

What You Need to Know About EV Sales

Electric Vehicle Summit 2021

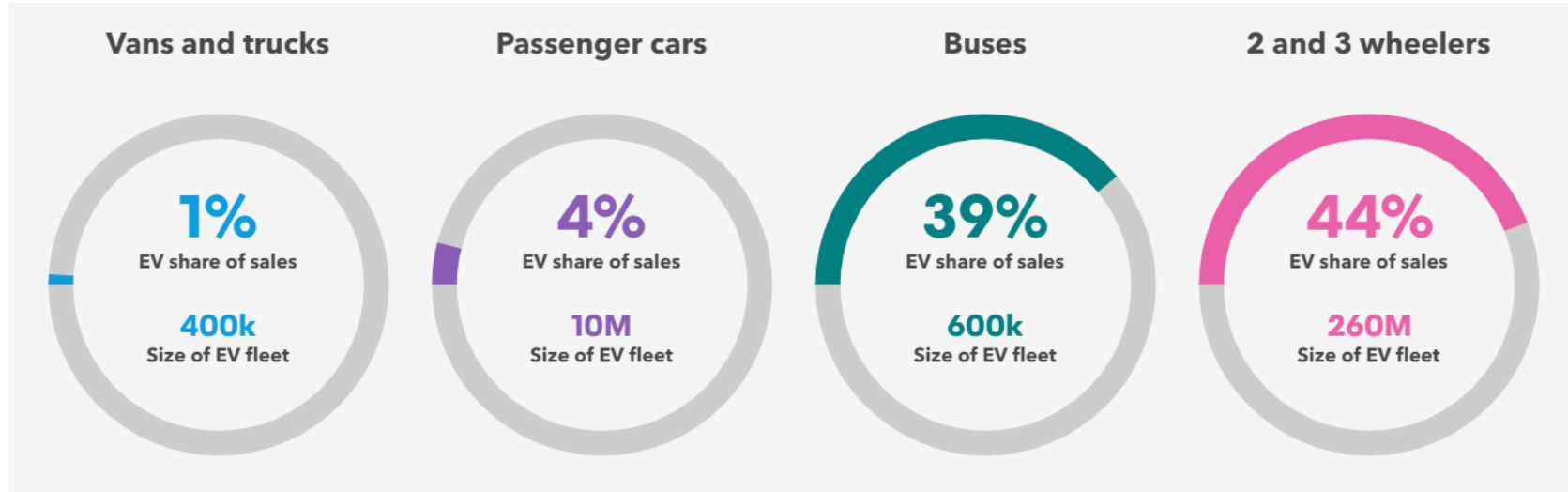
Andrew Grant

October 14, 2021



BloombergNEF

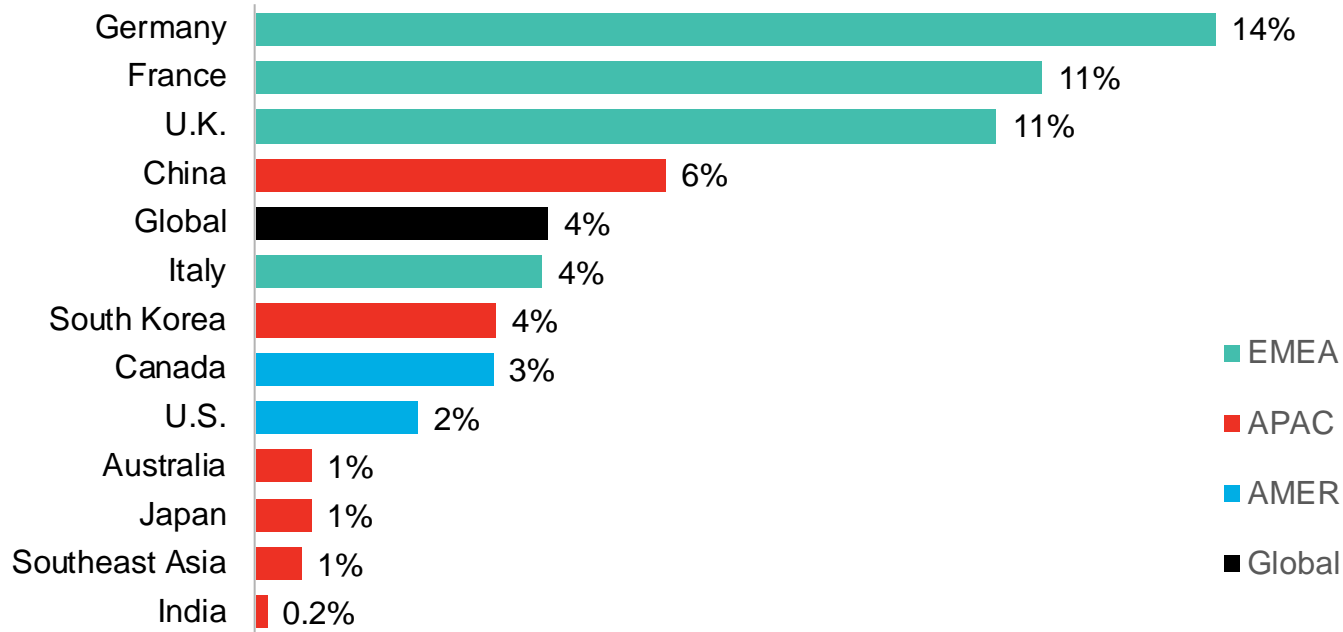
The picture today



Source: BNEF. 2020 data.

Adoption rates are highly varied

2020 EV share of passenger vehicle sales by market

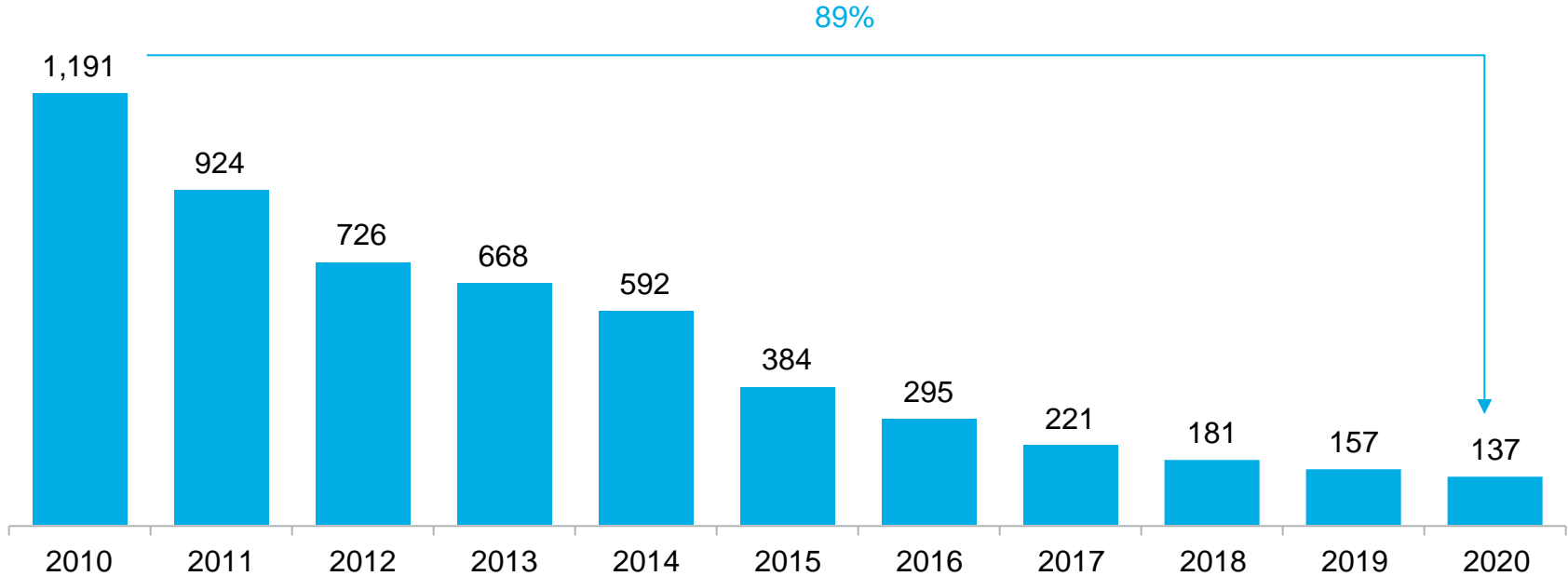


Source: BNEF. Note: Includes battery electrics and plug-in hybrids.

Drivers of change: technology

Lithium-ion battery price survey results: volume-weighted average

Real 2020 \$/kWh



Source: BNEF.

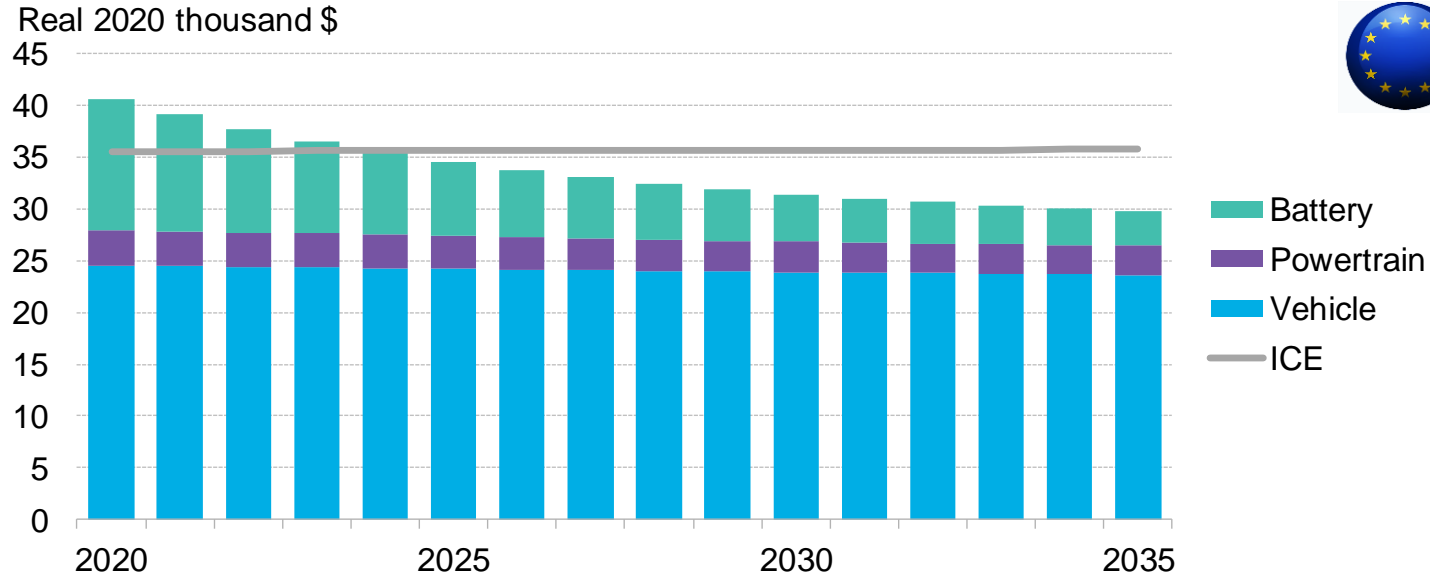
Drivers of change: technology

SUV segment BEV and ICE pre-tax prices and share of battery cost in Europe

BEV upfront price parity timeline



2022-2027

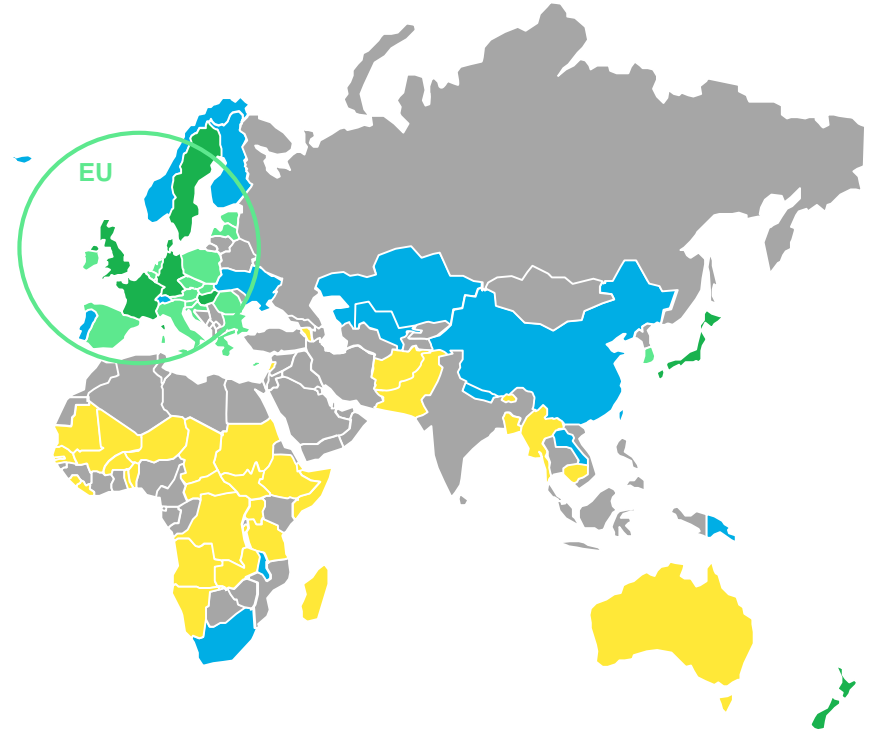
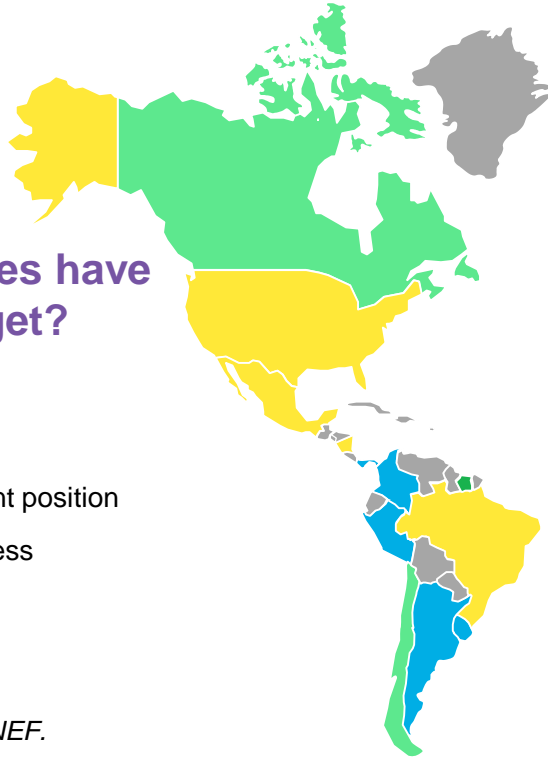
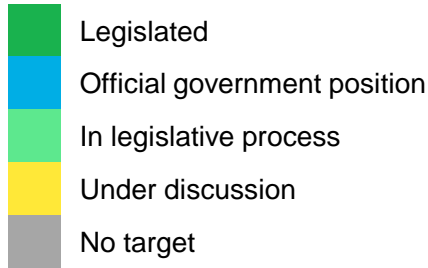


Source: BNEF.

Drivers of change: policy

Which countries have a net-zero target?

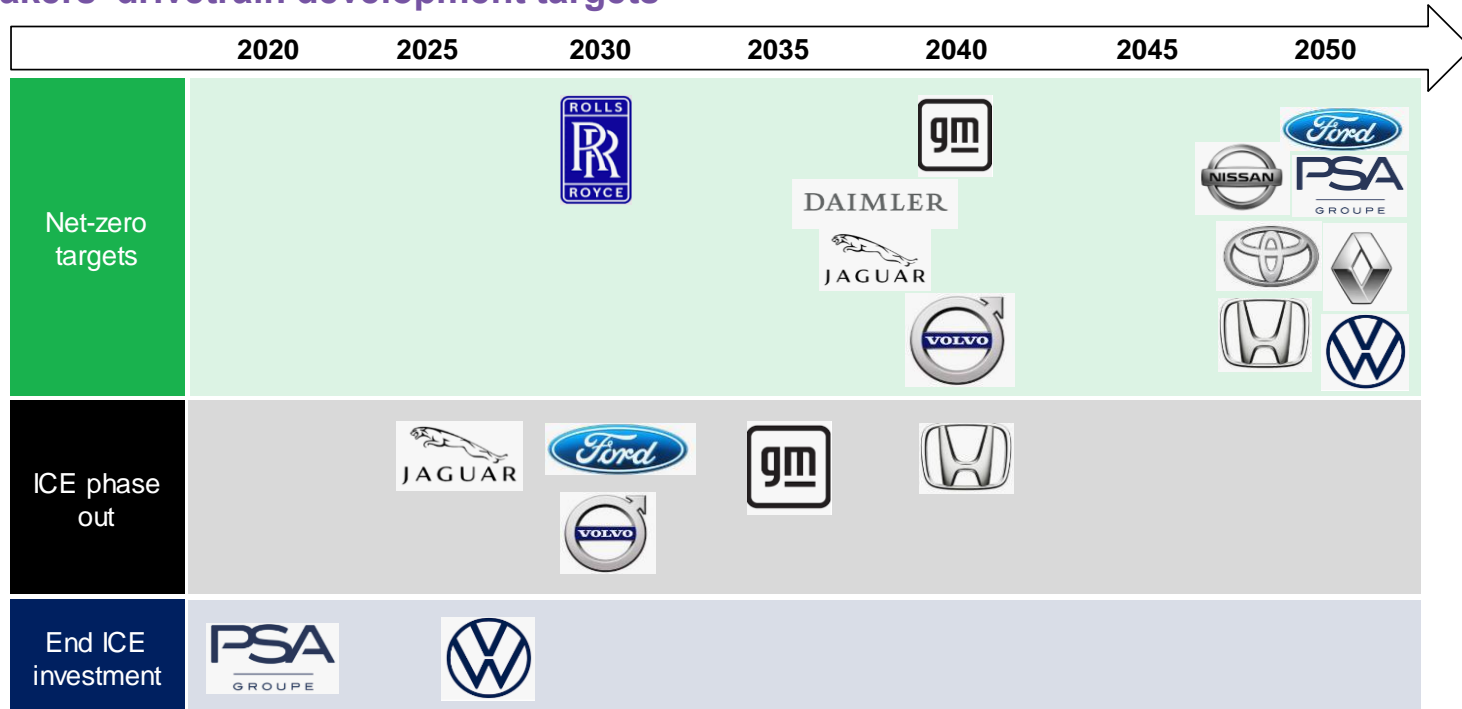
As at June 8, 2021



Source: Governments, BNEF.

Drivers of change: company strategies

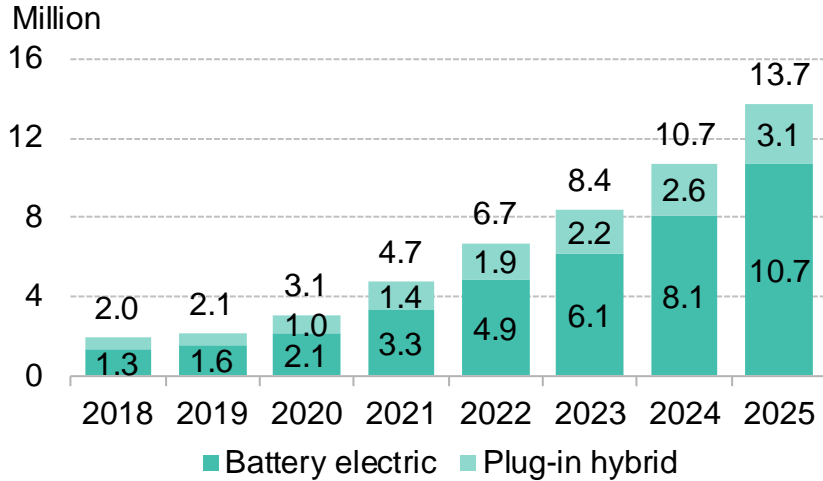
Automakers' drivetrain development targets



Source: BNEF. Note: Ford ICE phase-out target is for Europe only. Excludes interim targets.

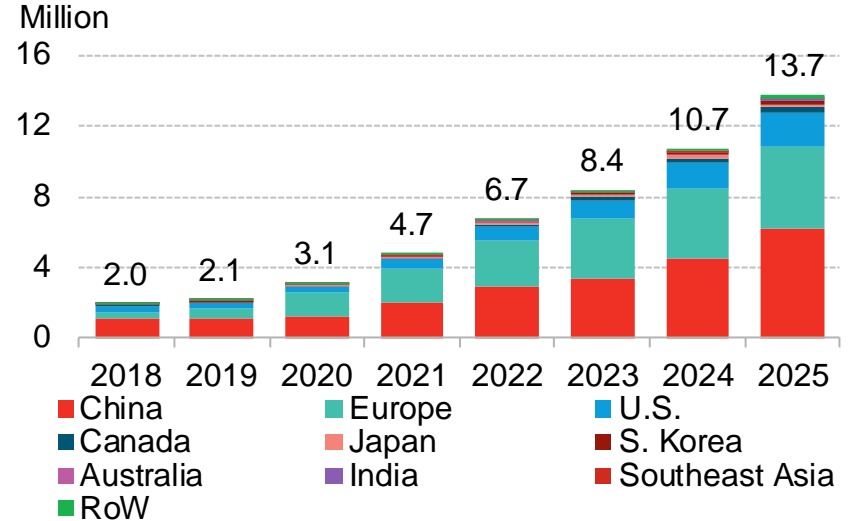
Sales rise quickly in the near term

Global passenger EV sales outlook by drivetrain



Source: BNEF.

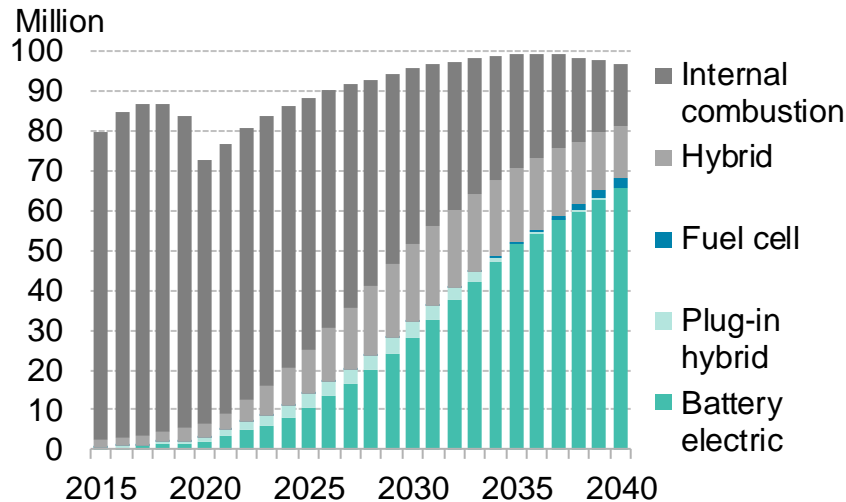
Global passenger EV sales outlook by market



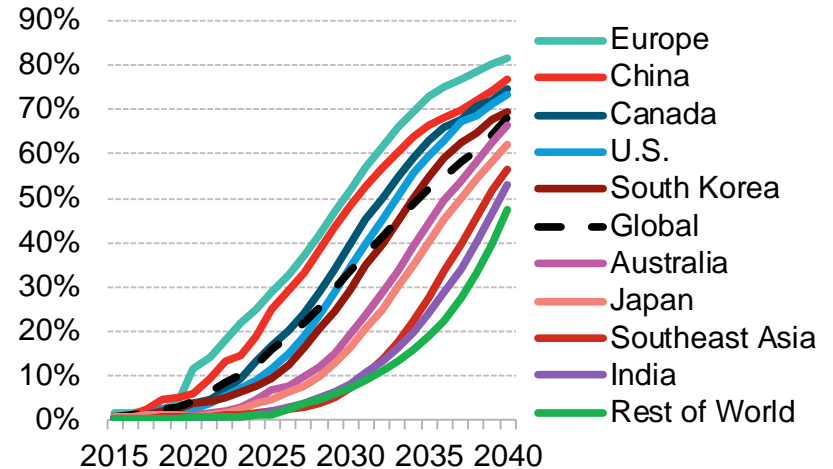
Source: BNEF.

Varied adoption between countries slows down the global average

Global passenger vehicle sales outlook by drivetrain – Economic Transition Scenario



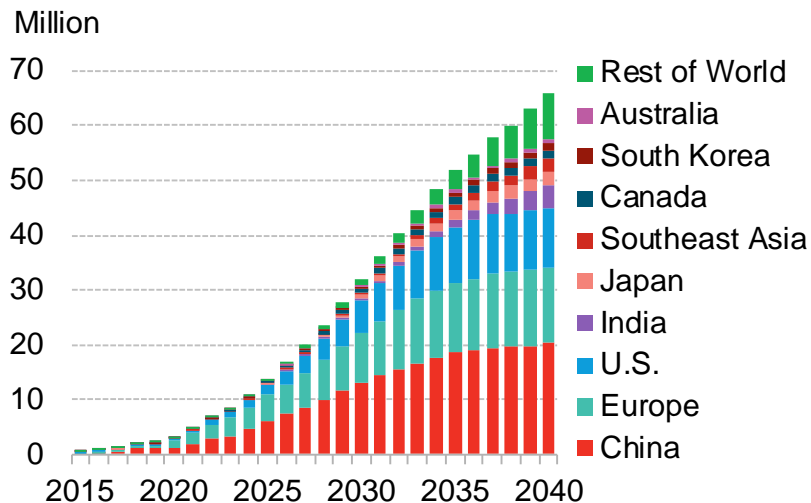
EV share of new passenger vehicle sales outlook by market – Economic Transition Scenario



Source: BNEF. Note: EVs include battery-electric and plug-in hybrid electric vehicles. Battery-electric vehicles represent 88% of total electric vehicle sales in 2030. Europe includes the EU, the U.K. and EFTA countries.

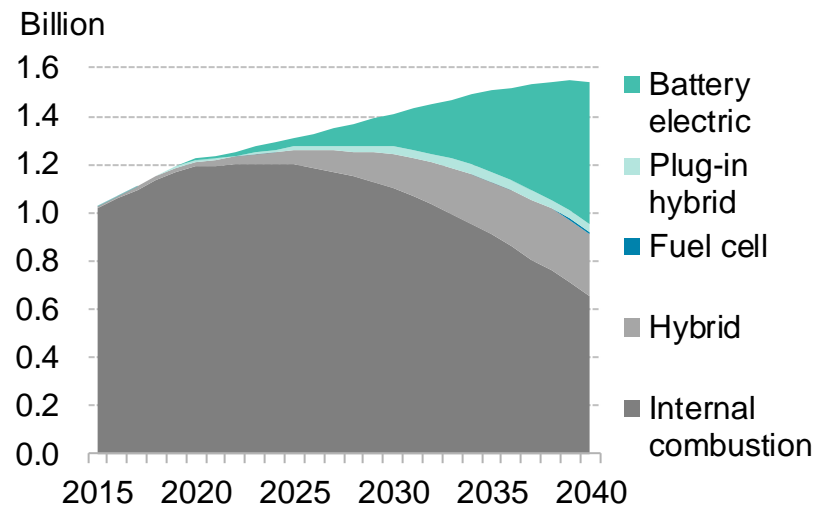
Fleet turnover takes time

Global passenger EV sales outlook by market – Economic Transition Scenario



Source: BNEF. Note: EVs include battery-electric and plug-in hybrid electric vehicles. Battery-electric vehicles represent 88% of total electric vehicle sales in 2030. Europe includes the EU, the U.K. and EFTA countries.

Global passenger vehicle fleet outlook by drivetrain – Economic Transition Scenario



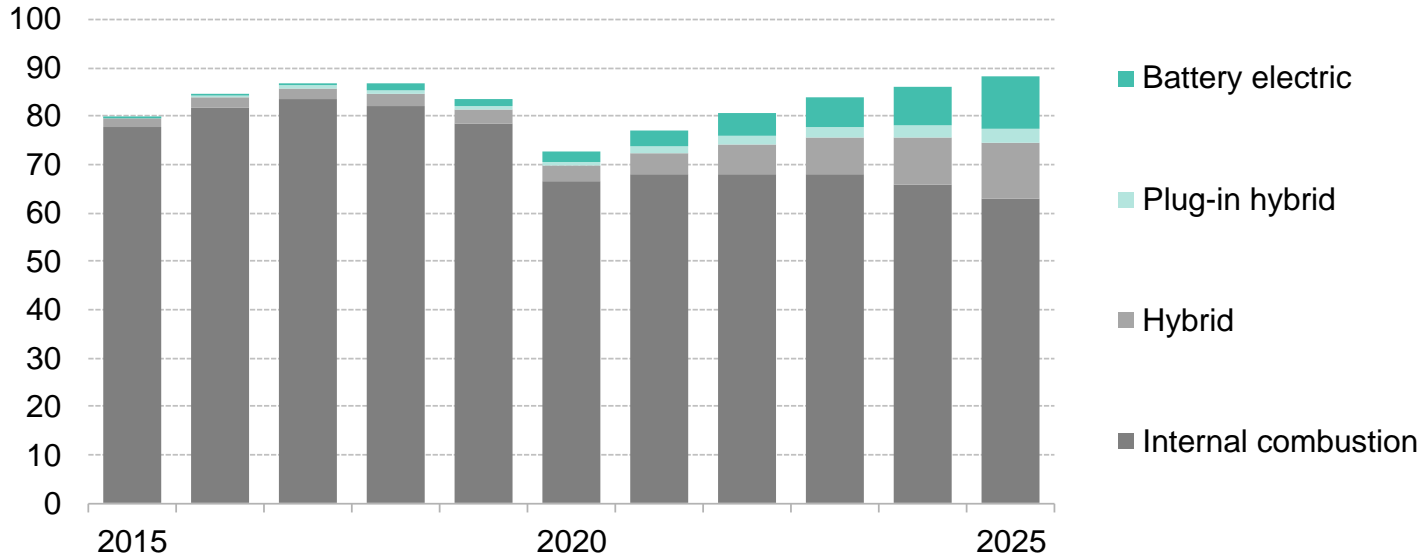
The impacts of EVs

ICE, battery materials, oil and more

Combustion vehicle sales have already peaked

Global passenger vehicle sales outlook by drivetrain – Economic Transition Scenario

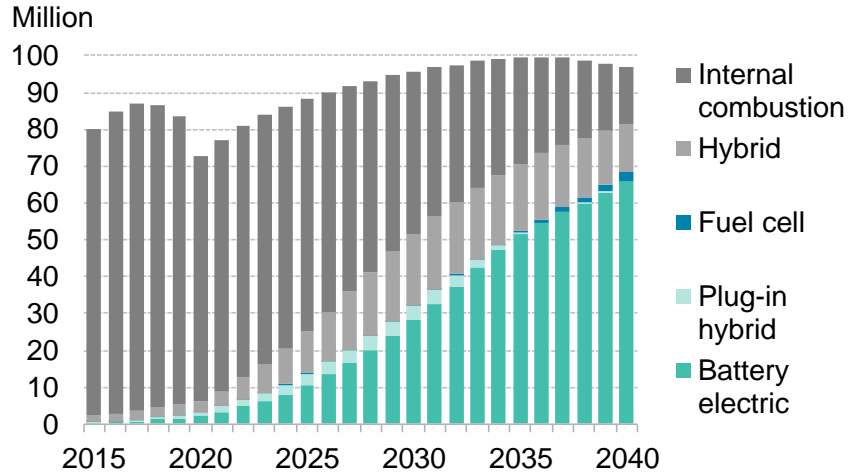
Million



Source: BNEF.

Combustion vehicle sales have already peaked

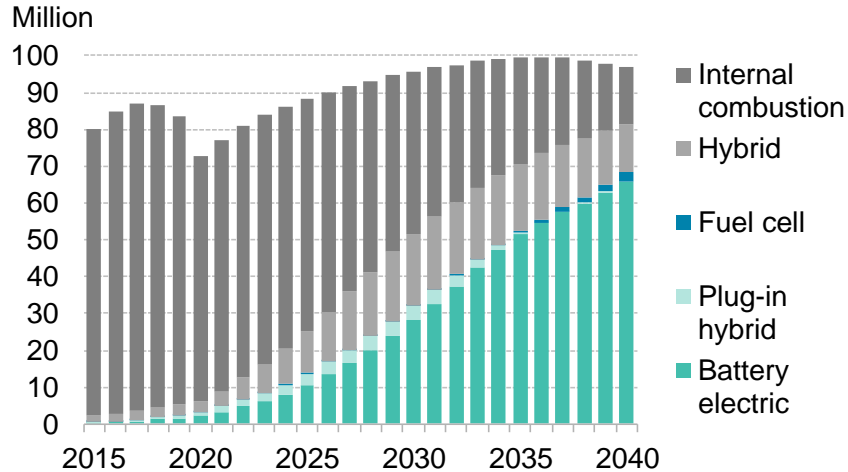
Global passenger vehicle sales outlook by drivetrain – Economic Transition Scenario



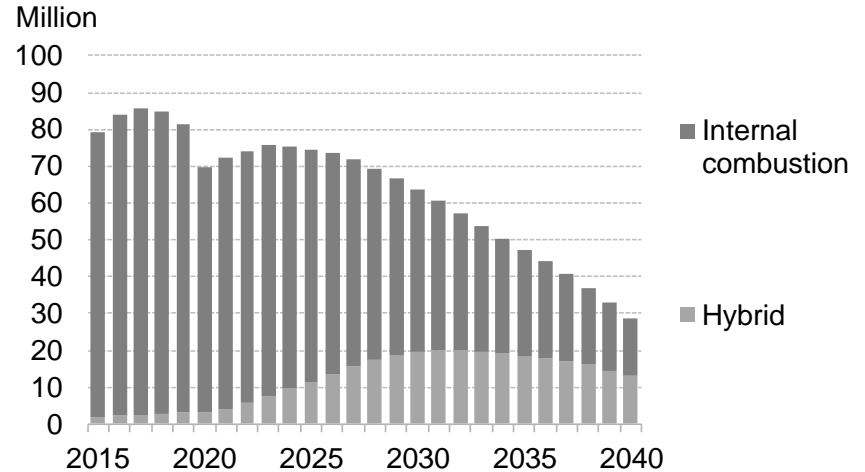
Source: BNEF.

Combustion vehicle sales have already peaked

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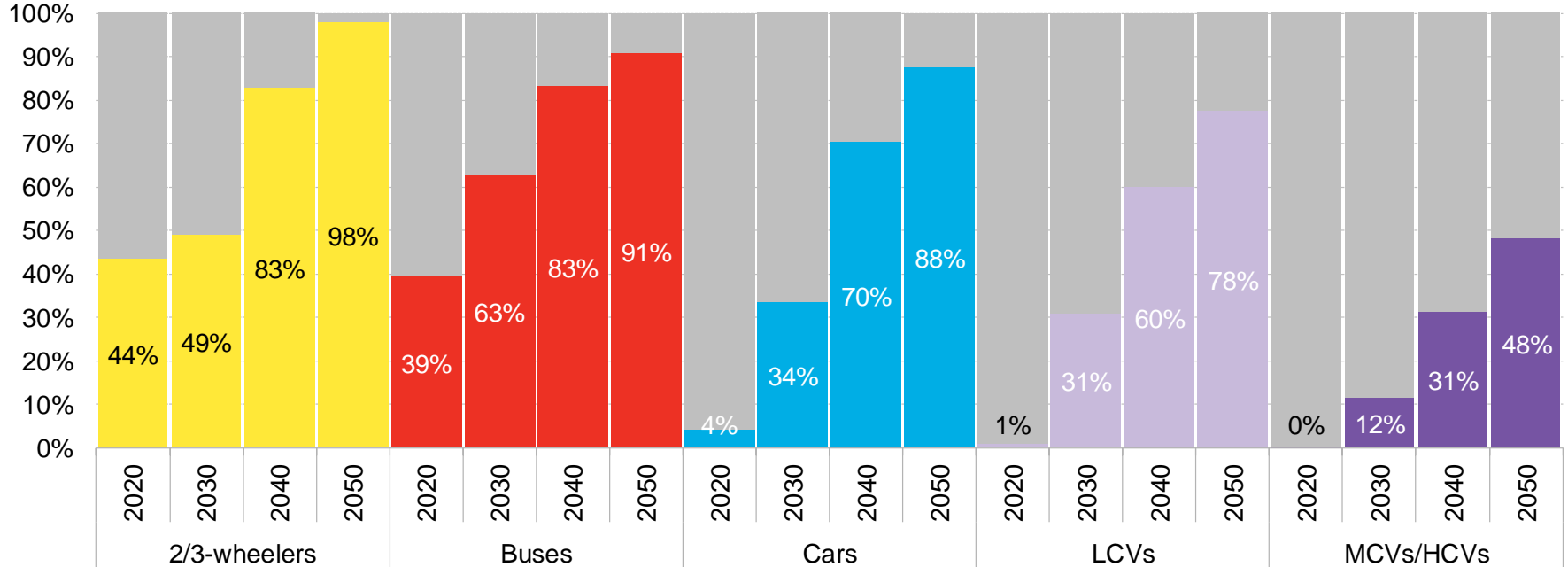
Global passenger vehicle sales outlook by drivetrain – Economic Transition Scenario



Source: BNEF.

Some segments are closer to achieving net zero than others

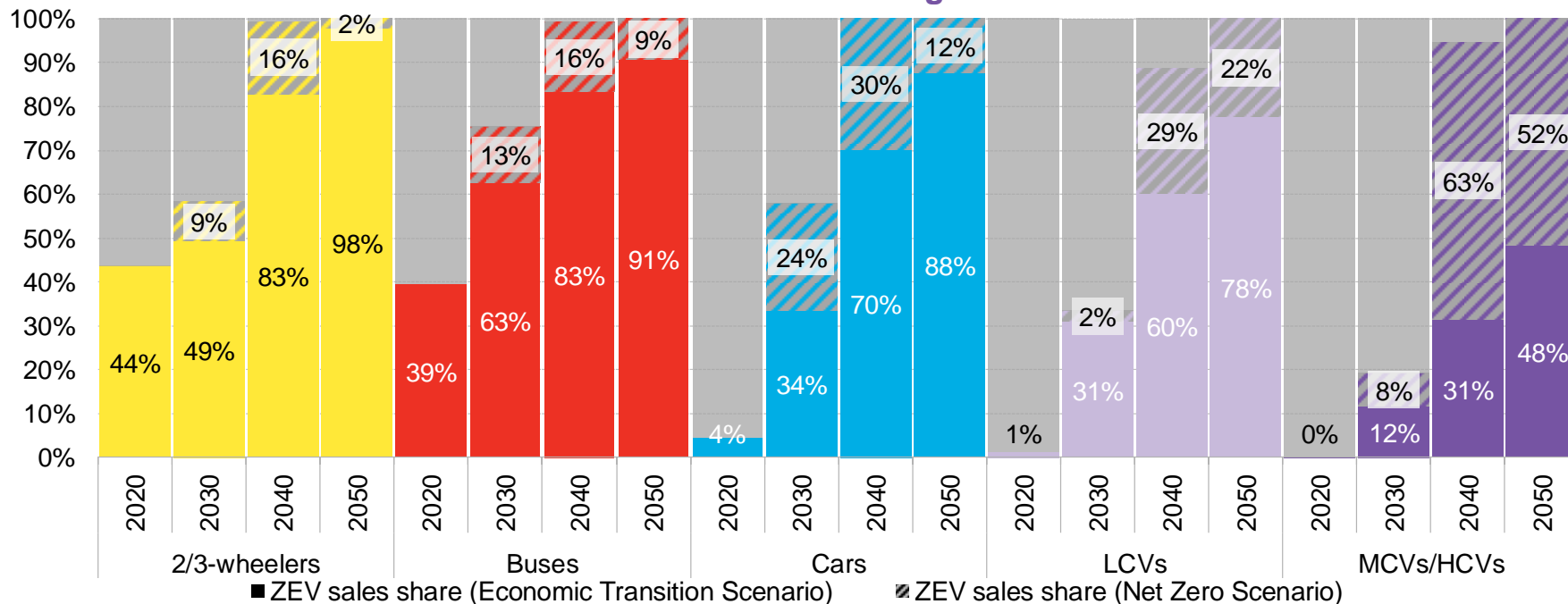
Zero-emission sales share outlook for all road vehicle segments – Economic Transition Scenario



Source: BNEF. Note: 'LCVs, MCVs and HCVs' are light-, medium- and heavy-duty commercial vehicles.

Some segments are closer to achieving net zero than others

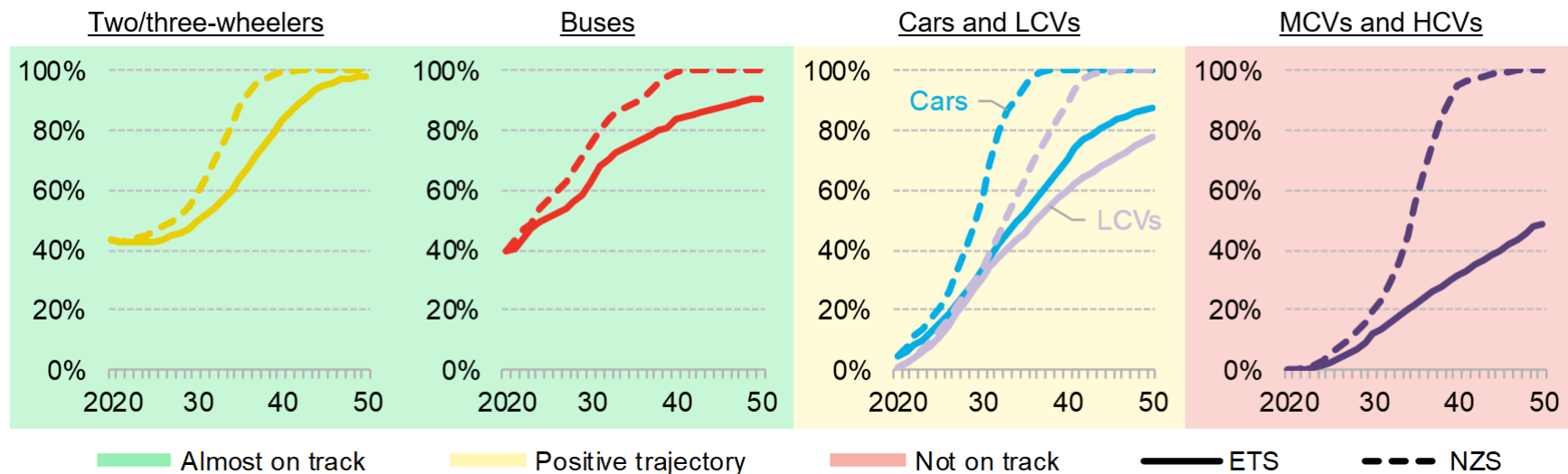
Zero-emission sales share outlook for all road vehicle segments – ETS and NZS



Source: BNEF. Note: 'LCVs, MCVs and HCVs' are light-, medium- and heavy-duty commercial vehicles.

Net Zero by 2050 means acceleration today

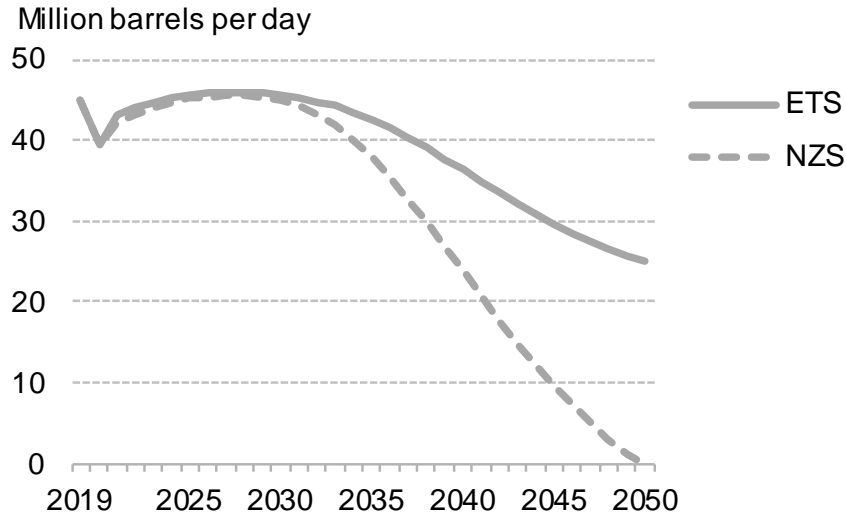
Figure 12: Zero-emission vehicle sales share outlooks – Economic Transition Scenario (ETS) and Net Zero Scenario (NZS)



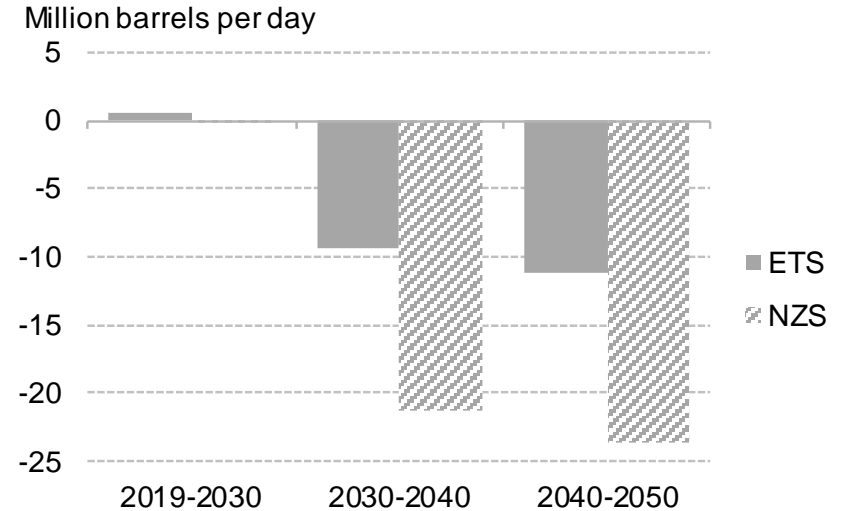
Source: BloombergNEF, LCVs, MCVs and HCVs' are light-, medium- and heavy-duty commercial vehicles. 'Zero-emission' includes battery-electric and fuel cell vehicles. All values global. Some values rounded.

Oil demand gets hit hard in both scenarios

Oil demand from road transport by scenario



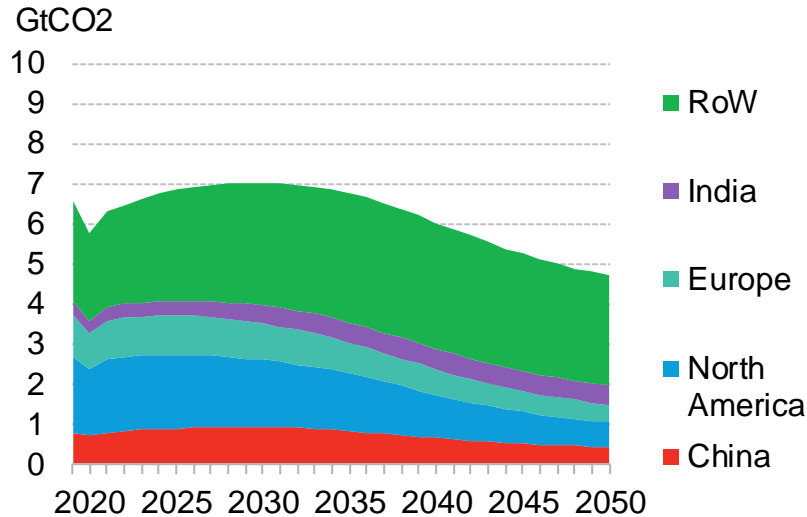
Oil demand growth from road transport by scenario



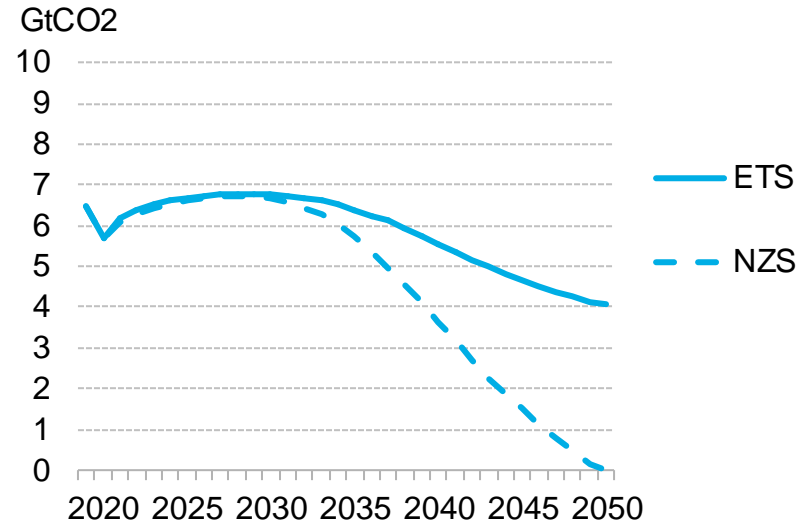
Source: BNEF. Note: 'ETS' is Economic Transition Scenario and 'NZS' is Net-Zero Scenario.

Road transport CO2 emissions peak around 2030

Global CO2 emissions from road transport by region – Economic Transition Scenario



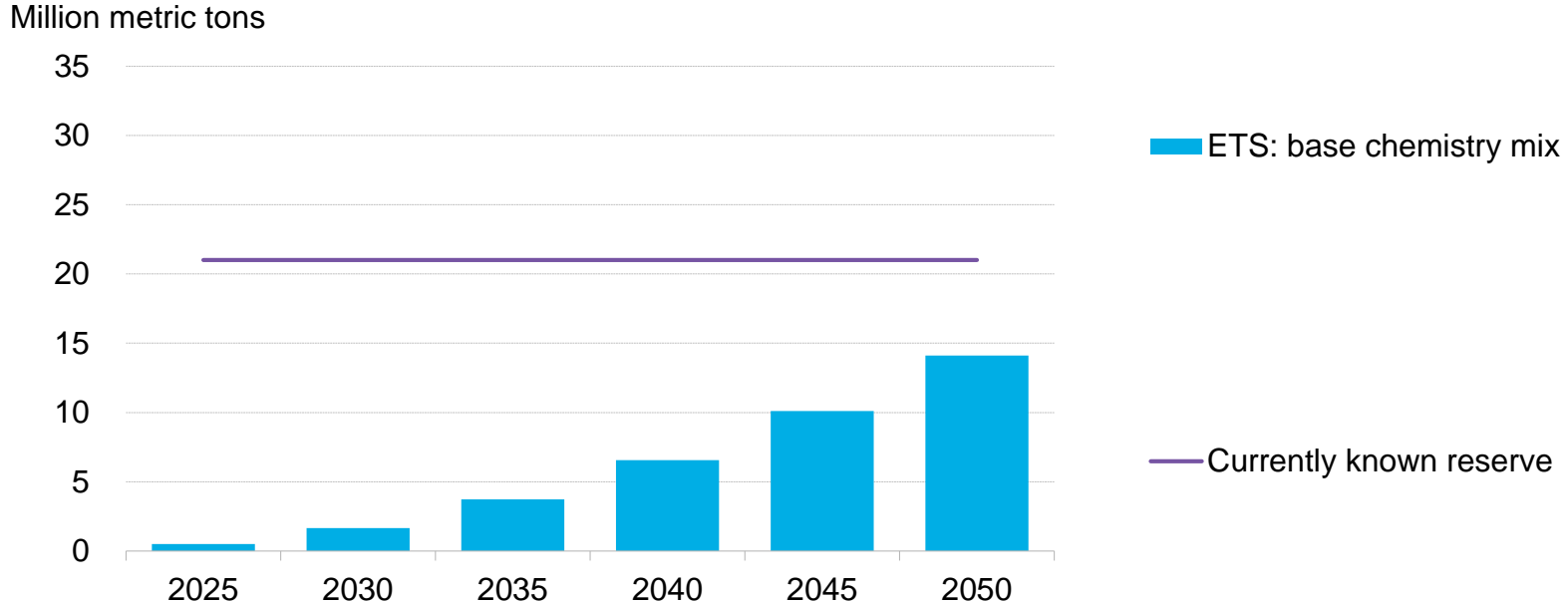
Global CO2 tailpipe emissions from road transport – Economic Transition Scenario and Net Zero Scenario



Source: BNEF. Note: Country breakdown includes tailpipe and power sector emissions. Scenario comparison is tailpipe only.

Battery recycling needed to avoid a material supply crunch

Cumulative lithium and demand and reserves under different chemistry mix scenarios

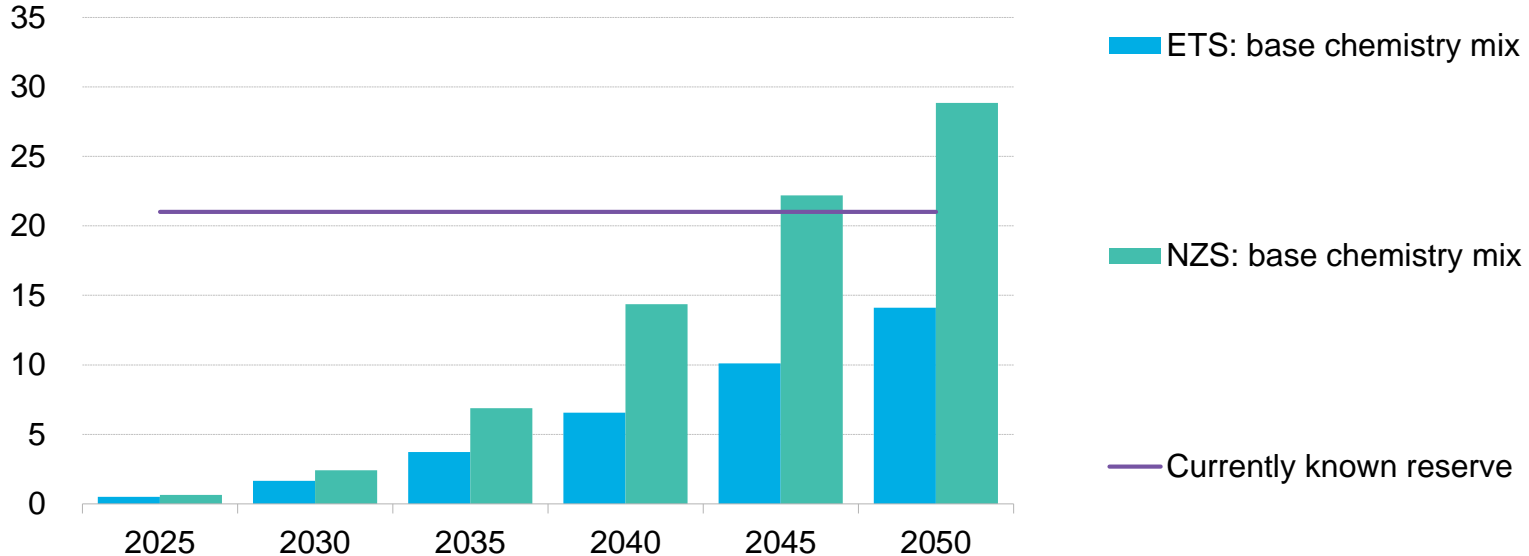


Source: BNEF. Note: Based on contained metal not lithium carbonate equivalent. Recycling uses our ETS chemistry mix with net zero battery demand. Assumes 70% of lithium is recovered from batteries after 15 years of use. Assumes 98% of cobalt is recovered from batteries after 15 years of use.

Battery recycling needed to avoid a material supply crunch

Cumulative lithium and demand and reserves under different chemistry mix scenarios

Million metric tons

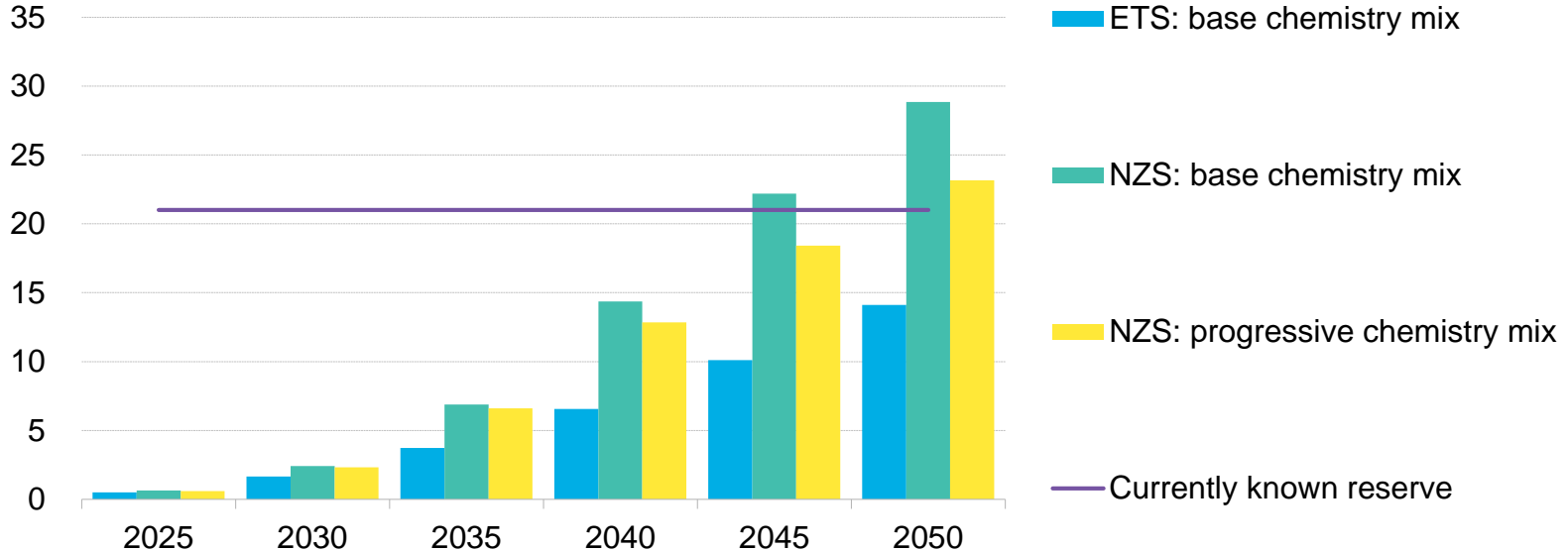


Source: BNEF. Note: Based on contained metal not lithium carbonate equivalent. Recycling uses our ETS chemistry mix with net zero battery demand. Assumes 70% of lithium is recovered from batteries after 15 years of use. Assumes 98% of cobalt is recovered from batteries after 15 years of use.

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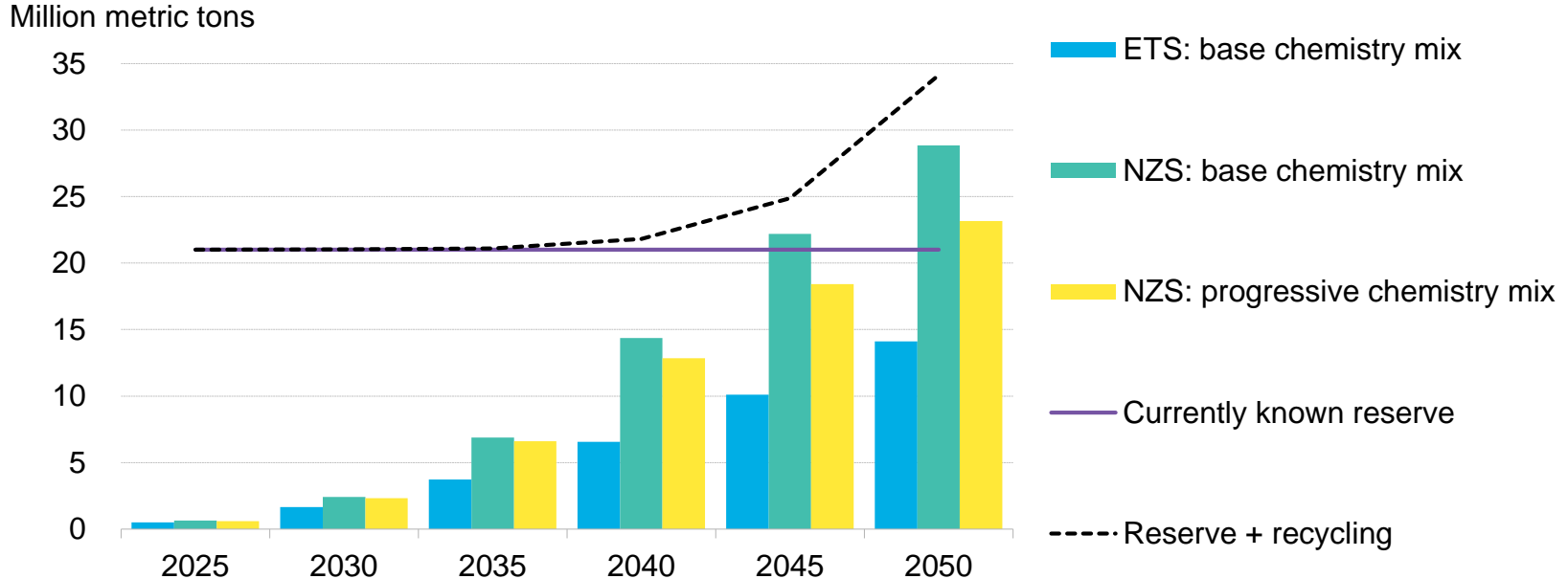
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Battery recycling needed to avoid a material supply crunch

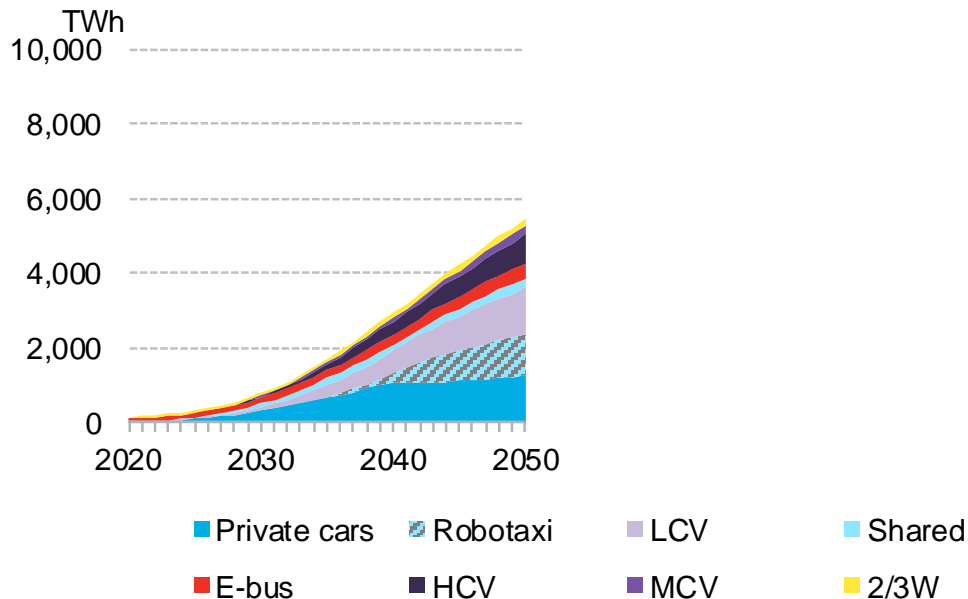
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EV Electricity demand is 14%~24% of global demand by 2050

ETS – by vehicle type

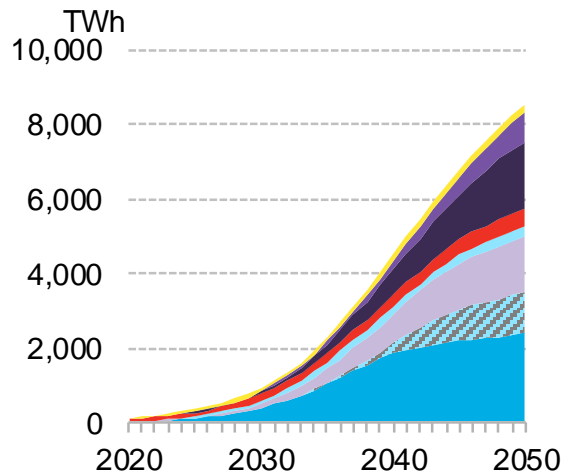
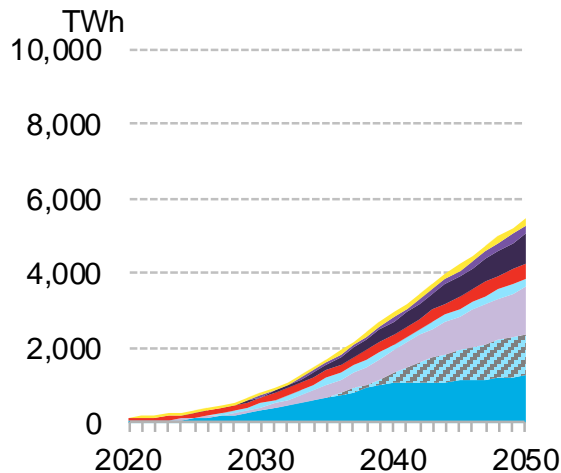


Source: BNEF. Note: General electricity demand is from BNEF's 2020 New Energy Outlook. 'Shared' is shared mobility vehicles.

EV Electricity demand is 14%~24% of global demand by 2050

ETS – by vehicle type

NZS – by vehicle type

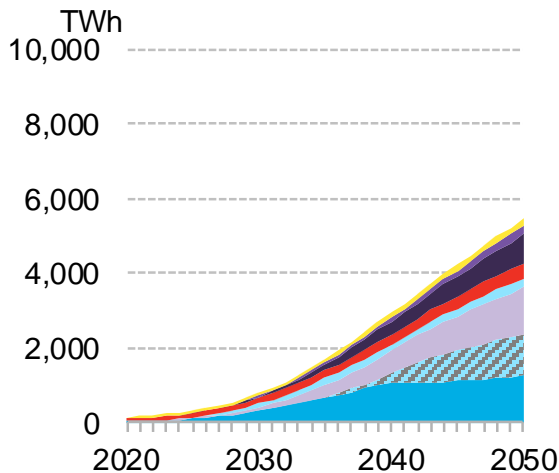


■ Private cars ■ Robotaxi ■ LCV ■ Shared
■ E-bus ■ HCV ■ MCV ■ 2/3W

Source: BNEF. Note: General electricity demand is from BNEF's 2020 New Energy Outlook. 'Shared' is shared mobility vehicles.

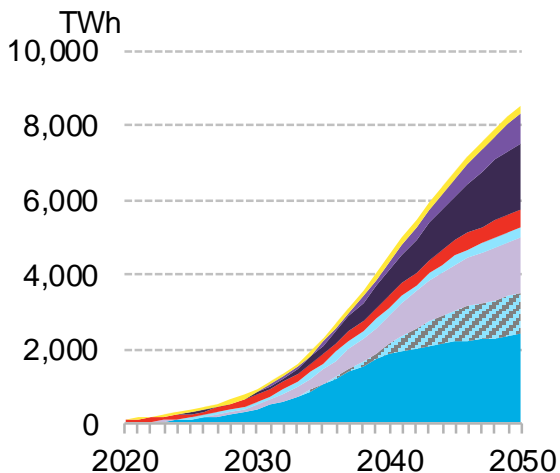
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ETS – by vehicle type



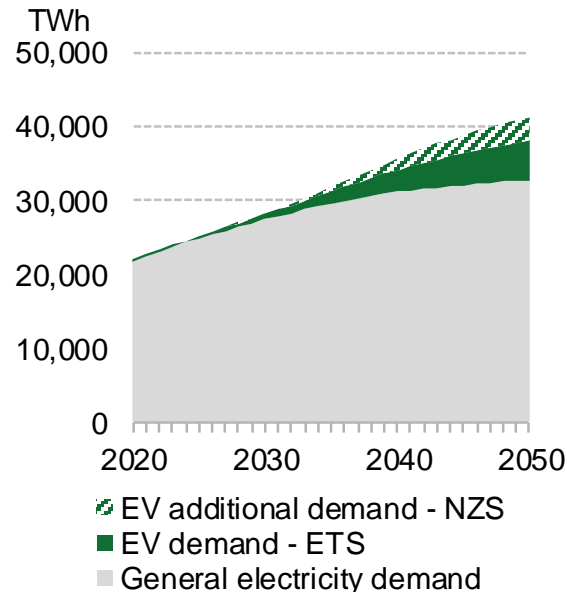
- Private cars
- Robotaxi
- E-bus
- HCV

NZS – by vehicle type



- LCV
- Shared
- HCV
- 2/3W

EV demand relative to general demand



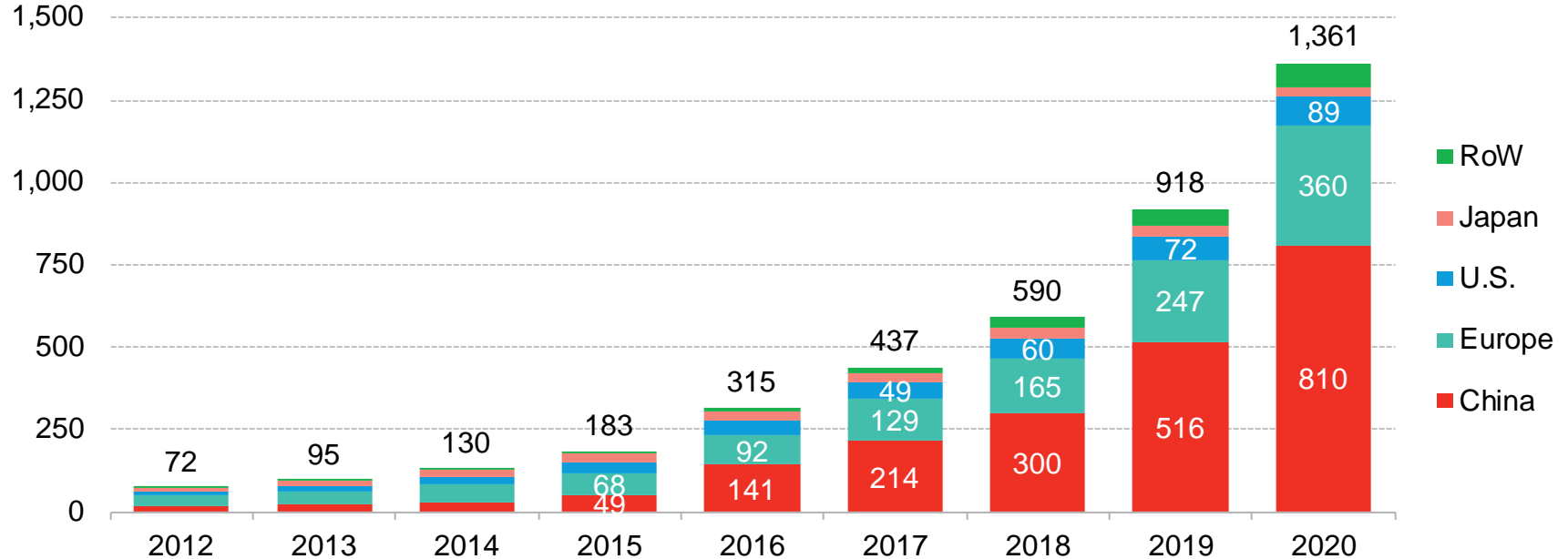
- EV additional demand - NZS
- EV demand - ETS
- General electricity demand

Source: BNEF. Note: General electricity demand is from BNEF's 2020 New Energy Outlook. 'Shared' is shared mobility vehicles.

The picture today: over 1.3 million charging points installed

Cumulative installed public charging connectors by market

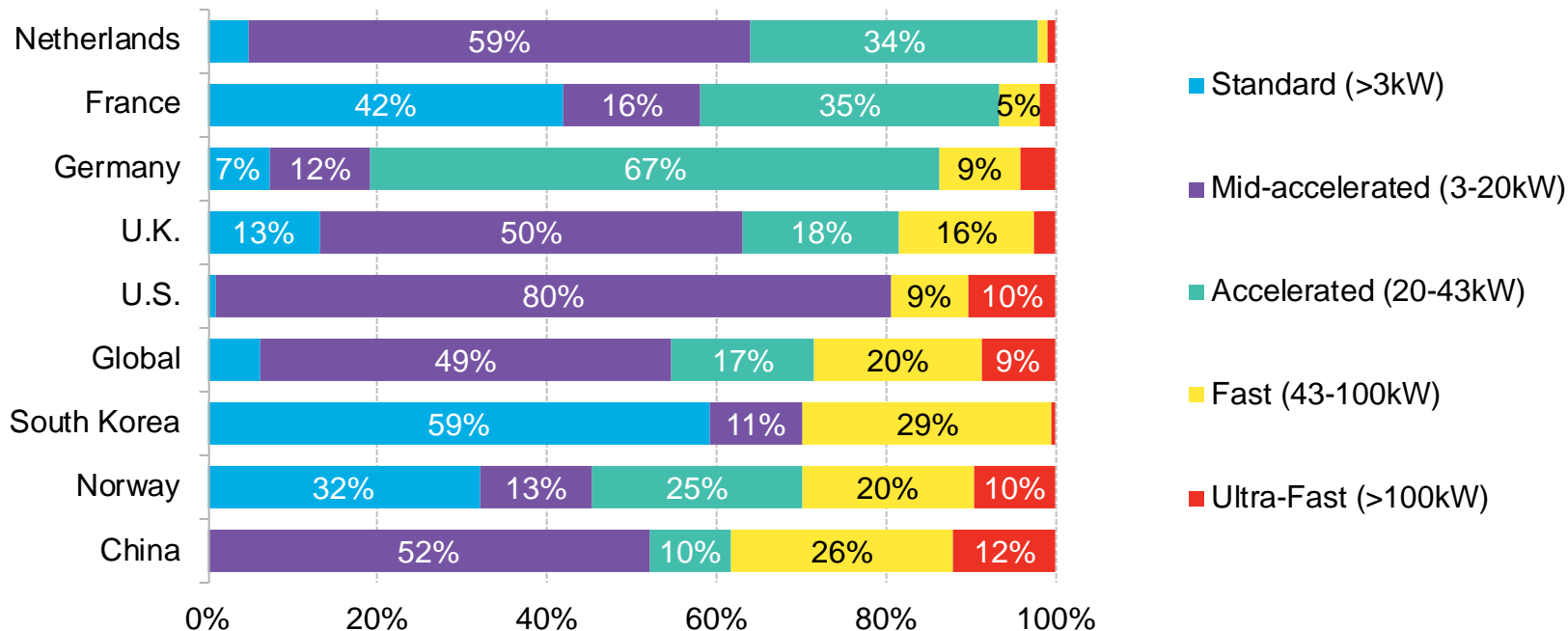
Thousand connectors



Source: BNEF. Note: Includes Tesla's (semi-private) destination and supercharger networks.

But speeds also vary

Share of public charge connectors by power category across different countries

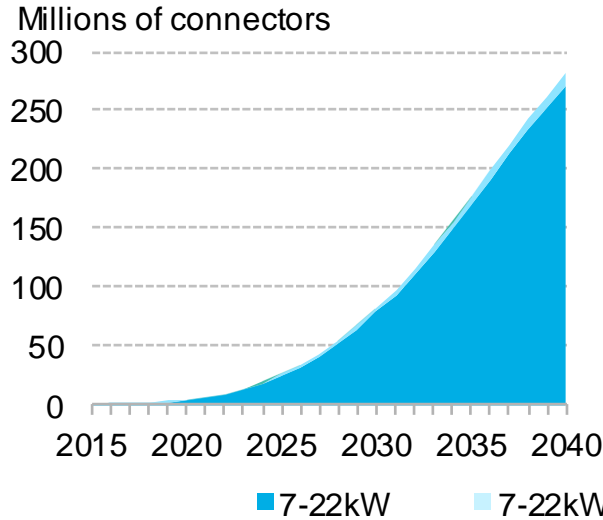


Source: BNEF.

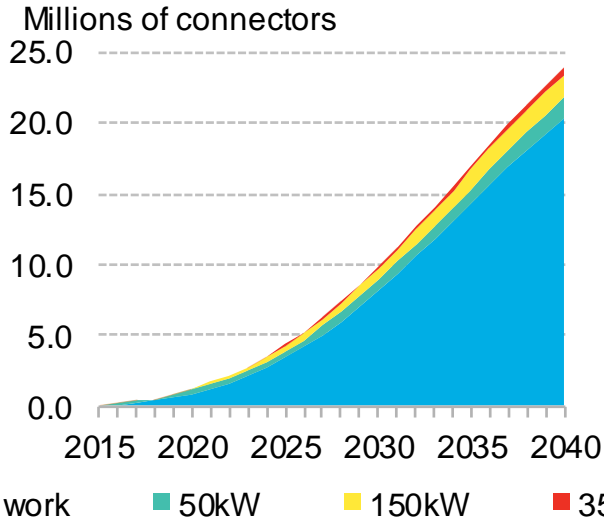
309 million EV chargers required by 2040

Cumulative global charging infrastructure by category – ETS

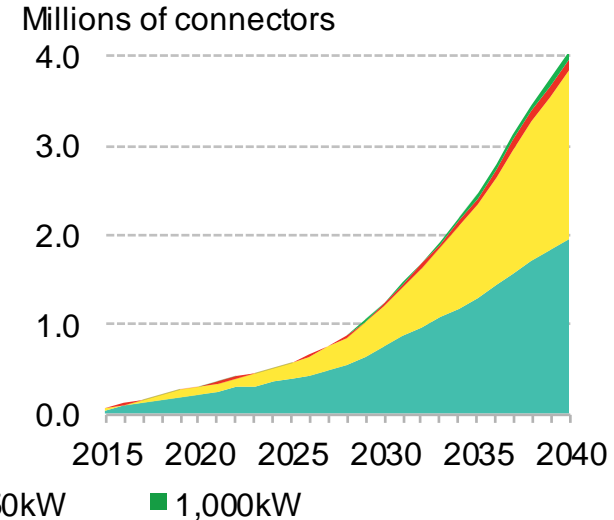
Home and work



Public



E-bus and truck

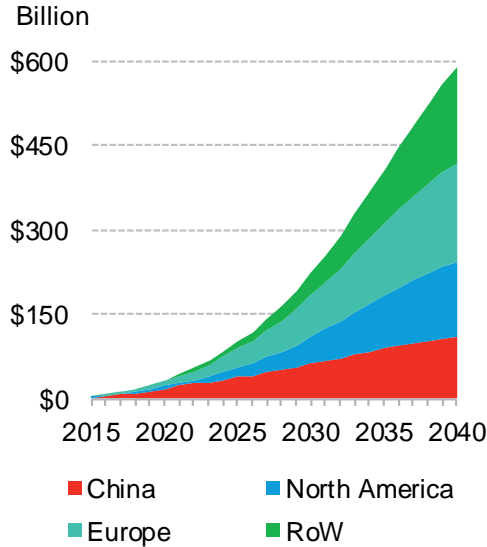


Source: BNEF. Note: Light commercial EVs are considered within home and public infrastructure.

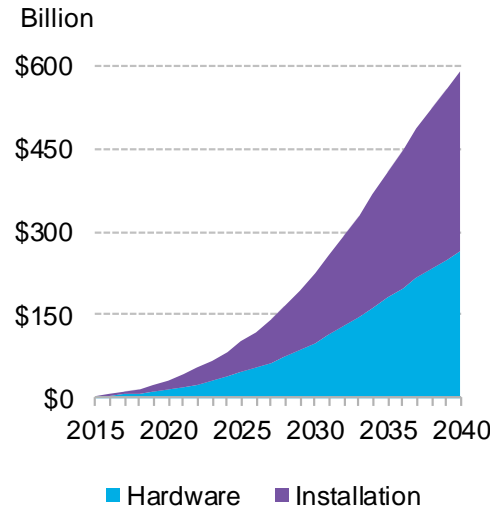
Some \$600 billion investment required by 2040

Cumulative investment in charging globally

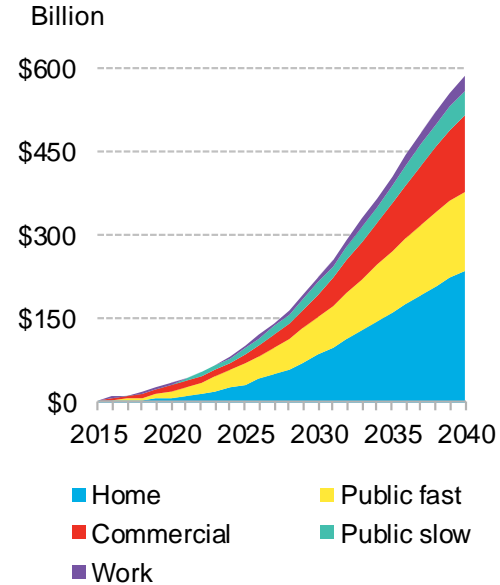
Cumulative investment by region



Cumulative investment by category



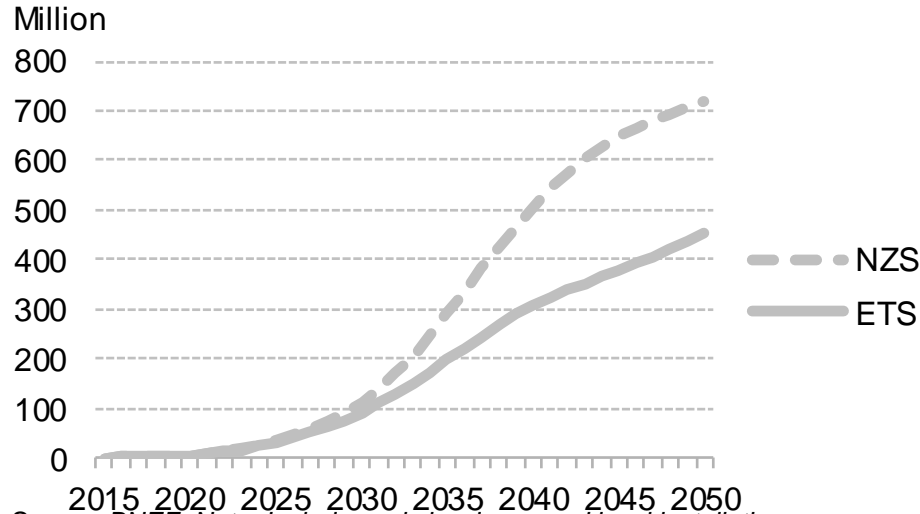
Cumulative investment by location



Source: BloombergNEF

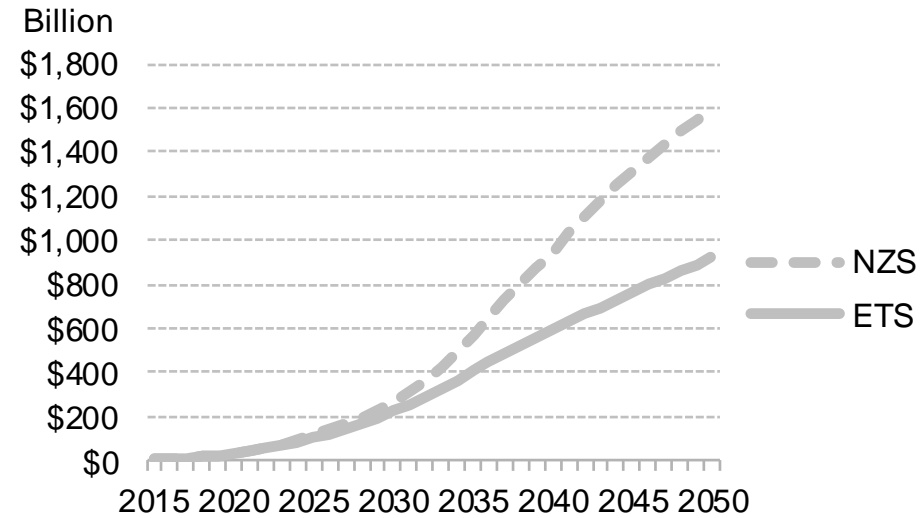
Increasing to \$920 billion ~\$1,600 billion by 2050

Comparison of total charge connectors needed globally by 2050



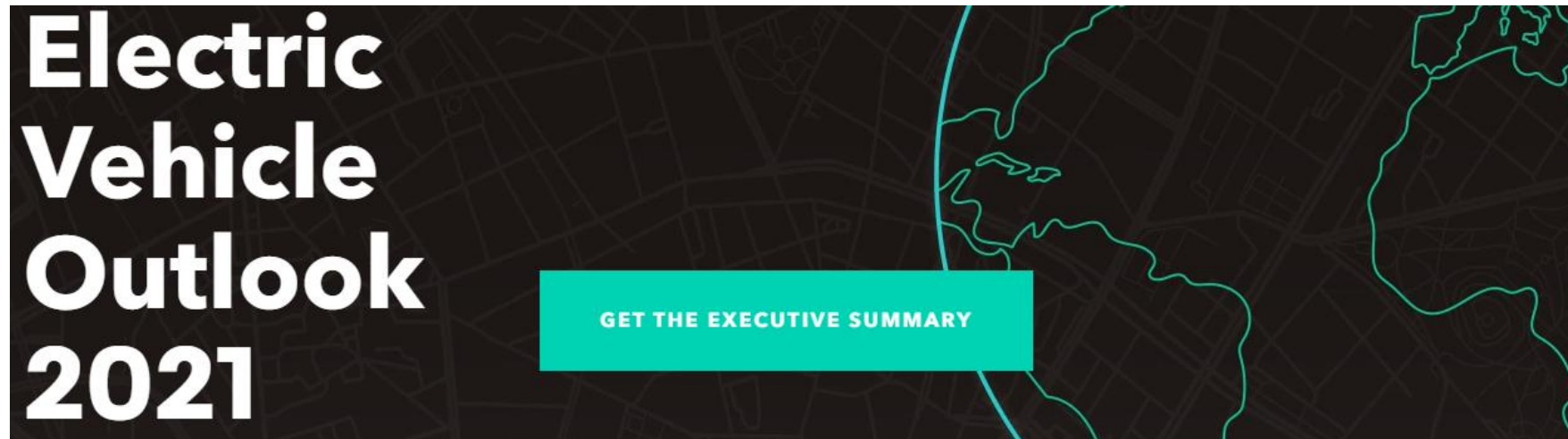
Source: BNEF. Note: Includes only hardware and local installations costs.

Comparison of total charging connector investment needed globally by 2050



Thank you

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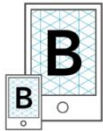
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