

VOLTA-X STUTT GART  
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# BVES SECTOR ANALYSIS 2024

Development and Perspectives for the German Energy Storage Sector

# DISCLAIMER



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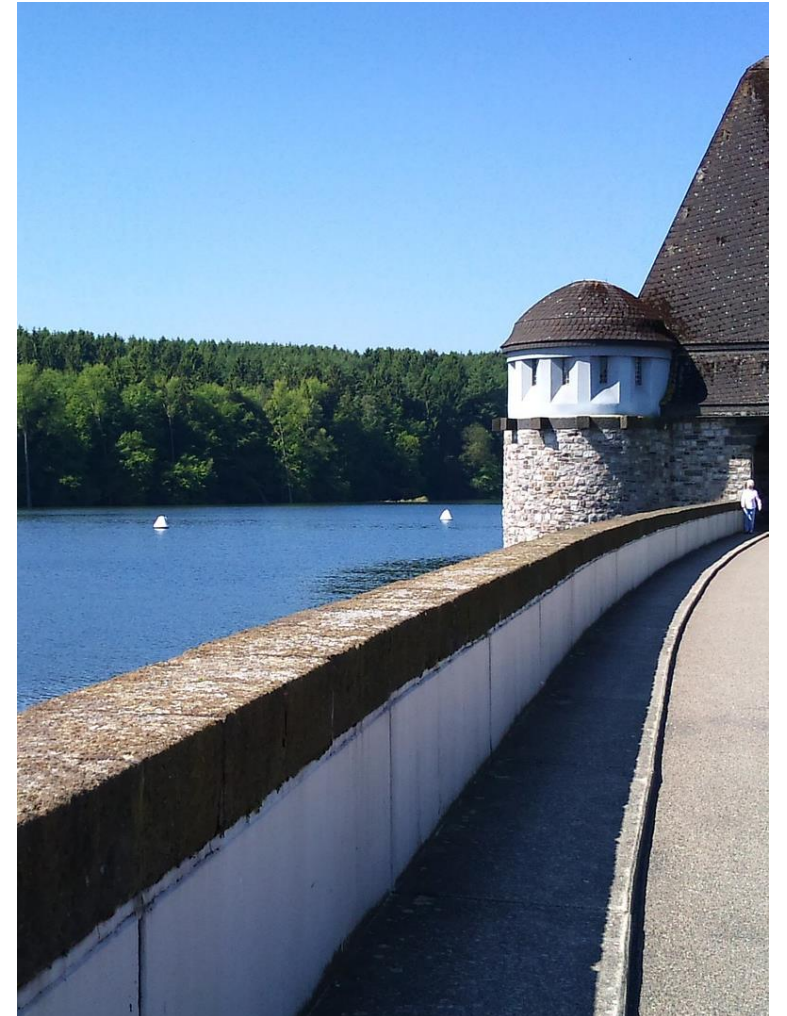
3EC explicitly point out that any forecasts of future developments are our own assessments based on currently available information.

# BVES SECTOR ANALYSIS 2024

## The German Energy Storage Sector

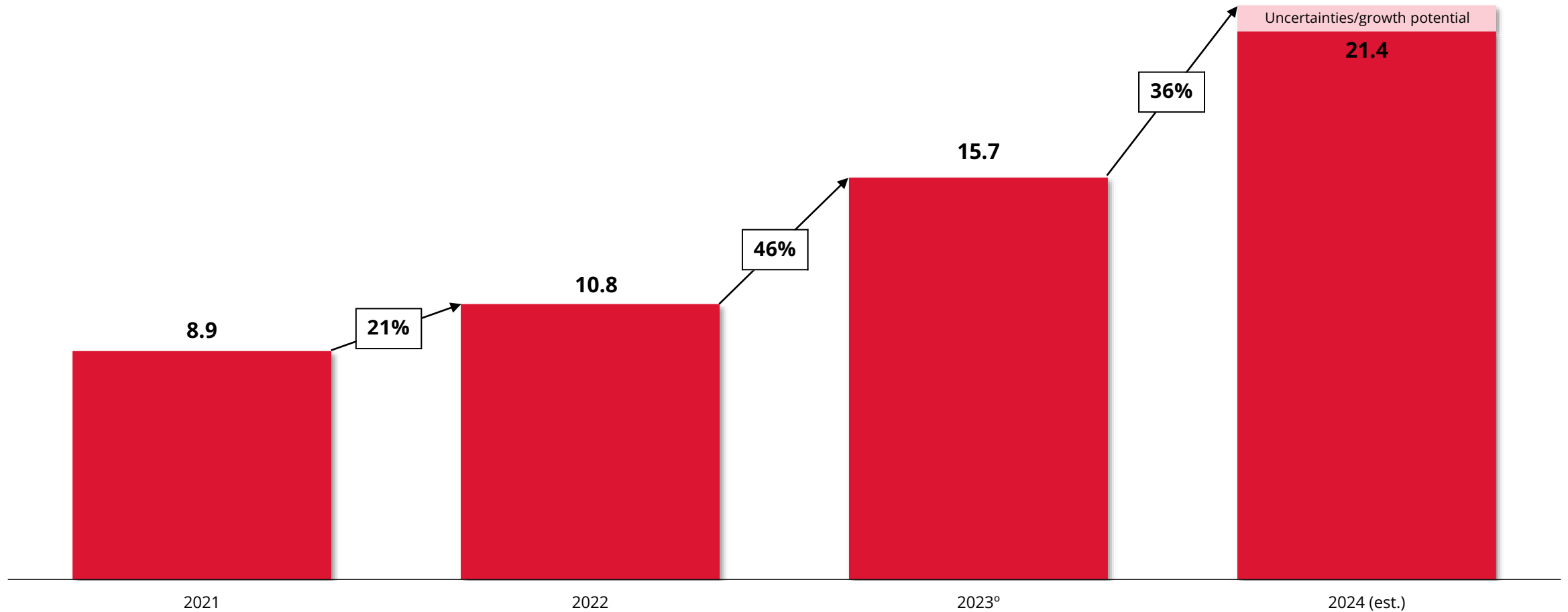
### Introduction

- Continuation of 2018-23 analyses commissioned by BVES.
- Division into application segments: Residential, commercial & industrial and utility.
- Includes thermal, mechanic, electrochemical and chemical storages as well as relevant sector coupling areas (charging stations, hydrogen).
- Determination of key figures (e.g., revenue, number of employees) through analysis of external sources and metadata as well as surveys and interviews with experts and members.



# INDUSTRY PRODUCES FURTHER JUMP IN SALES

Energy storage industry revenues\* in Germany 2021-2024 (in €B)



Source: 3EC

\* Domestic and international revenues of companies registered in Germany

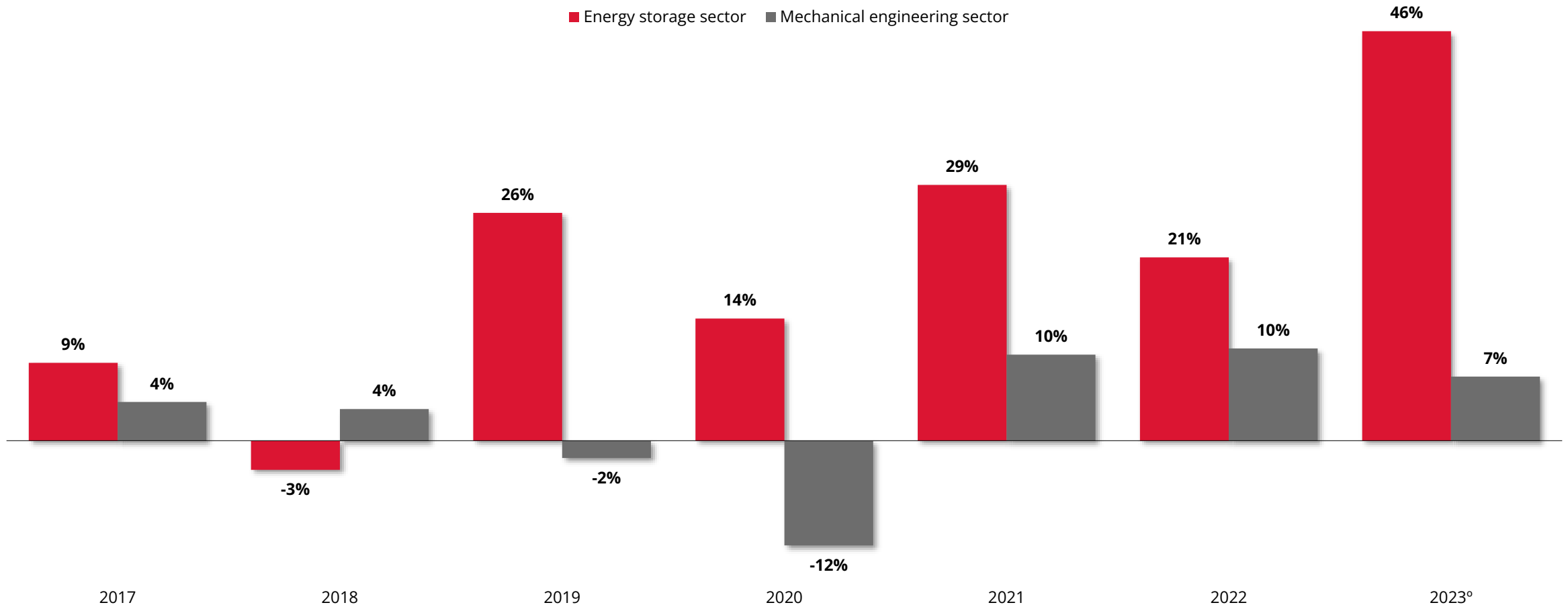
<sup>°</sup> Preliminary

# GROWTH COMPARISON

The energy storage industry continues to grow

## Revenue Growth\* Compared to Previous Year

■ Energy storage sector ■ Mechanical engineering sector



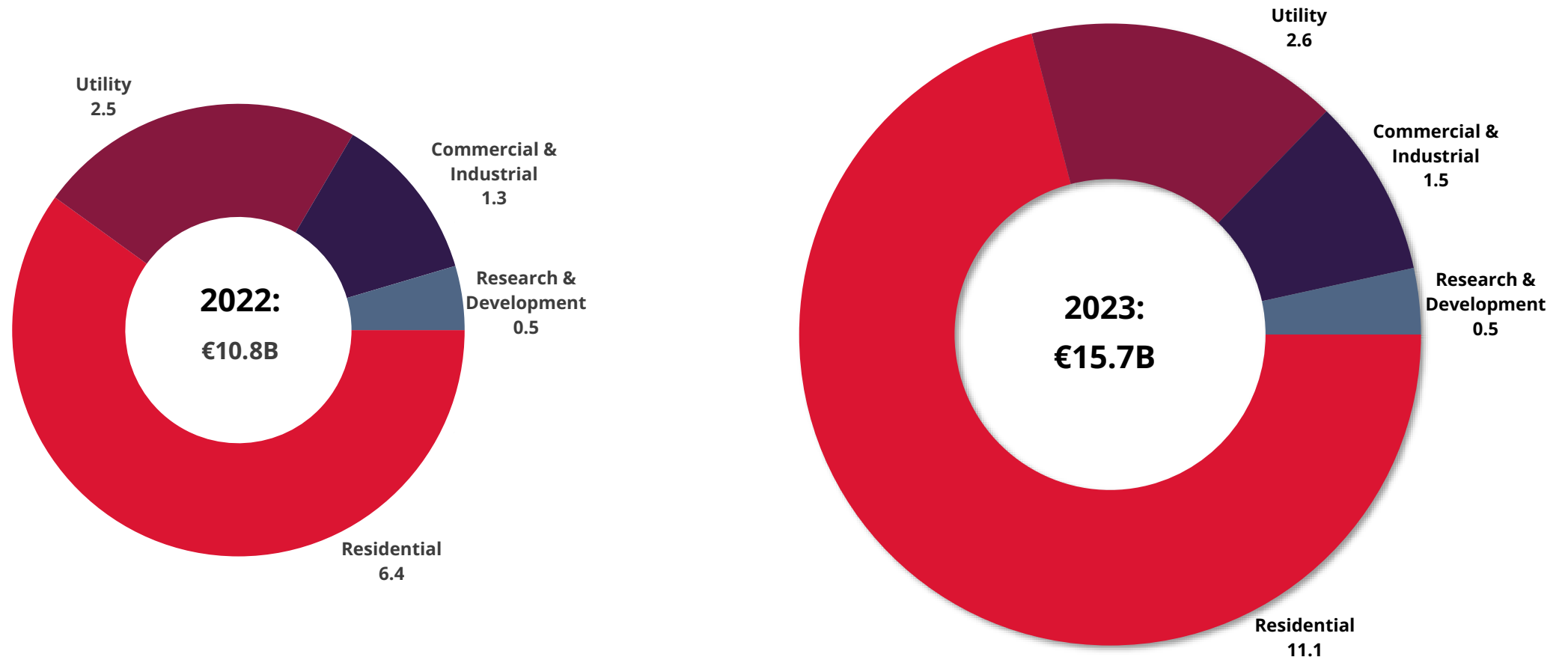
Sources: Destatis, 3EC

\* Domestic and international revenues of companies registered in Germany

° Preliminary

# ANALYSIS BY SEGMENT

2022 & 2023 revenue distribution\* in Germany (in €B)



Source: 3EC

\* Some figures still preliminary

Source: 3EC

# RESIDENTIAL SEGMENT

Unbroken trends lead to extraordinary growth rates

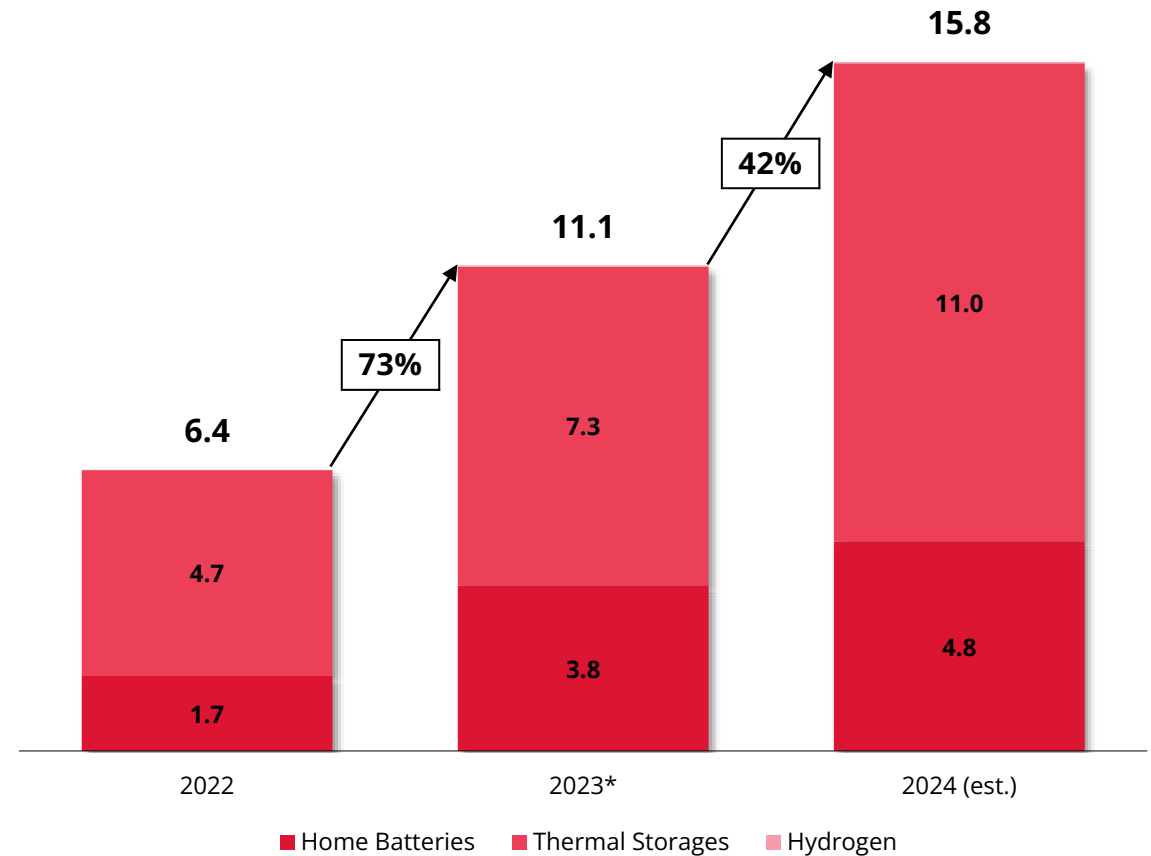
## Developments in 2023

- Growth jump of 73% to more than **€11 billion in sales**, higher than forecast last year.
- **Self-sufficiency and security of supply** continue to be main demand drivers – despite falling energy prices.
- **Storage systems becoming larger** to ensure EVs can be supplied with self-generated electricity.
- Hydrogen-based energy concepts for household applications remain at very low level.

## Expectations for 2024

- Growth to continue, but will slow down.

Revenues Residential Segment (€B)



\* Some figures still preliminary

Source: 3EC

# HOME BATTERIES IN RESIDENTIAL SEGMENT

Doubling to 2 million home storage systems possible in 2024

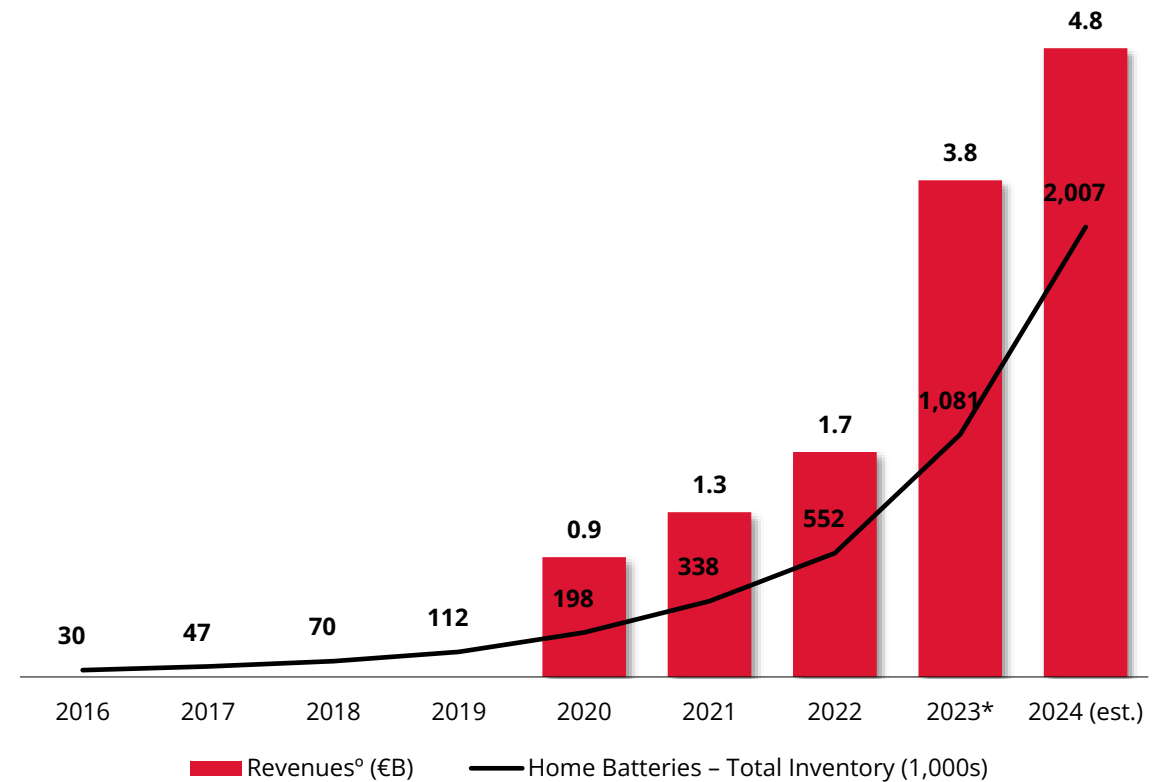
## Developments in 2023

- Revenue, inventory, capacity (now almost 10 GWh) and capacity (just under 6 GW; equivalent to output of German pumped hydro) **all doubled**.
- PV expansion and e-mobility continue to be key drivers.
- Electricity storage systems mostly **price-sensitive commodities**; share of German home storage systems has halved. Asian storage systems benefit significantly more from current demand growth.

## Expectations for 2024

- Fundamental trend continues unabated, with **strong growth** also evident in early months of 2024. More than 2 million home storage systems possible by the end of 2024, meaning ~15% of single-family homes would own home storage system.
- German home storage industry needs to become more **resilient**. Pricing policy of Chinese providers as well as disillusionment of users with "commodity" could have a negative impact.

## Home Batteries – Revenues and Inventory (Germany)



Sources: MaStR, estimates 3EC

\* Some figures still preliminary

° Recorded from 2020

# THERMAL STORAGES IN RESIDENTIAL SEGMENT

Growth rate in line with planned expansion path

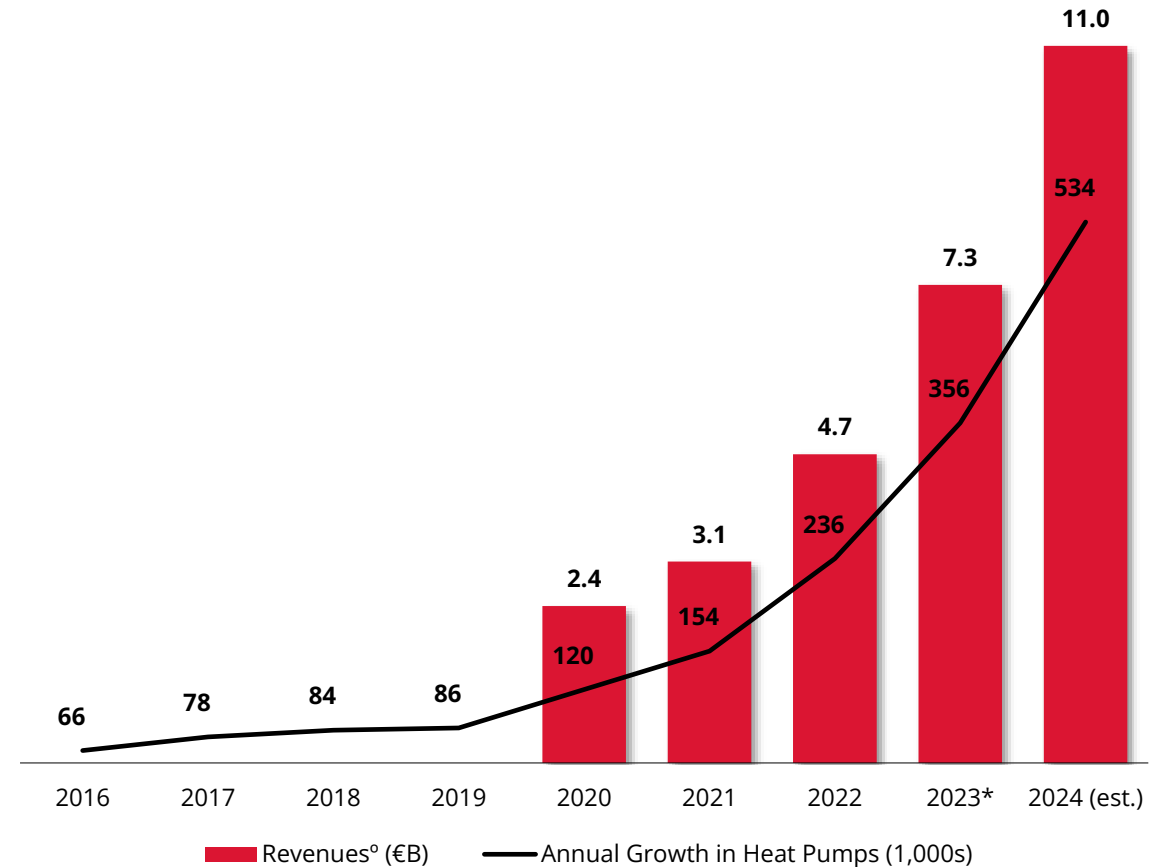
## Developments in 2023

- Despite discussions about GEG and weakening sales towards year-end, **new sales record** for heat pumps and associated heat storage systems: growth rate 150% higher than in previous year.
- **Security of supply and self-sufficiency** as drivers; Sector Coupling (use of PV generation) seen as trend.

## Expectations for 2024

- Expansion path to **more than 500,000 new heat pumps** in coming year appears possible (at same growth rate); industry prepared for this.
- However, **weak gas prices** dampening growth.

Thermal Storages – Revenues and Growth (Germany)



Sources: BWP (annual growth), estimates 3EC

\* Some figures still preliminary

<sup>°</sup> Recorded from 2020

# COMMERCIAL & INDUSTRIAL SEGMENT

Segment with lower revenue levels and lagging growth rates

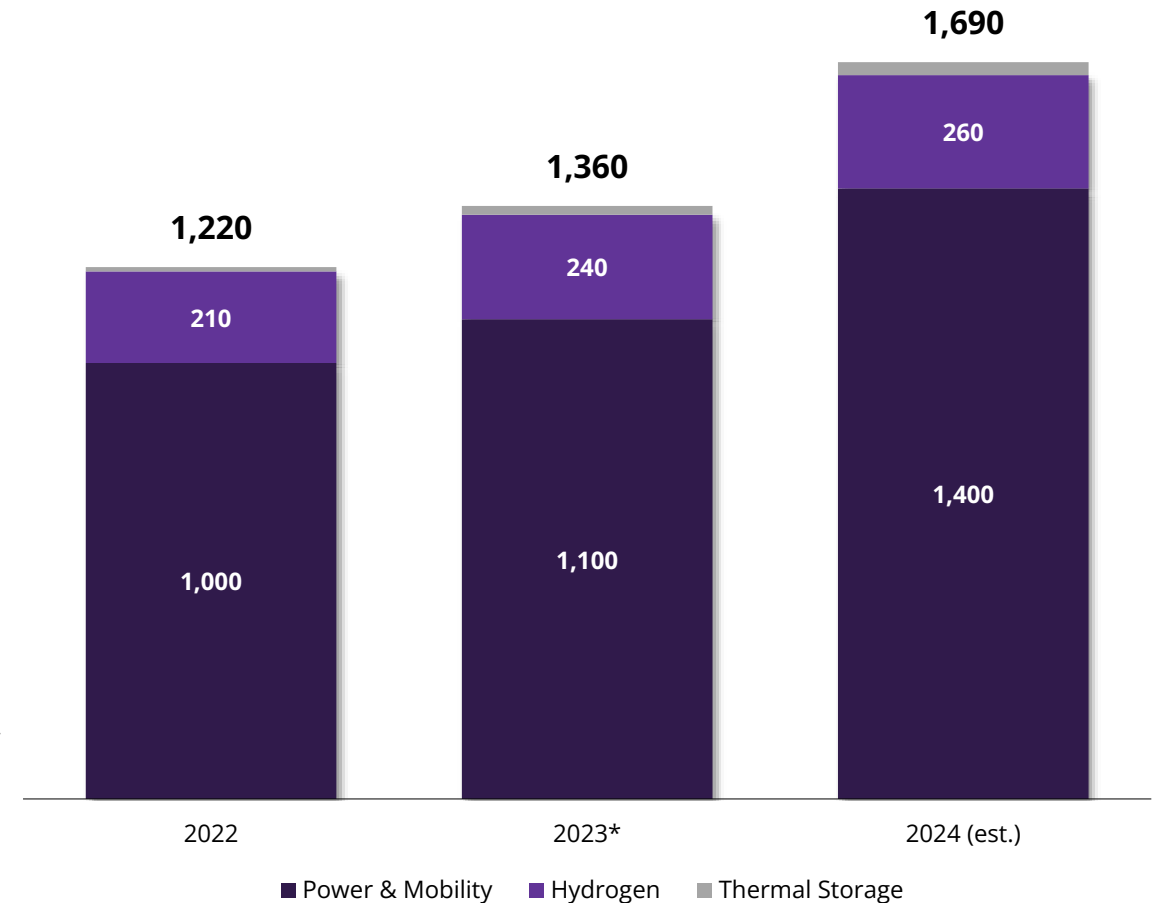
## Developments in 2023

- 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.

Revenues Commercial & Industrial Segment (€M)



\* Some figures still preliminary

Source: 3EC

# UTILITY SEGMENT

Continued strong growth in large-scale battery storage systems

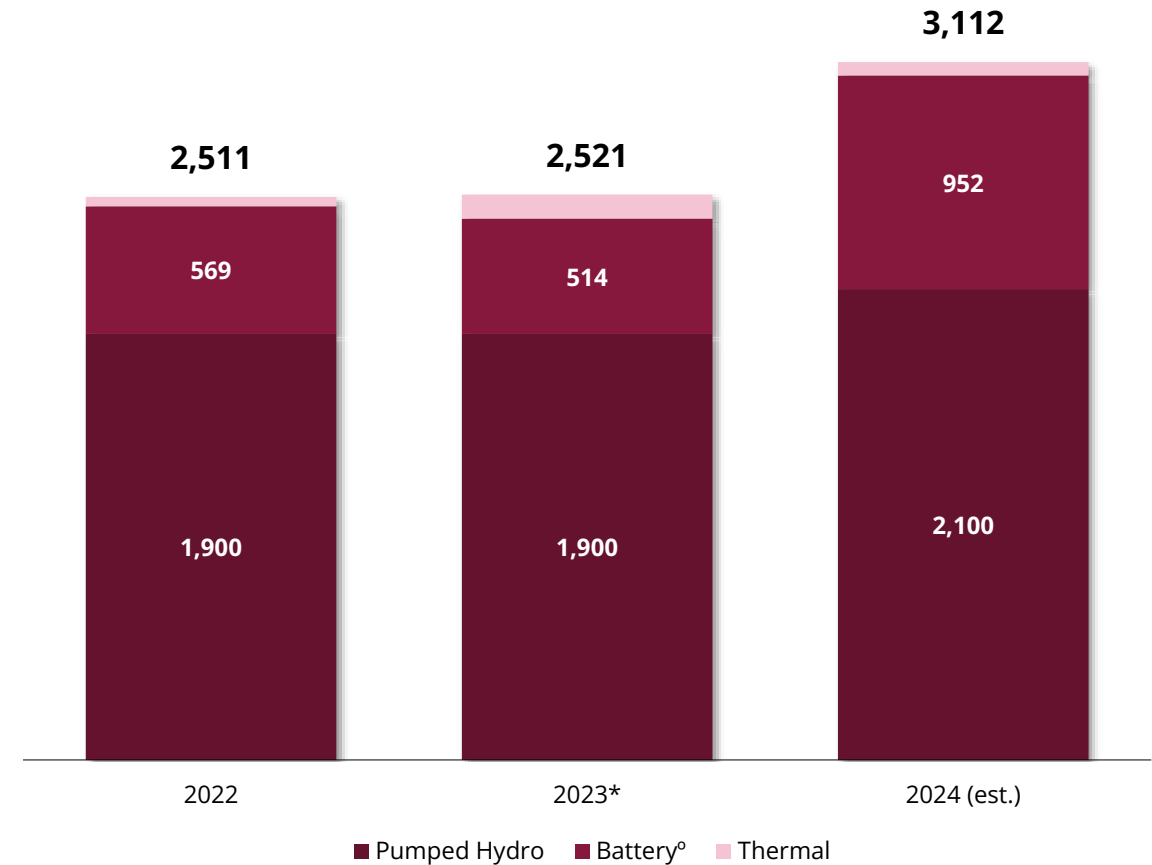
## Developments in 2023

- 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 volatile 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)



\* Some figures still preliminary

<sup>°</sup> Revenues from arbitrage activities not included

# MEMBER SURVEY AND EXPERT INTERVIEWS



# CONFIRMATION OF INDUSTRY ANALYSIS

## Representative survey of BVES members

- Targeted interviews with experts as well as decision-makers in energy storage industry, combined with representative survey among BVES members.
- Energy storage industry highly diversified, with participants reflecting this.

**Activity Areas of Survey Participants  
(multiple selections possible)**

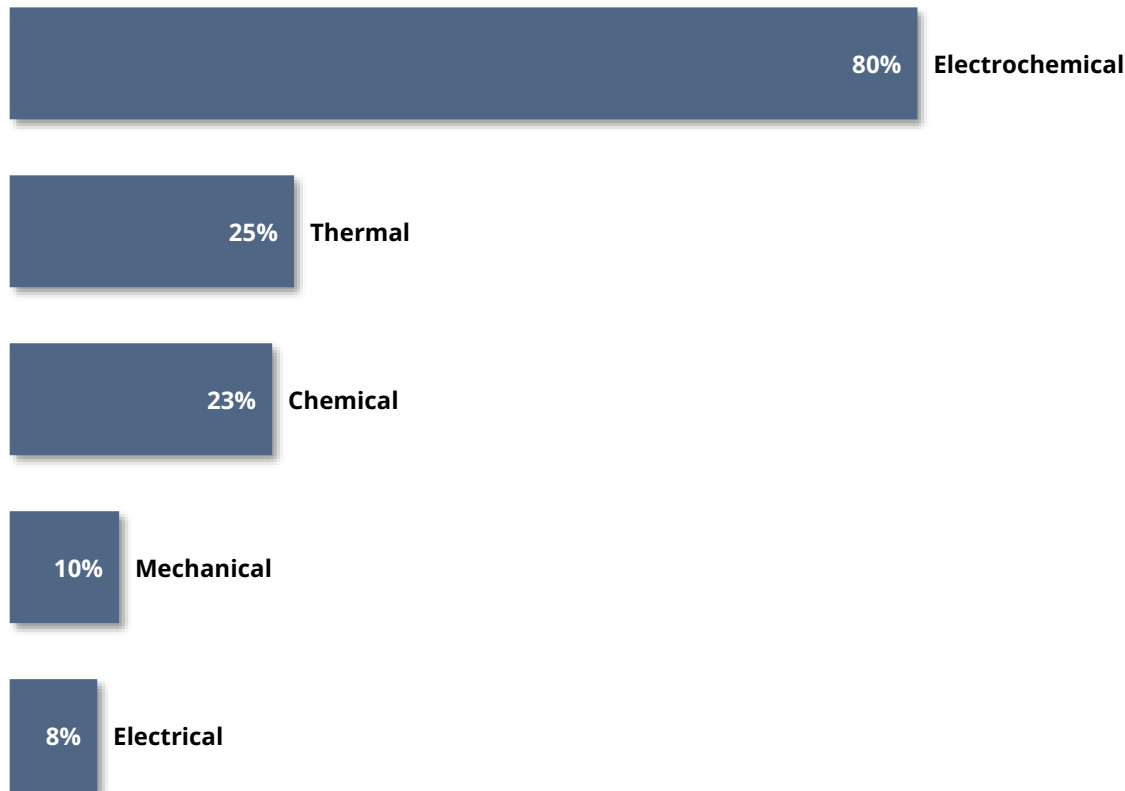


Source: 3EC

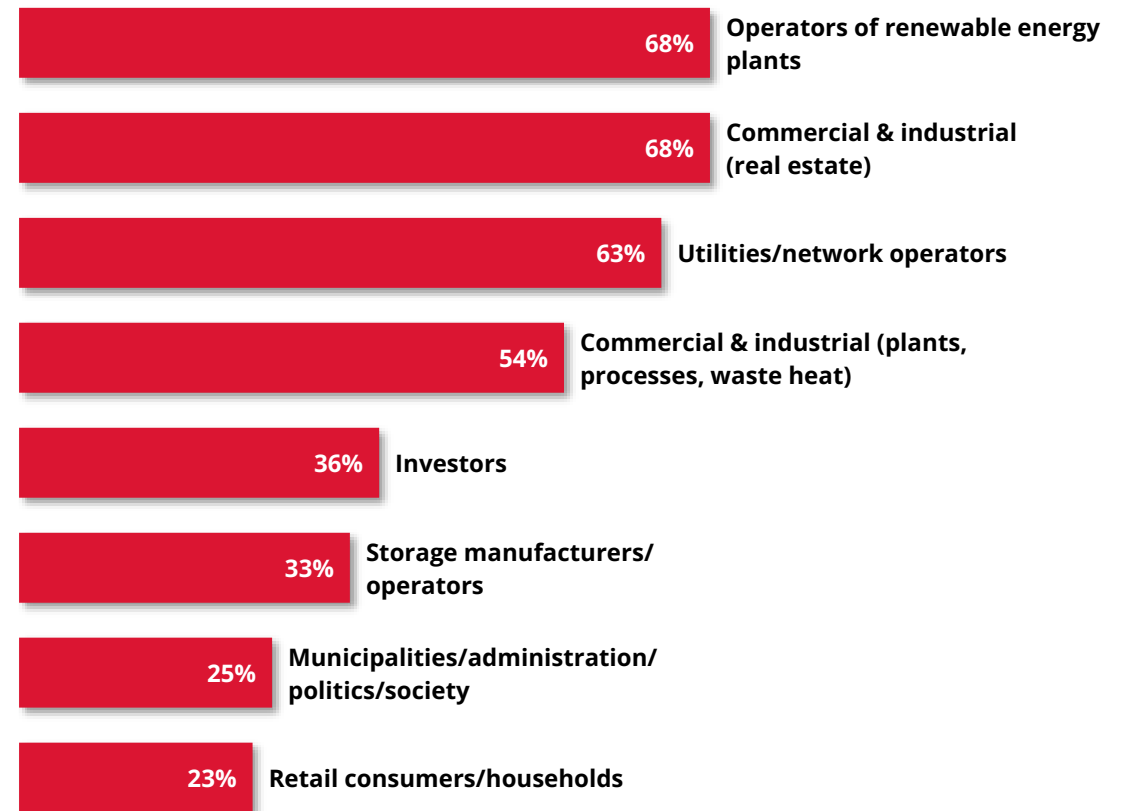
# ELECTROCHEMICAL SYSTEMS CONTINUE TO DOMINATE

... but target groups are relatively evenly distributed

### Storage Technology(ies) in Company's Focus



### Target Groups (multiple responses possible)



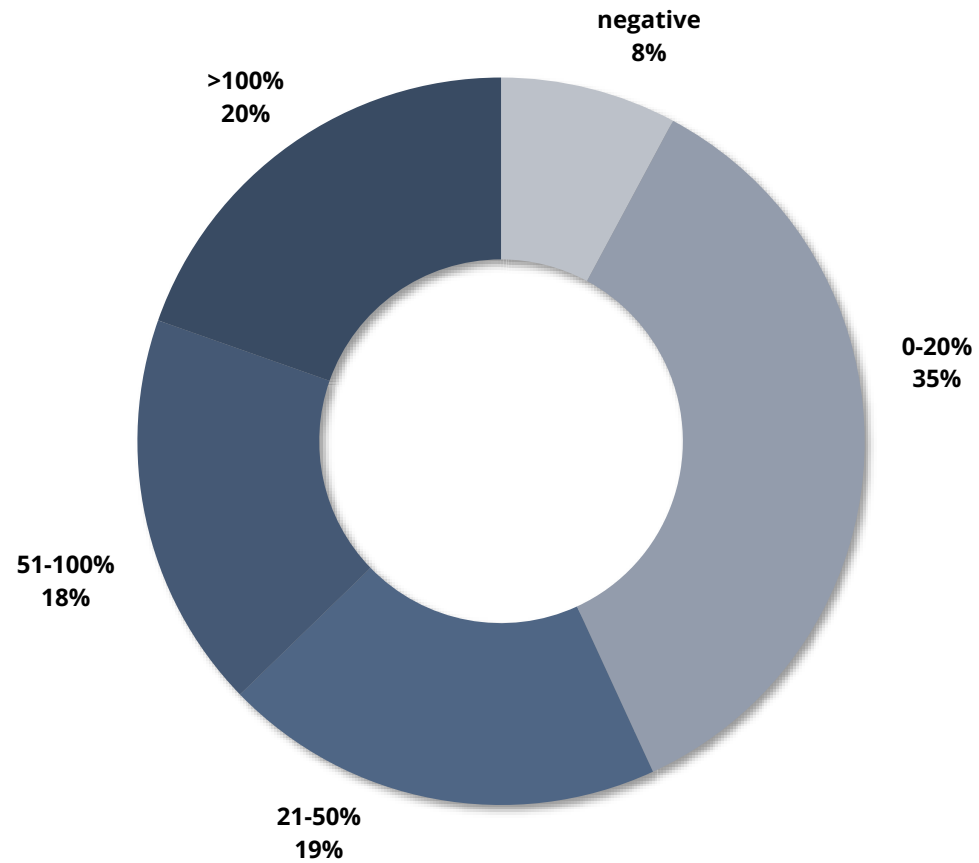
Source: 3EC

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# REVENUE GROWTH AND CHALLENGES IN 2023

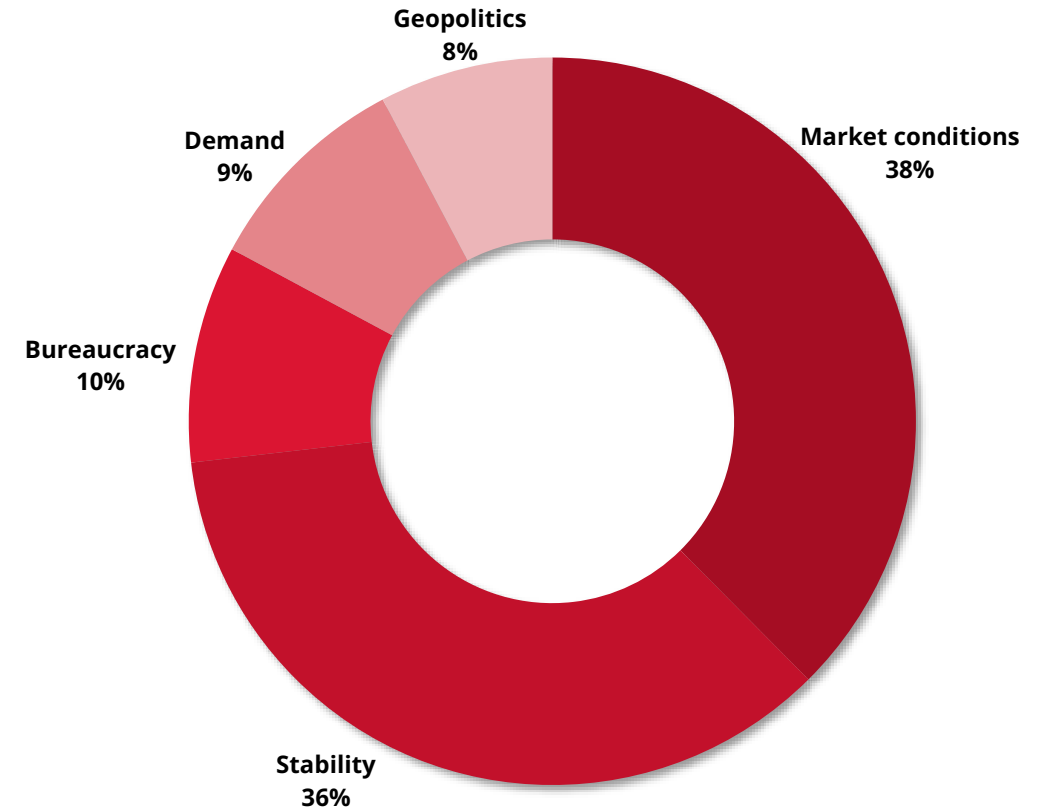
Clear majority with increase in sales, but wide range of influences on business activities

### Sales Development Compared to 2022



Source: 3EC

### Significant Risks to Business Activities



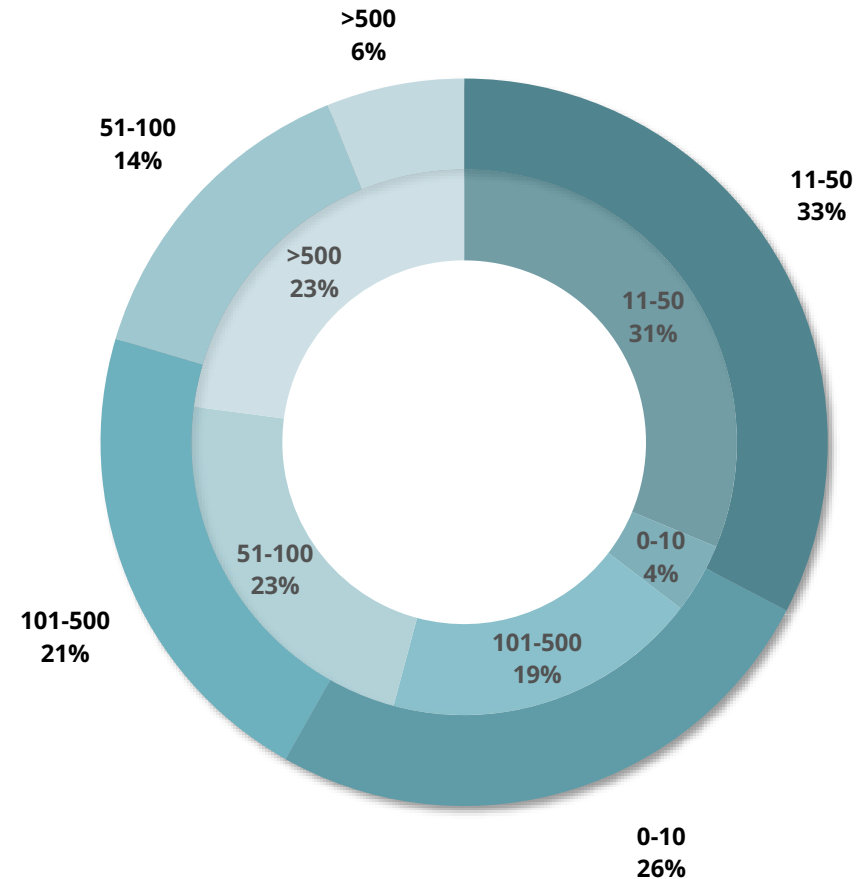
Source: 3EC

# SHORTAGE OF SKILLED WORKERS REMAINS MAJOR OBSTACLE

Industry still expects staff growth in 2024

- More than a third of the survey participants cite **shortage of skilled workers** as major obstacle.
- Nearly **50%** were **unable to meet staffing needs** in 2023.
- **More than 90%** of companies plan to hire more employees in 2024.

Company Size (Employees),  
2023 (outer) vs. 2022 (inner)

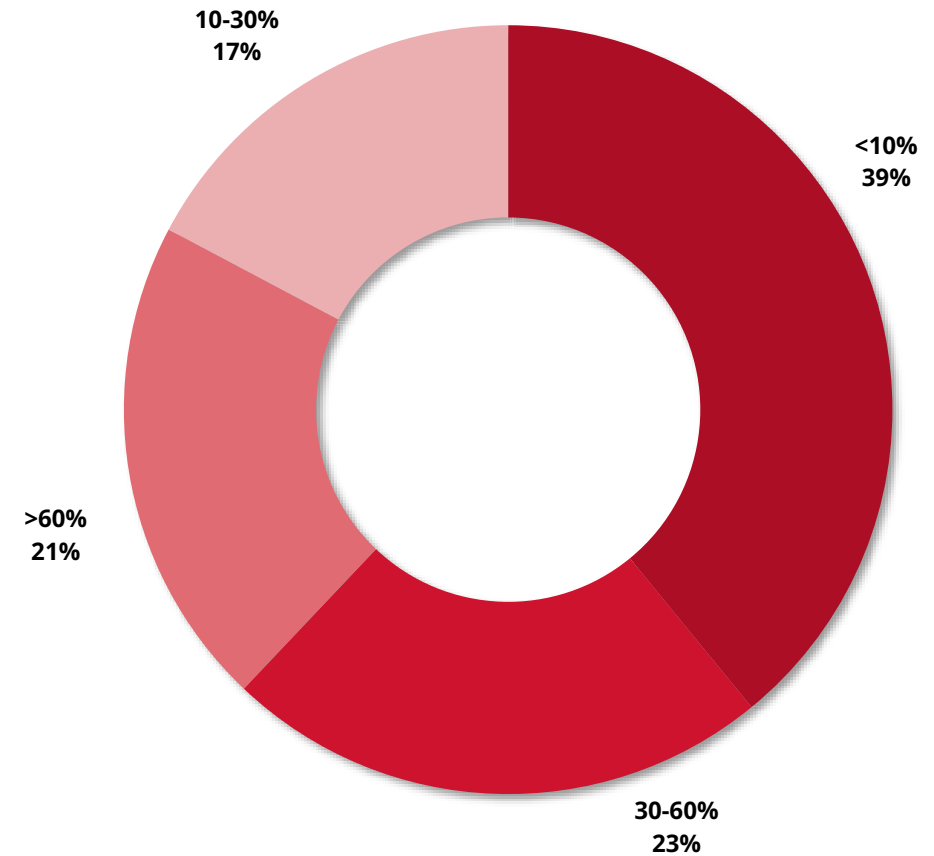


Source: 3EC

# STRONG INTERNATIONAL FOCUS

- German energy storage industry becoming more and more export-oriented, but pace slowing down.
- Very active both in Europe and outside the continent.

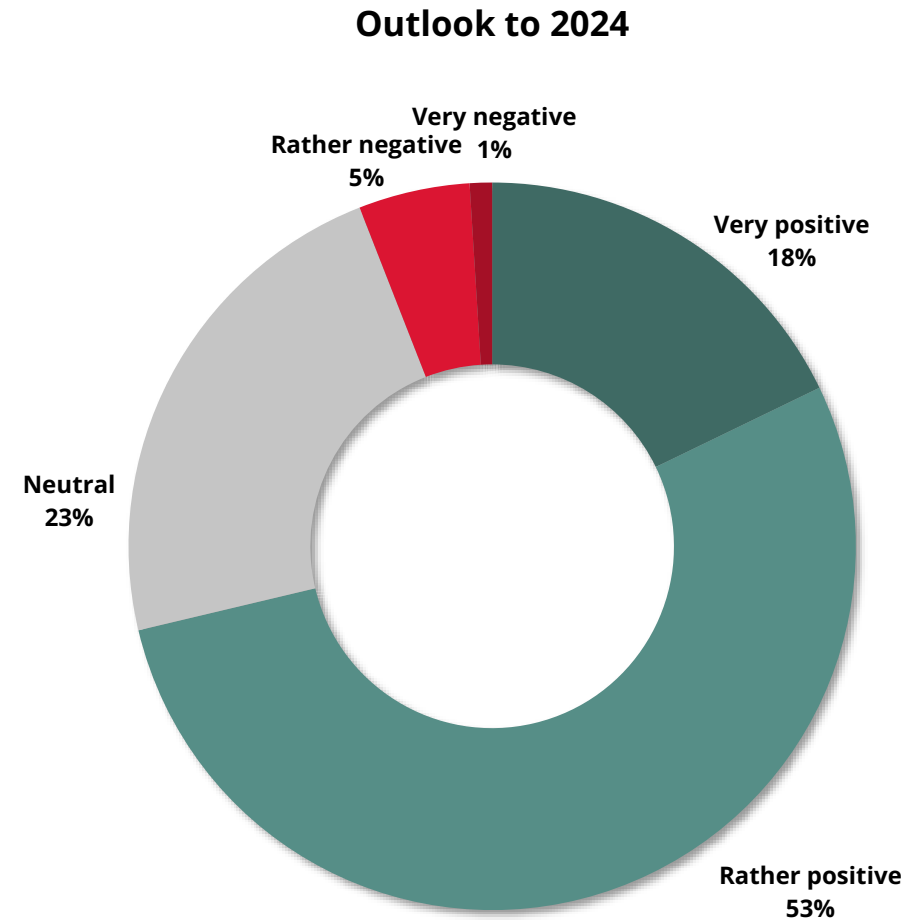
**International Business's Share of Total Revenues**



Source: 3EC

# OUTLOOK TO 2024

- **Market prospects** largely viewed positively, but more positive assessments are weakening significantly.
- **International business** for more than 50%, as in prior year, biggest growth driver.
- **USA** continues to be seen as very attractive thanks to IRA, but **other European countries** also becoming more interesting again. **Australia** often mentioned as specific growth market.
- **90%** of respondents see future **improvements in regulatory framework** for energy storage systems, but overwhelmingly do not expect rapid progress.
- Optimistic prospects for positive **political and regulatory changes**, especially at European and federal level.



Source: 3EC

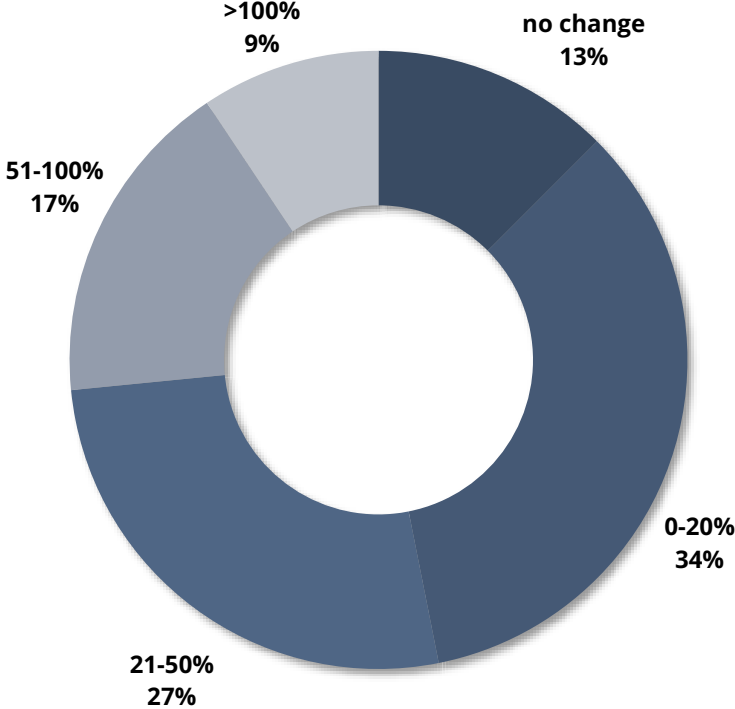
# GROWTH POTENTIAL FOR 2024

- Growth potential, especially in C&I segment, seen in all areas.
- Electricity segment said to currently offers most attractive prospects.
- Comparatively low relative growth in area of e-mobility for households.

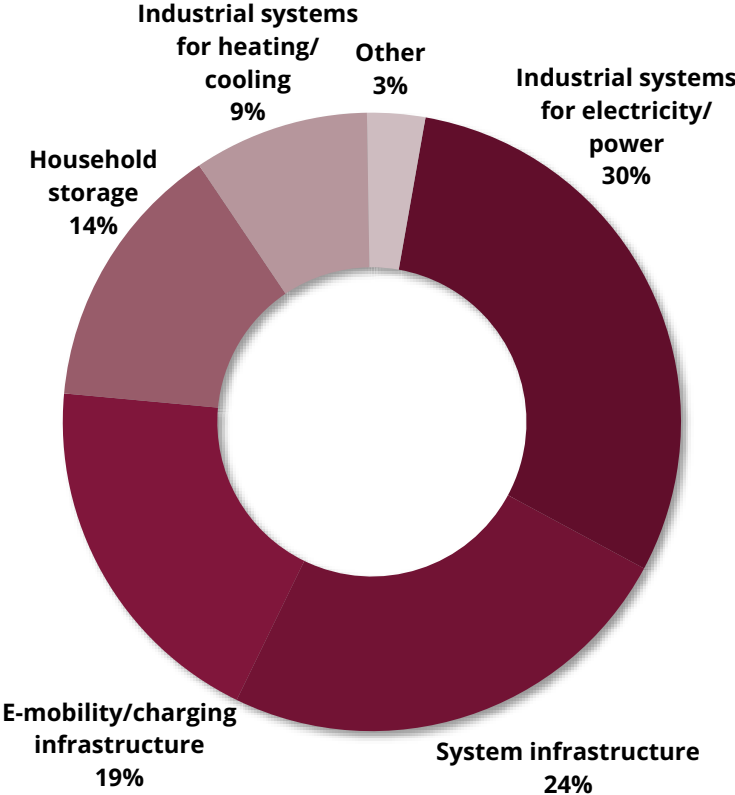
Market segments and sectors with highest growth potential

	Electricity	Heat	E-mobility
C&I	22%	11%	9%
Utility	18%	4%	14%
Households	8%	9%	5%

Expected Revenue Development Compared to 2023



Market Areas with Strongest Expected Revenue Development



Source: 3EC

Source: 3EC

# MANY THANKS



Lars Berensen

+49 (0) 172 410 66 55

[lars.berensen@3ec.energy](mailto:lars.berensen@3ec.energy)

Jörg Blaurock

+49 (0) 152 341 283 59

[joerg.blaurock@3ec.energy](mailto:joerg.blaurock@3ec.energy)

Pavel Wilhelm Kusch

+49 (0) 175 671 310 5

[pavel.kusch@3ec.energy](mailto:pavel.kusch@3ec.energy)

Florian Reichel

+49 (0) 176 565 345 08

[florian.reichel@3ec.energy](mailto:florian.reichel@3ec.energy)