

BERLIN
06.04.2022

BVES SECTOR ANALYSIS 2022

Development and Perspectives
for the German Energy Storage Sector

BVES SECTOR ANALYSIS 2022

The German Energy Storage Sector

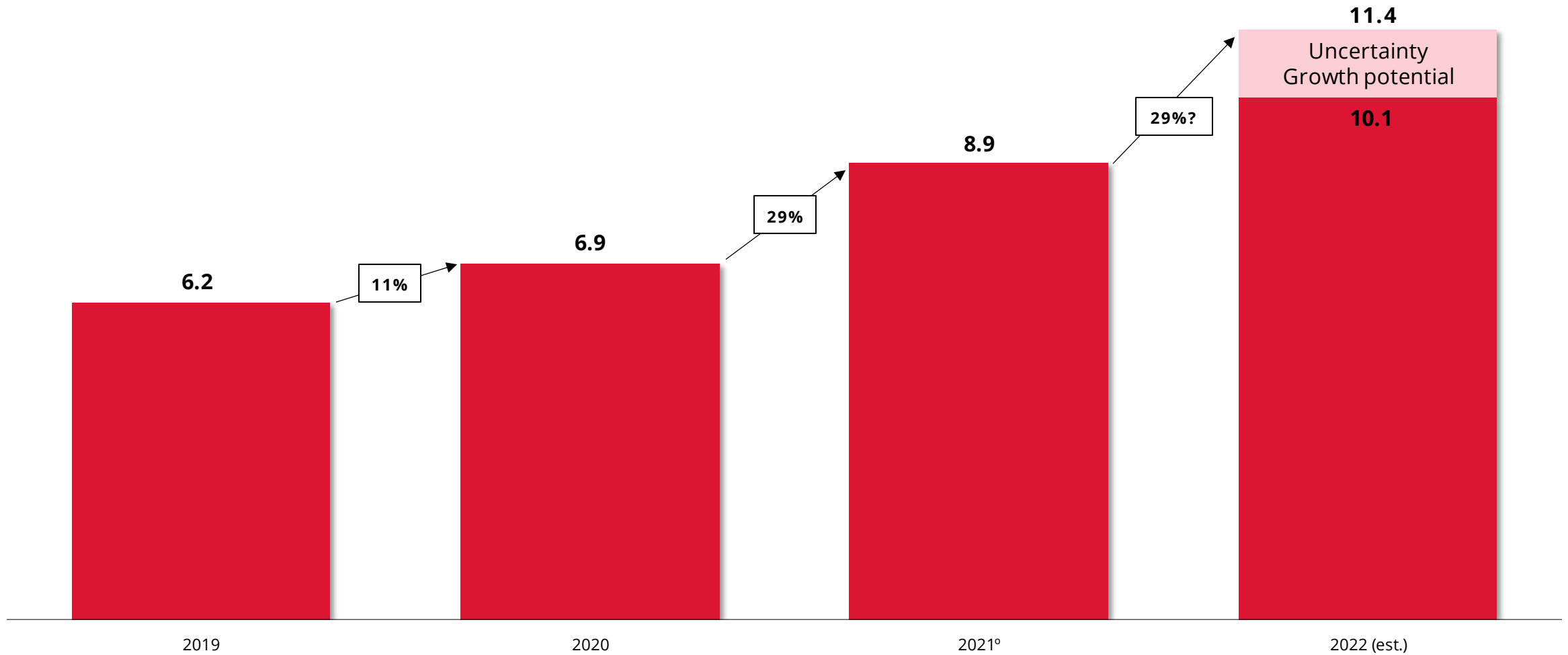
Sector Analysis 2022

- Continuation of 2018-21 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.



CONTINUED STRONG GROWTH

Revenues* of the Energy Storage Business in Germany 2019-2022 (in €B)



* Domestic and international revenues of companies registered in Germany

° Preliminary

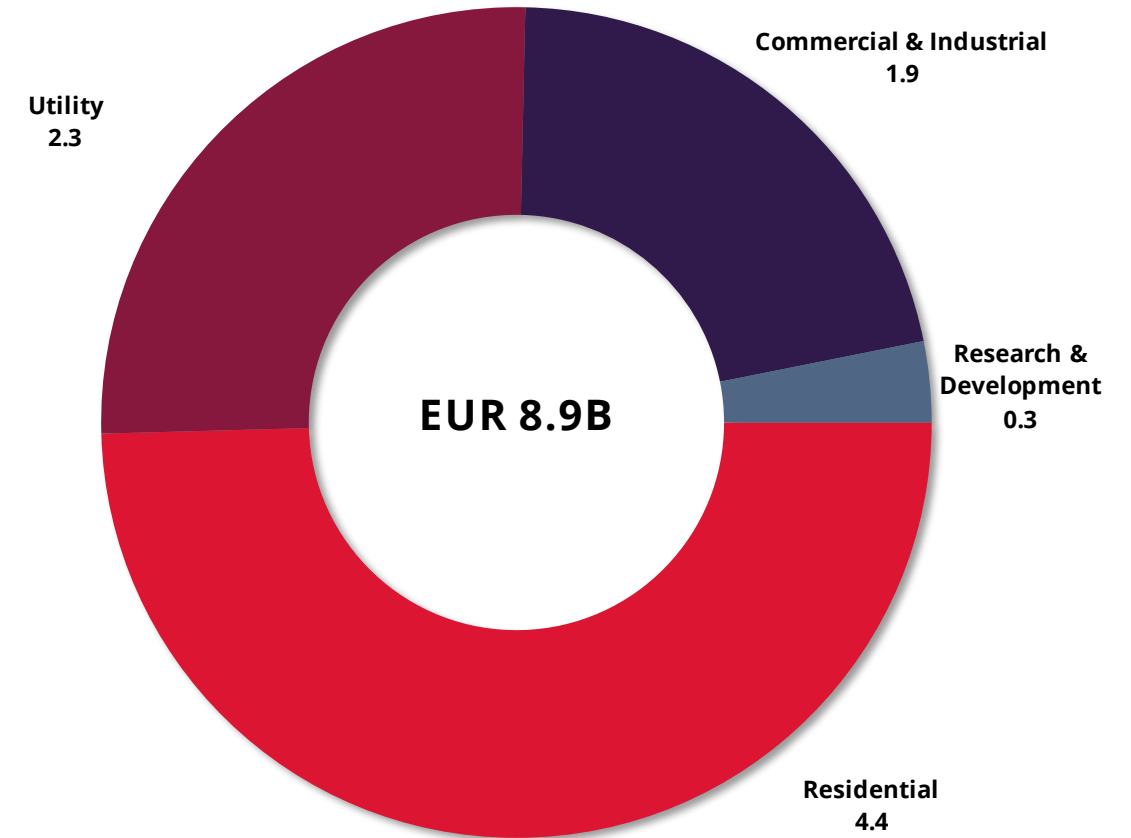
Source: 3EC

ANALYSIS BY SEGMENT

2021 Revenue Distribution* in Germany (in €B)

Developments in 2021

- Residential storage largest segment. Strong growth in both home and heat storages.
- Utility revenues stable. Segment dominated by pump storage.
- Recovery from prior year revenue dip in commercial & industrial segment. Further growth expected for 2022.
- Hydrogen storage showing first signs of commercial applications; so far still mainly used in field tests.



* Some figures still preliminary

Source: 3EC

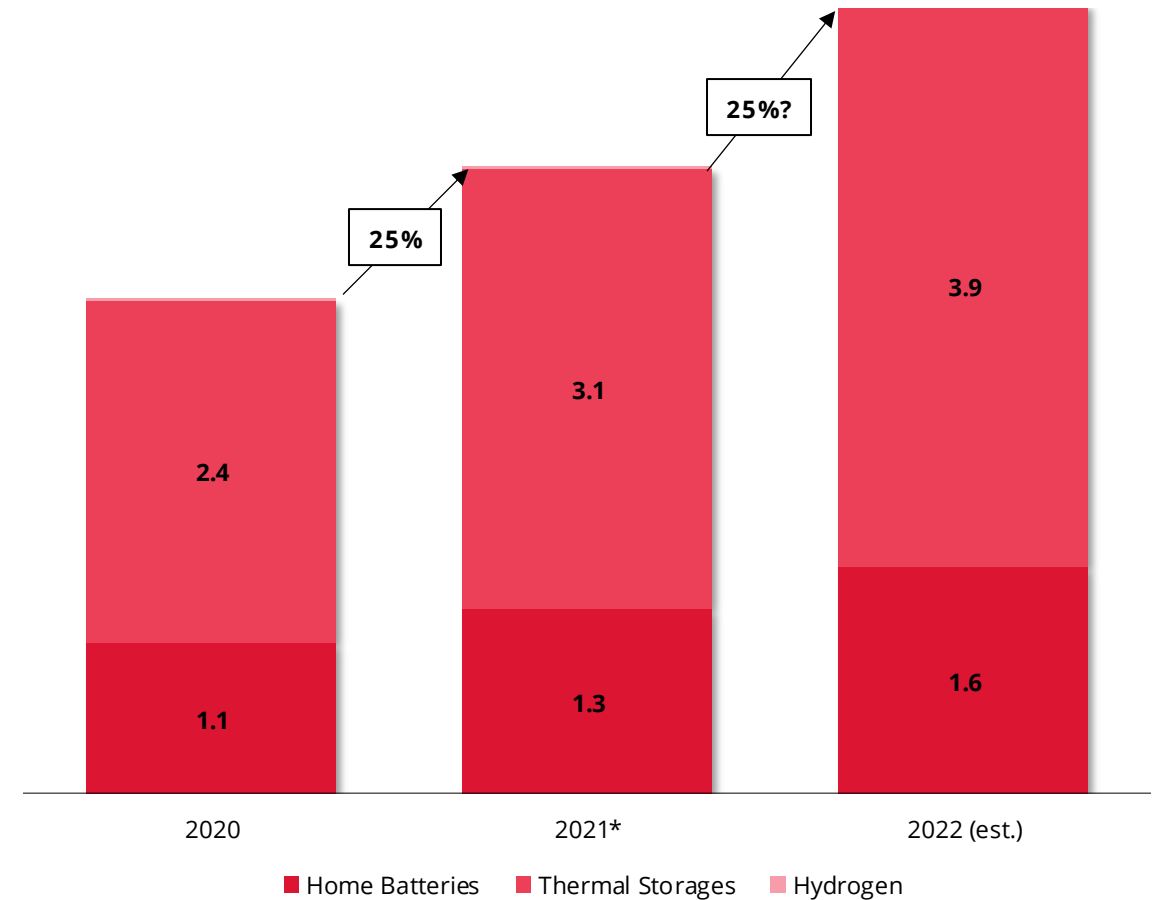
RESIDENTIAL SEGMENT

Strongest Contributor with over €4B Revenues

Developments in 2021

- Resilience, self-sufficiency and security of supply considerations, as well as rising energy costs, driving strong segment growth.
- High energy costs and supply concerns seen as drivers for further gains in 2022.
- Few viable hydrogen-based concepts for residential segment. However, strong demand observed.

Revenues Residential Segment (€B)



* Some figures still preliminary

Source: 3EC

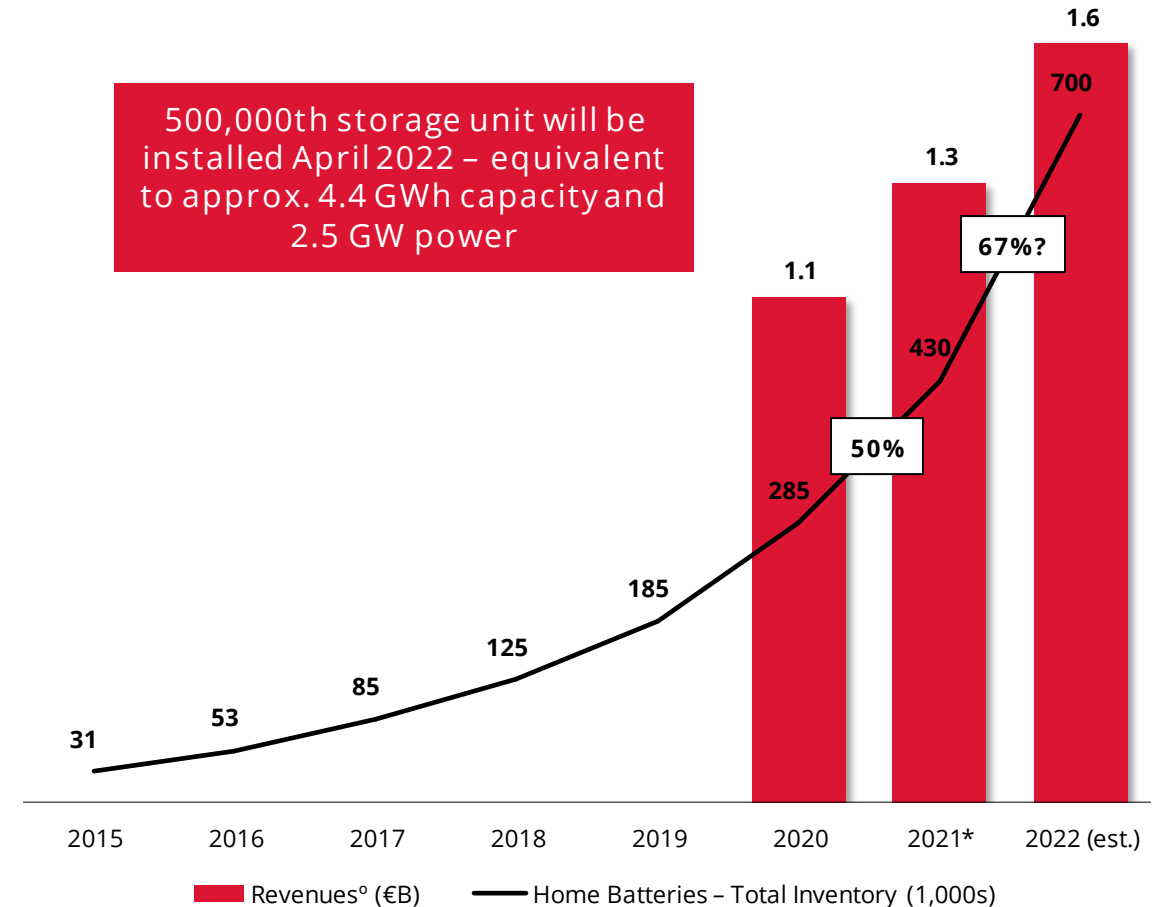
HOME BATTERIES IN RESIDENTIAL SEGMENT

High Demand Driving Record Revenues

Developments in 2021

- Resilience, self-sufficiency and e-mobility as well as proliferation of solar driving growth: 2020 number of solar installations (up to 20 kW) more than doubled[†] to over 200,000 units.
- Sector coupling becoming more commonplace: 30% of households with solar and storage also have a heat pump, 10% also own an EV[‡] (with percentages projected to be much higher in 2022).
- Storage capacity keeps growing (from 6.8 kWh in 2017 to 8.8 kWh in 2021).
- Market continues to be dominated by 3 large German providers. Share of foreign participants has shrunk in 2021.
- Strong growth expected to continue: Home batteries no longer seen as luxury item in light of security of supply and price concerns. Persistent high demand for e-mobility and solar.

Home Batteries – Revenues and Inventory (Germany)



Source: [ISEA RTWTH Aachen](#) 2022 (inventory), estimates 3EC

* Some figures still preliminary

[°] Recorded from 2020

[†] "Studie Stromspeicher Inspektion 2022"

[‡] "ISEA RWTH Aachen für Speichermonitoring BW in 2019"

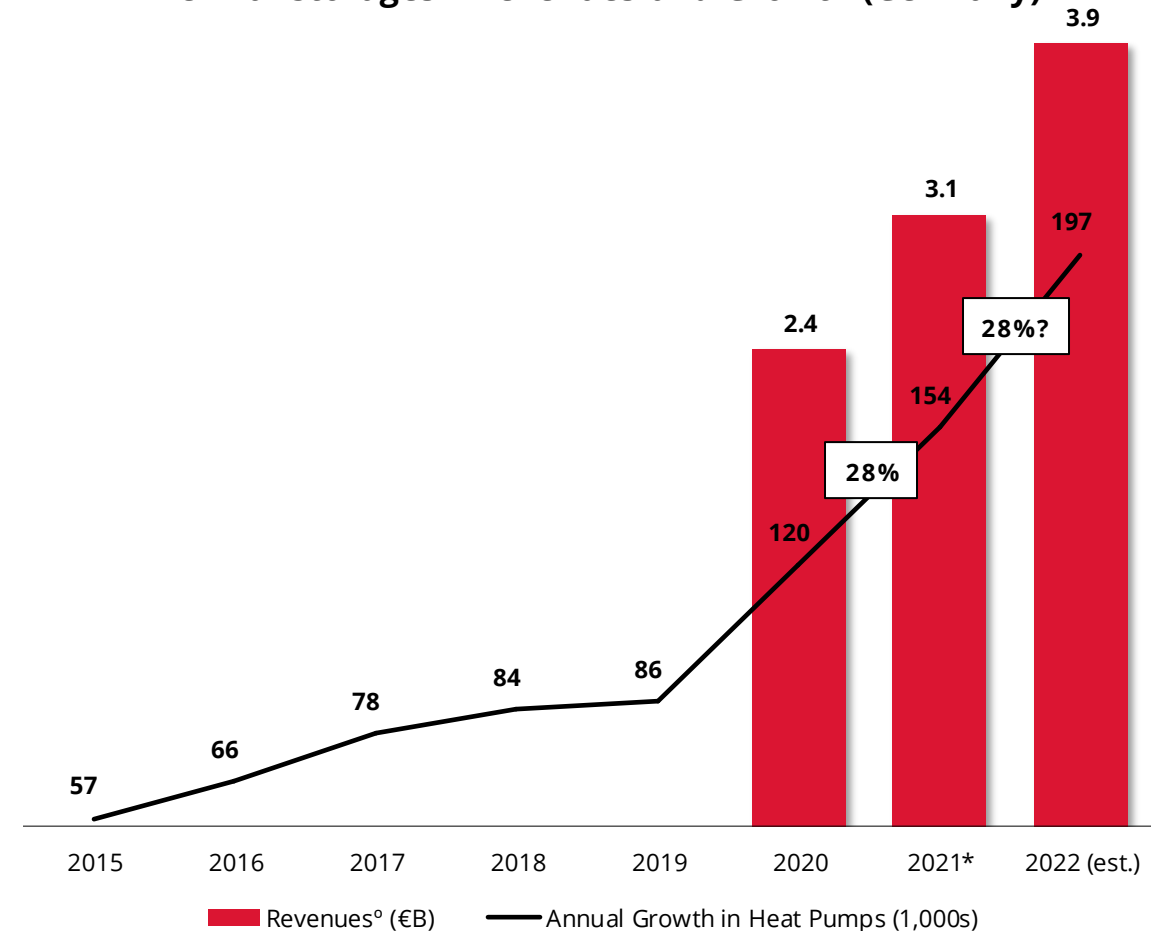
THERMAL STORAGES IN RESIDENTIAL SEGMENT

Stronger Growth Than Expected

Developments in 2021

- Considerable technology uptake! Drivers: New regulations providing subsidies of up to 50% as well as increasing cost of CO₂.
- Regulatory barriers for heat pumps; air to water heat pumps more often included in building upgrades.
- Pronounced growth expected to continue in 2022 on high gas prices and security of supply concerns, despite slow-moving market.
- German Association for Heat Pumps' (BWP) target (6M heat pumps by 2030) as well as German Government plans (65% share of renewables in new heating installations from 2025 seen as near-term demand drivers.
- Factory and manpower capacity constraints main obstacle.

Thermal Storages – Revenues and Growth (Germany)



* Some figures still preliminary

^o Recorded from 2020

Source: BWP (annual growth), estimates 3EC

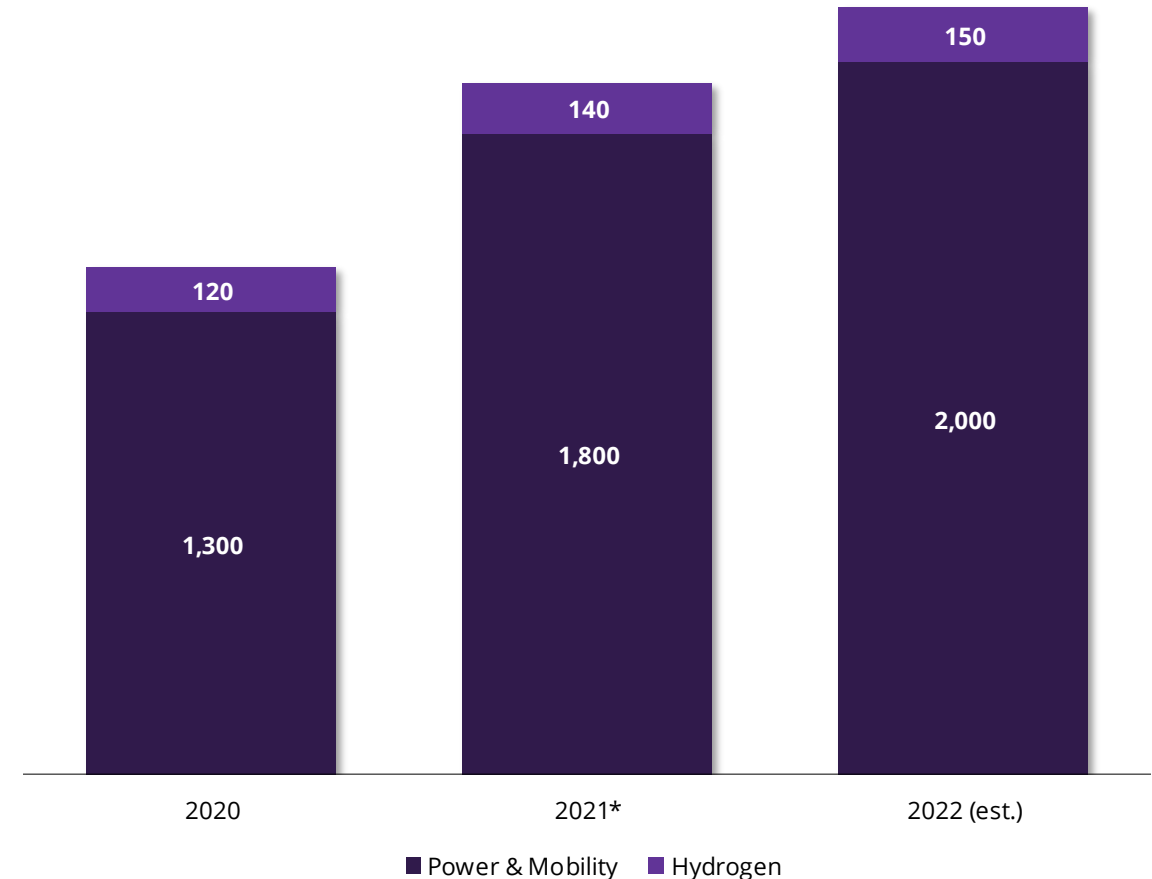
COMMERCIAL & INDUSTRIAL SEGMENT

Marked Recovery From Prior Year Covid-induced Dip

Developments in 2021

- Loss of revenues in 2020 (20%) more than compensated for in 2021. Main drivers: E-mobility, decarbonization obligations, increasing cost of CO₂.
- Holistic concepts in high demand. Hydrogen still marginal.
- Further growth projected for 2022: High energy costs as well as Russia-Ukraine war push companies towards renewable energy.
- Hydrogen applications in 1-10 MW range seen as growing in importance from 2023. Long approval times create barrier. More field tests and IPCEIs expected from 2025.
- Thermal storage still mostly used in R&D; first large projects planned to substitute use of natural gas. Pertinent German legislation (EEG) creating obstacle.
- Use cases remain manifold.

Revenues Commercial & Industrial Segment (€M)



* Some figures still preliminary

Source: 3EC

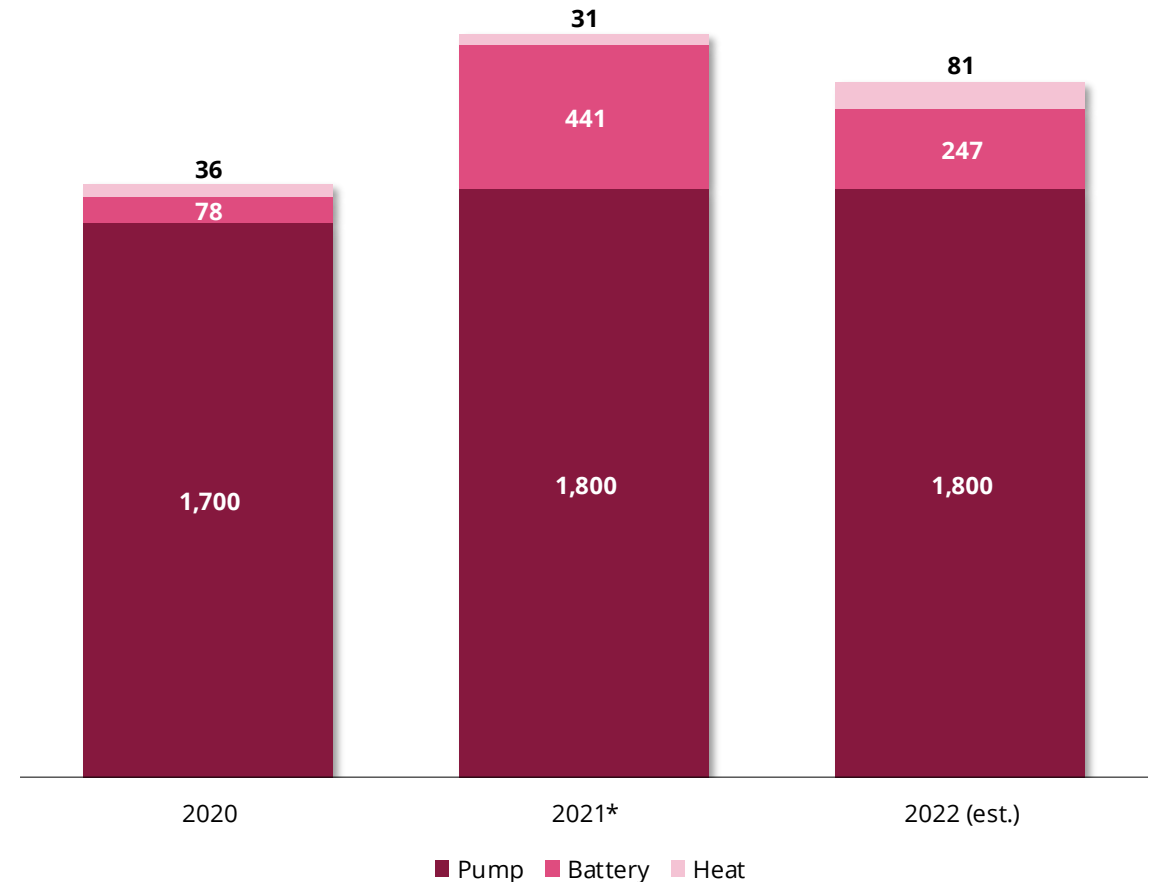
UTILITY SEGMENT

Pump Storage Revenues Remain Resilient

Developments in 2021

- Low availability for pump storage; high system balancing costs provide revenue stability. International business still recovering from the effects of the pandemic.
- Large battery storage benefiting from higher system balancing costs. Number of new projects limited, but first signs of uptake of innovation tenders.
- Heat storage installations associated with large projects, therefore subject to fluctuations.
- Research into hydrogen caverns through field tests and IPCEIs: EWE cavern as part of “Clean Hydrogen Coastline” project, VNG cavern Bad Lauchstädt, potential use of cavern storage in TES Wilhelmshaven project.

Revenues Utility Segment (€M)

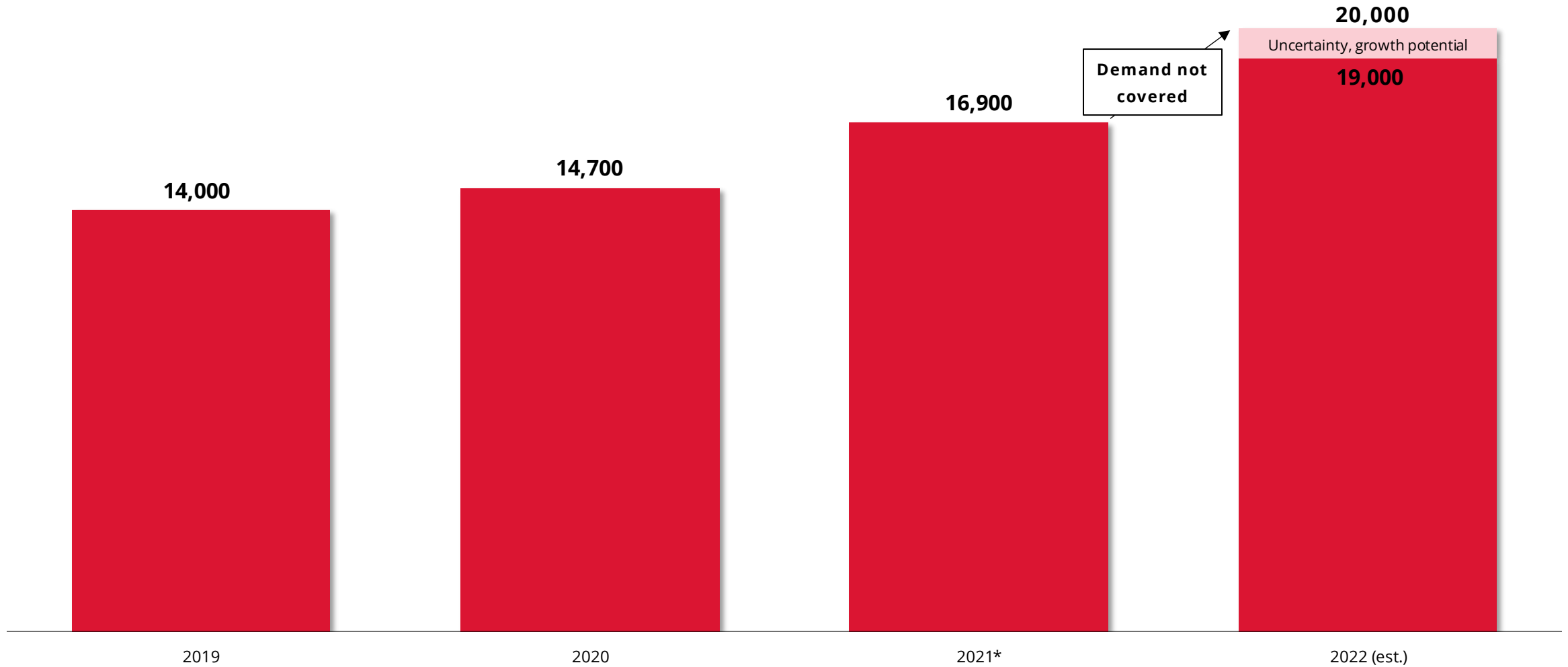


* Some figures still preliminary

Source: 3EC

EMPLOYEE NUMBERS GROWING WITH REVENUES

Employees in the Energy Storage Business in Germany 2019-2022



* Some figures still preliminary

Source: 3EC

THANK YOU



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