How big will lithium-ion batteries be in 2022?

But a 2022 analysis by the McKinsey Battery Insights team projects that the entire lithium-ion (Li-ion) battery chain, from mining through recycling, could grow by over 30 percent annually from 2022 to 2030, when it would reach a value of more than \$400 billion and a market size of 4.7 TWh. 1

How much does a lithium ion battery cost?

Currently, 54% of the cell price comes from the cathode, 18% from the anode, and 28% from other components. The average price of lithium-ion battery cells dropped from \$290 per kilowatt-hour in 2014 to \$103 in 2023. In the coming months, prices are expected to drop further due to oversupply from China.

When are battery cost projections updated?

In 2019,battery cost projections were updated based on publications that focused on utility-scale battery systems (Cole and Frazier 2019),with a 2020update published a year later (Cole and Frazier 2020). This report updates those cost projections with data published in 2020 and early 2021.

How are battery storage cost projections developed?

The projections are developed from an analysis of recent publications that include utility-scale storage costs. The suite of publications demonstrates wide variation in projected cost reductions for battery storage over time. We use the recent publications to create low, mid, and high cost projections.

How have lithium-ion battery prices changed over the last 10 years?

Lithium prices, for example, have plummeted nearly 90% since the late 2022 peak, leading to mine closures and impacting the price of lithium-ion batteries used in EVs. This graphic uses exclusive data from our partner Benchmark Mineral Intelligence to show the evolution of lithium-ion battery prices over the last 10 years.

What is the future of lithium batteries?

The elimination of critical minerals (such as cobalt and nickel) from lithium batteries, and new processes that decrease the cost of battery materials such as cathodes, anodes, and electrolytes, are key enablers of future growth in the materials-processing industry.

It represents lithium-ion batteries (LIBs) - primarily those with nickel manganese cobalt (NMC) and lithium iron phosphate (LFP) chemistries - only at this time, with LFP becoming the primary chemistry for stationary storage starting in 2021. Battery cost and performance projections in the 2023 ATB are based on a literature review of 14

Exhibit 1: Global battery sales by sector, GWh/y. Source: Ziegler and Trancik (2021), Placke et al. (2017) for 1991-2014; BNEF Long-Term Electric Vehicle Outlook (2023) for 2015-2022 and the latest outlook for 2023 (\*) from the BNEF Lithium-Ion Battery Price Survey (2023). 2. Battery costs keep falling while quality rises

## could fall towards \$80/kWh by 2026, amounting to a drop of almost 50% from 2023, a level at which battery electric vehicles would achieve ownership cost parity with gasoline-fueled cars ???

Our researchers forecast that average battery prices











Technical Report: Cost Projections for Utility-Scale Battery Storage: 2021 Update In this work we describe the development of cost and performance projections for utility-scale lithium-ion battery systems, with a focus on 4-hour duration systems. The projections are developed from an analysis of recent publications that consider utility



Battery cost projections for 4-hour lithium-ion systems, with values relative to 2022. .. iv Figure ES-2. Battery cost projections for 4-hour lithium ion systems.. iv Figure 1. Battery cost projections for 4-hour lithium-ion systems, with values relative to 2022. .. 4 Figure 2.



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Cost-savings in lithium-ion battery production are crucial for promoting widespread adoption of Battery Electric Vehicles and achieving cost-parity with internal combustion engines. This study presents a comprehensive analysis of projected produc-tion costs for lithium-ion batteries by 2030, focusing on essential metals.



In the same way, the price of lithium-ion batteries has dropped significantly. A battery that cost INR 562,500 in 1991 was just INR 13,575 in 2018. Comparing Lithium-Ion Battery Cell Prices by Brand and Type. The price of lithium-ion batteries differs based on their chemistry.

TY - GEN. T1 - Cost Projections for Utility-Scale Battery Storage. AU - Cole, Wesley. AU - Frazier, Allister. PY - 2019. Y1 - 2019. N2 - In this work we document the development of cost and performance projections for utility-scale lithium-ion battery systems, with a focus on 4-hour duration systems.

University of M?nster researchers expect a reduction to \$70 per kilowatt-hour by 2050 for lithium-ion batteries. lithium-ion battery costs ion batteries have not yet reached their cost

## Technical Report: Cost Analysis and Projections for U.S.-Manufactured Automotive Lithium-ion Batteries Title: Cost Analysis and Projections for U.S.-Manufactured Automotive Lithium-ion Batteries Technical Report ? Mon Jan 01 00:00:00 EST 2024

LITHIUM ION BATTERY COST

65kWh 30kW 130kwb 60kw









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## LITHIUM ION BATTERY COST PROJECTION

11 11

Lithium-Ion Batteries Figure 11. Avicenne global Li-ion projections ??? all markets Potential for future battery technology cost reductions 19 Figure . 2018 global lead???acid battery deployment by application (% GWh)..20 Figure 21. 2018 lead???acid

In this work we describe the development of cost and performance projections for utility-scale lithium-ion battery systems, with a focus on 4-hour duration systems. The projections are developed from an analysis of recent publications that consider utility-scale storage costs. KW - cost projection. KW - lithium ion. KW - storage. U2 - 10.

Projected cost reductions for battery technologies limit the competitiveness of pumped hydro and compressed air. Battery technologies exhibit the

## highest probability of lowest LCOS in most applications beyond 2025. Projecting future LCOS confirms that lithium ion becomes cost competitive for most discharge and frequency combinations below 8















Regional EV lithium-ion battery manufacturing capacity by manufacturer headquarters, 2023 Open. Battery prices Turmoil in battery metal markets led the cost of Li-ion battery packs to increase for the first time in 2022, with prices rising to 7% higher than in 2021. However, the price of all key battery metals dropped during 2023, with

Cost Projections for Utility-Scale Battery Storage: 2021 Update. Wesley Cole, A. Will Frazier, and Chad Augustine. National Renewable Energy Laboratory. NREL is a national laboratory of the ???



Figure 1. Battery cost projections for 4-hour lithium-ion systems, with values relative to 2019...5 Figure 2. Battery cost projections for 4-hour lithium ion systems.. 6 Figure 3. Battery cost projections developed in this work (bolded lines) relative to published cost





The global lithium ion battery recycling market size The global lithium ion battery recycling market size is projected to grow from \$3.79 billion in 2023 to \$23.21 billion by 2032, at a CAGR of 22.75% is utilized to extract and sell the raw materials accumulated in the electrode composition to lower the overall project cost and reduce

Therefore, the battery cost and performance projections in the 2024 ATB are based on the same literature review as that done for utility-scale and commercial battery cost projections: Battery cost and performance projections in the 2024 ATB are based on a literature review of 14 sources published in 2021 or 2022, as described by Cole and



The NREL Storage Futures Study has examined energy storage costs broadly and specifically the cost and performance of lithium-ion batteries (LIBs) (Augustine and Blair, Therefore, the battery cost and performance projections in the 2021 ATB are based on the same literature review as for utility-scale and commercial battery cost projections.







Battery cost and performance projections in the 2021 ATB are based on a literature review of 13 sources published in 2018 or 2019, as described by Cole et al. (Cole et al., 2021). Three projections from 2019 to 2050 are developed for scenario modeling based on this literature. Lithium-ion Battery: 192: 768: Battery Central Inverter : 15: 59

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## LITHIUM ION BATTERY COST PROJECTION

TY - GEN. T1 - Cost Projections for Utility-Scale Battery Storage: 2020 Update. AU - Cole, Wesley. AU - Frazier, A. PY - 2020. Y1 - 2020. N2 - In this work we describe the development of cost and performance projections for utility-scale lithium-ion battery systems, with a focus on 4-hour duration systems.

Trends in lithium-ion battery production costs: The impact of existing technologies. Figure 3 illustrates the projected production cost for lithium-ion batteries by 2030, assuming the utilization of existing technology without incorporating the discussed research and developments. Each trend represents a weighted average cost derived from the

Lithium-ion battery costs are based on battery pack cost. Lithium prices are based on Lithium Carbonate Global Average by S& P Global. 2022 material prices are average prices between January and March. Related charts Annual increase in population with electricity access by technology in sub-Saharan Africa, 2015-2022











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