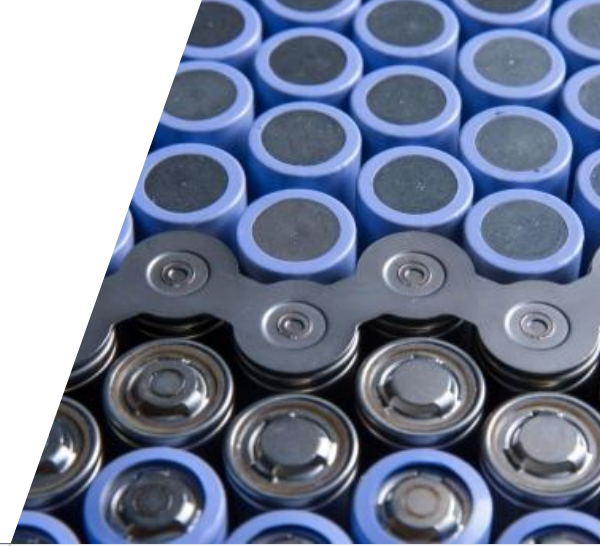


Outlook for Electric Vehicles and the Nuances of the EV Battery Market

Dr. Andy Leach

09 November 2022



BNEF offices around the world



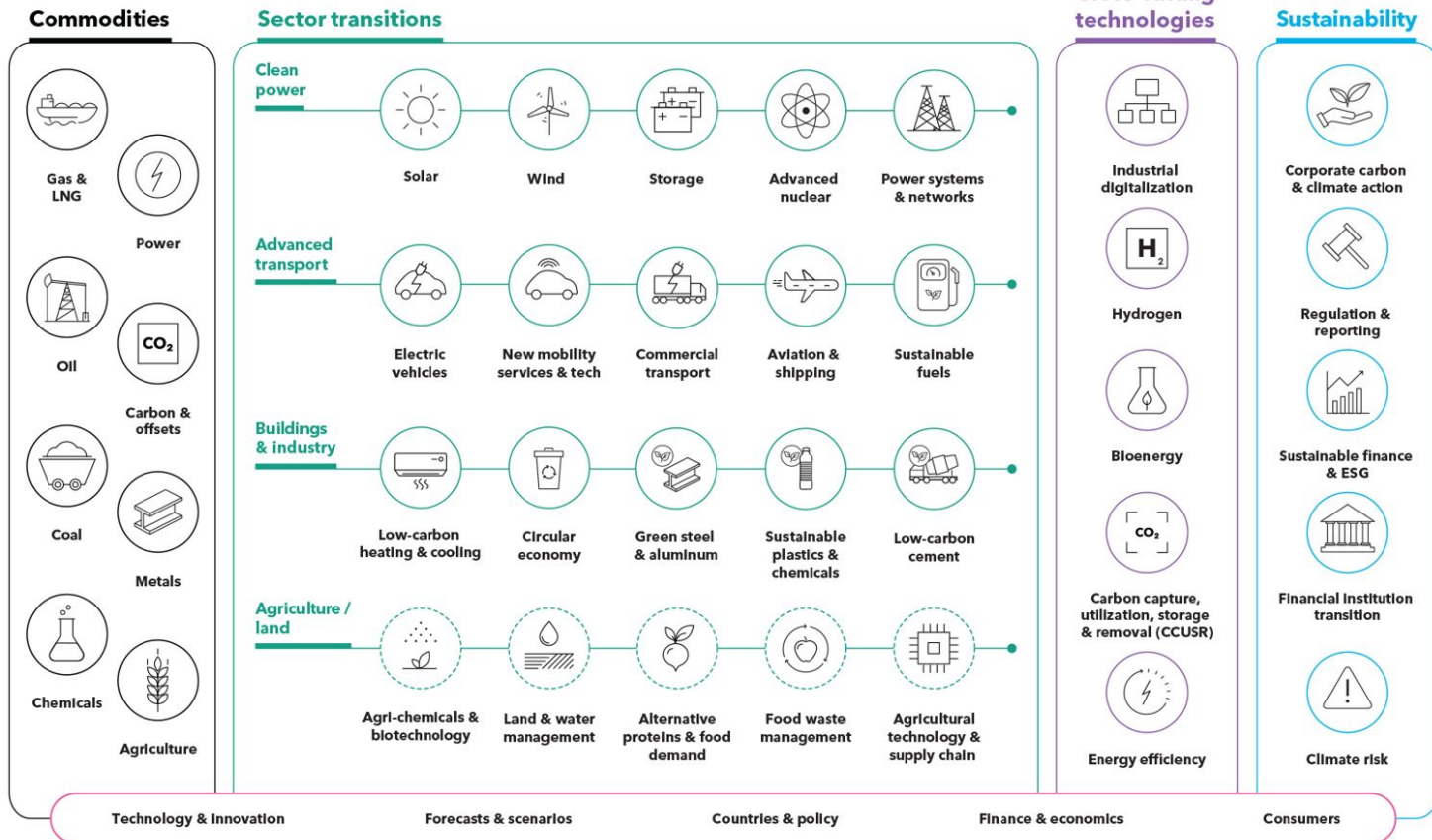
250

BNEF professionals in
18 locations*

*Part of the Bloomberg LP network of
19,000 employees in 176 locations.

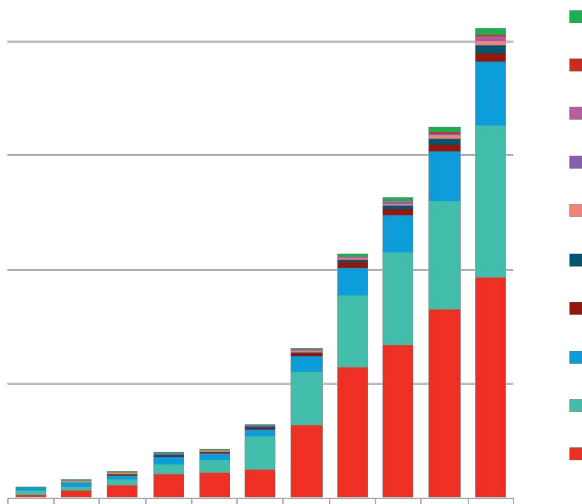
BNEF coverage

Strategies for a cleaner, more competitive future



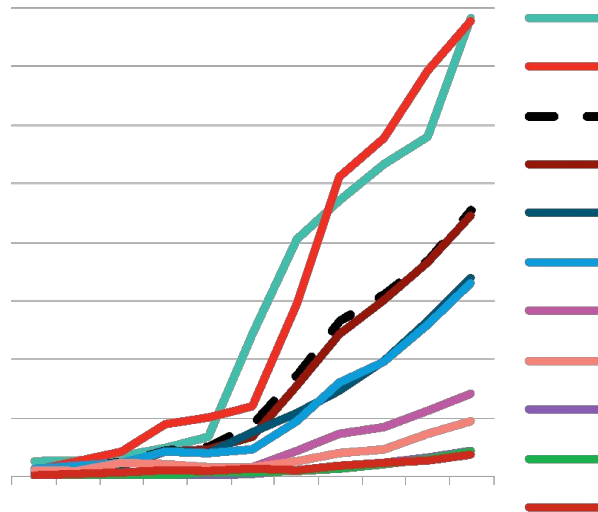
Passenger EV sales set to continue growing rapidly

Passenger EV sales by market



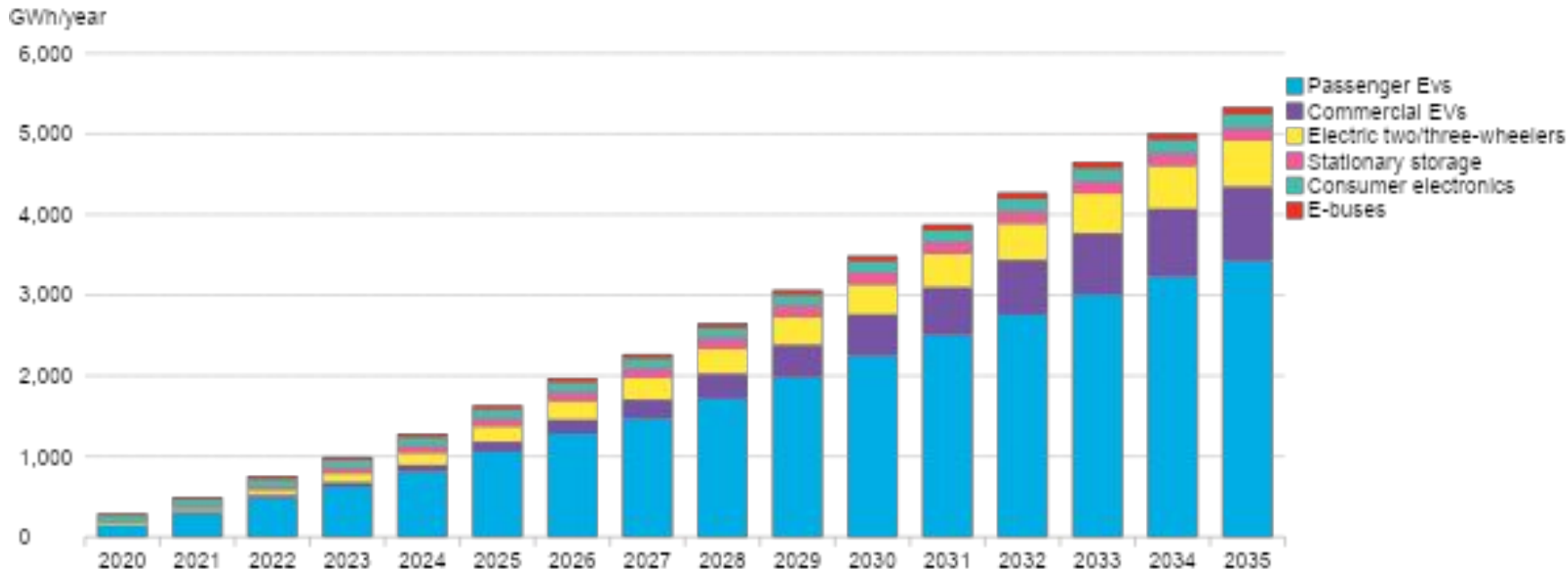
Source: BNEF. Includes BEVs and PHEVs. Note different axis scales.

EV share of new car sales by market



Battery demand from EVs higher than previous forecast

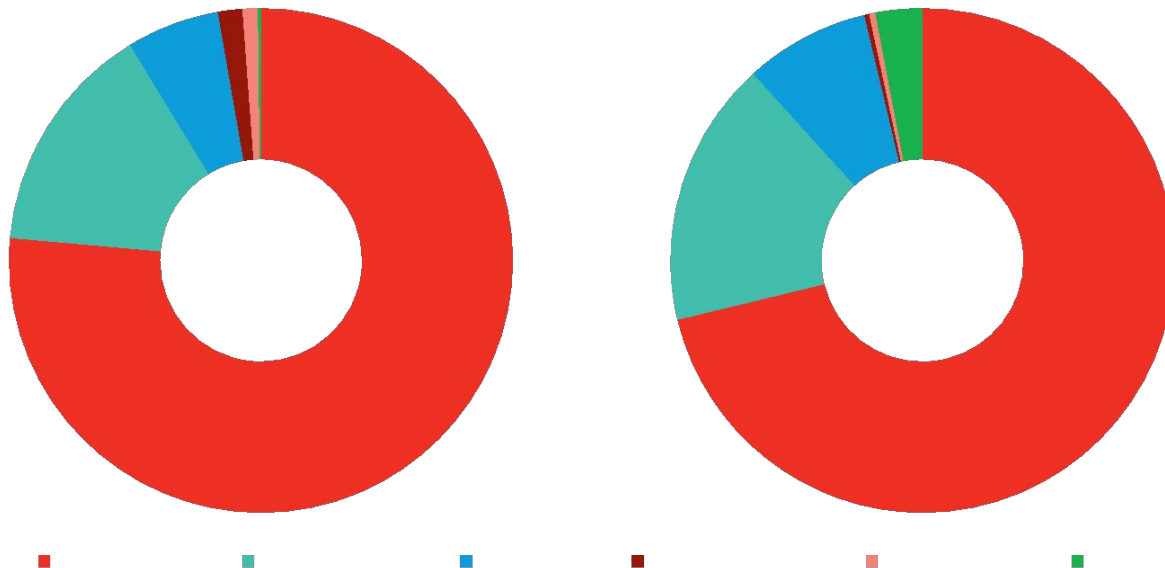
Lithium-ion battery demand outlook



Source: BloombergNEF, Avicenne

Battery manufacturing ramping up globally

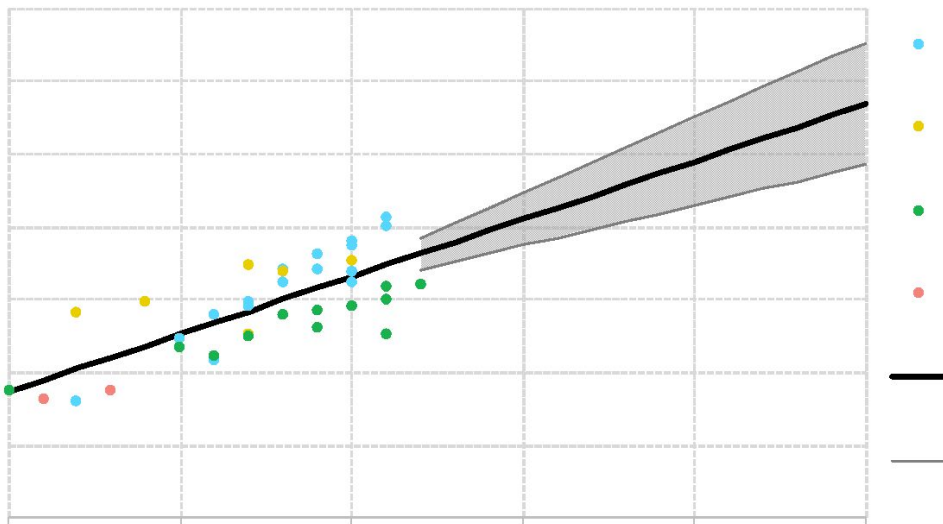
Lithium-ion cell manufacturing capacity by region of plant location



Source: BloombergNEF Note: 2022 includes facilities commissioned up to the end of May 2022. 2025 'Other' includes capacity outside of the regions otherwise indicated. Based on current announcements without de-risking. Values have been rounded.

Battery pack density has increased and chemistries have changed

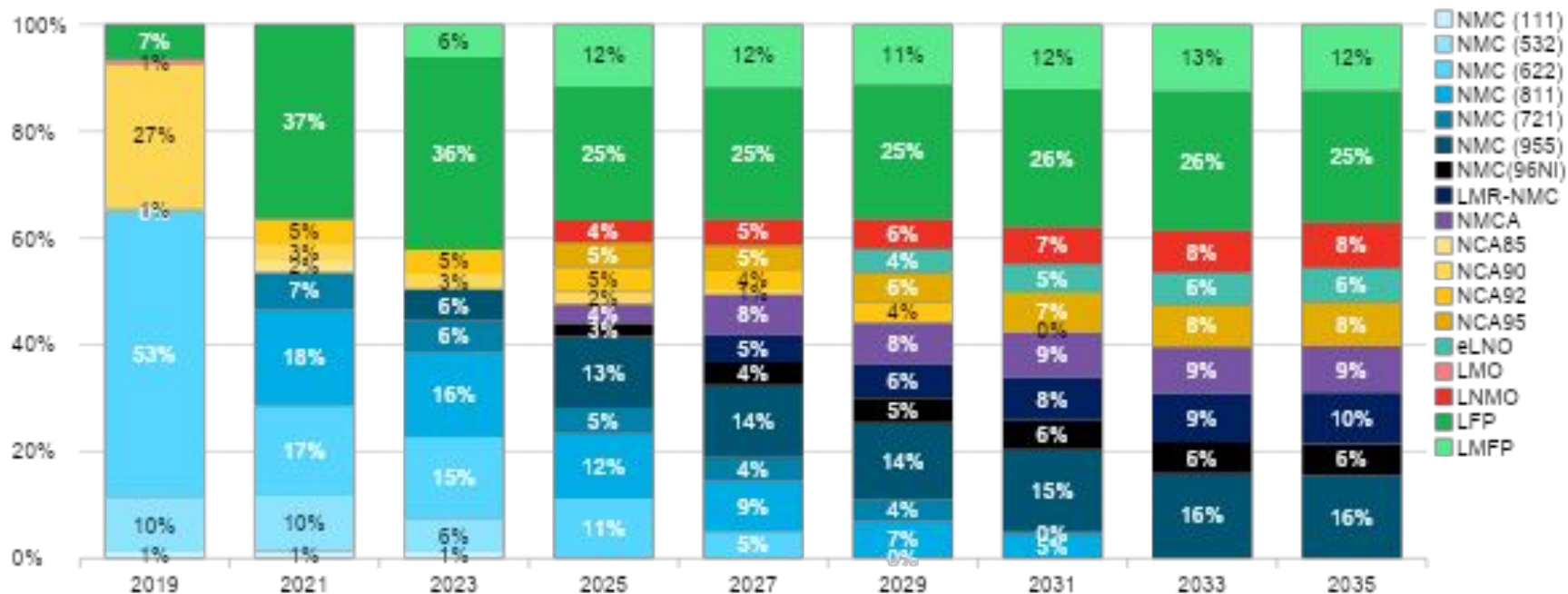
Historic and estimated changes to battery-pack energy density



Source: BloombergNEF

Chemistry evolution expected to continue

Passenger EV chemistry mix



Source: BloombergNEF

Lithium-ion battery price declines will continue going forward

Lithium-ion battery price outlook

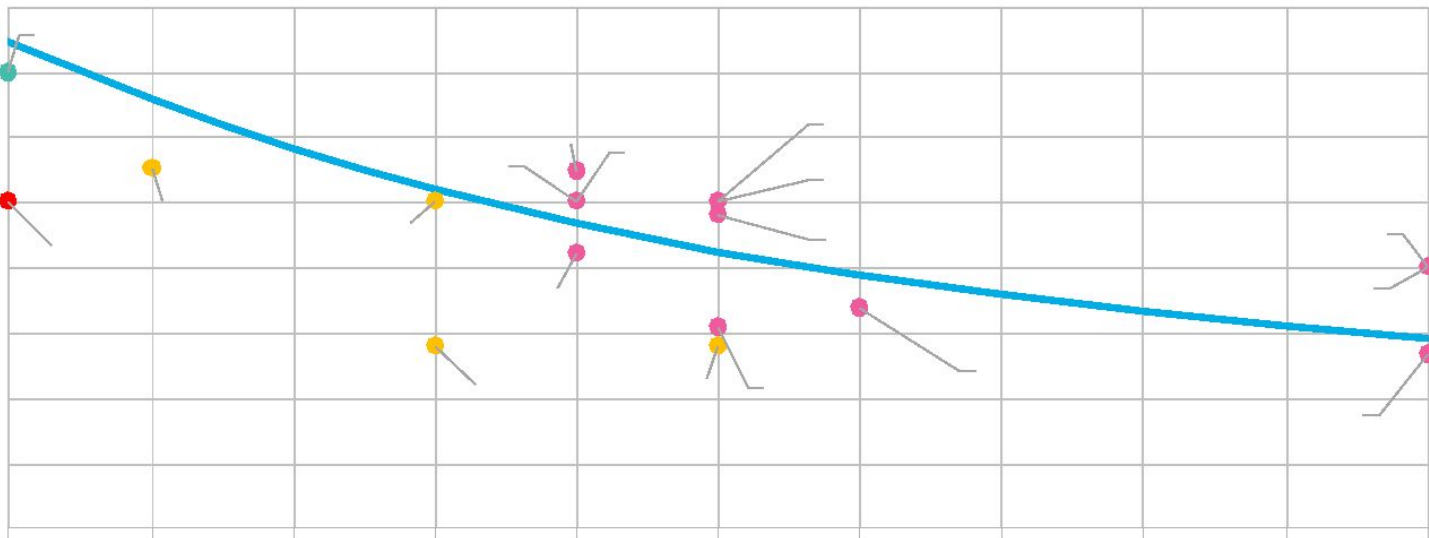
Lithium-ion battery pack price (real 2021 \$/kWh)



Source: BloombergNEF Note: This is based on the 2021 Battery Price Survey.

Long-term cost reduction in pack price expected despite short-term volatility

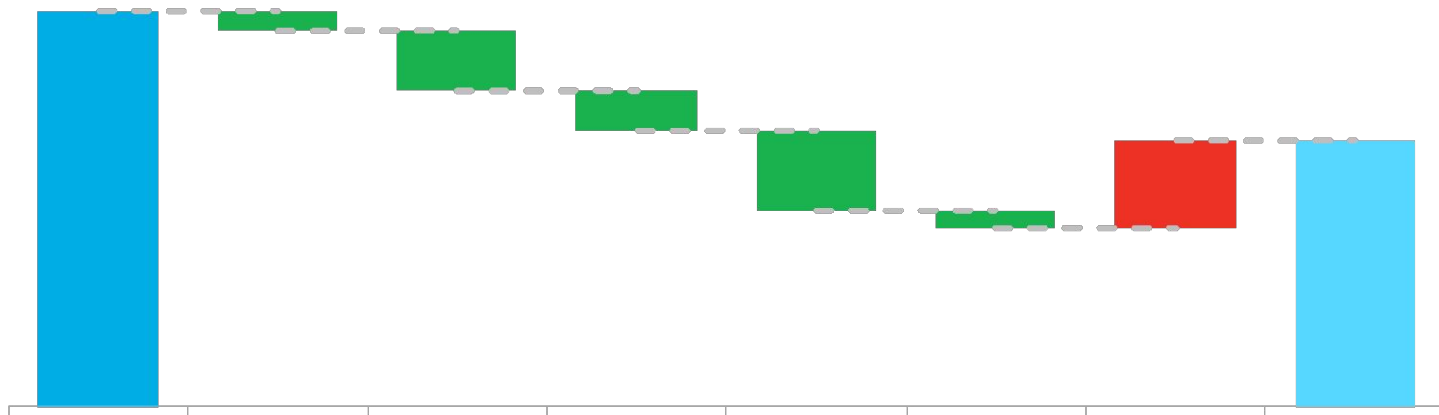
Publicly stated pack price targets



Source: BloombergNEF, company announcements.

Volkswagen recent announcements suggests \$60-90 per kWh pack price

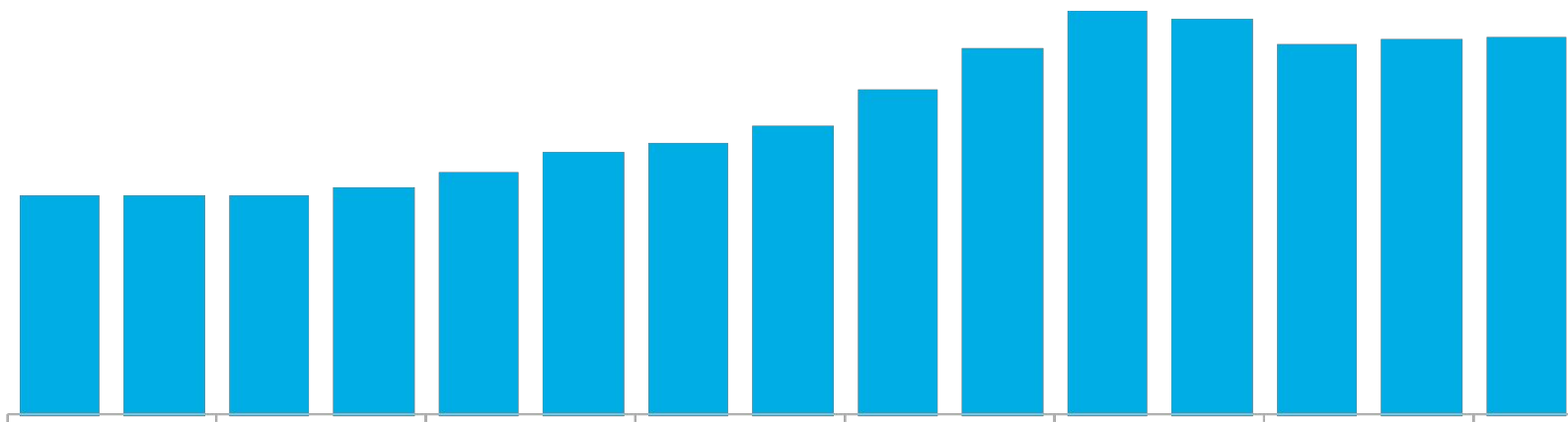
Estimated cost of VW's future battery packs



Source: BloombergNEF Note: Av. pack price is the average 2021 volume weighted pack price. Raw material volatility is based on observed cathode price increases of 117% (NMC622) between September 2021 and June 2022, based on BloombergNEF's Cathode Cost Model (web | terminal). In reality, this should reflect a range of additional raw material costs based on the highest prices seen in the last 12 months.

Lithium iron phosphate (LFP) battery cell cost adjusted for raw material prices

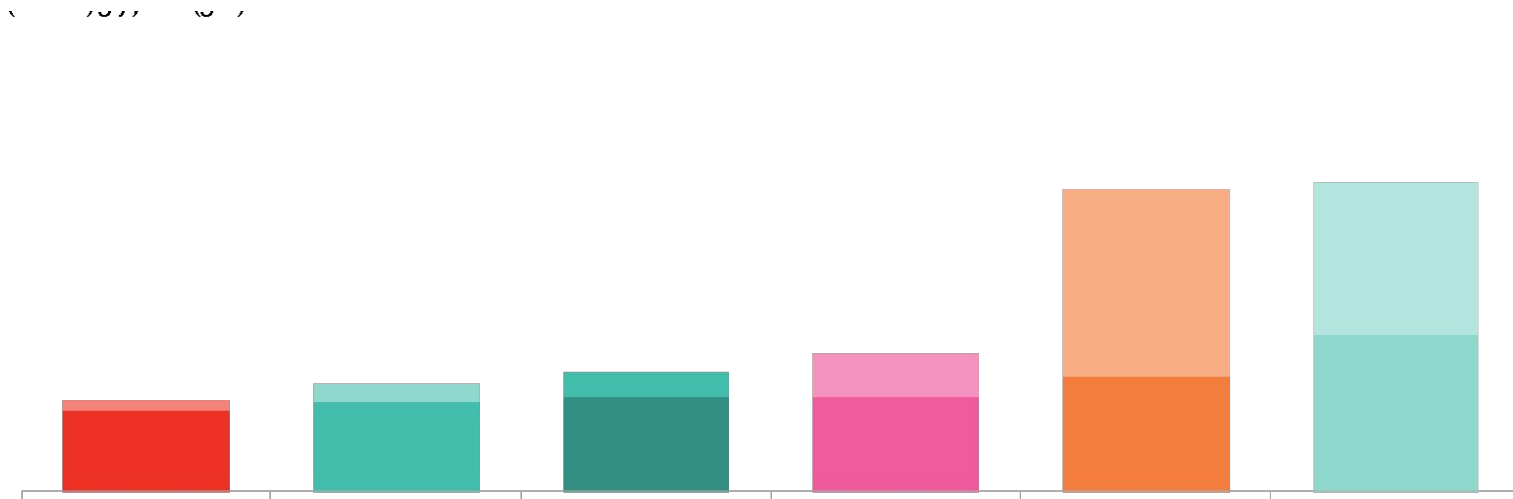
Battery pack prices have increased for the first time but leveling off



Source: BloombergNEF. Note: Adjusted costs for a 4h Chinese battery cell from 2021 Energy Storage Cost Survey ([web](#) | [terminal](#)) with Bottom-up Battery Cost Model ([web](#) | [terminal](#)) and Cathode Cost and Prices Livesheet ([web](#) | [terminal](#)). For full methodology on prices refer to Appendix A of note.

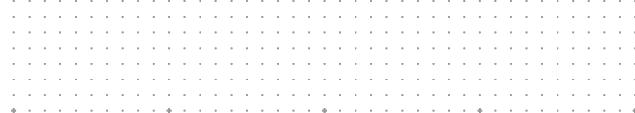
Chinese E-bus battery packs two thirds cheaper than rest of the world

Cost of battery packs by segment



Source: BloombergNEF

Thank you, any questions?



Copyright and disclaimer

Copyright

© Bloomberg Finance L.P. 2021. This publication is the copyright of Bloomberg Finance L.P. in connection with BloombergNEF. No portion of this document may be photocopied, reproduced, scanned into an electronic system or transmitted, forwarded or distributed in any way without prior consent of BloombergNEF.

Disclaimer

The BloombergNEF ("BNEF"), service/information is derived from selected public sources. Bloomberg Finance L.P. and its affiliates, in providing the service/information, believe that the information it uses comes from reliable sources, but do not guarantee the accuracy or completeness of this information, which is subject to change without notice, and nothing in this document shall be construed as such a guarantee. The statements in this service/document reflect the current judgment of the authors of the relevant articles or features, and do not necessarily reflect the opinion of Bloomberg Finance L.P., Bloomberg L.P. or any of their affiliates ("Bloomberg"). Bloomberg disclaims any liability arising from use of this document, its contents and/or this service. Nothing herein shall constitute or be construed as an offering of financial instruments or as investment advice or recommendations by Bloomberg of an investment or other strategy (e.g., whether or not to "buy", "sell", or "hold" an investment). The information available through this service is not based on consideration of a subscriber's individual circumstances and should not be considered as information sufficient upon which to base an investment decision. You should determine on your own whether you agree with the content. This service should not be construed as tax or accounting advice or as a service designed to facilitate any subscriber's compliance with its tax, accounting or other legal obligations. Employees involved in this service may hold positions in the companies mentioned in the services/information.

The data included in these materials are for illustrative purposes only. The BLOOMBERG TERMINAL service and Bloomberg data products (the "Services") are owned and distributed by Bloomberg Finance L.P. ("BFLP") except (i) in Argentina, Australia and certain jurisdictions in the Pacific islands, Bermuda, China, India, Japan, Korea and New Zealand, where Bloomberg L.P. and its subsidiaries ("BLP") distribute these products, and (ii) in Singapore and the jurisdictions serviced by Bloomberg's Singapore office, where a subsidiary of BFLP distributes these products. BLP provides BFLP and its subsidiaries with global marketing and operational support and service. Certain features, functions, products and services are available only to sophisticated investors and only where permitted. BFLP, BLP and their affiliates do not guarantee the accuracy of prices or other information in the Services. Nothing in the Services shall constitute or be construed as an offering of financial instruments by BFLP, BLP or their affiliates, or as investment advice or recommendations by BFLP, BLP or their affiliates of an investment strategy or whether or not to "buy", "sell" or "hold" an investment. Information available via the Services should not be considered as information sufficient upon which to base an investment decision. The following are trademarks and service marks of BFLP, a Delaware limited partnership, or its subsidiaries: BLOOMBERG, BLOOMBERG ANYWHERE, BLOOMBERG MARKETS, BLOOMBERG NEWS, BLOOMBERG PROFESSIONAL, BLOOMBERG TERMINAL and BLOOMBERG.COM. Absence of any trademark or service mark from this list does not waive Bloomberg's intellectual property rights in that name, mark or logo. All rights reserved. © 2021 Bloomberg.

BloombergNEF (BNEF) is a leading provider of primary research on clean energy, advanced transport, digital industry, innovative materials, and commodities.

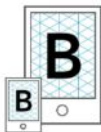
BNEF's global team leverages the world's most sophisticated data sets to create clear perspectives and in-depth forecasts that frame the financial, economic and policy implications of industry-transforming trends and technologies.

BNEF research and analysis is accessible via web and mobile platforms, as well as on the Bloomberg Terminal.

Coverage.

Clean energy
Advanced transport
Commodities
Digital industry

Get the app



On IOS + Android
about.bnef.com/mobile

BloombergNEF

Dr Andy Leach, aleach26@bloomberg.net

Client enquiries:

Bloomberg Terminal: press <Help> key twice

Email: support.bnef@bloomberg.net

Learn more:

about.bnef.com | [@BloombergNEF](https://twitter.com/BloombergNEF)