

IBKRWEBINARS.COM



September 12, 2022

Nikko Asset Management

Understanding China's Dominance in the EV Race

U-Jin Lim

ETF Business Development
Director
Nikko Asset Management

Exchange and Industry Sponsored Webinars are presented by unaffiliated third parties. Interactive Brokers LLC is not responsible for the content of these presentations. You should review the contents of each presentation and make your own judgment as to whether the content is appropriate for you. Interactive Brokers LLC does not provide recommendations or advice. This presentation is not an advertisement or solicitation for new customers. It is intended only as an educational presentation.



Disclosure:

Options involve risk and are not suitable for all investors. For information on the uses and risks of options, you can obtain a copy of the Options Clearing Corporation risk disclosure document titled [Characteristics and Risks of Standardized Options](#) by calling (312) 542-6901.

Futures are not suitable for all investors. The amount you may lose may be greater than your initial investment. Before trading futures, please read the [CFTC Risk Disclosure](#). For a copy visit [interactivebrokers.com](#).

There is a substantial risk of loss in foreign exchange trading. The settlement date of foreign exchange trades can vary due to time zone differences and bank holidays. When trading across foreign exchange markets, this may necessitate borrowing funds to settle foreign exchange trades. The interest rate on borrowed funds must be considered when computing the cost of trades across multiple markets.

The Order types available through Interactive Brokers LLC's Trader Workstation are designed to help you limit your loss and/or lock in a profit. Market conditions and other factors may affect execution. In general, orders guarantee a fill or guarantee a price, but not both. In extreme market conditions, an order may either be executed at a different price than anticipated or may not be filled in the marketplace.

There is a substantial risk of loss in trading futures and options. Past performance is not indicative of future results.

Any stock, options or futures symbols displayed are for illustrative purposes only and are not intended to portray recommendations.

- IRS Circular 230 Notice: These statements are provided for information purposes only, are not intended to constitute tax advice which may be relied upon to avoid penalties under any federal, state, local or other tax statutes or regulations, and do not resolve any tax issues in your favor.
- Interactive Brokers LLC is a member of [NYSE](#) [FINRA](#) [SIPC](#)



WILL CHINA DOMINATE THE GLOBAL EV RACE?

EXPLORING THE CHINESE EV SPACE WITH NIKKO AM

September 2022

TABLE OF CONTENT

1	Executive Summary	[5]
2	Electric Vehicles: A primer on EVs and the Future Mobility Revolution	[6]
3	Understanding China's Dominance in the EV Race	[15]
4	Getting Plugged In	[31]
5	Index Methodology - MSCI China All Shares IMI Future Mobility top 50 Index	[33]

WARMING UP THE ENGINE



WARMING UP THE ENGINE





UNDERSTANDING CHINA'S DOMINANCE IN THE EV RACE

- China is already the world's largest EV market with one out of every two EVs sold globally going to China.
- We explore how demand, consumer behavior, world-leading production capacity, laser-focus on infrastructure and production innovation, all combined with supportive government policy led to the creation of a highly conducive environment for the growth of the EV industry in China
- **China is ahead of Europe and the US today, and likely to continue their dominance in the global EV race for many more years to come.**



THE TRANSPORTATION PARADIGM IS CHANGING RAPIDLY

- There is strong momentum behind the trend towards cleaner forms of mobility.
- A key driver behind this trend are governments seeking to regulate their economies towards ambitious net-zero emissions targets.
- Major traditional automakers (e.g., GM, Honda, Volkswagen) are also fully onboard this trend.
- The growing interest in the EV industry cannot be denied, and at some point, soon, most cars running on fossil fuels will be phased out.

Aug 2022

Honda Motor Co Ltd [+ Add to myFT](#)

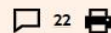
Honda pledges to end sale of petrol and diesel cars by 2040

Japanese group aims to capitalise on alliance with GM to accelerate change in America



Toshihiro Mibe, chief executive of Honda, at a news conference in Tokyo on Friday. He said one key factor for meeting the carmaker's targets is an improvement in battery technology © Kiyoshi Ota/Bloomberg

Kana Inagaki in Tokyo APRIL 23 2021



Honda's new chief executive has pledged to end the sale of petrol and diesel cars by 2040, one of the most ambitious targets for the switch to electric among the world's largest carmakers.

In his first press conference since taking over Japan's second-largest carmaker, Toshihiro Mibe said the group would capitalise on its existing [alliance with General Motors](#) to accelerate its shift to electric and hydrogen technology in the US.

Source: FT

G.M. Will Sell Only Zero-Emission Vehicles by 2035

The move, one of the most ambitious in the auto industry, is a piece of a broader plan by the company to become carbon neutral by 2040.



General Motors plans an electric Hummer pickup, with a high-end version due in showrooms this fall. General Motors Company, via Associated Press

By Neal E. Boudette and Coral Davenport

Jan. 28, 2021

The days of the internal combustion engine are numbered.

General Motors said Thursday that it would phase out petroleum-powered cars and trucks and sell only vehicles that have zero tailpipe emissions by 2035, a seismic shift by one of the world's largest automakers that makes billions of dollars today from gas-guzzling pickup trucks and sport utility vehicles.

Source: New York Times

MACRO FOCUSED

B Bloomberg.com (August 8, 2021)

At Least Two-Thirds of Global Car Sales Will Be Electric by 2040

Electric vehicle adoption is accelerating thanks to improvements in battery density and ... Europe and China are leading the transition.



Y Yahoo Finance (September 13, 2021)

EV Charging Station Market to Exhibit a CAGR of 30.26% and Hit USD 111.90 Billion by 2028 Backed by Increasing...

In recent times, demand for Electric Vehicles is rising rapidly worldwide. However China and the United States are holding the major market



Y Yahoo Finance (August 25, 2021)

Global Electric Vehicle Market Anticipated to Hit \$812,888.1 Million, Growing at 19.8% CAGR from 2021 to 2028 -...

Growing demand for low-emission, high performance, and fuel-efficient vehicles is fueling the global electric vehicle market growth.



E The Economist (August 21, 2021)

New, 800V, electric cars, will recharge in half the time

They include General Motors, Volvo, BYD and Stellantis (a large shareholder in which, for full disclosure, also has a stake in The Economist's ...)



BT The Business Times (September 7, 2021)

BMW increases orders of batteries as electric vehicle demand ...

BMW AG has boosted orders for battery cells to keep pace with accelerating demand for electric cars that made up for more than 11 per cent ...



CHINA FOCUSED

WSJ Wall Street Journal (August 30, 2021)

China's Electric-Vehicle Ambitions Are No Pipe Dream

Chinese electric-vehicle sales are shifting back into high gear after a period of stagnant growth. Its homegrown EV makers are also turning ...



R Reuters (September 4, 2021)

China set to sell 1.7 million NEVs between Jan-Aug, nearly ...

BEIJING, Sept 4 (Reuters) - China, the world's biggest vehicle market, ... battery electric, plug-in hybrid and hydrogen fuel-cell vehicles.



CNBC (June 15, 2021)

China's electric car leaders predict new energy vehicles will dominate the local market by 2030

New energy vehicles, which include electric cars, will account for 70% of China's new car sales by 2030. BYD founder Wang Chuanfu said at a



E Electrek (November 29, 2021)

China claims title of having world's largest EV charging network

A report out of China, citing recent data from the Electric Vehicle Charging



R Reuters (November 10, 2021)

Smartphone maker Xiaomi switches China playbook with eye toward EV showrooms

Chinese smartphone maker Xiaomi Corp is revamping its playbook in its home country by opening thousands of new stores to spur domestic sales...



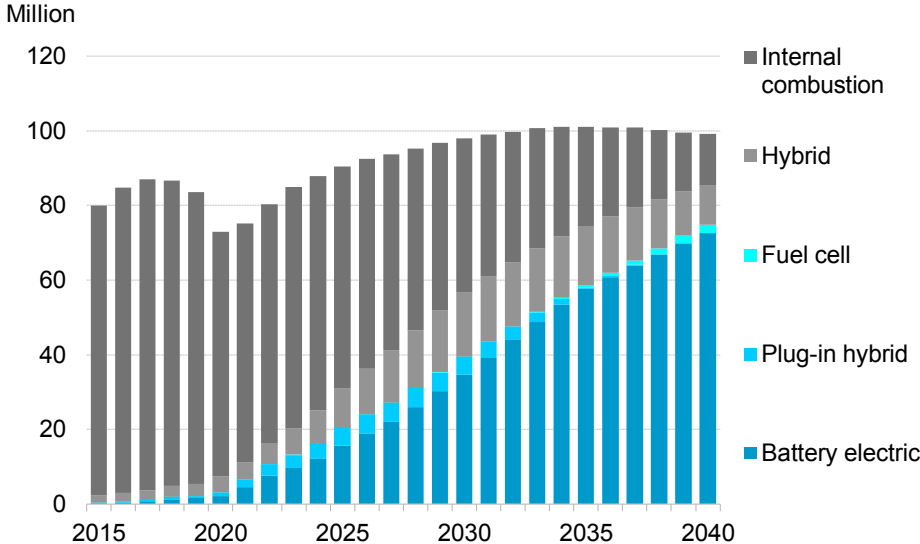
“EV (Electric Vehicles) is one of the fastest growing industries globally, and the market is expected to expand at a compound annual growth rate (CAGR) of 20% to reach \$800bn by 2027.”*

Hou Wey Fook, DBS Private Bank, Chief investment officer, Citywire,
May 2021

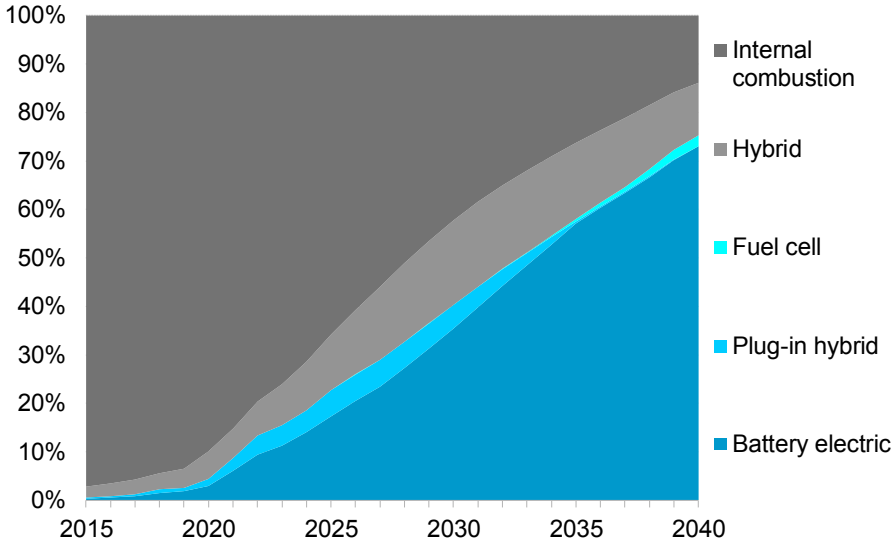
*The compound annual growth rate (CAGR) is the rate of return (RoR) that would be required for an investment to grow from its beginning balance to its ending balance, assuming the profits were reinvested at the end of each period of the investment's lifespan.

GLOBAL PASSENGER VEHICLES SALES OUTLOOK BY DRIVE TRAIN

Global passenger vehicle sales by drivetrain – Economic Transition Scenario



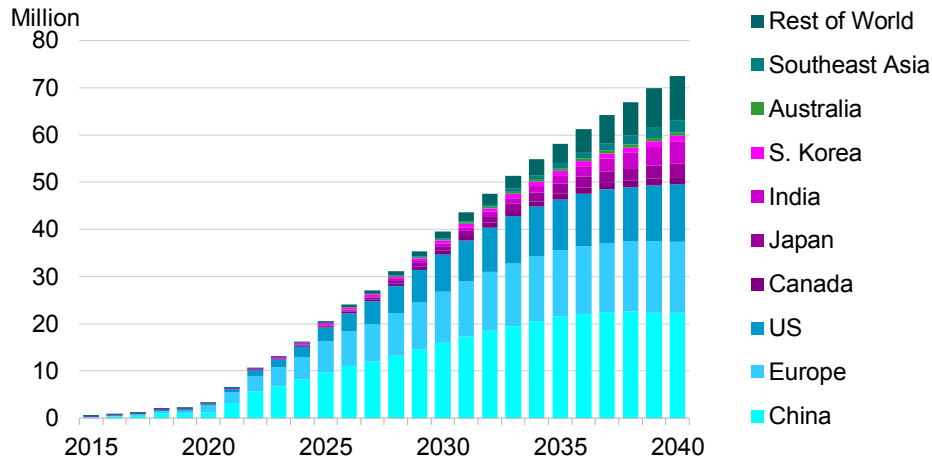
Global passenger vehicle share of sales by drivetrain – Economic Transition Scenario



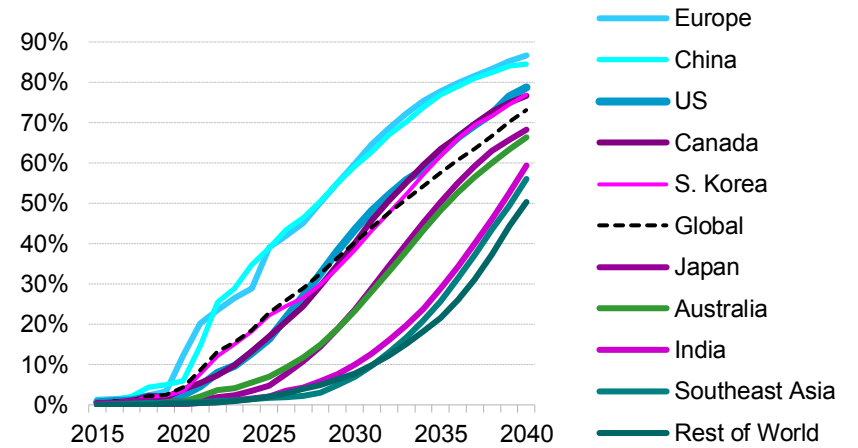
Source: BloombergNEF Electric Vehicle Outlook 2022.
 Past performance or any forecast is not necessarily indicative of the future performance of the market.

GLOBAL LONG-TERM PASSENGER EV SALES OUTLOOK

Global long-term passenger EV sales by market – Economic Transition Scenario



Global long-term EV share of new passenger vehicles sales by market – Economic Transition Scenario



A GLOBAL EFFORT IN COMBATING CLIMATE CHANGE

CHINA – CARBON NEUTRAL BY 2060

- China is aiming to achieve carbon neutrality before 2060, a signature initiative by President Xi.
- EVs to represent 40% of all new car sales by 2030.
- Has the potential added benefit of reducing dependence on oil and gas imports.

THE USA – NET ZERO BY 2050

- Reducing U.S. greenhouse gas emissions 50-52% below 2005 levels in 2030
- Reaching 100% carbon pollution-free electricity by 2035
- Achieving a net-zero emissions economy by 2050
- Delivering 40% of the benefits from federal investments in climate and clean energy to disadvantaged communities

EUROPE – FIT FOR 55

- European Commission launches proposals to reach 55% emissions reduction by 2030
- The 'Fit for 55' package includes a ban on combustion engines from 2035
- Coupled with a requirement for Member States to install charging and fueling points at regular intervals on major highways

SINGAPORE

- Singapore has laid out a vision to have all vehicles run on cleaner energy by 2040.
- Initiative spearheaded by the National Electric Vehicle Centre.

Source: Nikko AM, Aug 2022

<https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>

<https://www.unsdsn.org/european-commission-launches-proposals-to-reach-55-emissions-reduction-by-2030>

<https://www.iea.org/reports/an-energy-sector-roadmap-to-carbon-neutrality-in-china/executive-summary>

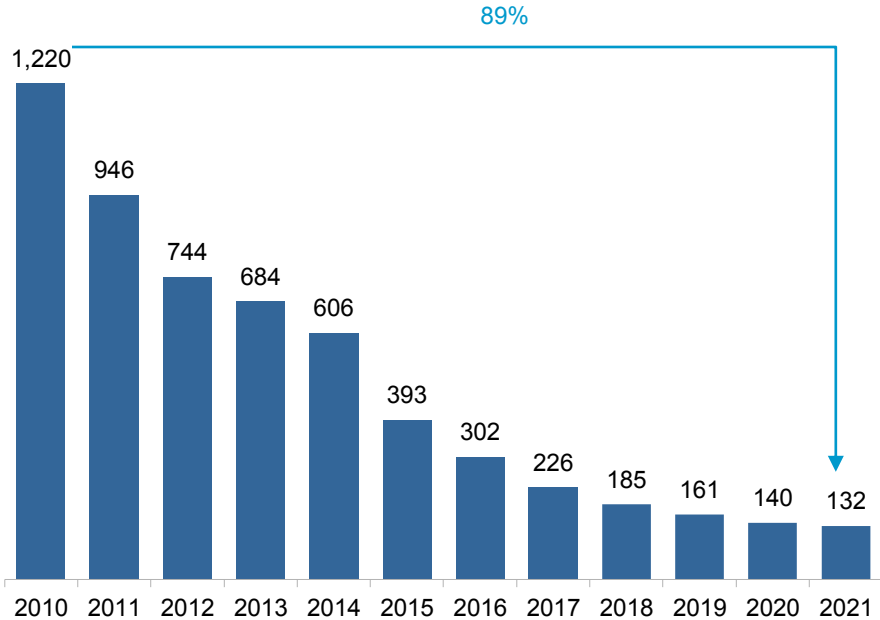
https://www.lta.gov.sg/content/ltgov/en/industry_innovations/technologies/electric_vehicles.html

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

A NEED FOR A NEW SOURCE OF POWER

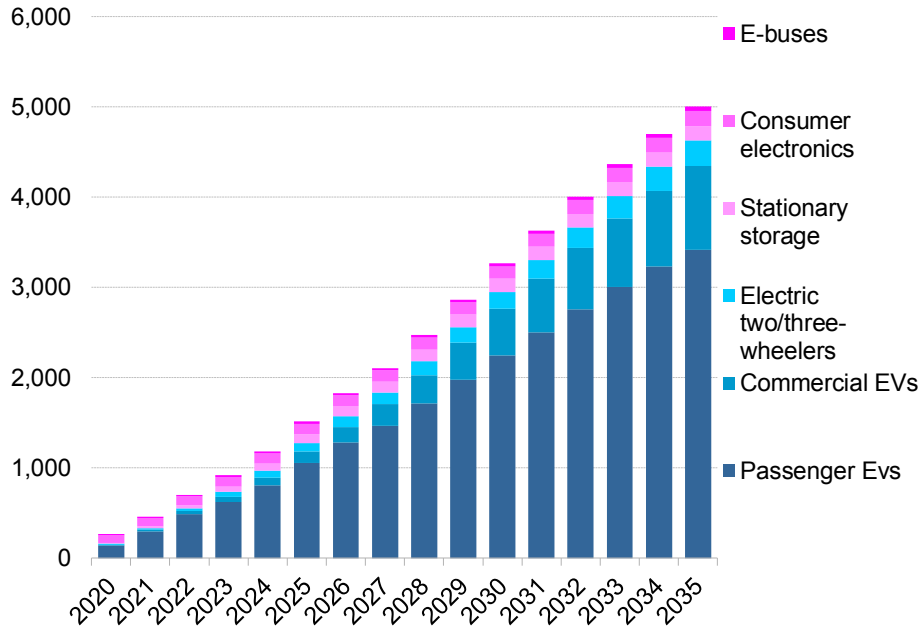
Volume-weighted average lithium-ion pack price

Battery pack price (real 2021 \$/kWh)



Lithium-ion battery demand outlook

GWh/year



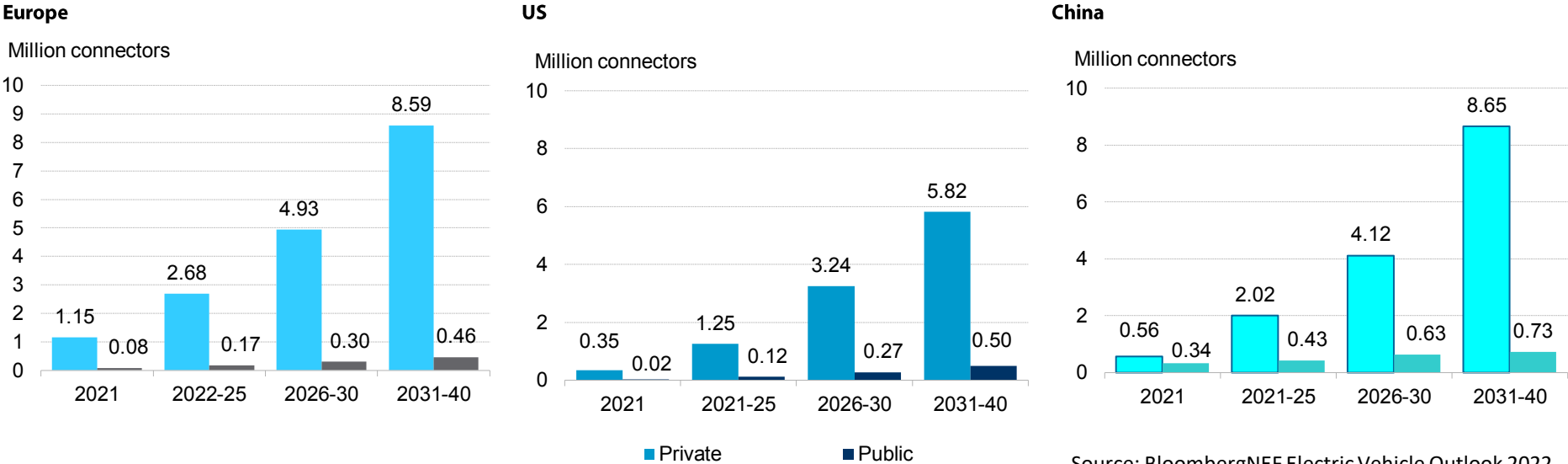
Source: BloombergNEF Electric Vehicle Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

A NEED FOR NEW INFRASTRUCTURE

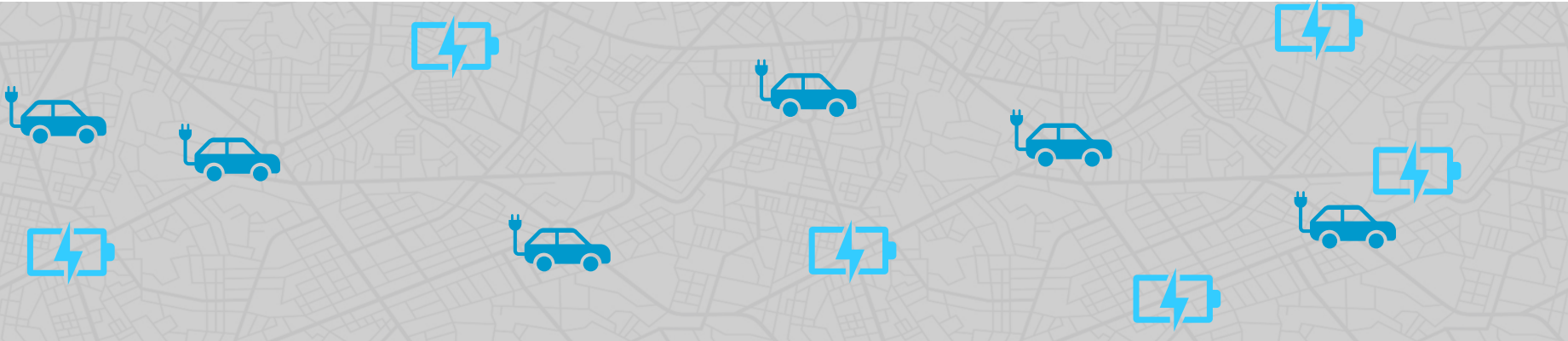
Average annual private and public charger installations by region

- Economic Transition Scenario



Source: BloombergNEF Electric Vehicle Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

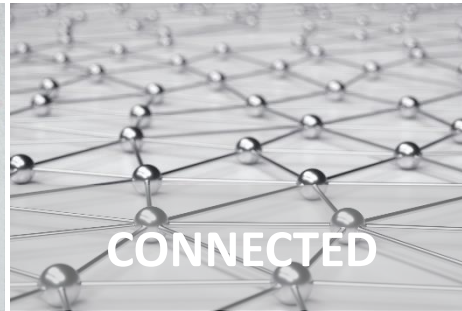


A NEED FOR NEW TECHNOLOGICAL ADVANCES

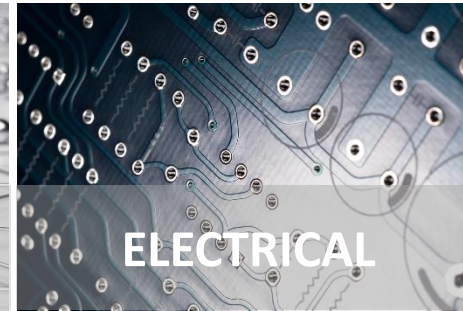
The Future of Mobility



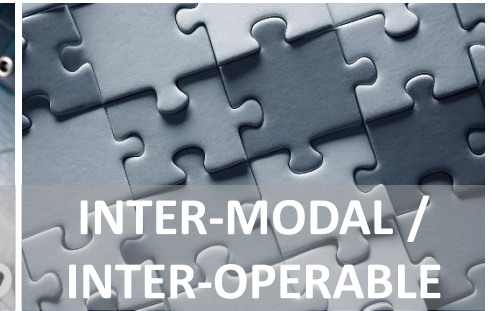
- Customized exterior / interior
- Entertainment options/space
- Provision of AI Software
- Delivery on Demand



- Necessary for the transition towards fully Autonomous Vehicles & the advancement of self driving technology
- Improved sensors
- UX-interfaces
- Hand gestures
- Voice Guidance
- Integrated cockpits



- Battery technology
- Semiconductor technology
- Charging technology

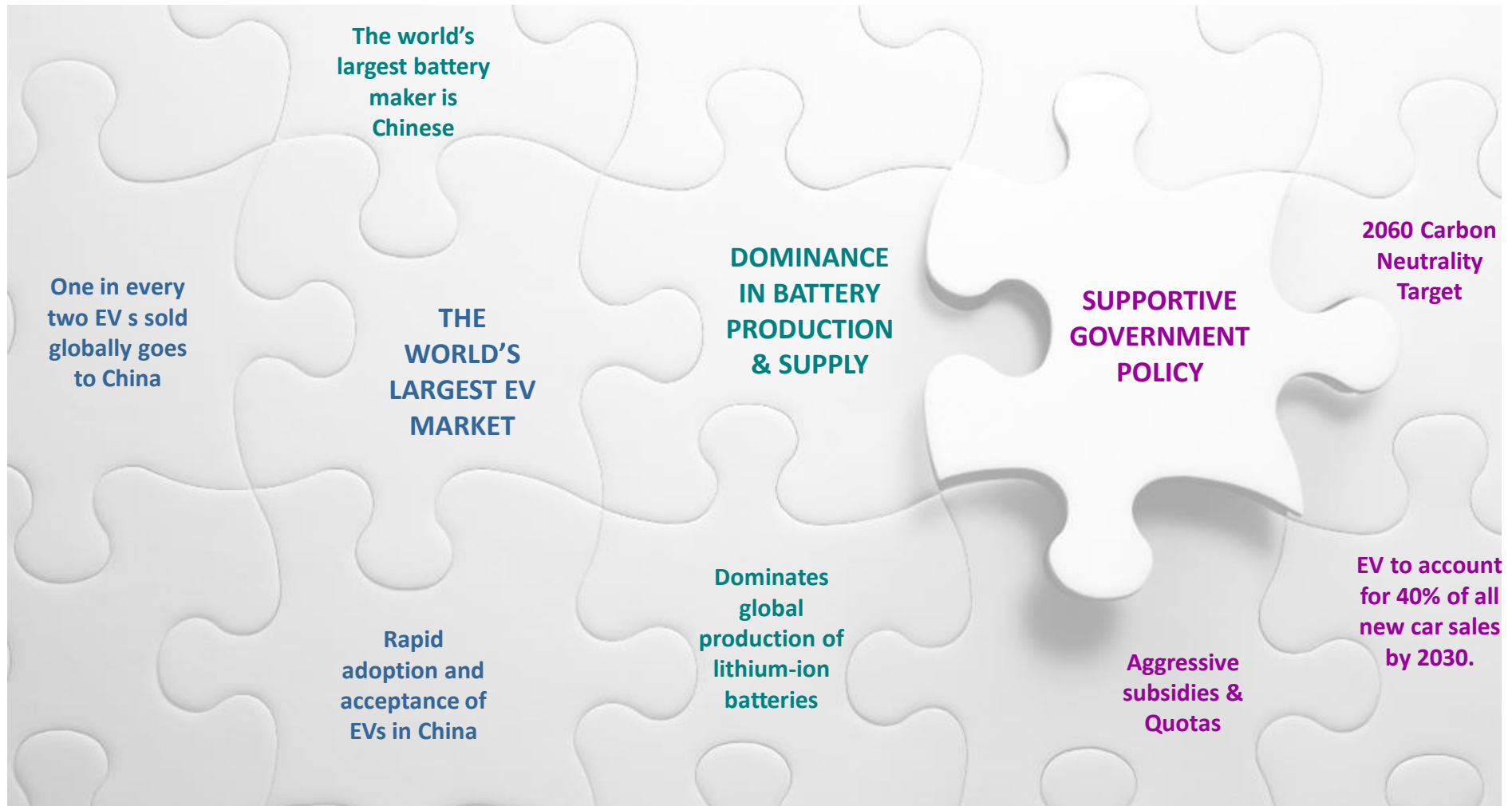


- Different modes of transport seamlessly connected
- “De-silo-lisation” of transportation solutions i.e parking, car-sharing, public and private transport etc.

UNDERSTANDING CHINA'S DOMINANCE IN THE EV RACE

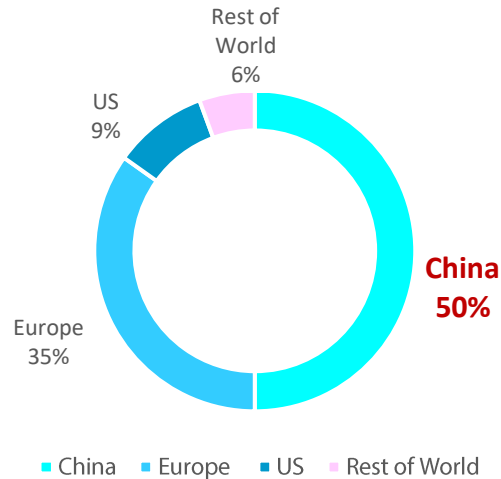


UNDERSTANDING CHINA'S DOMINANCE IN THE EV RACE



CHINA IS THE WORLD'S LARGEST EV MARKET

Global Passenger EV sales by market, 2021

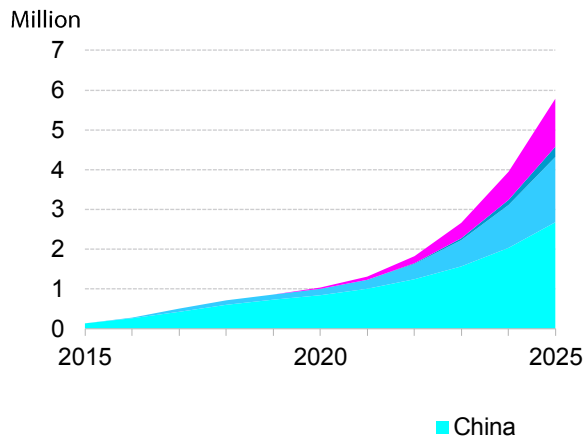


🚗 China is already the world's largest EV market with **one out of every two** EVs sold globally in 2021 going to China.

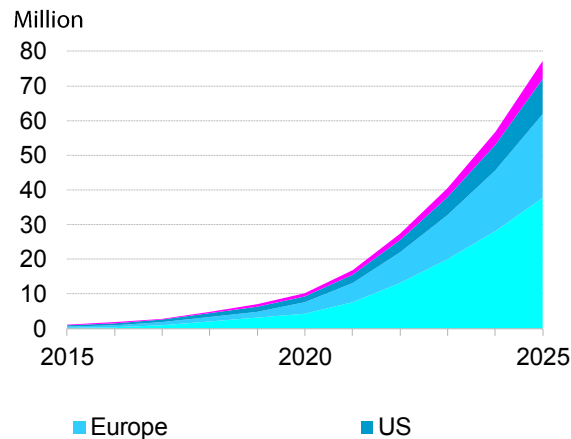
Source: IEA Global EV Outlook 2022.

GLOBAL EV FLEET SIZES BY SEGMENT AND MARKET

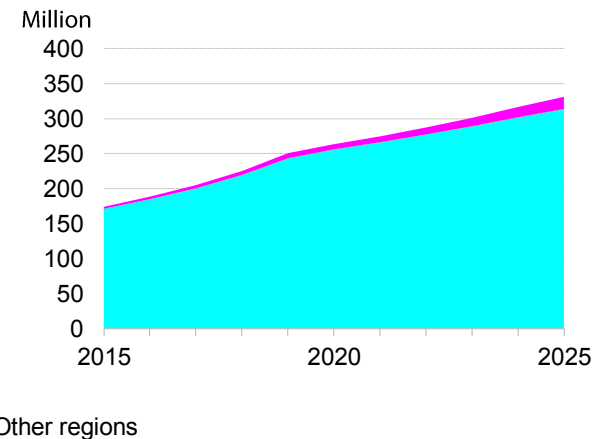
Electric buses, vans and trucks



Passenger EVs



Electric two- and three-wheelers



Source: BloombergNEF Electric Vehicle Outlook 2022.

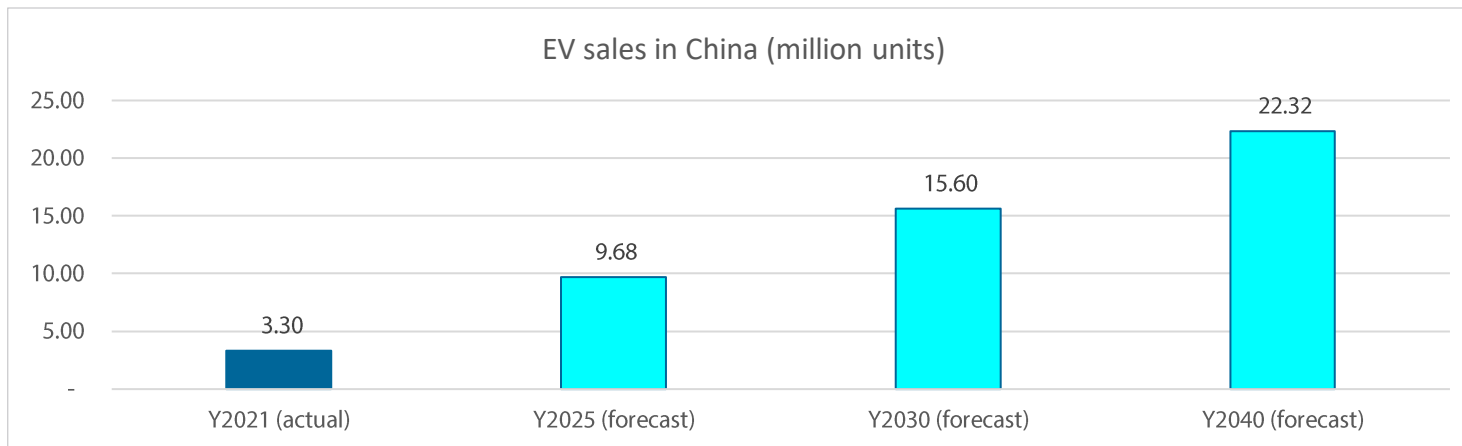
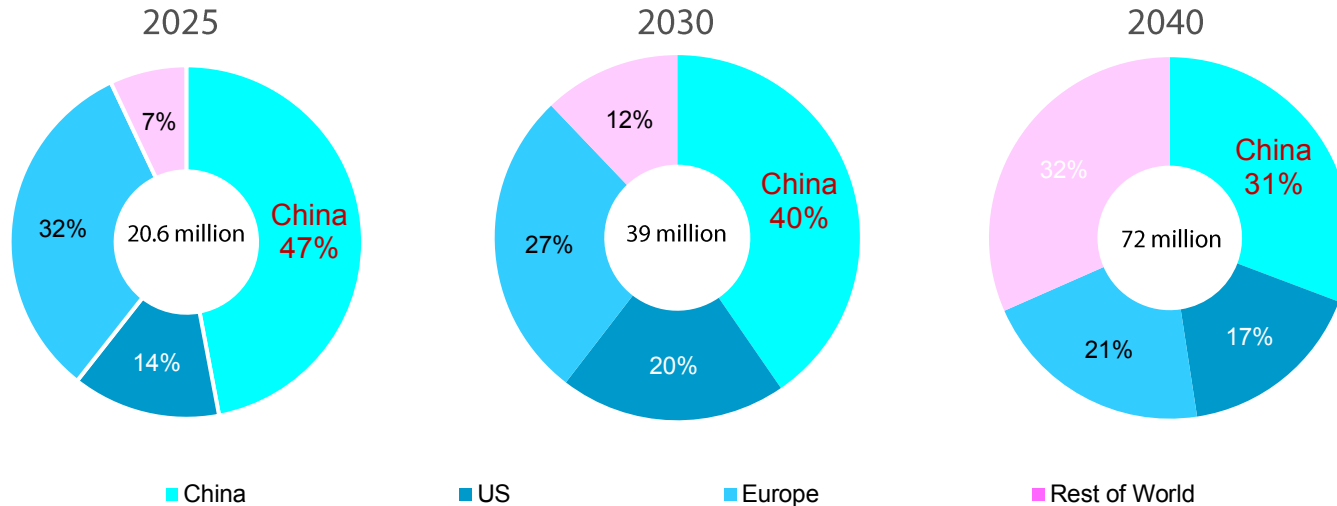
Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

CHINA EV SALES FORECAST TO CONTINUE TO GROW RAPIDLY

Global passenger EV sales by market in 2025, 2030 and 2040

- Economic Transition Scenario



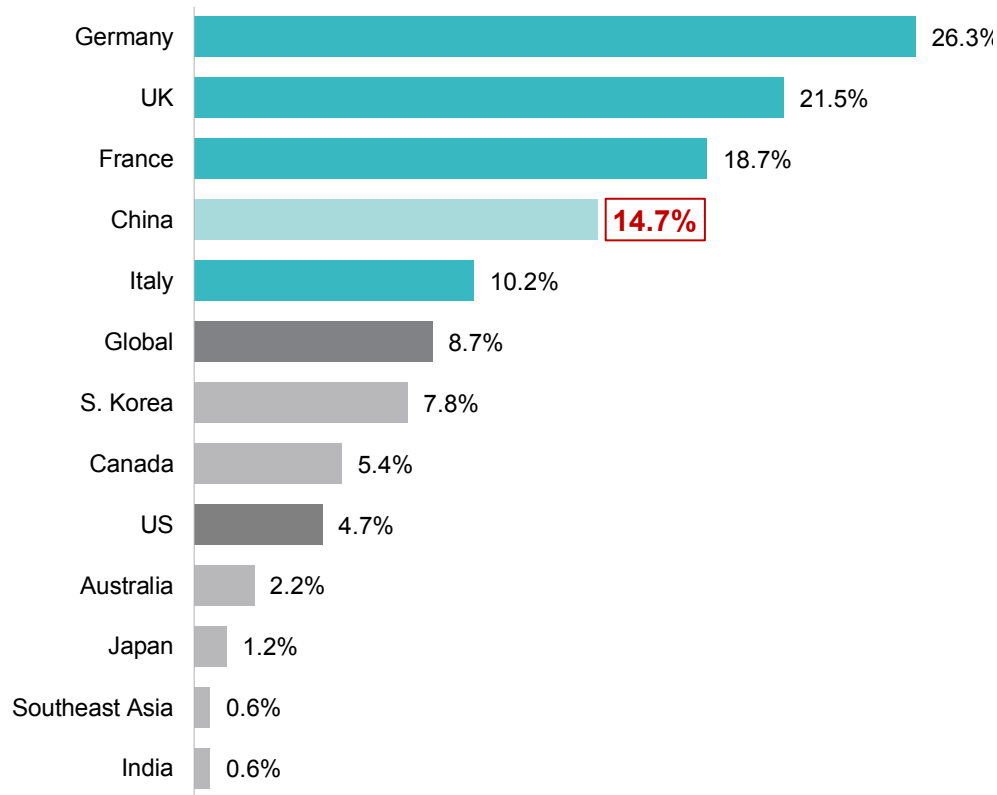
Source: IEA Global EV Outlook 2022, BloombergNEF Electric Vehicle Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

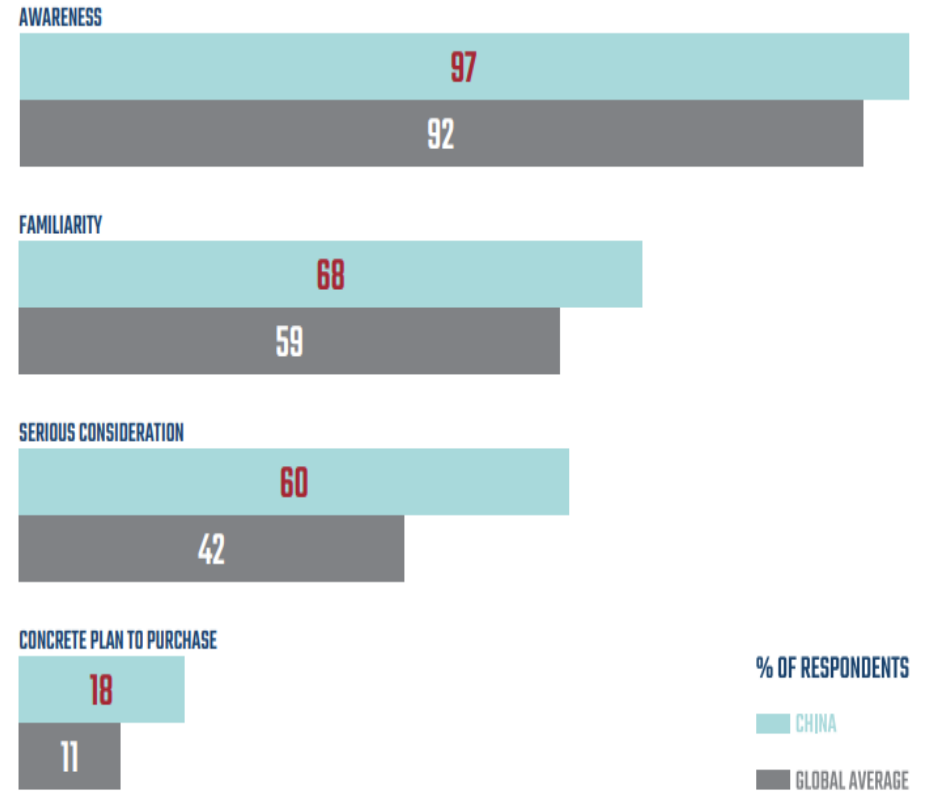
AWARENESS, ACCEPTANCE AND ADOPTION

Passenger EV sales share in selected markets, 2021



Source: BloombergNEF Electric Vehicle Outlook 2022.

Global Consumer Survey

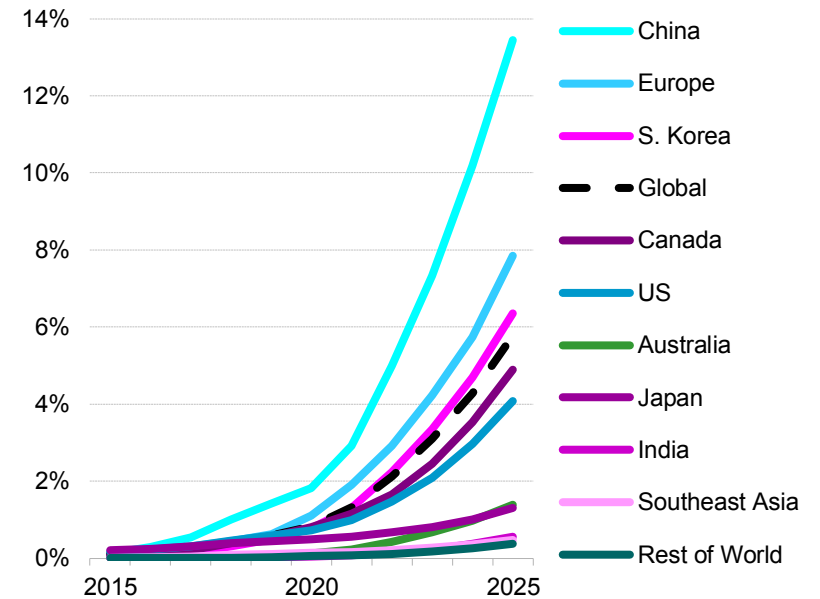


Source: McKinsey ACES Consumer Survey, 2019

PENETRATION RATE EXPECTED TO GROW SIGNIFICANTLY



Global near-term EV share of passenger vehicle fleet by market



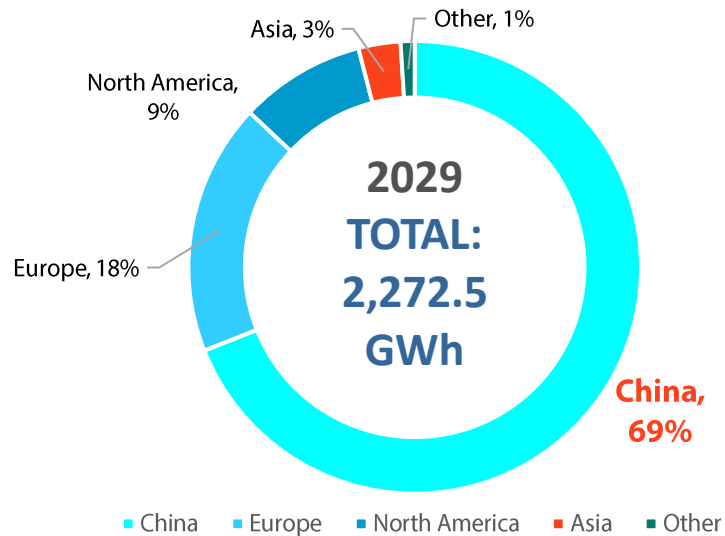
Source: BloombergNEF Electric Vehicle Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

DOMINANCE IN BATTERY PRODUCTION AND SUPPLY

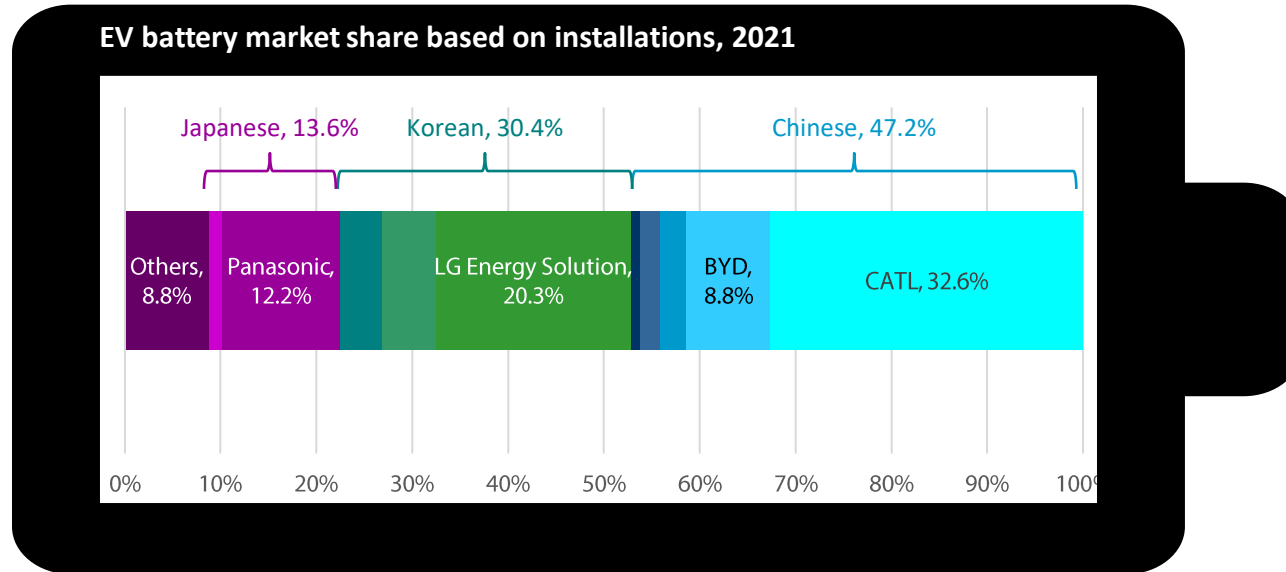
Lithium-ion battery mega-factory capacity by region



- ⇒ China dominates global production of lithium-ion batteries (a key component for the EVFM industry) and is forecasted to account for almost 70% of production capacity by 2029.
- ⇒ Local EV manufacturers are expected to benefit from the ease of access to this important battery component to produce EVs faster and at a lower cost.

Source: Benchmark Mineral Intelligence, Lithium-ion battery megafactory assessment, February 2020.
Past performance or any forecast is not necessarily indicative of the future performance of the market.

DOMINANCE IN BATTERY PRODUCTION AND SUPPLY



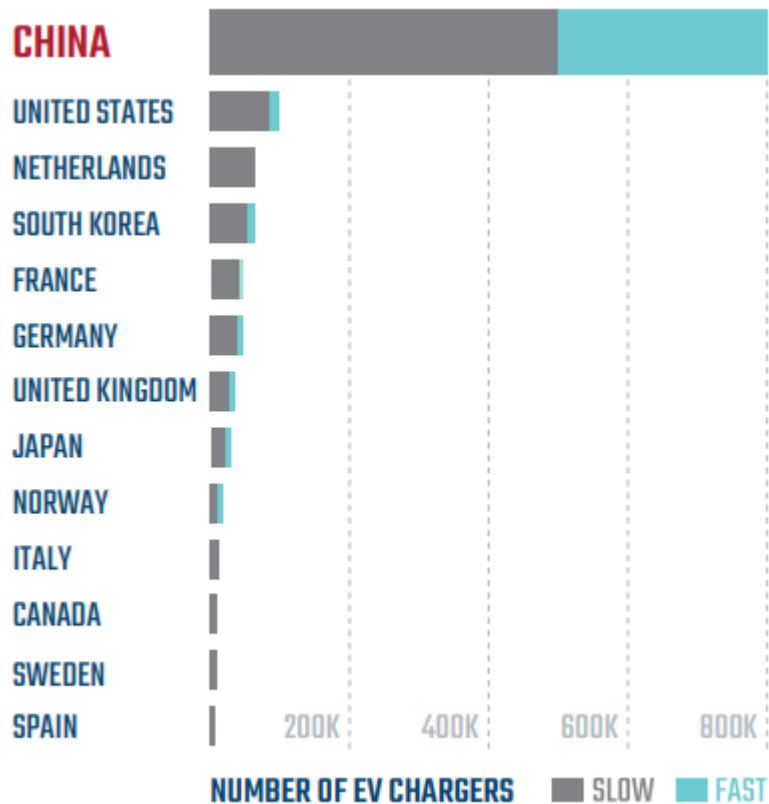
■ All others ■ AESC ■ Panasonic ■ Samsung SDI ■ SK ON ■ LG Energy Solution ■ SVOLT ■ Gotion ■ CALB ■ BYD ■ CATL

Source: SNE Research 2022.

Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

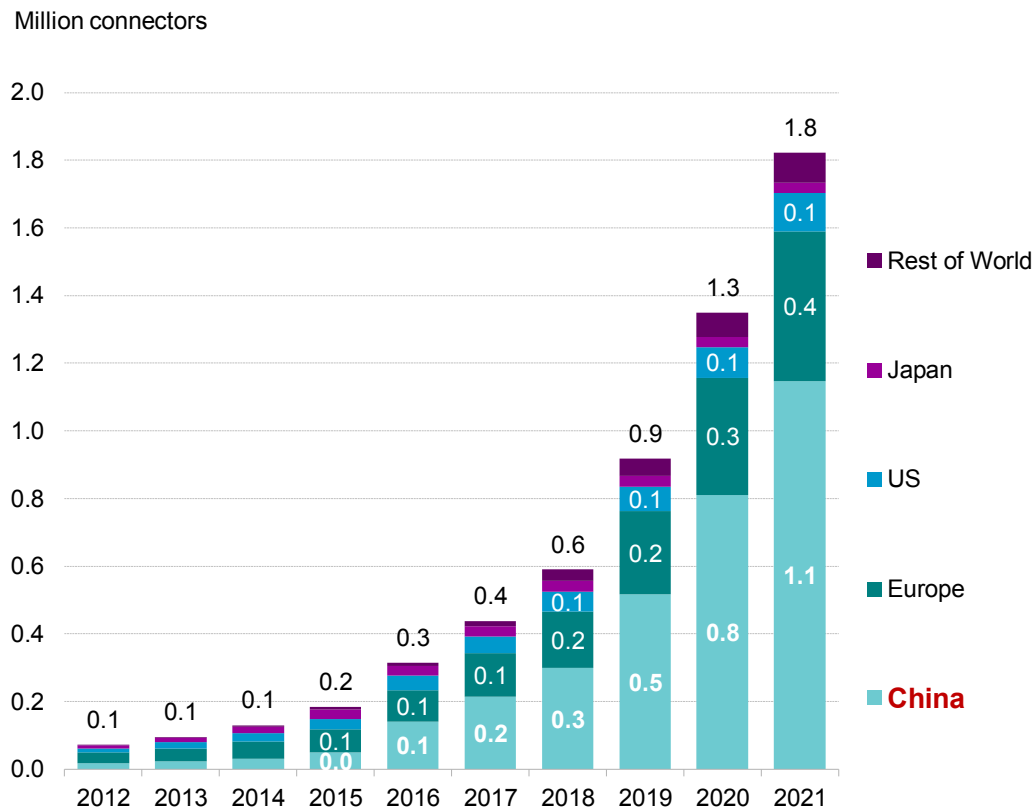
CHARGING INFRASTRUCTURE INVESTMENTS - OUTSPENDING THE COMPETITION

Number of EV Chargers in 2020



Source: Statista, 5 Aug 2021

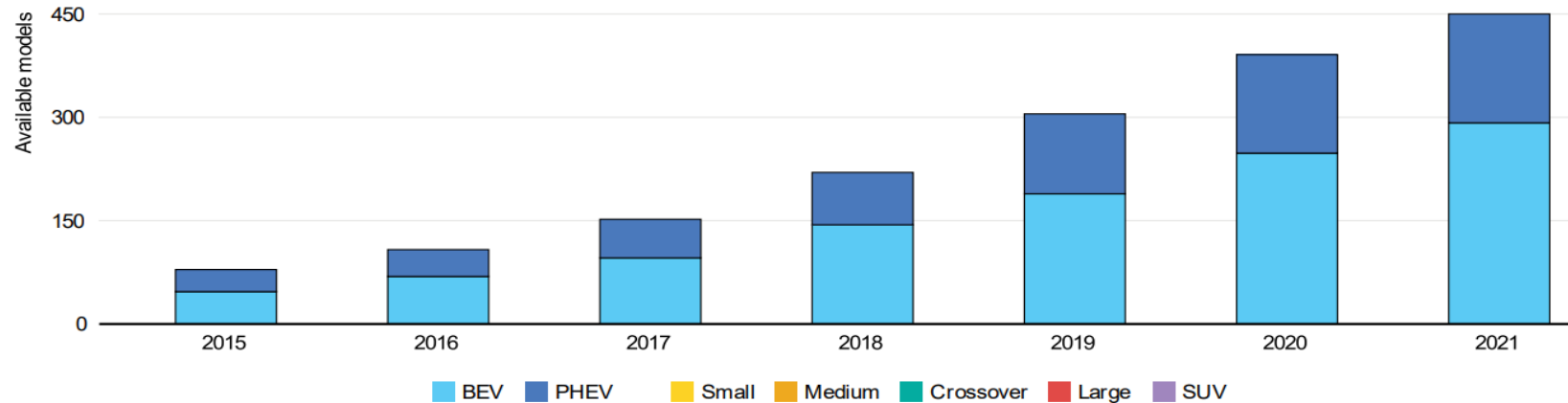
Cumulative global public charging connectors



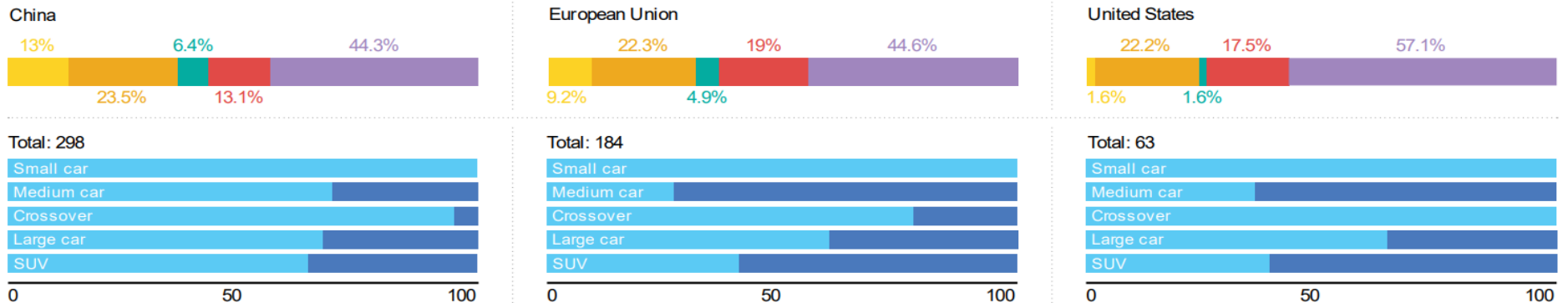
Source: BloombergNEF Electric Vehicle Outlook 2022.

ABUNDANCE OF MODELS AND COMPETITIVELY PRICED ELECTRIC VEHICLES

Status and evolution of electric vehicle model availability, 2015-2021



Available EV models by vehicle segments and powertrain

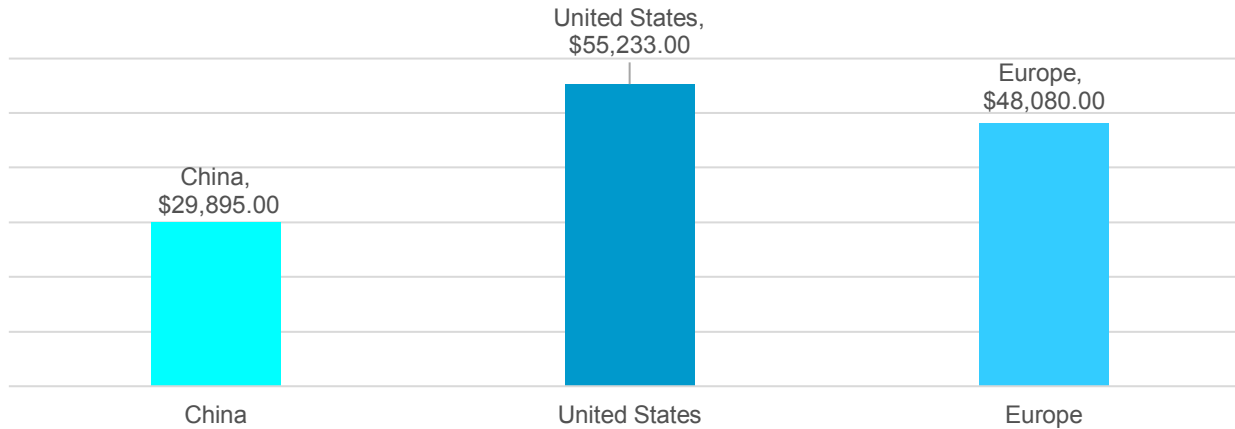


Notes: BEV = battery electric vehicle; PHEV = plug-in hybrid vehicle. Crossovers are a type of sports utility vehicle (SUV) built on a passenger car platform.

Source: IEA Global EV Outlook 2022.

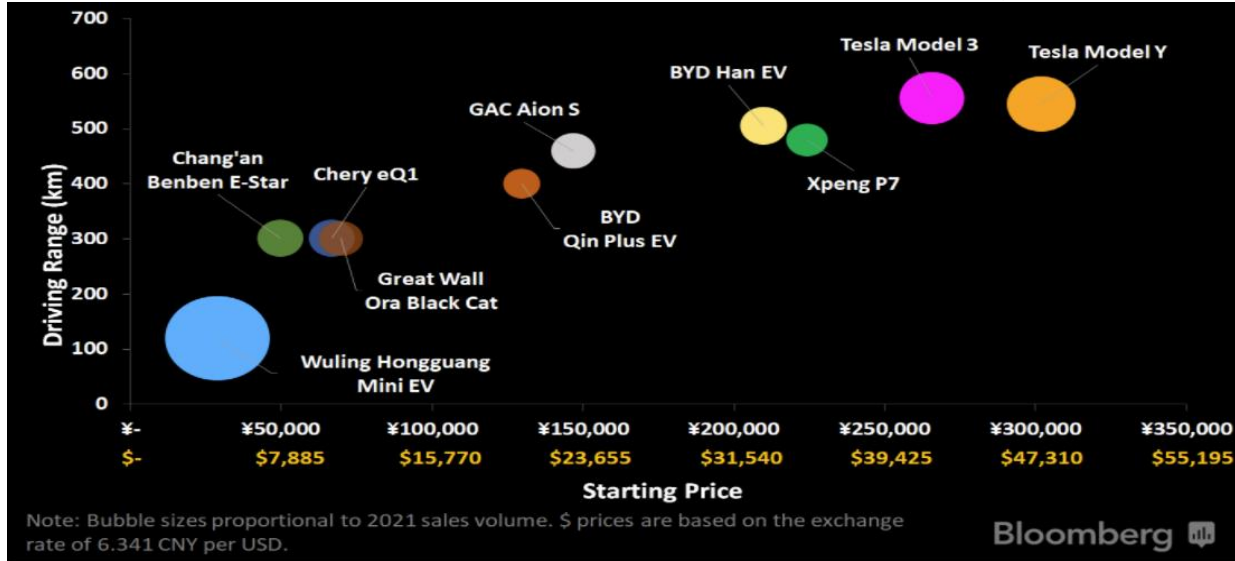
ABUNDANCE OF MODELS AND COMPETITIVELY PRICED ELECTRIC VEHICLES

Average retail price of EV s sold / registered in H1 2020



Putting EV affordability at the heart of innovation-driven production has resulted in competitively-priced EVs in China as compared to other markets such as the US and Europe.

Source: Jato Dynamics, 13 Oct 2020



Source: Bloomberg, Aug 2022.

Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

ABUNDANCE OF MODELS AND COMPETITIVELY PRICED ELECTRIC VEHICLES

Innovation & Affordability

Baojun E100. Tiny, cheap EVs that cost around USD 7,000

Top speed: 100km/h
Range: 250 km/charge
Battery: Lithium Iron-Phosphate (LFP)

More for urban driving than long road trips.



Source: Bloomberg News, June 27, 2021. Photographer: Qilai Shen/Bloomberg

Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

ABUNDANCE OF MODELS AND COMPETITIVELY PRICED ELECTRIC VEHICLES

Innovation & Affordability

Wuling Hong Guang Mini EV.

One of the cheapest EV cars. Costs around USD 5,000. Range: 120/170km per charge

Top selling EV model for first ten months of 2021. Sells even better than Tesla Model 3.

CATL or Contemporary Amperex Technology is one of the main suppliers of EV batteries to SAIC- GM- Wuling, the company which produces this car.

CATL also supplies EV batteries to Tesla, BMW, Honda, Volkswagen, Volvo, Dongfeng Motor

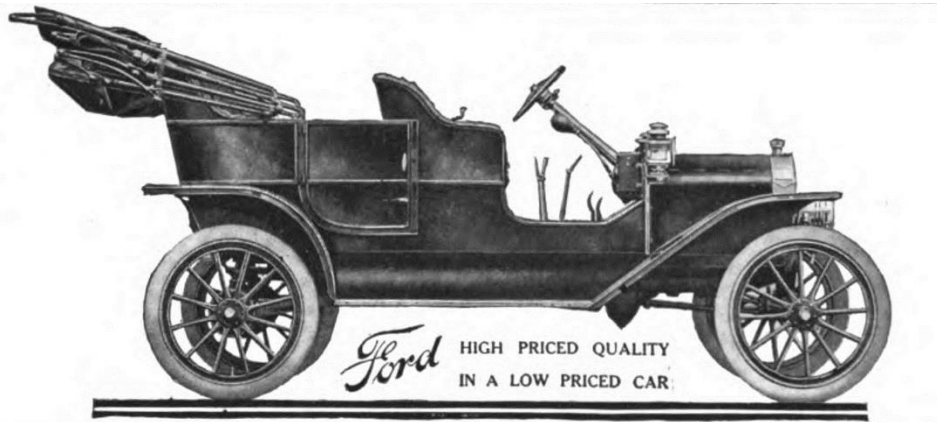


Wuling Hong Guang Mini EV. Wuling Motors.

Source: Business Insider article, “This tiny \$4,500 EV with just 27 horsepower is crushing the Tesla Model 3 in China”, 17 May 2021

Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

SUPPORTIVE GOVERNMENT POLICY



Source: https://en.wikipedia.org/wiki/File:1908_Ford_Model_T.jpg.
Wikimedia Commons



Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

SUPPORTIVE GOVERNMENT POLICY



2060 CARBON NEUTRALITY TARGET

A strong Electronic Vehicle and Future Mobility (“EVFM”) industry will be critical in meeting this goal.

Source: Bloomberg “How China Plans to Become Carbon-Neutral by 2060”
11 Aug 2021



MADE IN CHINA 2030

China has imposed a mandate on automakers which requires electric vehicles to account for 40% of all new car sales by 2030.

Source: Reuters “China to Open Auto Market as Trade Tensions Simmer”
17 Apr 2018



GREATER INTERNATIONAL COLLABORATION

By 2022, China will remove all restrictions on foreign investments in its auto sector and pave the way for the world’s biggest car market.

Source: MIT Energy Initiative “China transition to electric vehicles”
25 Nov 2020



SMART VEHICLE DATA REGULATION

Regulators are stepping up on data and network security to support the growth of mobility technologies.

Source: South China Morning Post “China’s tech regulator orders smart vehicle makers and telecom operators to enhance data and network security” 16 Sep 2021

GETTING PLUGGED IN



BREAKING DOWN THE EVFM VALUE CHAIN

ELECTRIC VEHICLE MANUFACTURERS



Growing demand will drive innovation and motivate manufacturers to bring improved EV models to market.

HARDWARE & COMPONENTS



Continuing battery improvements will extend driving range, making EVs an increasingly attractive choice.

SOFTWARE



Developments in autonomous driving and vehicle connectivity will enhance mobility enjoyment and open new revenue streams.

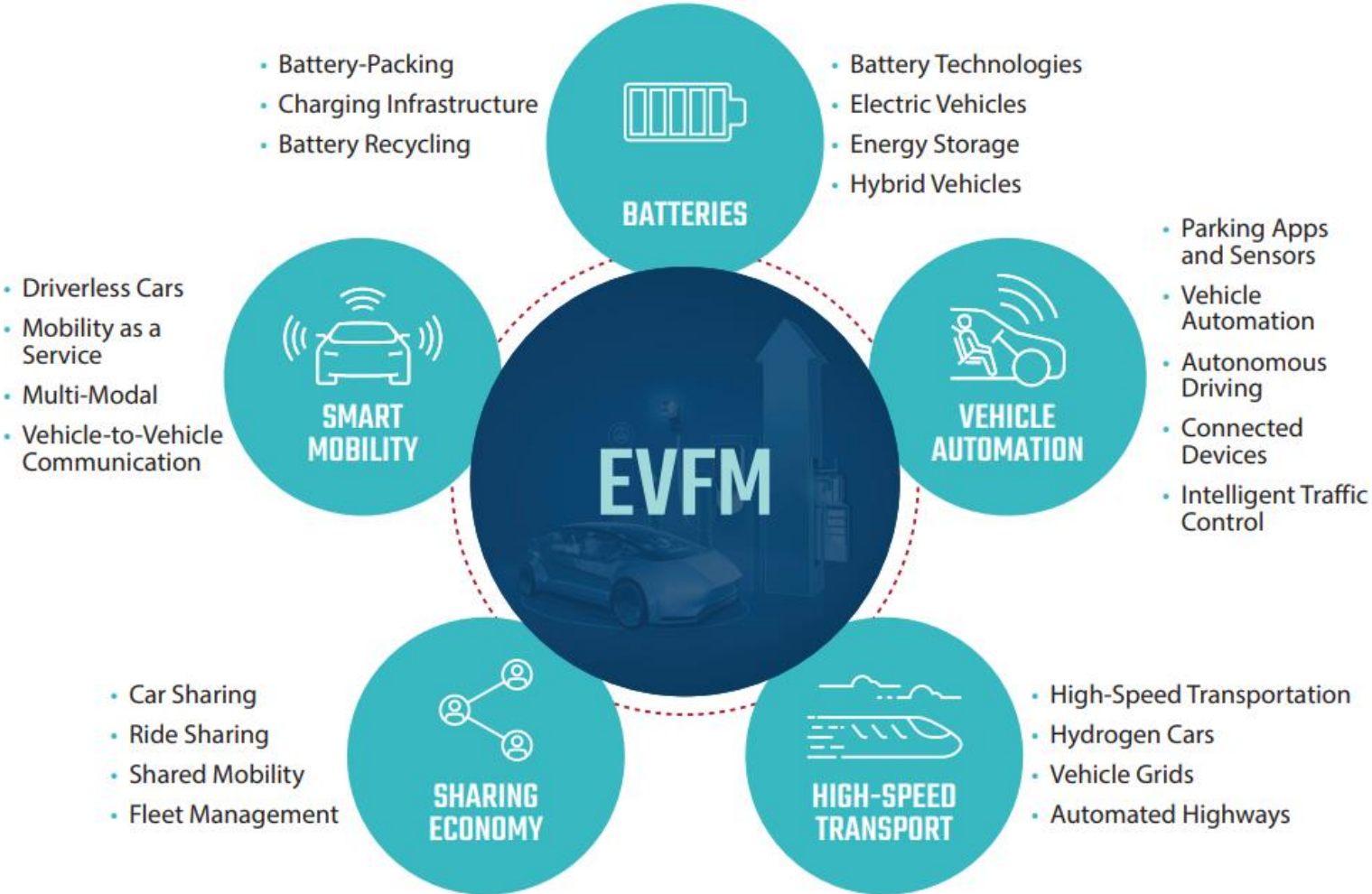
INFRASTRUCTURE



Improving the speed and availability of the nation's charging network will reduce range anxiety and increase EV adoption.

5 FUTURE-PROOF SECTORS

Primed for multi-decade expansion.

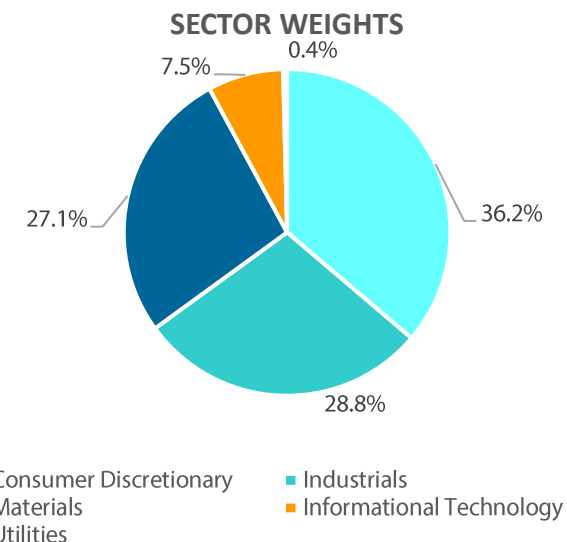


Source: Nikko AM, MSCI, Aug 2022

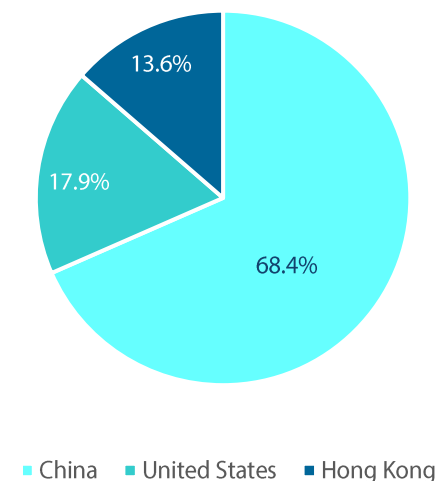
MSCI CHINA ALL SHARES IMI FUTURE MOBILITY TOP 50 INDEX

TOP 10 CONSTITUENTS

NAME	INDEX WEIGHT (%)	SECTOR	DESCRIPTION
Contemporary Amperex Technology Co. Limited,	10.47	INDUSTRIALS	A global leader in lithium-ion battery development and manufacturing
NIO A ADR	10.17	CONSUMER DISCRETIONARY	One of China's leading company engaged in the design, manufacture and sale of Evs
Geely Automobile Holdings Limited	5.69	CONSUMER DISCRETIONARY	A chinese automobile manufacturer, focusing on development, manufacturing and sales of passenger vehicles
BYD Co. Ltd. (H Shares)	5.14	CONSUMER DISCRETIONARY	A chinese manufacturer of automobiles (including EVs), rail, batteries and electronics
Li Auto A ADR	4.72	CONSUMER DISCRETIONARY	Li Auto Inc is a China-based new energy passenger vehicles (NEV) automaker principally engaged in the design, develop, manufacture and sales of smart electric vehicles.
BYD Co. Ltd. (A Shares)	4.43	CONSUMER DISCRETIONARY	A chinese manufacturer of automobiles (including EVs), rail, batteries and electronics
EVE Energy Co., Ltd.	3.82	INDUSTRIALS	One of China's leading company engaged in lithium-ion battery development and manufacturing
Longi Green Energy	3.71	INFORMATION TECHNOLOGY	A China-based company mainly engaged in the production of photovoltaic products. e.g. monocrystalline silicon ingots, monocrystalline silicon wafers, semiconductor materials and solar cells.
Tianqi Lithium Ind	3.64	MATERIALS	A China-based company principally engaged in the research and development, manufacture and distribution of lithium products.
Yunnan Energy New Material Co Ltd	3.29	MATERIALS	A China-based supplier of film products, packaging and printing products, as well as paper packaging products. Its film products mainly include lithium ion isolation film



COUNTRY OF LISTING



Source: MSCI, Jun 2022

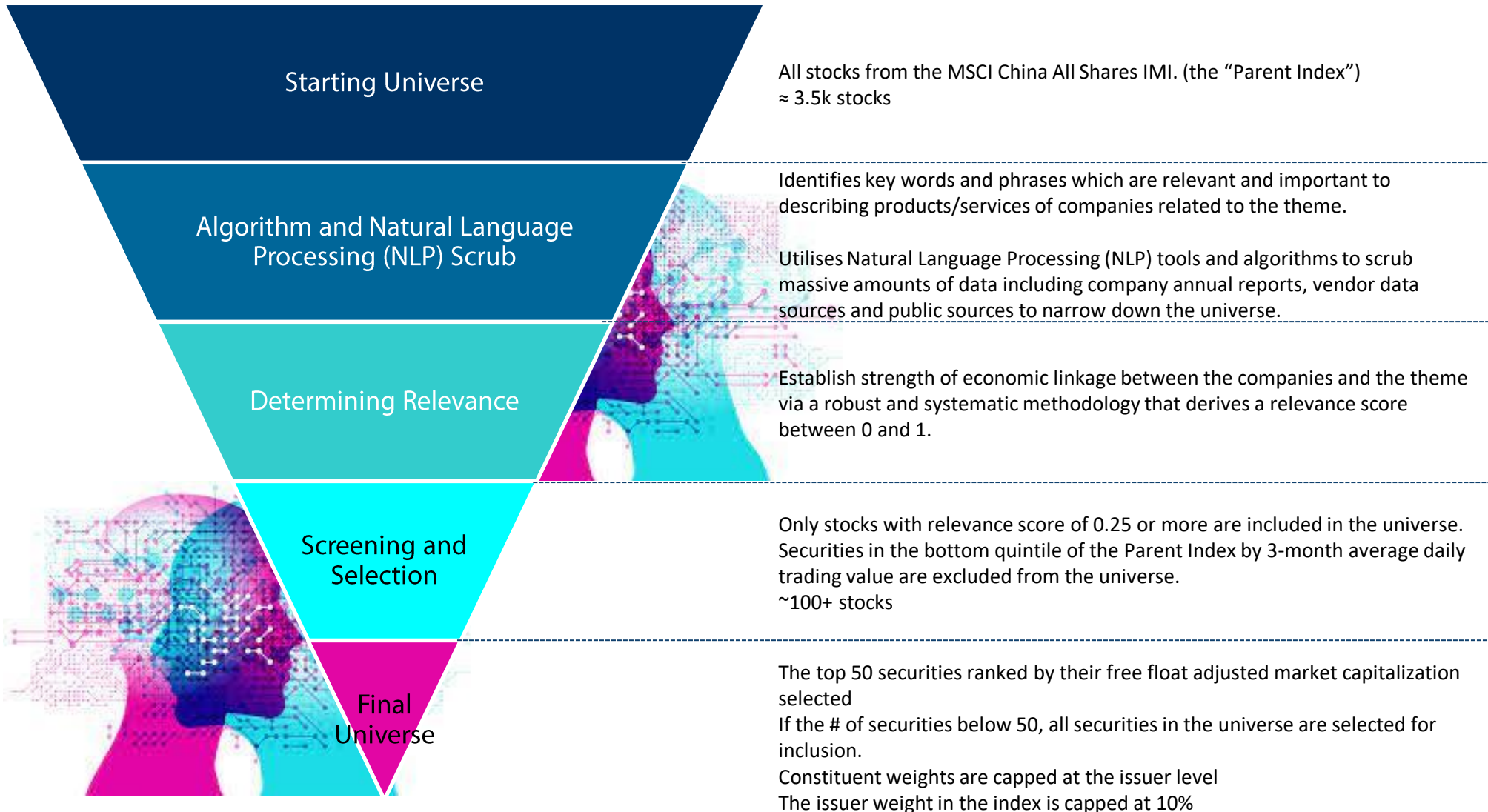
TOTAL 55.07



Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

MSCI CHINA ALL SHARES IMI FUTURE MOBILITY TOP 50 INDEX

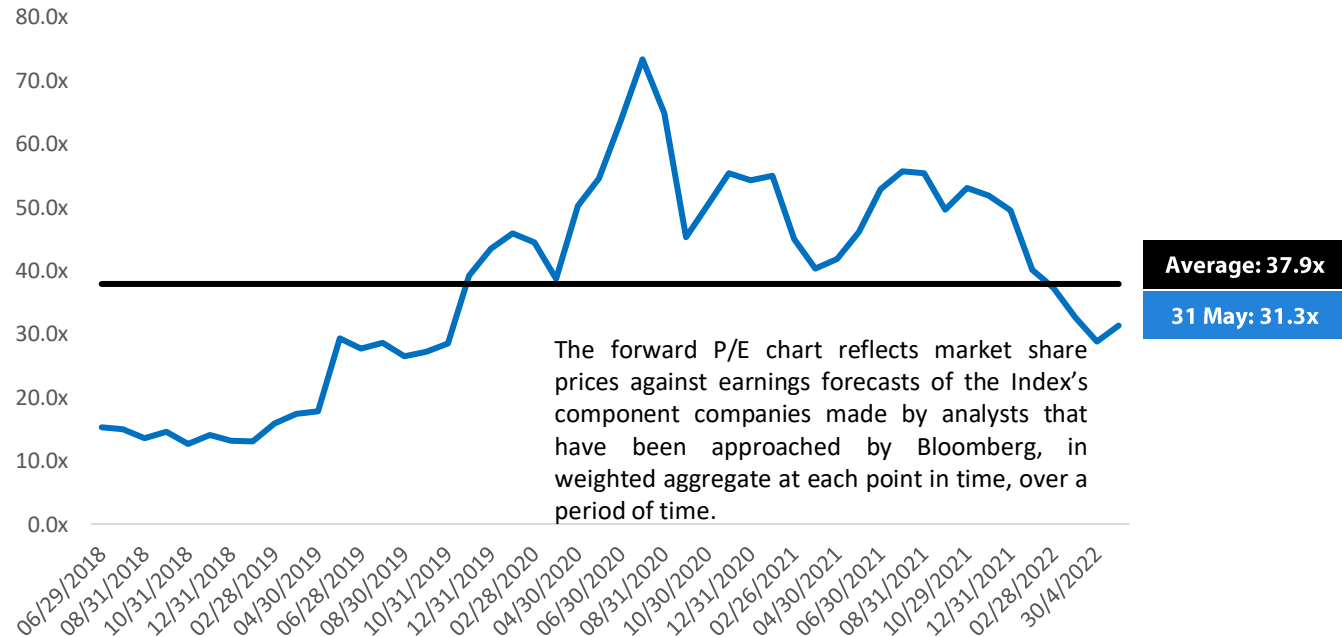


FORWARD PRICE EARNINGS RATIO (P/E)

China future mobility sector trades at a forward P/E ratio of 31x as of 31 May 2022.

This is slightly below the 3-year average of 38x

Forward P/E ratio chart of the MSCI China All Shares IMI Future Mobility Top 50 Index



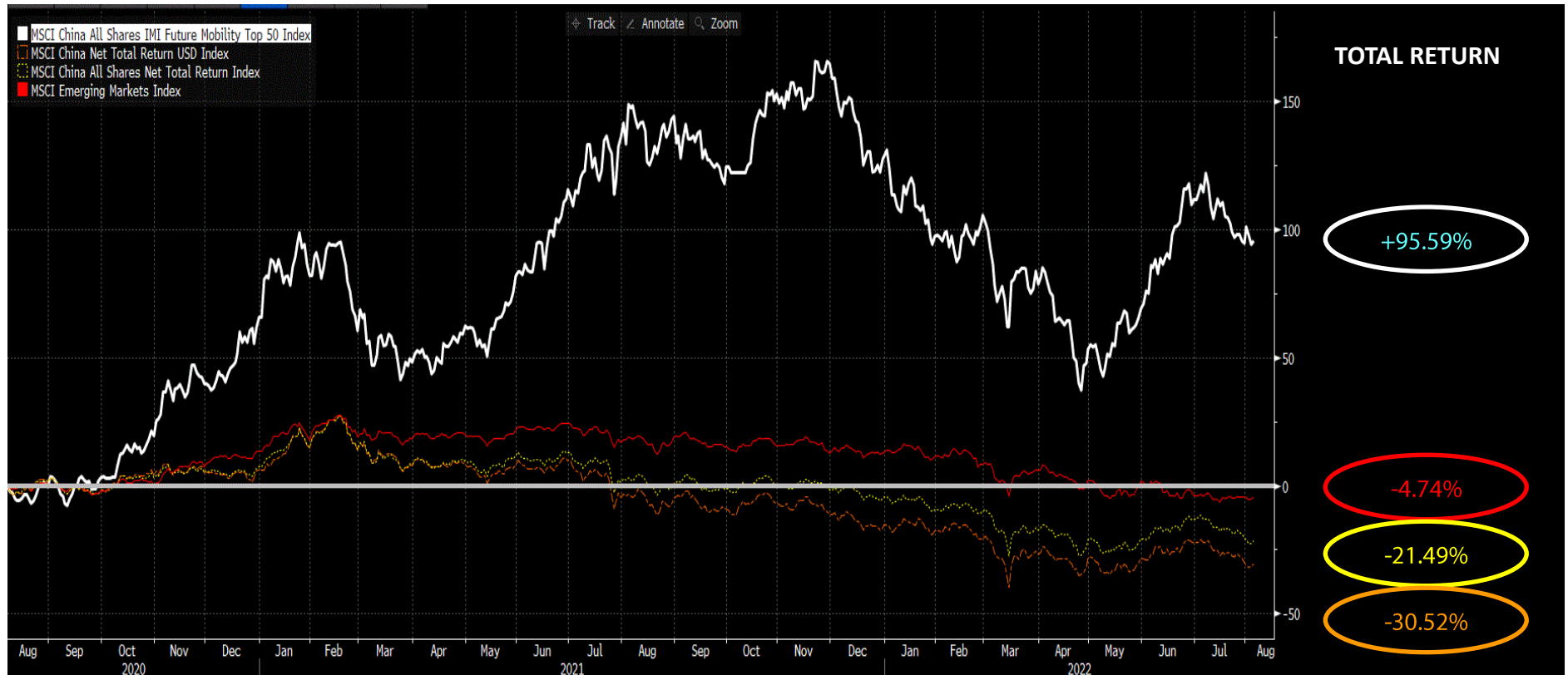
Source: MSCI as of 31 May 2022.

^ Forward Price to Earnings is a financial ratio comparing the market value of a company to its future earnings forecasted in this case for the next 12 months. Past performance or any forecast is not necessarily indicative of future performance.

HISTORICAL NET TOTAL RETURN PERFORMANCE

Performance against broad based China and Emerging Market (EM) indices on a net total return basis

Comparison of Index Performance over 2 years (Rebased to 100)



Source: Bloomberg as of 4 August 2022

Performance of the index presented here are for illustrative purposes only. Past performance is not necessarily indicative of the future performance.

THANK YOU!

End of Presentation



IMPORTANT INFORMATION

Important Information:

This document is purely for informational purposes only with no consideration given to the specific investment objective, financial situation and particular needs of any specific person. It should not be relied upon as financial advice. **Any securities mentioned herein are for illustration purposes only and should not be construed as a recommendation for investment.** You should seek advice from a financial adviser before making any investment. In the event that you choose not to do so, you should consider whether the investment selected is suitable for you. Investments in funds are not deposits in, obligations of, or guaranteed or insured by Nikko Asset Management Asia Limited (“Nikko AM Asia”). Past performance or any prediction, projection or forecast is not indicative of future performance.

The information contained herein may not be copied, reproduced or redistributed without the express consent of Nikko AM Asia. While reasonable care has been taken to ensure the accuracy of the information as at the date of publication, Nikko AM Asia does not give any warranty or representation, either express or implied, and expressly disclaims liability for any errors or omissions. Information may be subject to change without notice. Nikko AM Asia accepts no liability for any loss, indirect or consequential damages, arising from any use of or reliance on this document.

The performance of the ETF’s price on the Singapore Exchange Securities Trading Limited (“SGX-ST”) may be different from the net asset value per unit of the ETF. The ETF may also be suspended or delisted from the SGX-ST. Listing of the units does not guarantee a liquid market for the units. Investors should note that the ETF differs from a typical unit trust and units may only be created or redeemed directly by a participating dealer in large creation or redemption units.

Nikko Asset Management Asia Limited. Registration Number 198202562H.

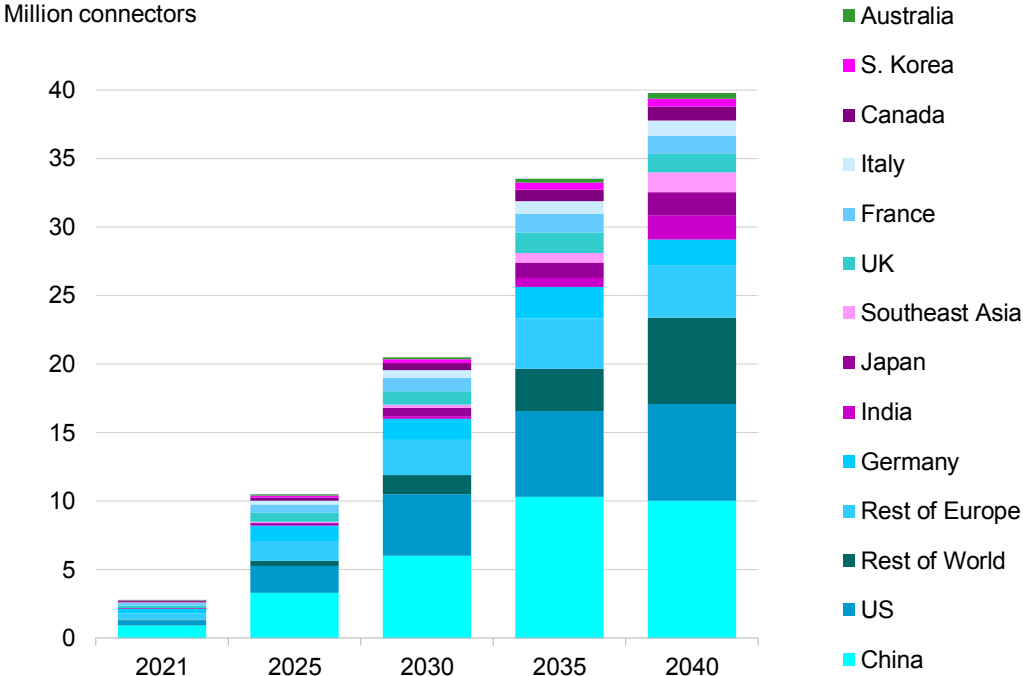
The funds or securities referred to herein are not sponsored, endorsed, or promoted by MSCI, and MSCI bears no liability with respect to any such funds or securities or any index on which such funds or securities are based. The prospectus contains a more detailed description of the limited relationship MSCI has with Nikko AM Asia and any related funds

APPENDIX



A NEED FOR NEW INFRASTRUCTURE

Annual installations of electric vehicle charger connectors to 2040 - Economic Transition Scenario



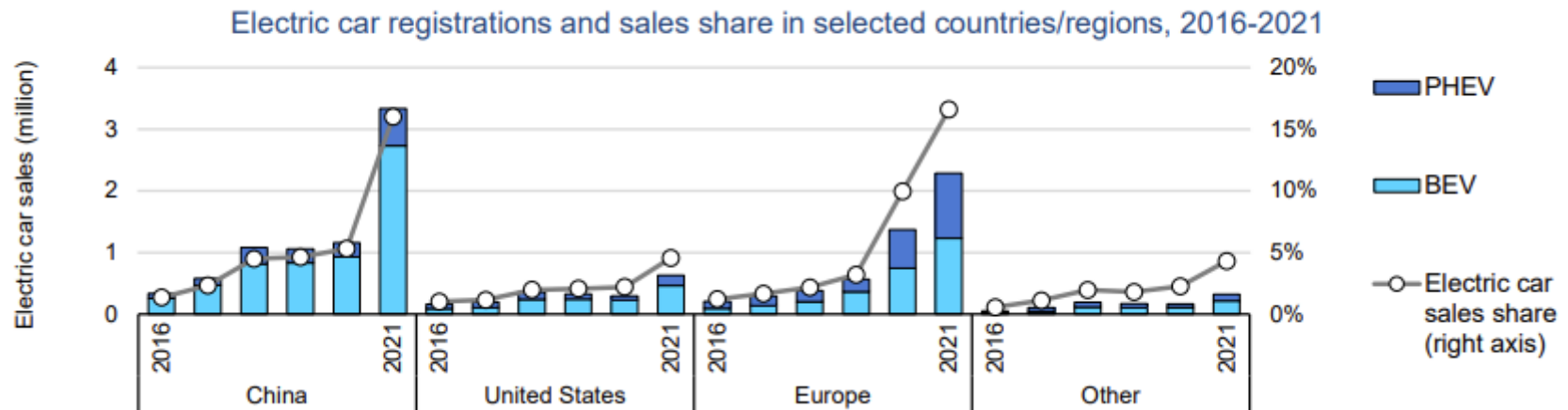
Source: BloombergNEF Electric Vehicle Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

CHINA AND EUROPE LEADS THE WORLD IN TERMS OF ADOPTION

China leads the US in terms of adoption. Trails Europe by a slight margin



Source: IEA Global EV Outlook 2022.

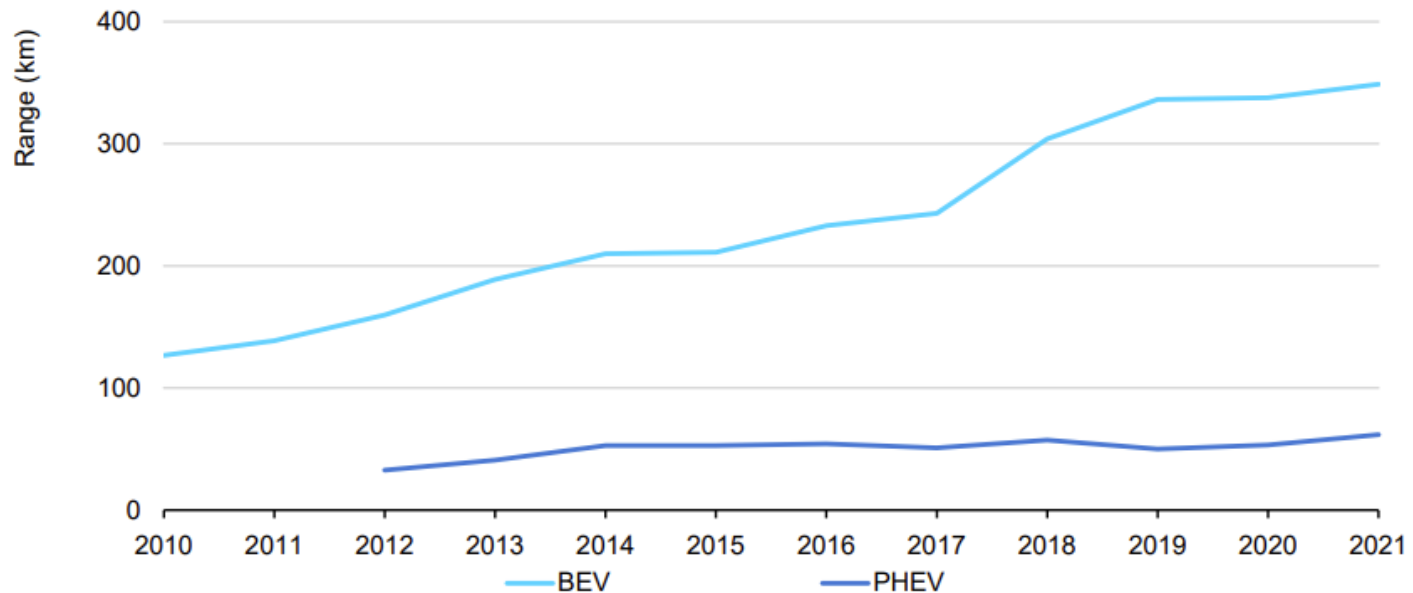
Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

TECHNOLOGICAL ADVANCES CRITICAL FOR THE EV REVOLUTION TO CONTINUE

A need for new technological advances and innovation

Evolution of average range of electric vehicles by powertrain



IEA. All rights reserved.

Notes: Range is sales-weighted and normalised to the Worldwide Harmonized Light Vehicle Test Procedure for all regions. Range for PHEVs refers to the all-electric electric drive range.

Sources: IEA analysis based on [EV Volumes](#).

Source: IEA Global EV Outlook 2022.

Past performance or any forecast is not necessarily indicative of the future performance of the market.

Confidential – Not For Redistribution. This material must be read in conjunction with the 'Important Information' statement on the last page

ROADMAP: MASS ADOPTION OF HIGHLY AUTONOMOUS VEHICLES IN CHINA

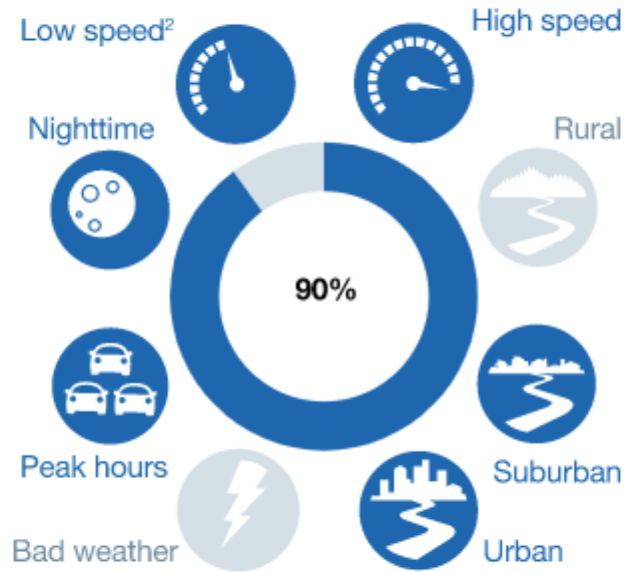
Use cases and passenger-kilometers addressable by autonomous vehicles over time,¹ % of passenger-kilometers traveled

Phase 1, ~2023



Technology ready and early adoption of constrained Level 4 AV technology

Phase 2, ~2027



Start of mass commercialization of Level 4 AV technology

Phase 3, ~2032



Full adoption with penetration into rural areas

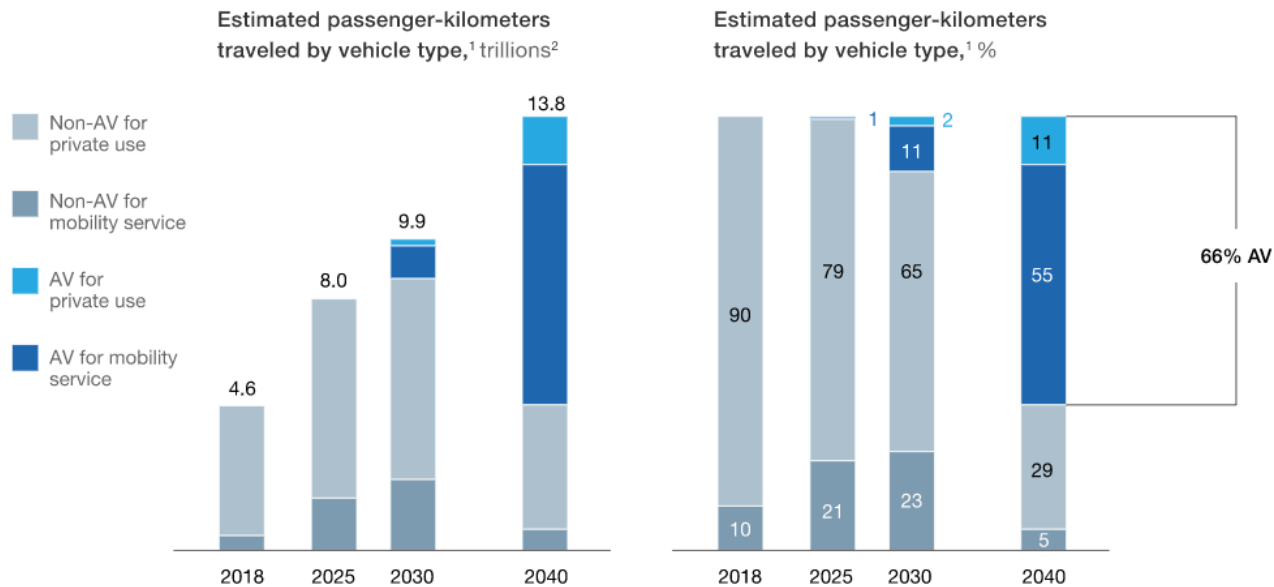
¹Suburban area has less traffic and more simple driving conditions than urban area.

²Driving speed no more than 60 kilometers per hour.

Source: Mckinsey Center for Future Mobility, Jan 2019

AUTONOMOUS VEHICLES - THE VEHICLES OF THE FUTURE WILL BE DRIVERLESS?

Autonomous vehicles (AV) will travel about 66 percent of total passenger-kilometers in 2040.

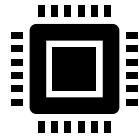


¹Baseline scenario.
²Figures may not sum, because of rounding.

Source: Mckinsey Center for Future Mobility, Jan 2019

Benefits of Autonomous Vehicles

- A reduction in accidents
- Improvement in mobility for disabled and elderly
- Freeing up time spent in commute, potentially increasing productivity.
- A building block to solve burgeoning infrastructure problems in large cities.
- Another internet touchpoint for the masses.



L1: General hardware connectivity

The driver is able to track basic vehicle usage and monitor technical status



L2: Individual connectivity

The driver uses his/her personal profile to access digital services via external digital ecosystems and platforms



L3: Preference-based personalization

All occupants enjoy personalized controls, their own infotainment content, and target contextual advertising



L4: Multisensorial live interaction:

All occupants interact live with the vehicle and receive proactive recommendations on services and functions.



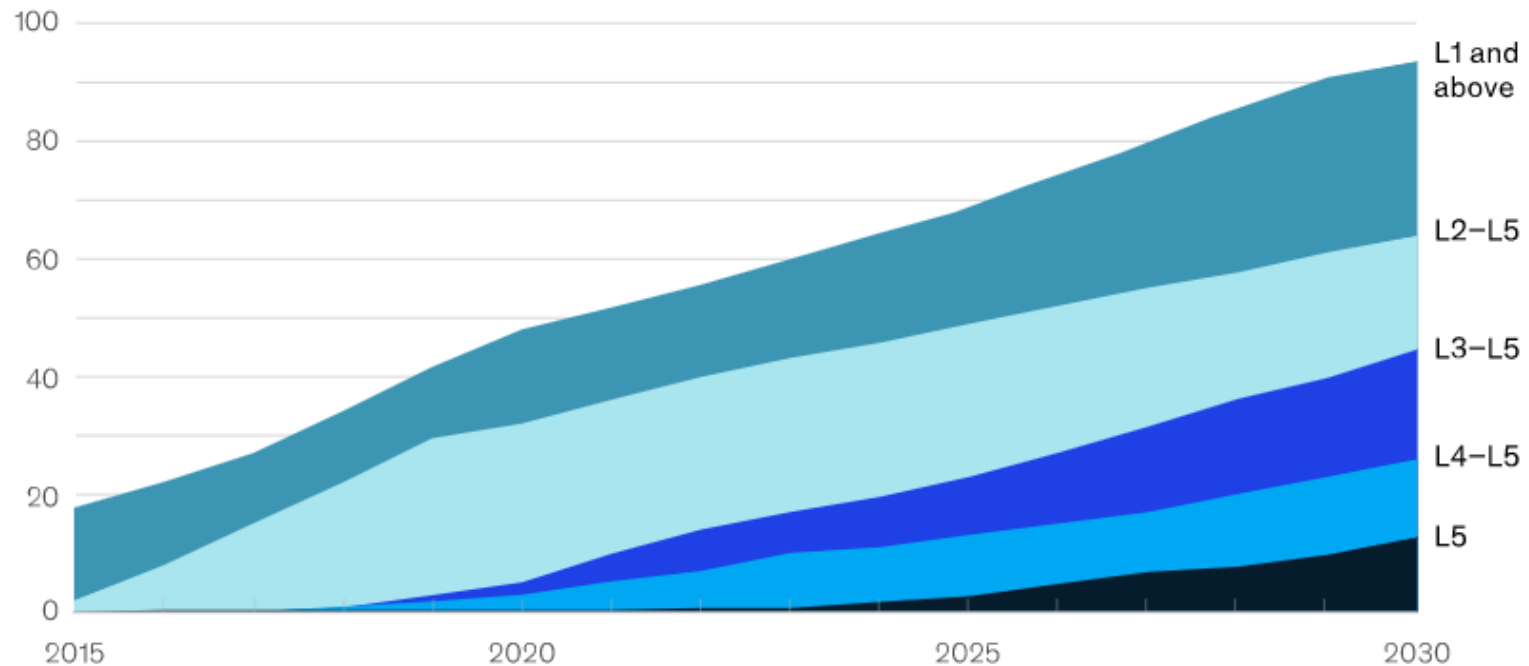
L5: Virtual Chauffeur:

Cognitive AI fulfils all occupants' explicit and unstated needs, predicting and performing complex, unprogrammed tasks

THE SOFTWARE OPPORTUNITY IS VAST AS CONNECTED CARS PROLIFERATE

By 2030, 45 percent of global new-car sales could be at level 3 or above in connectivity.

Global penetration of connected cars, % of new light-vehicle sales by connectivity level



Source: Mckinsey Center for Future Mobility, Jan 2019

THE SOFTWARE OPPORTUNITY IS VAST AS CONNECTED CARS PROLIFERATE



The background of the slide features a close-up, shallow depth-of-field photograph of several interlocking gears. The gears are light-colored, possibly brass or steel, and are set against a dark, textured background. The focus is sharp on the gears in the foreground, while those in the background are blurred.

REVENUE GENERATION

- Selling data—collecting, analyzing, and reselling big data to third parties
- Tailored advertising—leveraging car data to push individual offerings to customers
- Direct monetization—selling products, features, or services to the customer

COST REDUCTION

- Analyzing actual usage patterns to reduce repair and down time costs
- R&D and material cost reduction—gathering product field data for development
- Improved customer satisfaction—better tailoring product and services to customer needs

SECURITY ENHANCEMENT

- Reduced time for intervention—collecting and forwarding warnings in real time, pointing in the right direction
- Potential for the development of more tailored insurance solutions and coverage