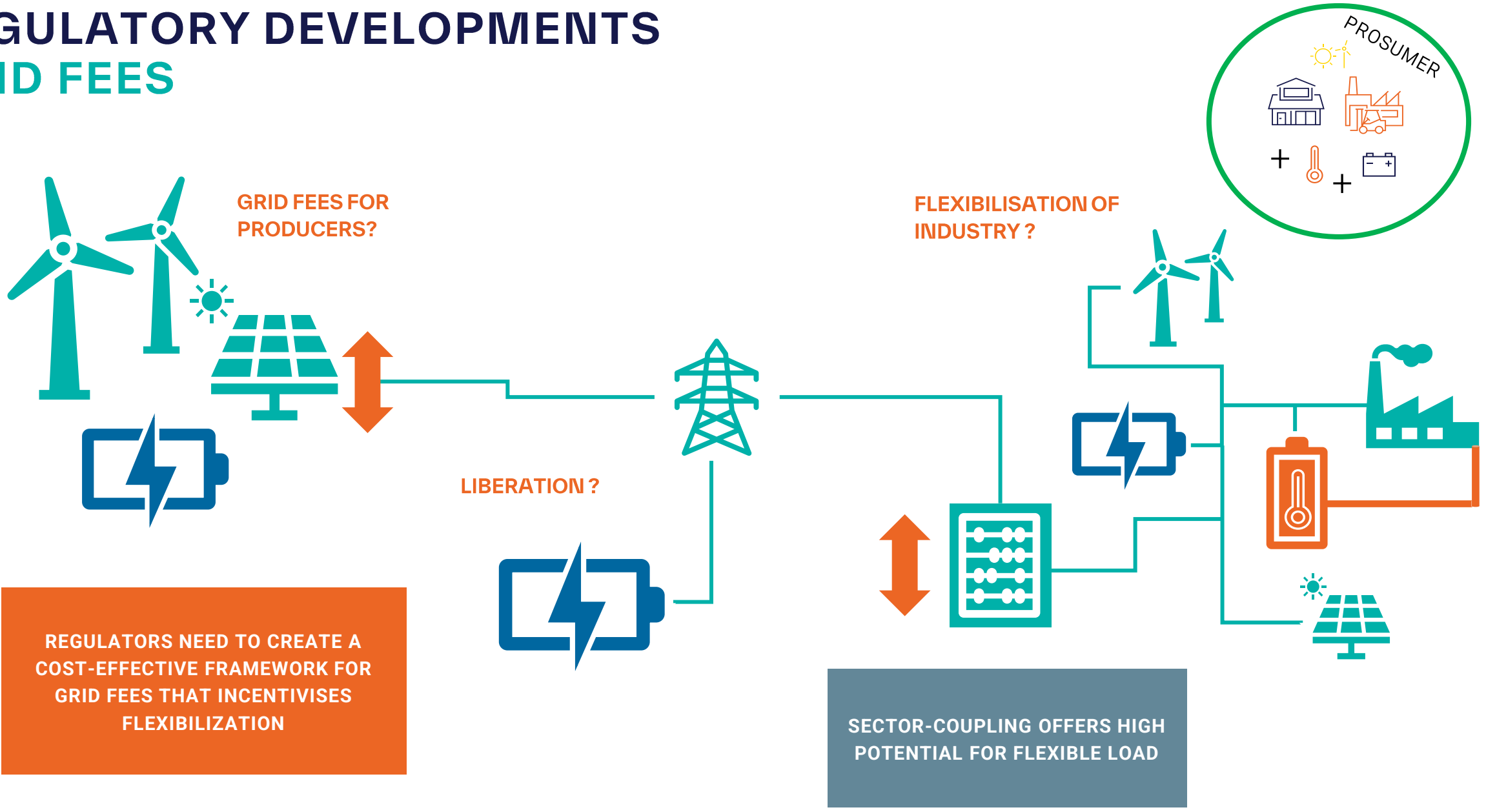
REGULATORY DEVELOPMENTS
GRID FEES



MOBILITY & CHARGING INFRASTRUCTURE
TRENDS

FAST CHARGING IS KEY

- TIME SHIFT
- FAST & MORE RELIABLE GRID CONNECTION
- LOGISTICS / ROOF TOPS
- PEAK LOAD SHAVING
- AVOIDING A COSTLY GRID EXTENSION

STORAGE PROVIDES CHARGING-POWER THAT GRID CANNOT OFFER

ALL TRUCKS BECOMING ELECTRIC!

Best Practice
Charging Solution for DB Schenker Trucks

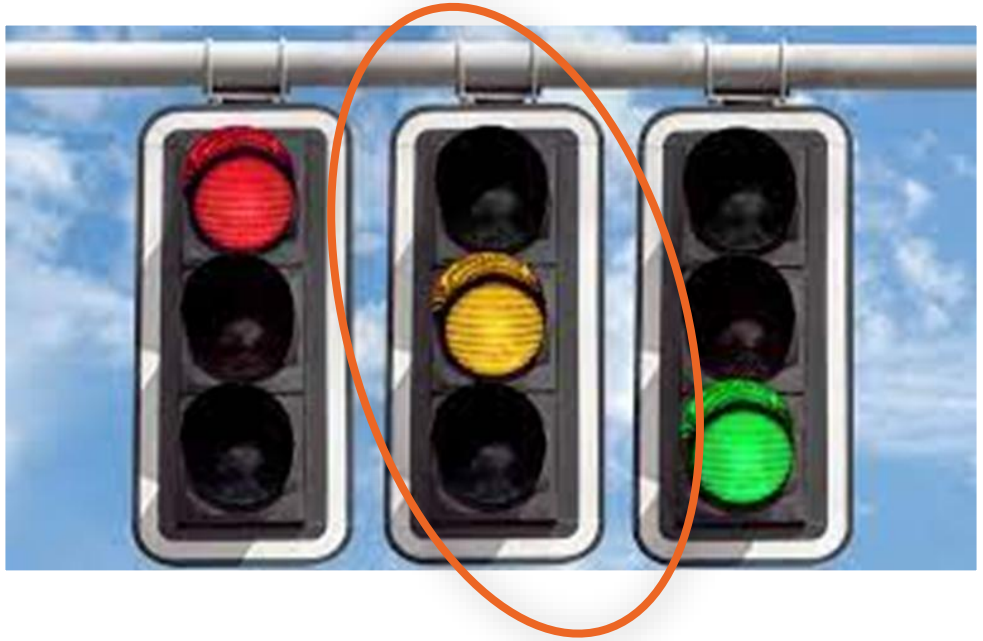
PV-Plant: 835kWp
Storage capacity: 800kwh
Charging Power: 480kW

Requirements for Charging Power for heavy trucks have been overestimated:

Transition easier than excpected.

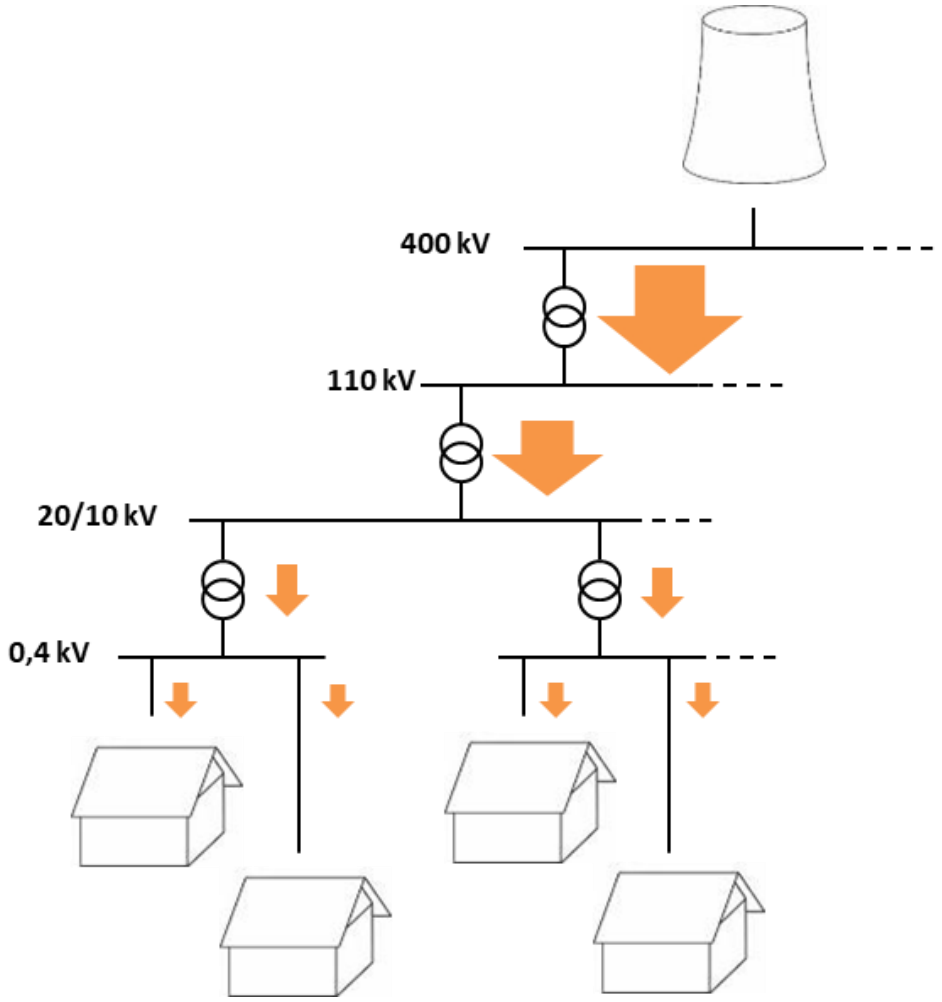
➔ **Storage can often replace grid-connection**

TECHNOLOGIES ARE READY, BUT ...

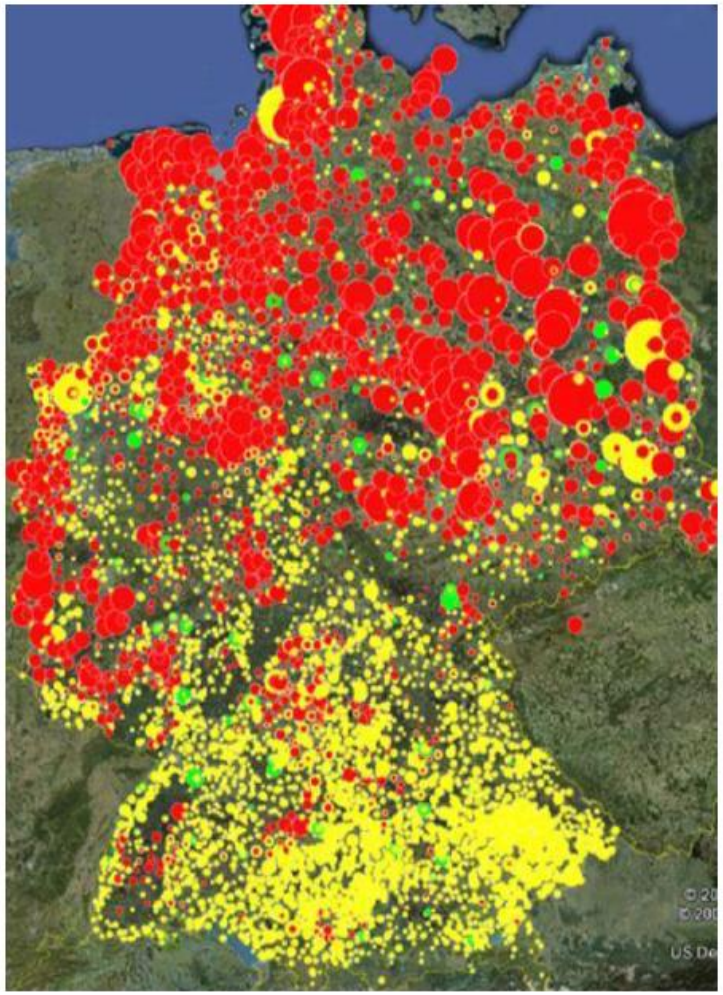


... THERE IS MOSTLY NO SUITABLE LEGAL FRAMEWORK

ENERGY LAW IS MAINLY STILL BASED ON THE OLD ENERGY SYSTEM...



… AND NOT SUITABLE FOR THE NEW ENERGY REALITY!



PREVENTIVE AND PROTECTIVE FIRE SECURITY WITH LARGE-SCALE LITHIUM ION STORAGE SYSTEM

DOWNLOAD HERE

BVES
Bundesverband Energiespeicher Systeme e.V.

ANY QUESTIONS ABOUT ENERGY STORAGE OR A MEMBERSHIP AT THE BVES?

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Federal Ministry
for Economic Affairs
and Climate Action

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Thank you for your attention!

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Senior Expert Politics & Regulation
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12.11.2024, Madrid

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και Βιομηχανικό Επιμελητήριο

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