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**KraneShares**

# Hockey Stick Growth: Opportunities From The Electric Vehicle and New Transportation Technology Ecosystem

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# Driving The Future: Opportunities From The Electric Vehicles & New Transportation Technology Ecosystem



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KraneShares



## Introduction to KraneShares

### About KraneShares

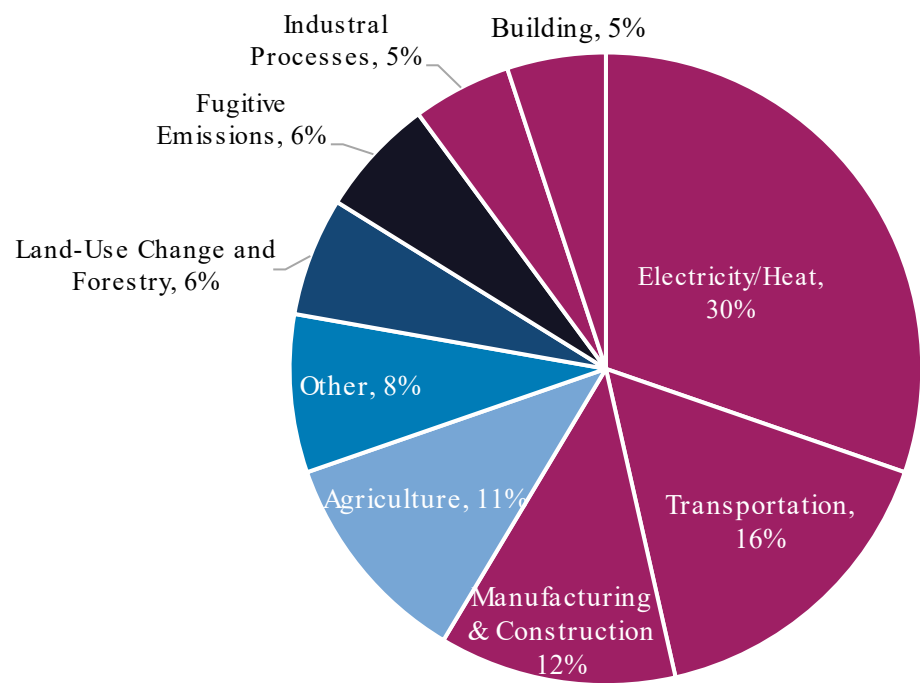
Krane Funds Advisors, LLC is the investment manager for KraneShares ETFs. Our suite of China focused ETFs provides investors with solutions to capture China's importance as an essential element of a well-designed investment portfolio. We strive to provide innovative, first to market strategies that have been developed based on our strong partnerships and our deep knowledge of investing. We help investors stay current on global market trends and aim to provide meaningful diversification. Krane Funds Advisors, LLC, is a signatory of the United Nations-supported Principles for Responsible Investing (UN PRI). The firm is majority owned by China International Capital Corporation (CICC).



More than half of greenhouse gas emissions can be reduced/eliminated with electrification and renewables<sup>1</sup>  
 Electricity, transportation, and manufacturing account for more than 50% of greenhouse gas emissions<sup>1</sup>

### The Climate Challenge

Greenhouse gas emissions by sector<sup>1</sup>  
 in billions of tones of CO2-equivalent

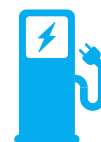


Sources of carbon emissions that can be improved through electrification and renewables

### Solution for a sustainable climate



**Electrification**  
 (Transportation, buildings, Industrials)



**Renewables**  
 (solar, wind, biofuels, Hydrogen)



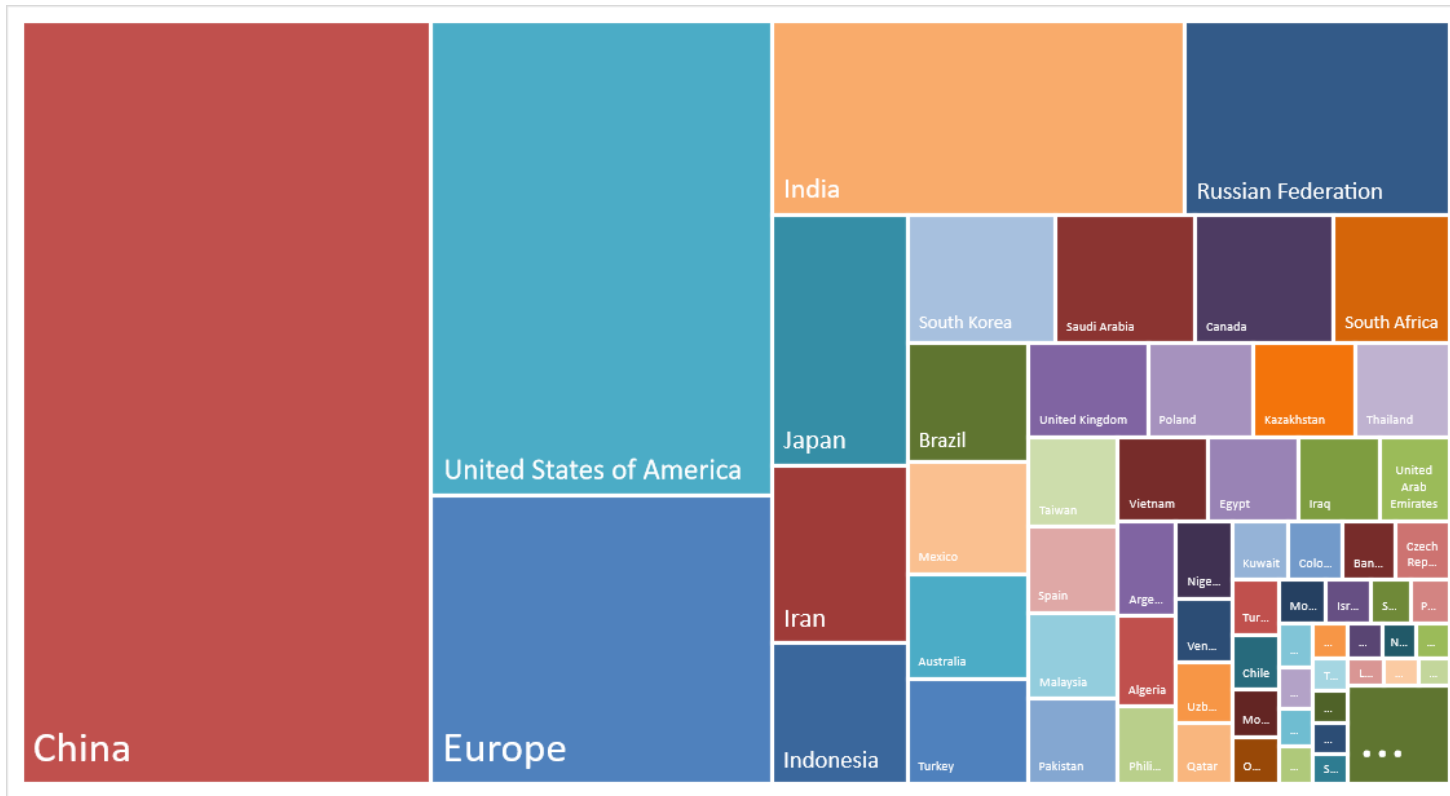
**Efficiency**  
 (Solar components, batteries etc.)

1. International Renewable Energy Agency (IRENA), CAIT Climate Data Explorer. Data as of 2019. Retrieved on July 19<sup>th</sup>, 2021 (latest).

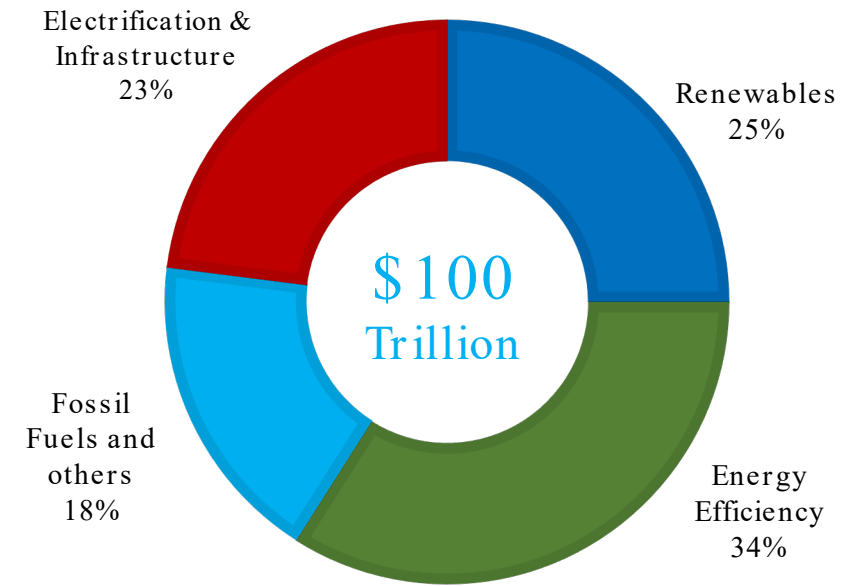
We believe high productivity comes with a burden.

A \$100 Trillion investment is needed to achieve an energy transformation

Carbon Emissions by Country



Investment needed for transformation (2020 – 2050)

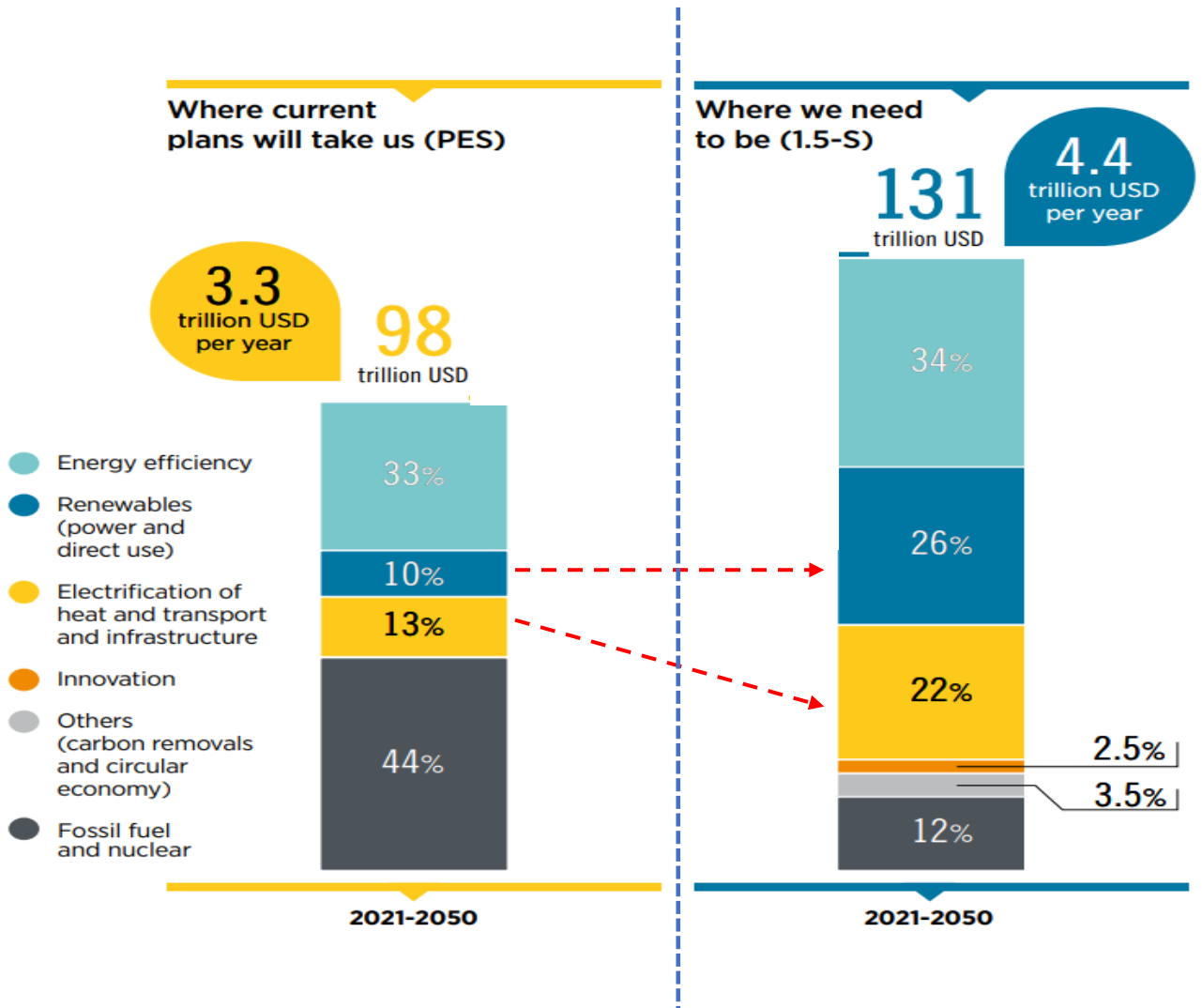


Sources: Global Carbon Project (left chart) and International Renewable Energy Agency (IRENA) (right chart). Data as of December of 2019 retrieved on July 19<sup>th</sup>, 2021 (left chart), forecast as of June of 2021 (right chart)

According to IRENA, current investment projections of \$100 trillion won't be enough \$131 trillion or an additional \$1.1 trillion per year will be needed to meet climate goals by 2050

The **Planned Energy Scenario (PES)** is the primary reference case for this study, providing a perspective on energy system developments based on governments' current energy plans and other planned targets and policies, including Nationally Determined Contributions (NDCs) under the Paris Agreement.

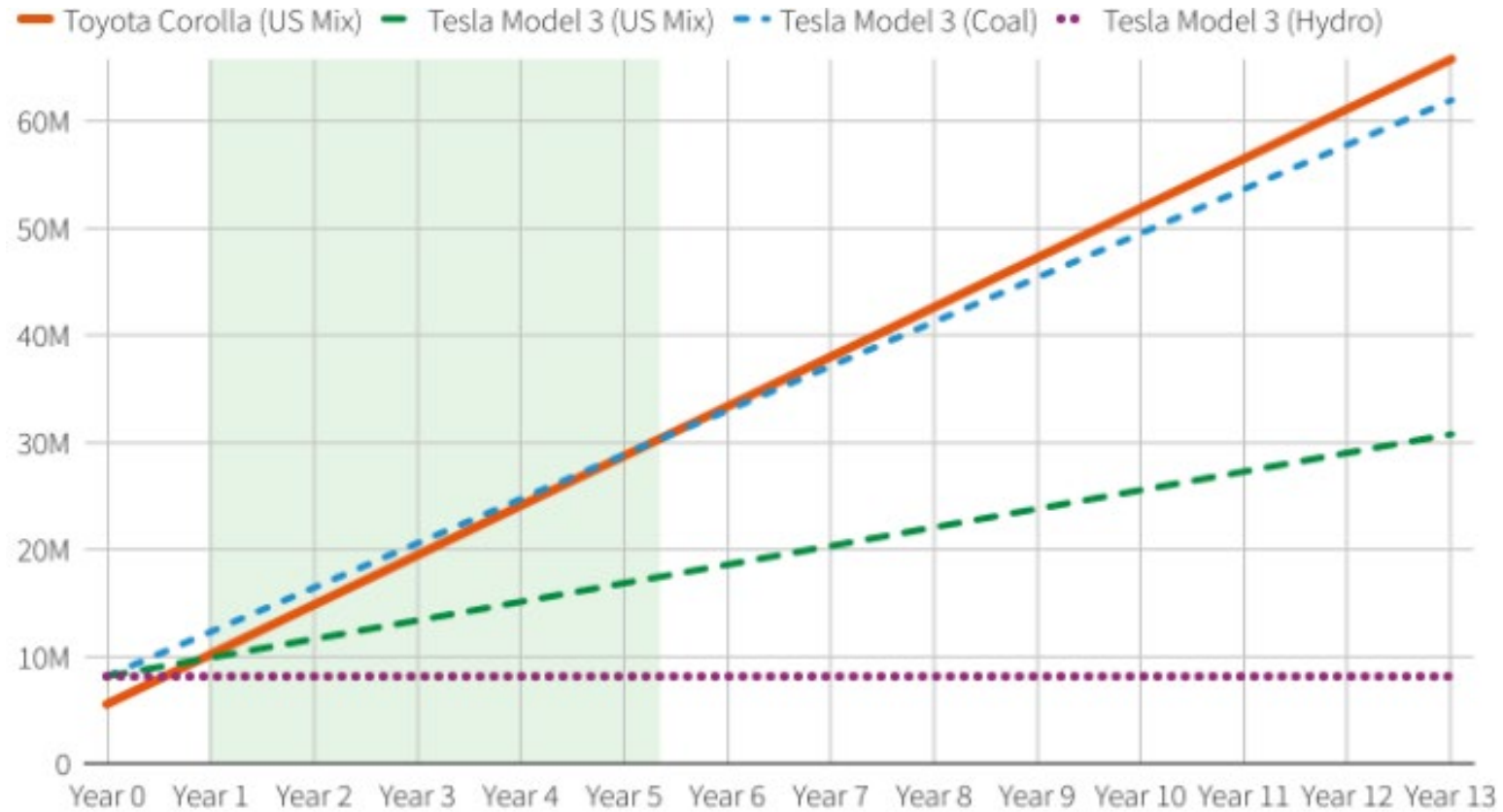
The **1.5°C Scenario (1.5-S)** describes an energy transition pathway aligned with the 1.5°C climate ambition - that is, to limit global average temperature increase by the end of the present century to 1.5°C, relative to pre-industrial levels. It prioritises readily available technology solutions, which can be scaled up at the necessary pace for the 1.5°C goal.



Sources: IRENA. Data forecast as of June, 2021.

It takes a typical electric vehicle (EV) almost one year to achieve carbon-parity with a similar gas-powered vehicle.

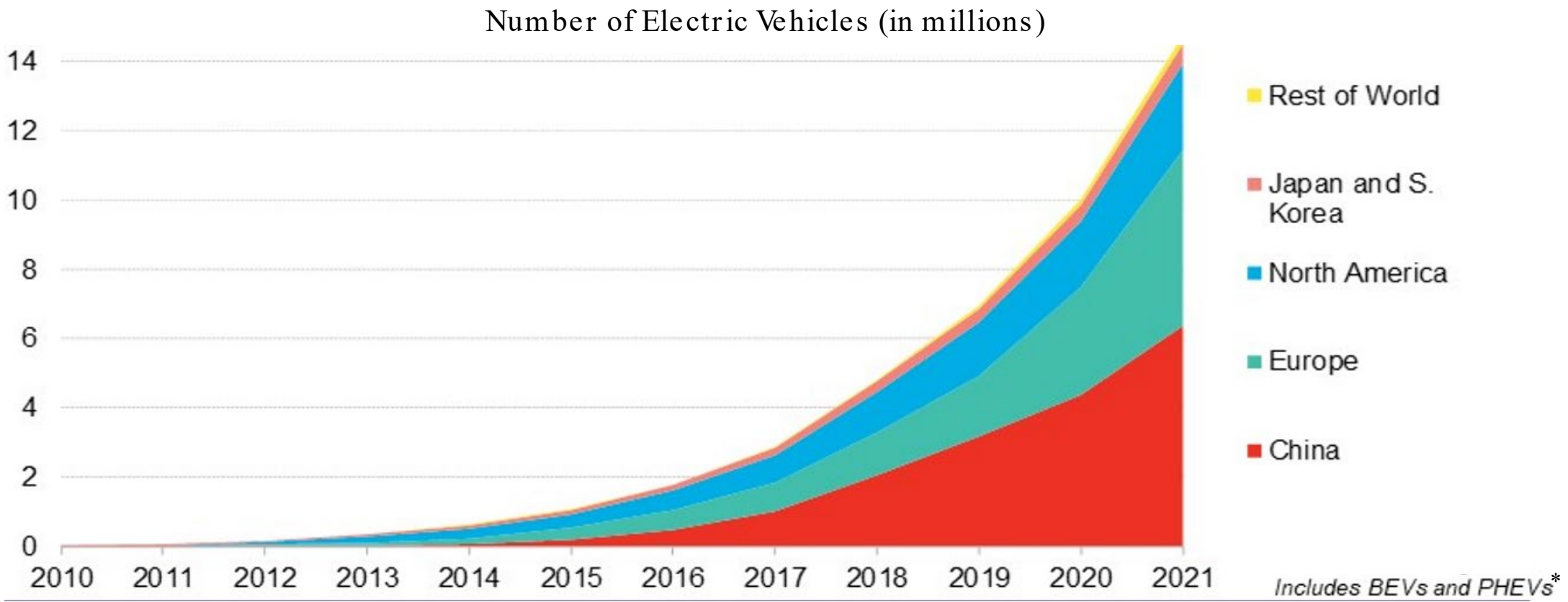
Lifetime CO2 emissions in million of grams – ICE\* vs. EV



US mix represents a mixed source of energy generation and Hydro is carbon-free hydroelectricity

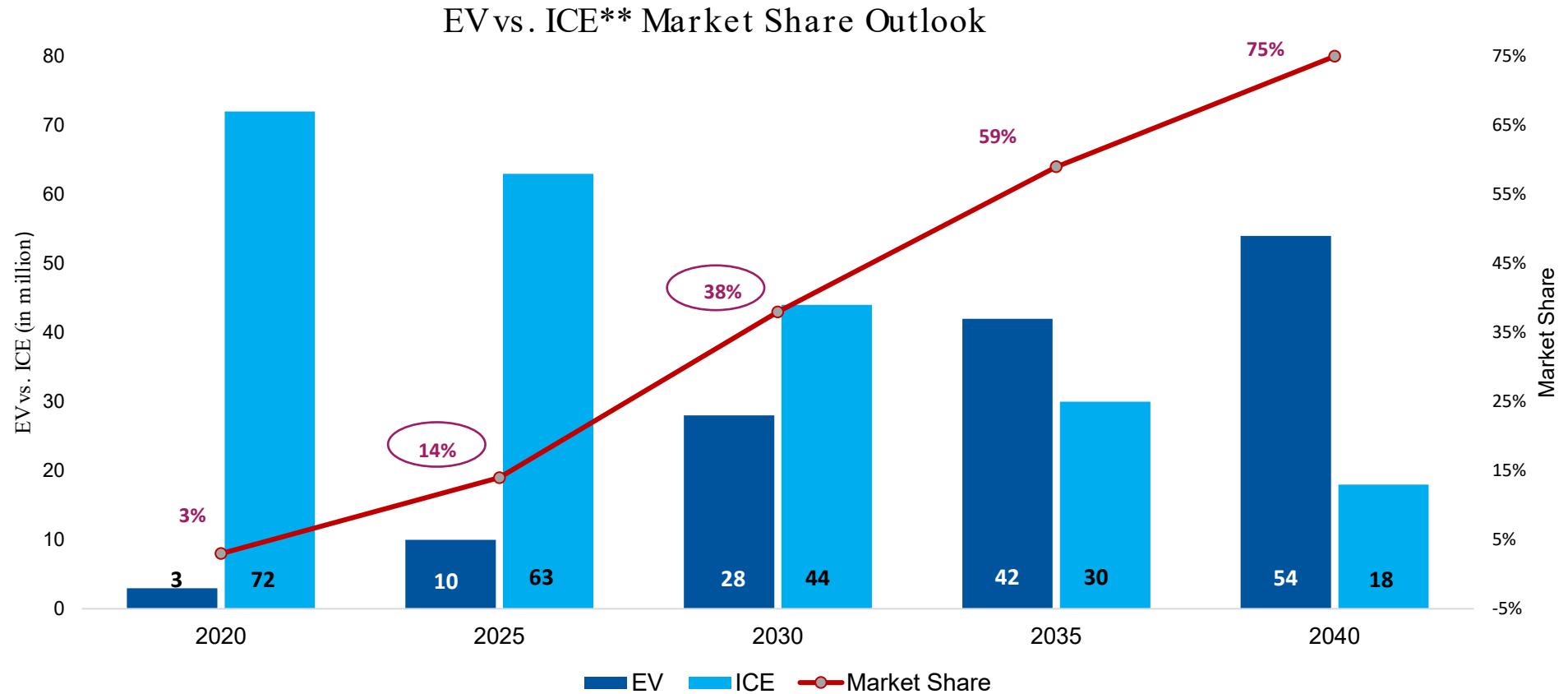


By the end of 2021, an estimated 14 million EVs will be on the road globally constituting ~2% of total cars  
 China has the greatest number of cars, but Europe is catching up.



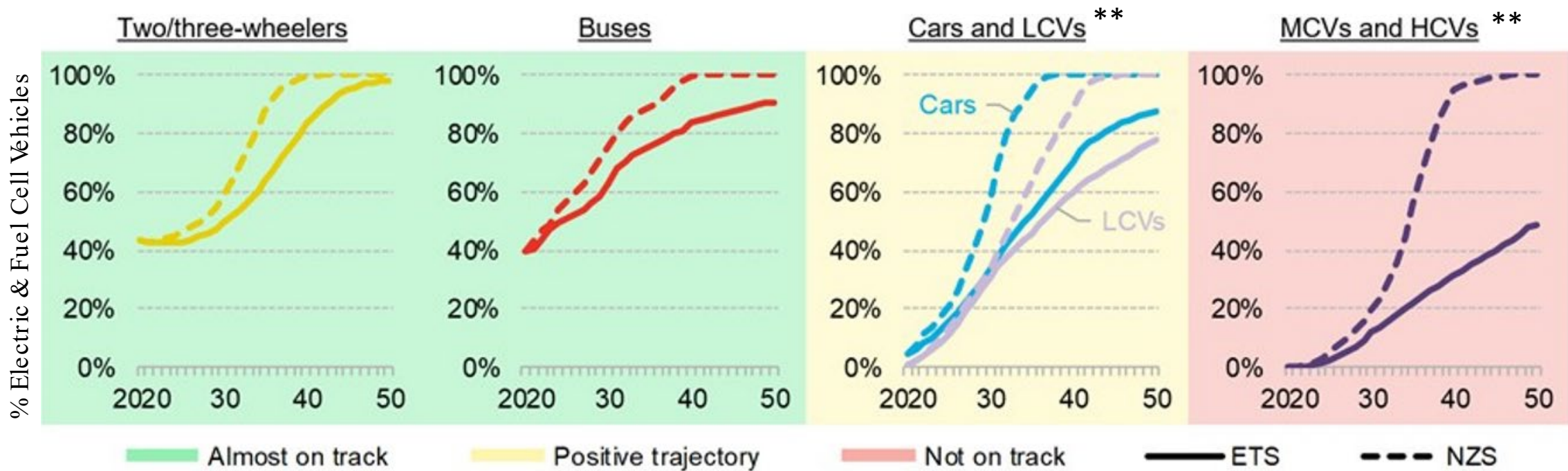
\* BEVs are Battery Electric Vehicles and PHEVs are Plug-in Hybrid Electric Vehicles

“Hockey stick”\* growth projections for leading renewable and electrification industries



\*\*“Hockey stick” growth refers to a growth trend that goes from flat to upward sloping, resembling the shape of a hockey stick.  
 \*\* EV is electric vehicles and ICE is Internal Combustion Engine

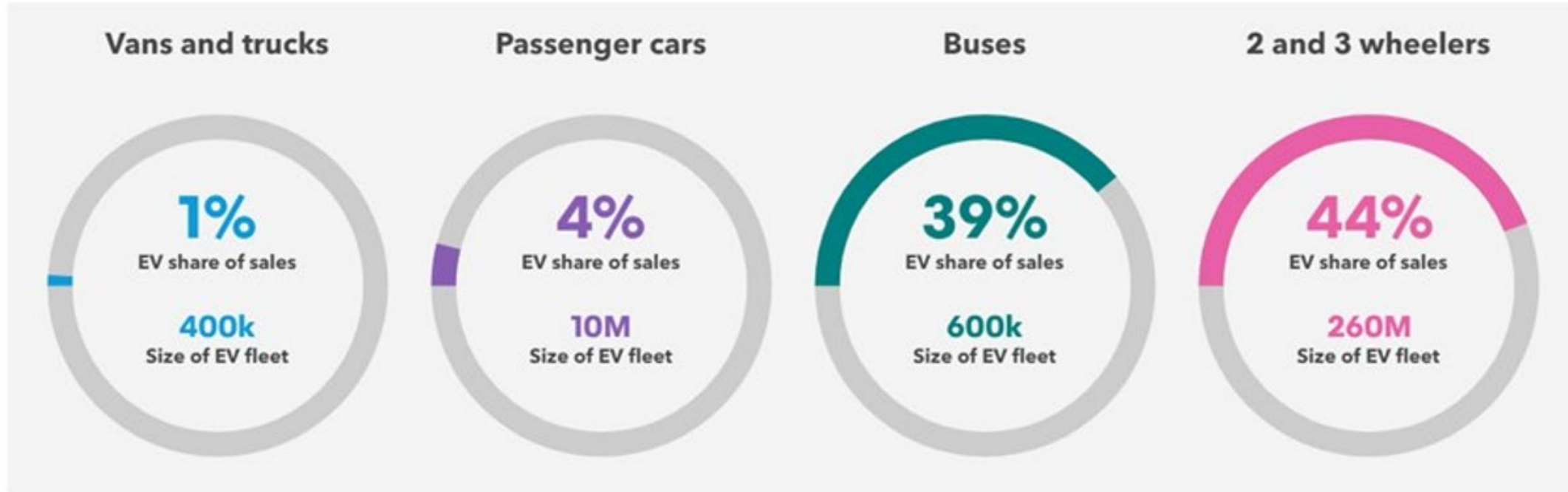
# EV market share trajectory - current Economic Transition Scenario (ETS)\* versus Net-Zero Scenario (NZS)\*



\*The economic transition scenario refers to the presumed trajectory of alternative energy vehicle adoption assuming no significant technological or policy changes, while the net-zero scenario assumes the achievement of net-zero emissions by year 2050.

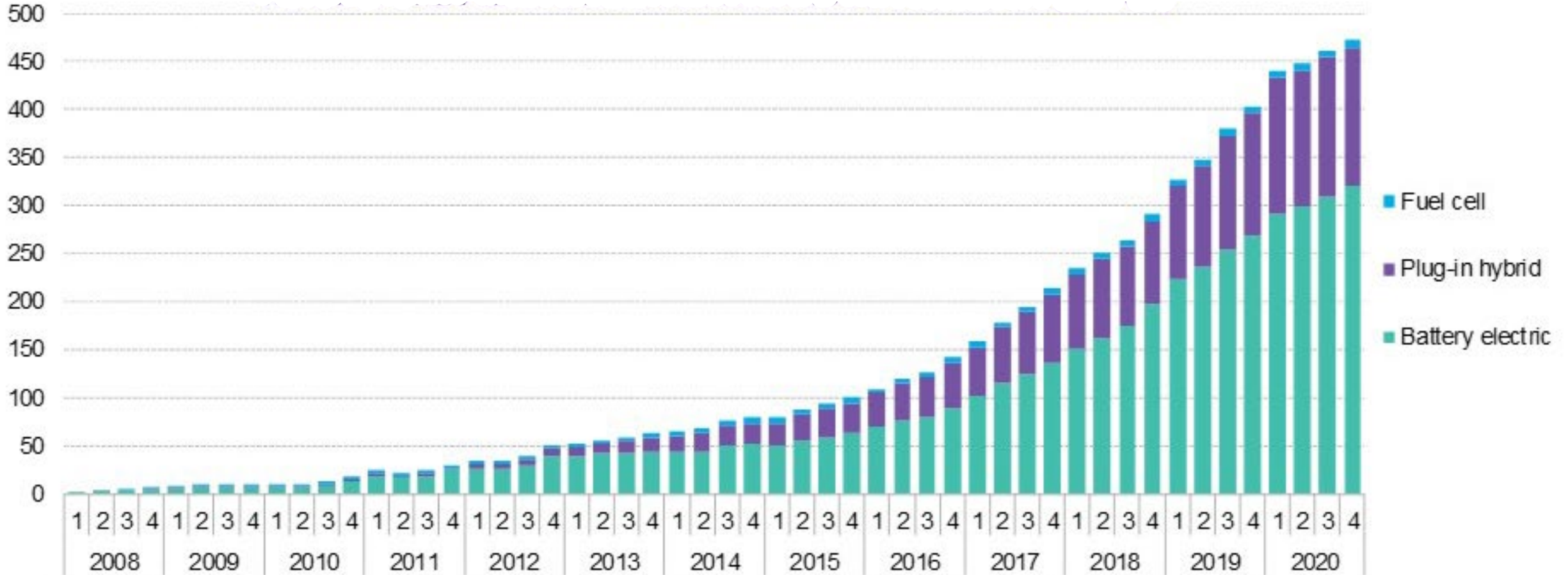
\*\*LCVs, MCVs, HCVs are light-, medium-, and heavy-duty commercial vehicles. Zero-emission includes battery and fuel cell vehicles

Electrification is not just about passenger cars – Electric Vehicle (EV) shares and fleet size by segment in 2020



Suppliers' adoption: There are now almost 500 different EV models available globally

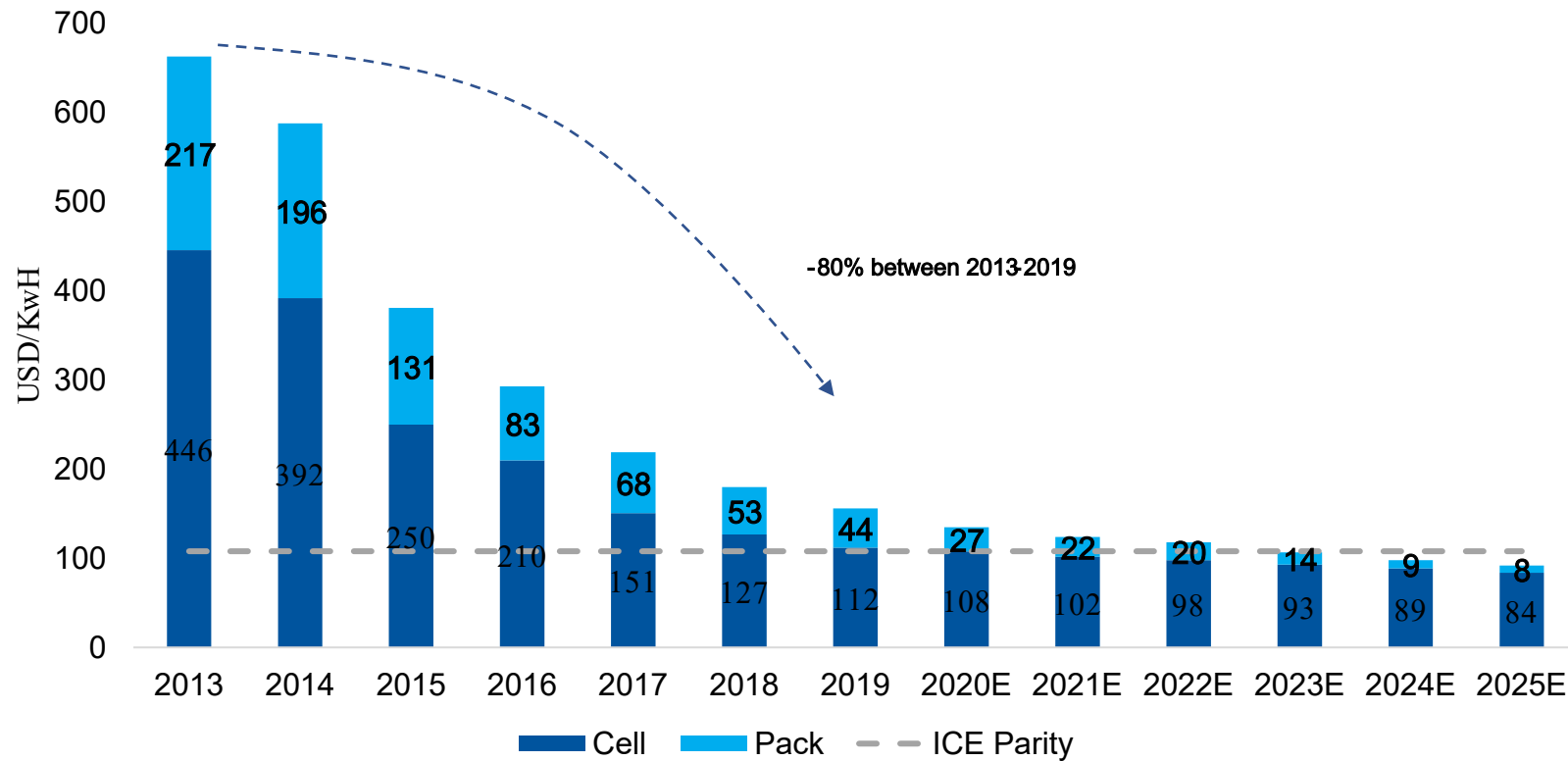
Number of EV and fuel cell vehicle models available globally



Sources: Bloomberg New Energy Finance (BNEF), automaker announcements as of 12/31/2020. Upcoming models are included only if they have a set launch date. Excludes concept cars.

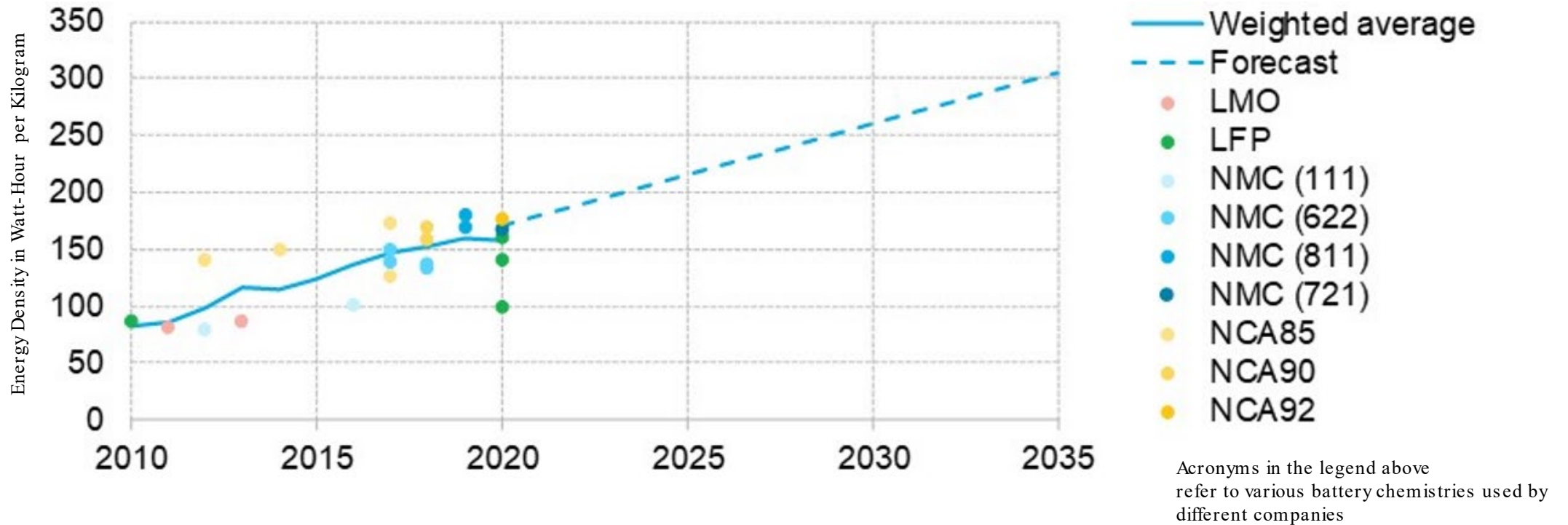
Energy storage cost declined by 80% between 2013 and 2019 driven by innovation  
ICE Parity is finally within reach

EV Battery price vs. Internal Combustion Engine (ICE)

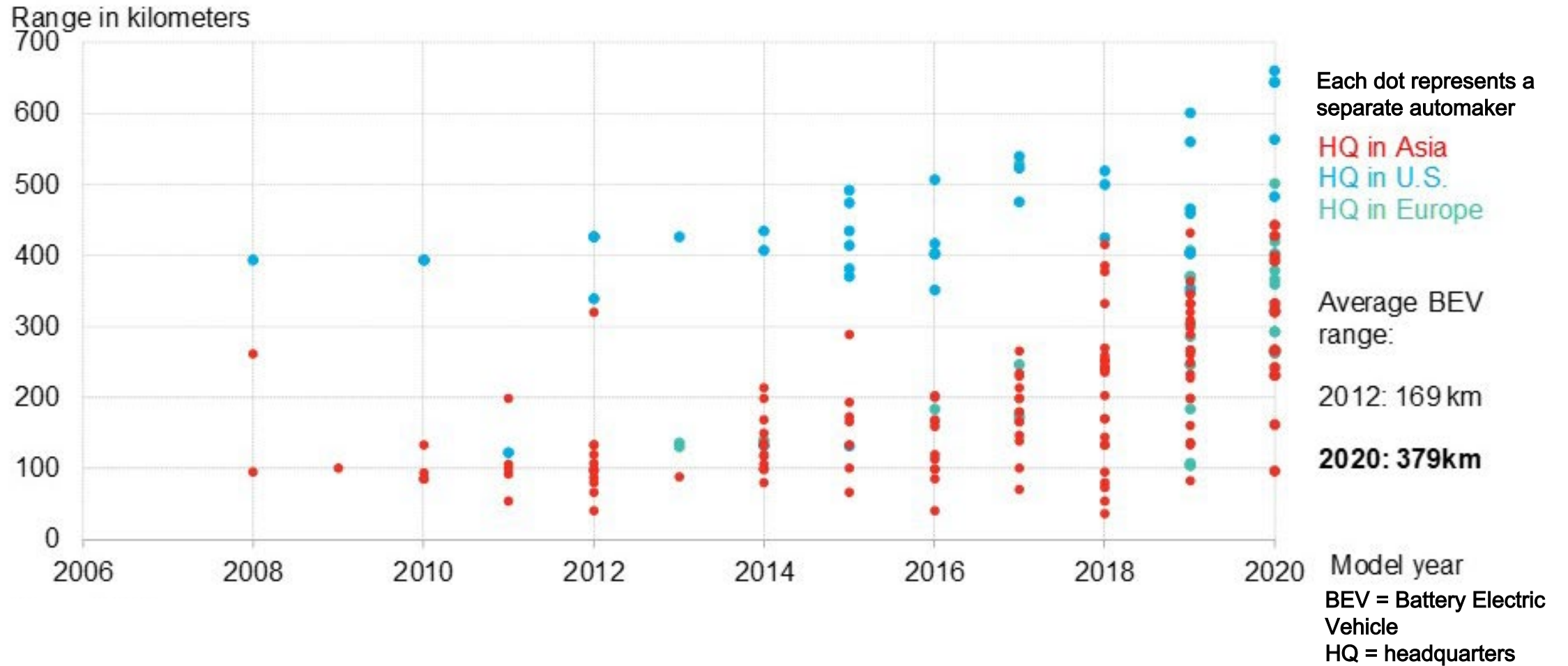


# Energy cost reduction in the form of higher energy density

Historic and estimated changes to battery-pack energy density



## Average Electric Vehicle range keeps rising

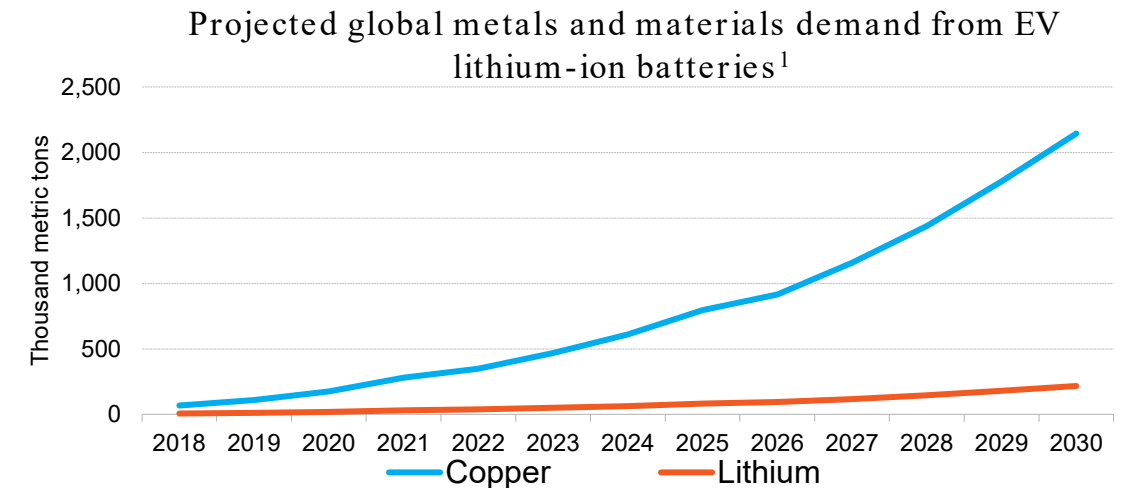
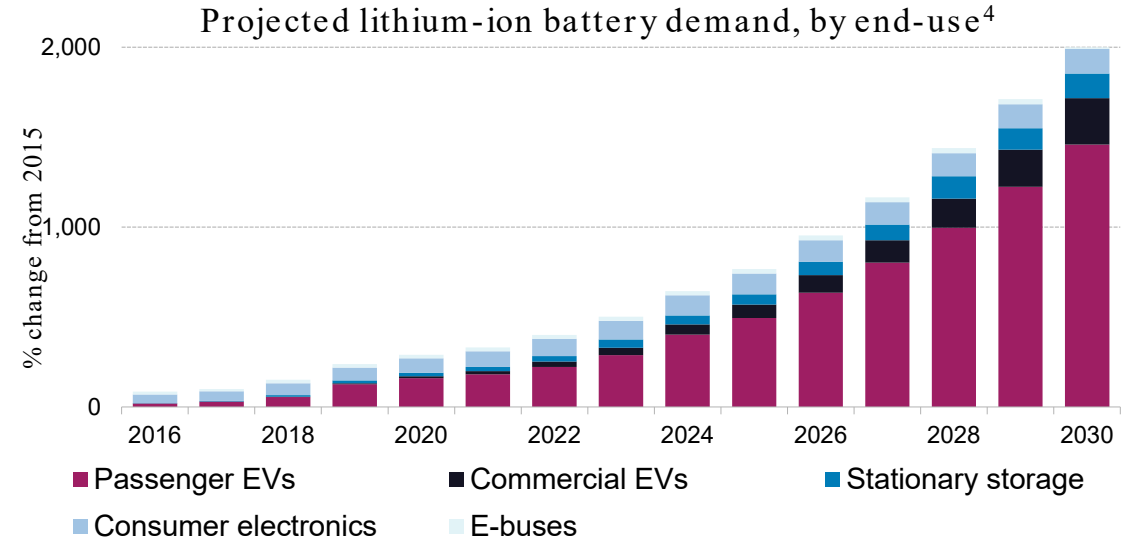


Sources: Bloomberg New Energy Finance (BNEF). Data December of 2020.



## Batteries and Non-Ferrous Metals demand to increase sharply

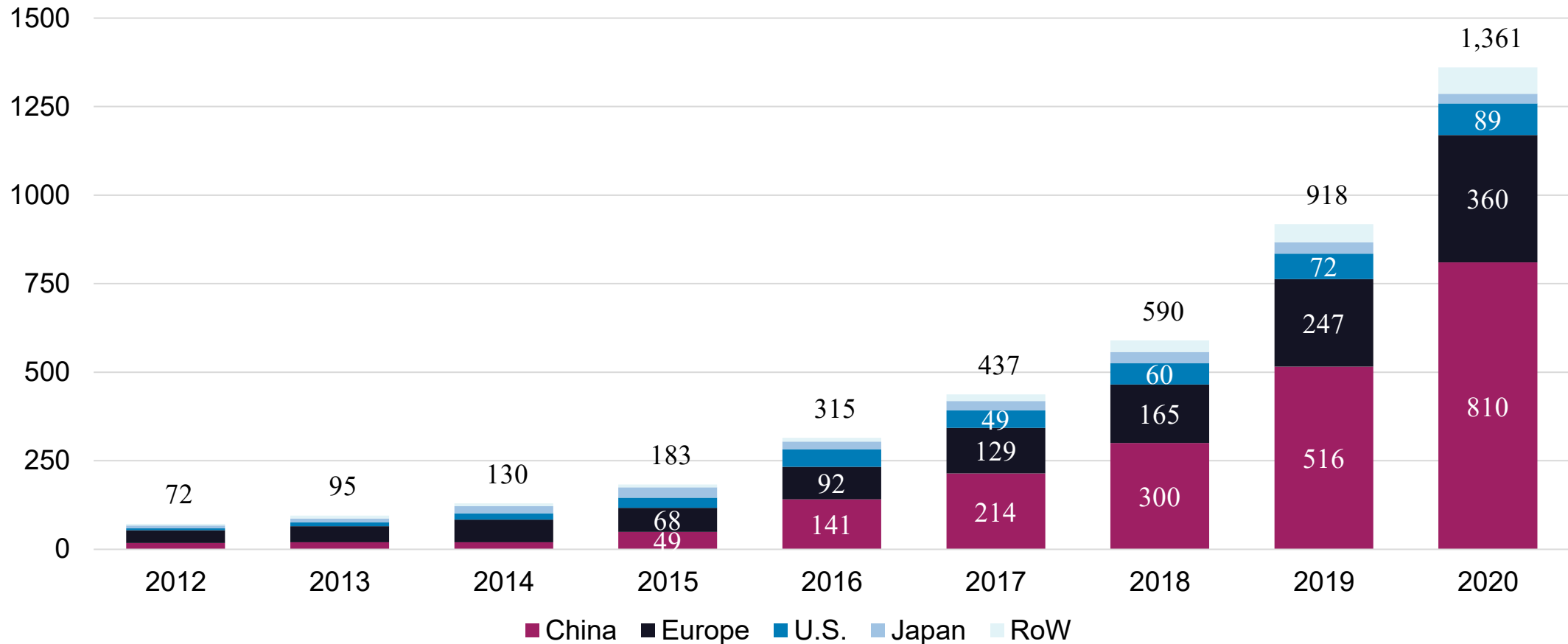
- Widespread adoption of electric vehicles may dramatically increase demand for lithium-ion batteries and non-ferrous metals such as lithium and copper.
- Global lithium-ion battery demand is projected to grow by 1,829% from 2015 to 2030.
- The revenue pool for lithium, an indispensable component of electric vehicle batteries, is expected to grow 450% from 2017 to 2025.<sup>2</sup>
- Copper demand for electric cars may rise nine-fold from 2017 to 2027.<sup>3</sup>



1. Data from Bloomberg New Energy Finance as of 05/21/2018, retrieved 31/Mar/2021.
2. Desjardins, Jeff. "The Massive Impact of EVs on Commodities in One Chart." Visual Capitalist. 15 September 2017.
3. Reuters. "Copper demand for electric cars to rise nine-fold by 2027: ICA" Reuters. 13 June 2017.
4. Data from Bloomberg New Energy Finance as of 5/15/2019, retrieved 3/31/2021.

## Charging infrastructure being built around the globe led by China

Cumulative installed public connectors by market (thousands)



Sources: Bloomberg New Energy Finance (BNEF) and public companies. Data July 2021.

New business models are also emerging

E-scooter battery swapping station in Taiwan

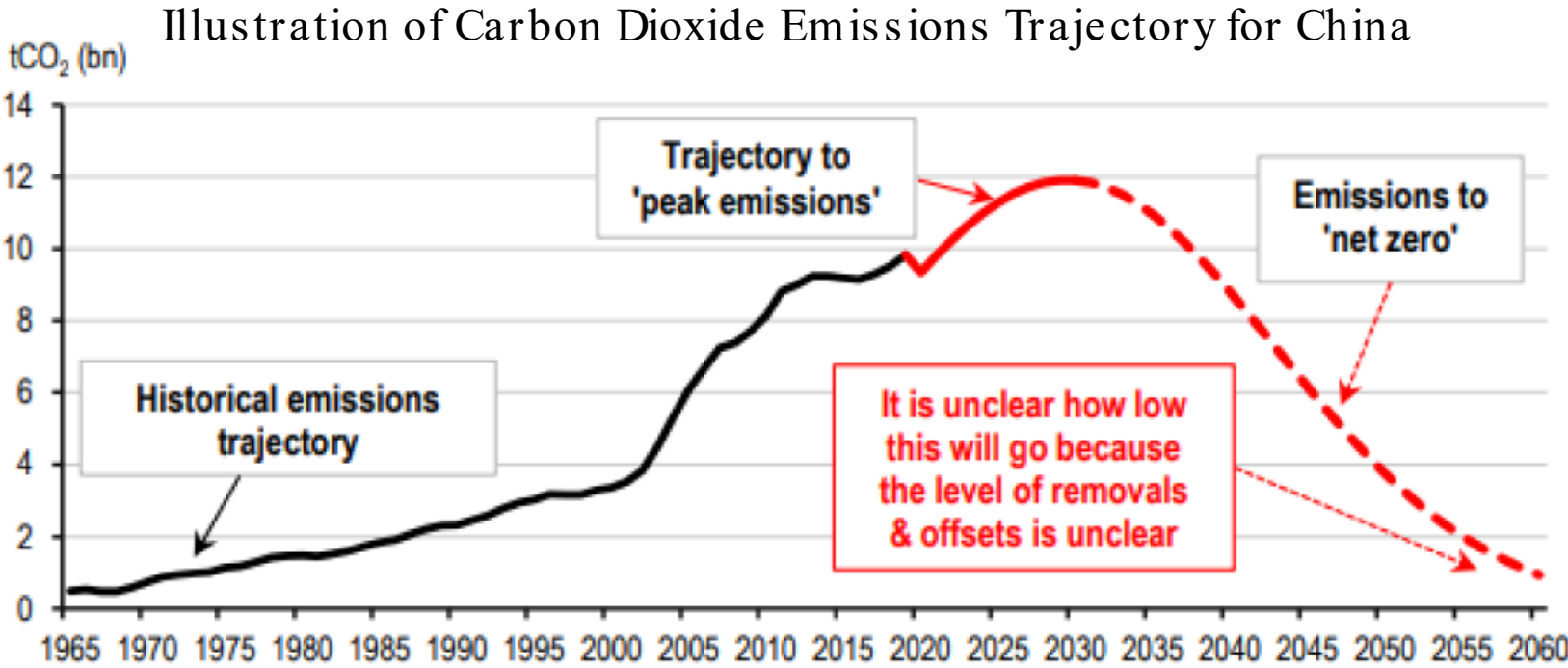


Nio swaps batteries in less than 3 minutes!



# China's climate goal: Carbon neutrality by 2060

- China's 14<sup>th</sup> Five Year Plan reiterated the goal of carbon neutrality by 2060 and announced a slew of environmental initiatives to meet this goal<sup>1</sup>
- China aims to reach peak carbon by 2030<sup>1</sup>



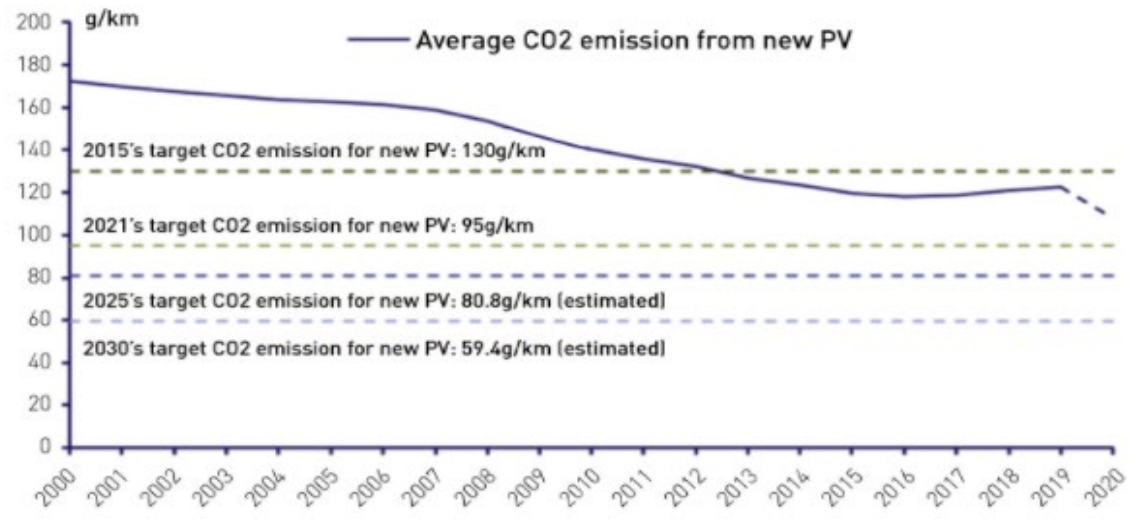
Source: HSBC (based on BP Statistical Review 2020)

tCO<sub>2</sub> (bn) = metric tons of CO<sub>2</sub> in billions

Sources: HSBC. Data as of December of 2020.  
 1. 14<sup>th</sup> Five Year Plan.

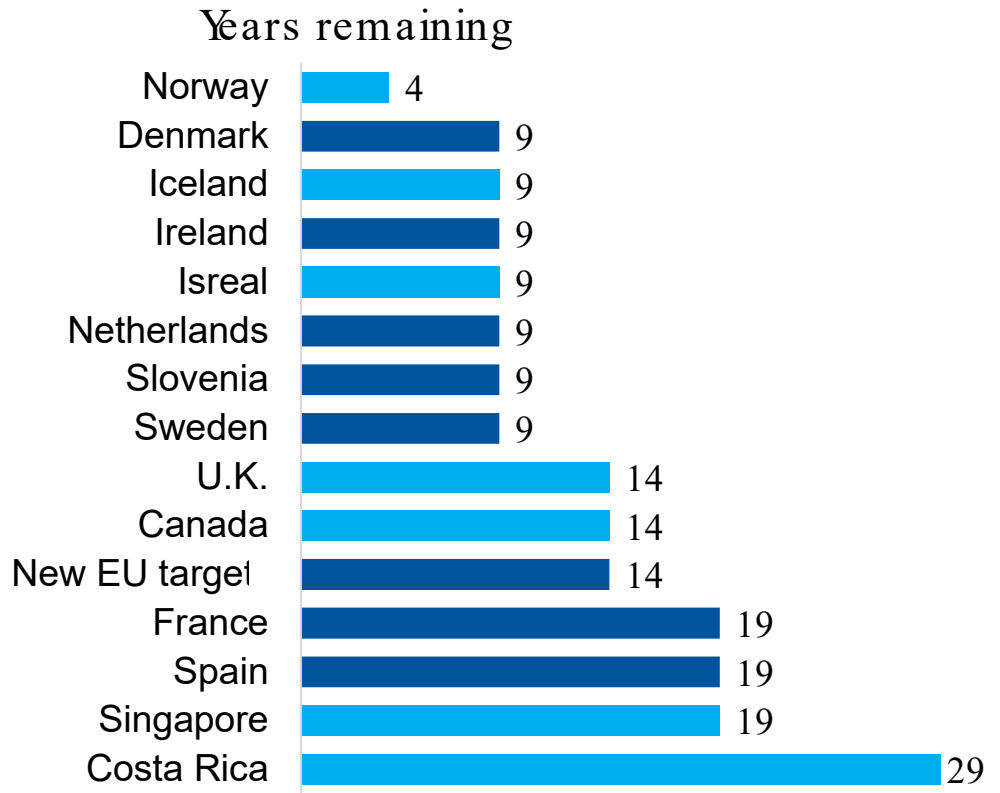
Government policies are helping industries fighting climate change expand  
 China, EU, UK, Japan and South Korea have set 2050/2060 as target dates to be carbon neutral

Europe’s average CO2 emission from new petroleum vehicles (PV) and mandatory emission targets

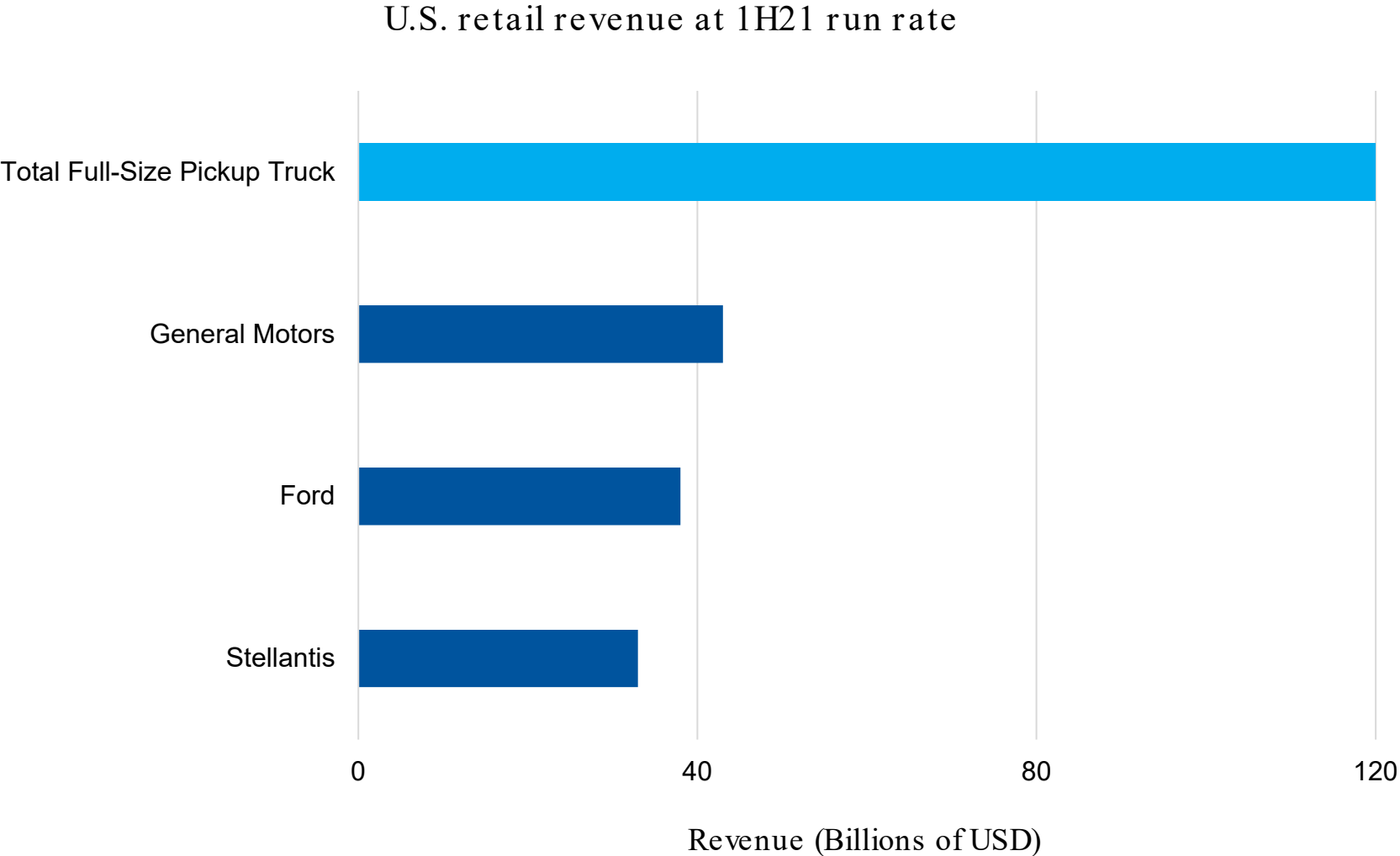


Note: Include the EU, UK, Norway, and Iceland. Source: CLSA, EEA, EU, Dataforce as of 12/31/2019.

Internal Combustion Engine (ICE) phase-out Plan

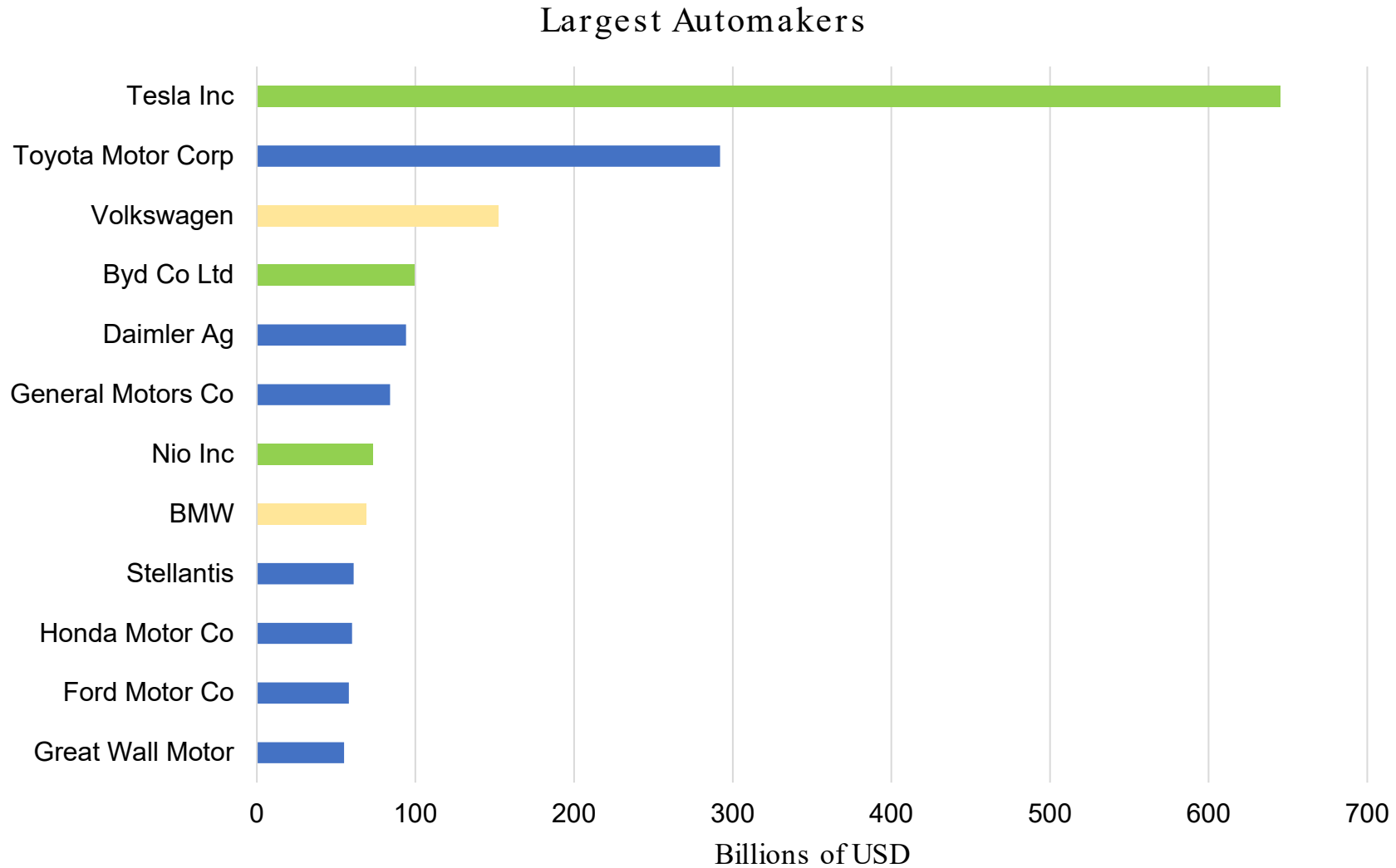


U.S policy should emerge soon – We love our SUVs and pickup trucks



Sources: Bloomberg, public companies and Edmunds.com. Data as of July 2021. Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations. Past performance is not necessarily indicative of future results

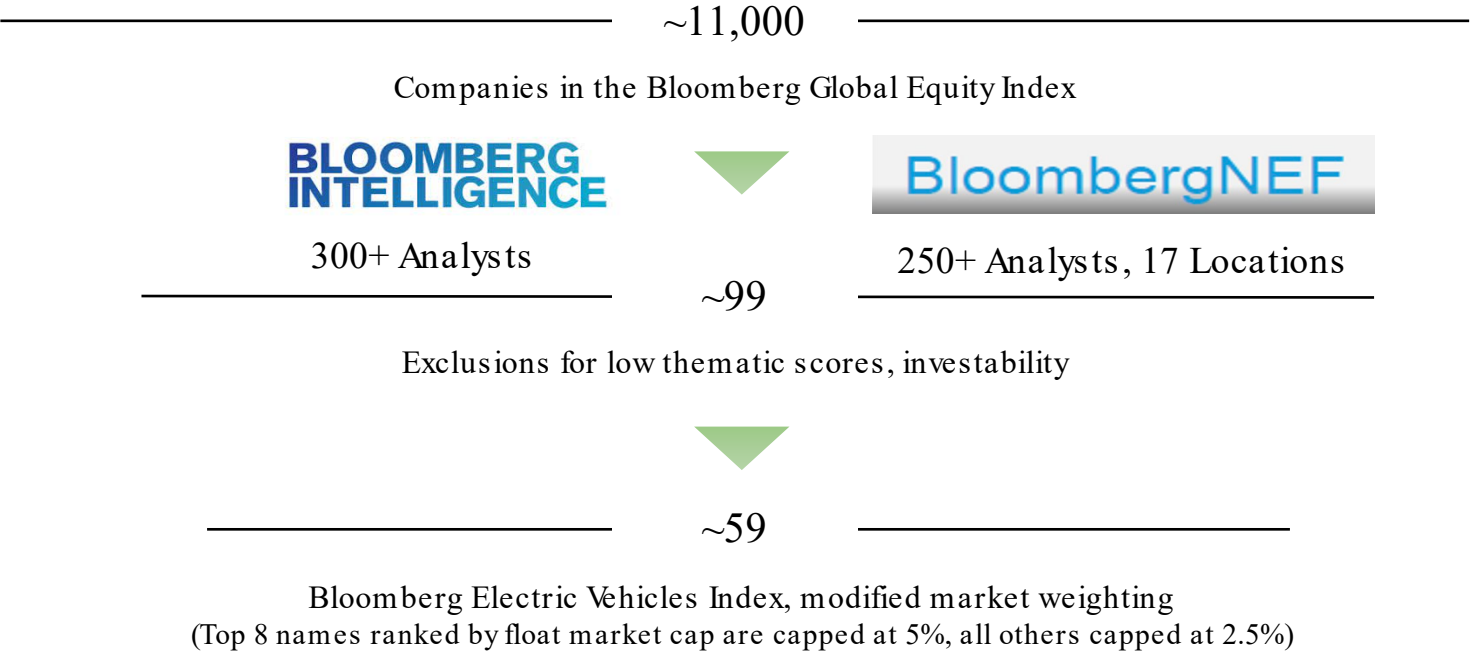
# Global Automakers by Market Cap



Sources: Bloomberg Intelligence. Data as of July 2021. Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations. Past performance is not necessarily indicative of future results



# Bloomberg Electric Vehicles Index (BBEV, BBEVT, BBEVN)








- Index Construction Process
- Satisfies 40-Act Funds Rules:
- No single issuer weight > 25%
  - $\sum(\text{issuer market cap} > 5\%_t) < 50\%$



Sources: Bloomberg Intelligence. Data as of July 2021. Any trading symbols, entities or investment products displayed are for illustrative purposes only and are not intended to portray recommendations. Past performance is not necessarily indicative of future results

Bloomberg Electric Vehicles Index – We believe we are entering an electrified, connected, and autonomous future.

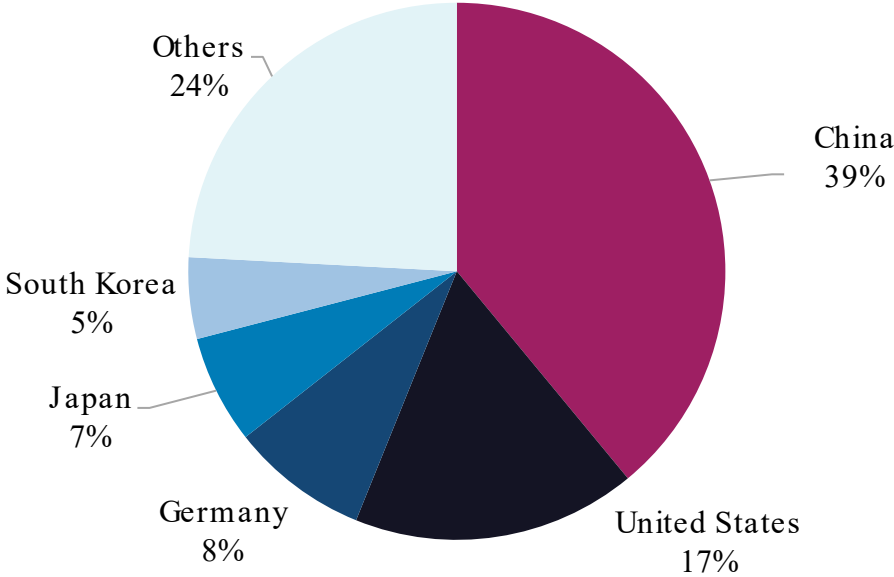
		Definition
	Entire Vehicle & EV Component Manufacturers	Electric vehicles (EV) are vehicles which use one or more electric motors for propulsion.
	Batteries & Hydrogen Fuel Cells	Adoption of electric vehicles and other new energy vehicles dramatically increases demand for lithium-ion batteries and hydrogen fuel cells.
	Vehicle Connectivity & Autonomous Capability	Vehicle connectivity has three main characteristics: the presence of sensors, vehicle connectivity to networks, and the ability to rapidly compute incoming data. Autonomous vehicles, also called driverless cars or self-driving cars, are vehicles that can sense the environment and navigating without human input.
	Charging	Electric vehicle adoption requires robust, widespread, and efficient charging stations and infrastructure.
	Raw Materials	Adoption of electric vehicles and other new energy vehicles may drive demand for raw materials such as lithium.

We believe the Bloomberg Electric Vehicles Index is the best representation of the EV ecosystem, supported by research from Bloomberg Intelligence & BloombergNEF\*

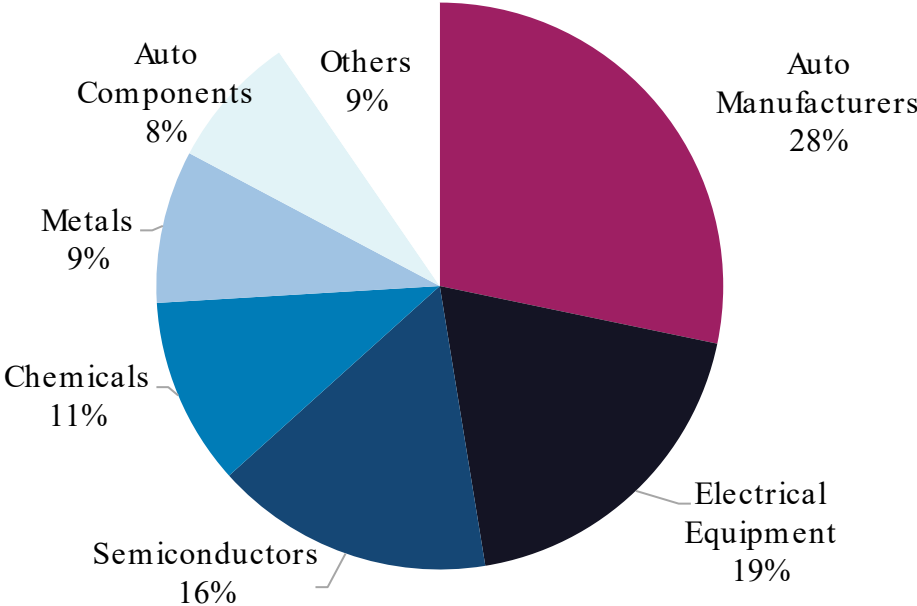
The index is diverse in geography and industry

1. Overweight to China, a bright spot for EV development
2. Only 28% of the index is comprised of automakers, reflecting the multi-faceted nature of EV development

Index Breakdown by Country



Index Breakdown by Industry



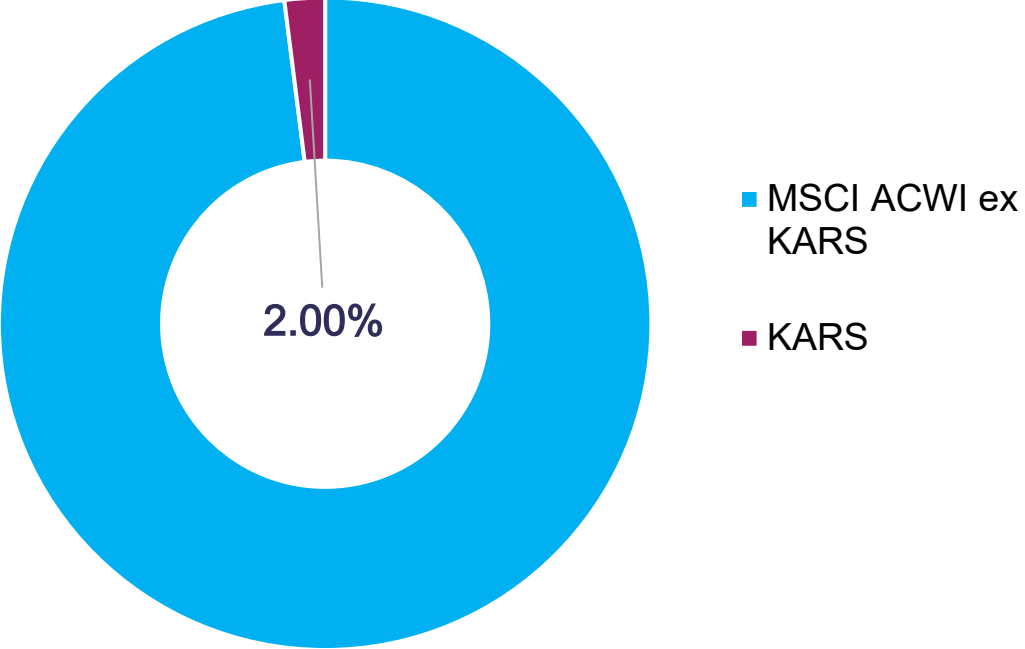
\*Bloomberg New Energy Finance

Data from Bloomberg as of 6/30/2021. Index constituents subject to change. Indices are unmanaged and do not include the effect of fees. One cannot invest directly in an index Diversification does not ensure a profit or guarantee against a loss.

# A differentiated potential source of alpha

KARS constitutes less than 2% of the global equity index

MSCI ACWI and KARS  
Common Holdings



Sources: Morningstar, KraneShares. Data as of June 2021. The fund's holdings are subject to change.  
The MSCI ACWI Index, MSCI's flagship global equity index, is designed to represent performance of the full opportunity set of large- and mid-cap stocks across 23 developed and 27 emerging markets.

## Important Notes (continued)

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