

A Global Overview of Drivetrains

Africa's growth opportunity

Dr. Kwasi Ampofo

November 17, 2021

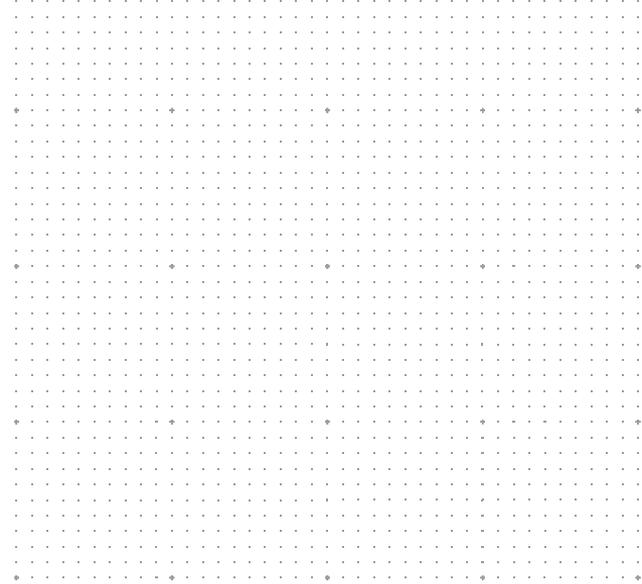


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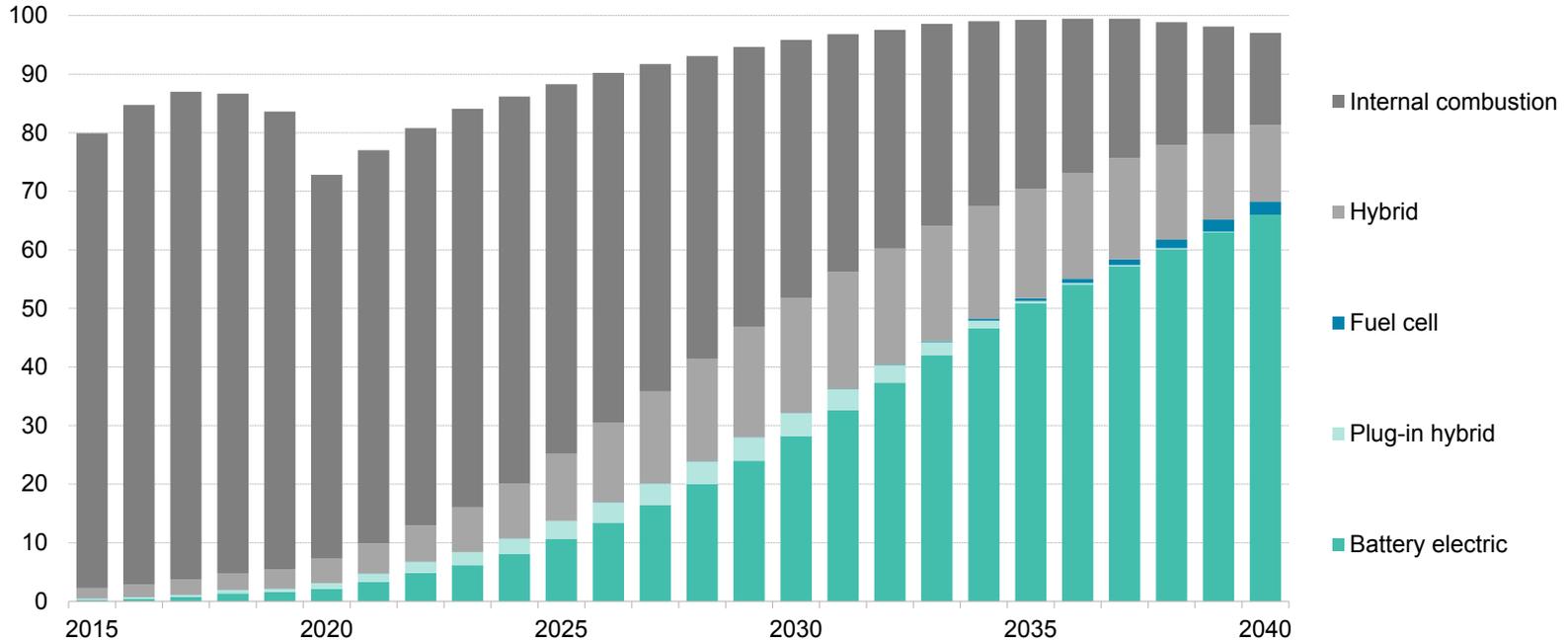
Demand

Demand will grow



Global passenger vehicle sales by drivetrain

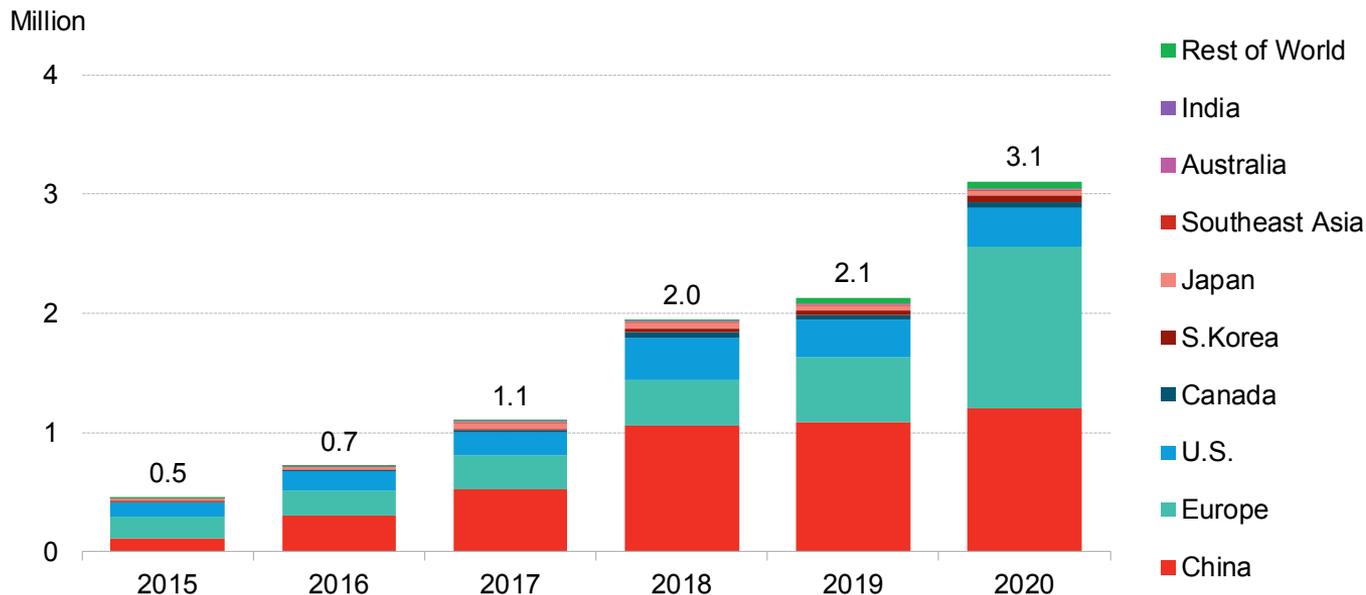
Million vehicles



Source: BNEF

Sales of passenger EVs are rising fast

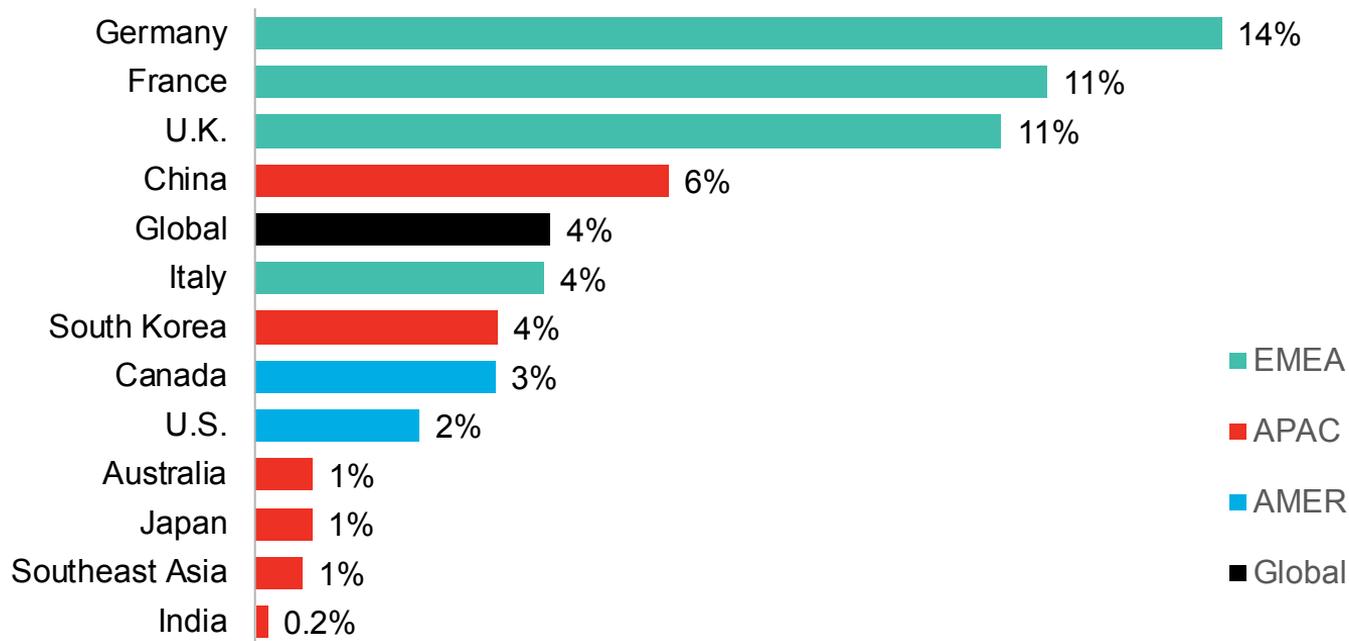
Global passenger EV sales by market



Source: BNEF, Marklines. Totals include BEVs and PHEVs. Includes highway-capable passenger vehicles. Excludes low-speed EVs, buses and other commercial vehicles. South Korean EV sales prior to 2016 are excluded. The excluded data does not have a material impact on the results.

But not everywhere

2020 EV share of passenger vehicle sales by market



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

Demand

The growth is set to continue. Why?



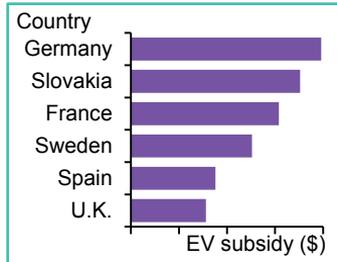
BNEF

The growth is set to continue. Why?

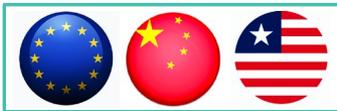


Policy

- EV purchase subsidies



- Fuel economy regulations

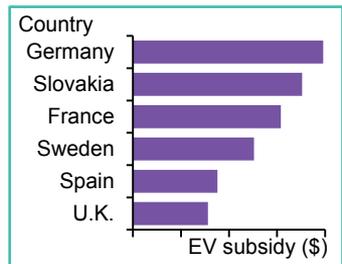


Source: BNEF

The growth is set to continue. Why?

Policy

- EV purchase subsidies



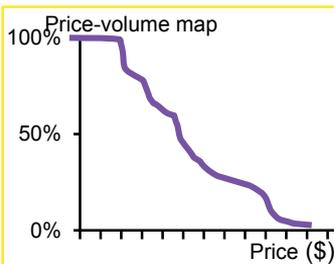
- Fuel economy regulations



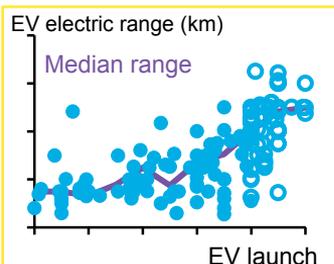
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Model availability and addressable market

- EV model segments



- Improving technology

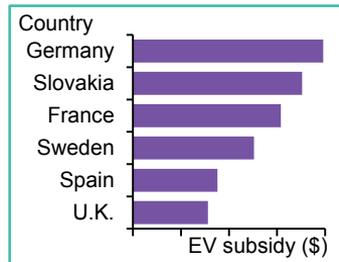


Source: BNEF

The growth is set to continue. Why?

Policy

- EV purchase subsidies

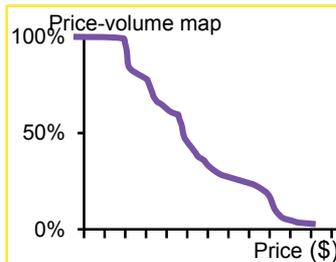


- Fuel economy regulations

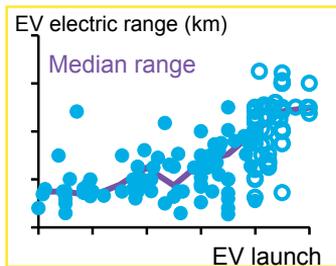


Model availability and addressable market

- EV model segments

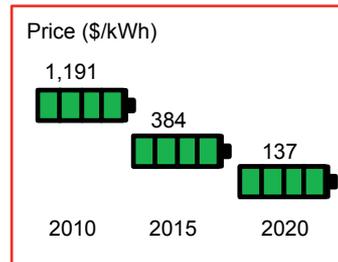


- Improving technology



Upfront cost parity

- Battery prices decline



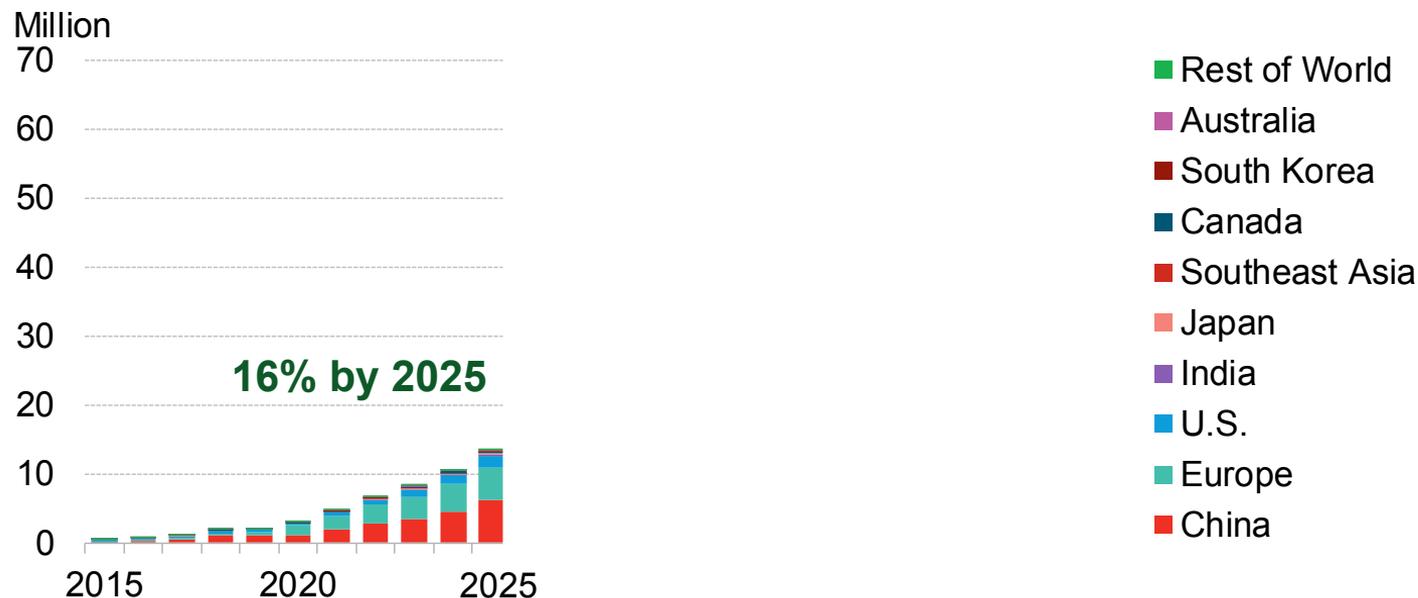
- BEV prices decline



Source: BNEF

The first two are the pillars for our near-term EV adoption outlook

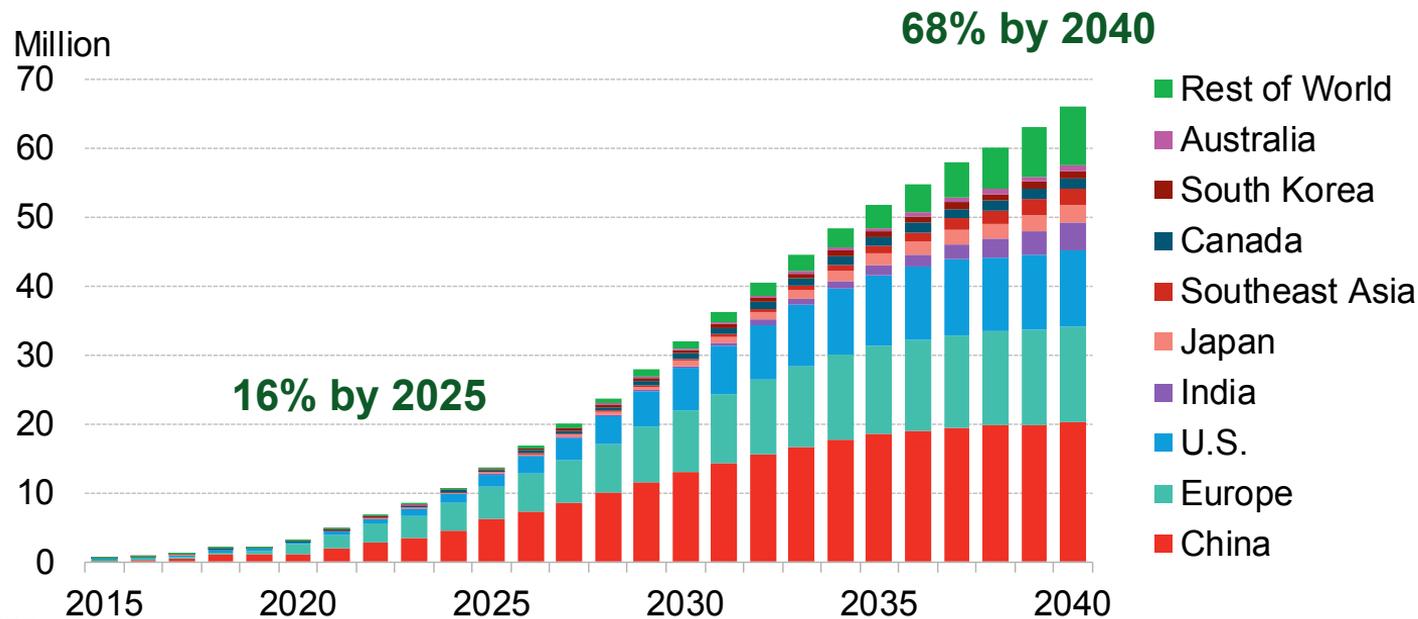
Global passenger EV sales outlook by market, Economic Transition Scenario



Source: BNEF.

Long-term, upfront cost parity moves adoption beyond the three main regions

Global passenger EV sales outlook by market, Economic Transition Scenario

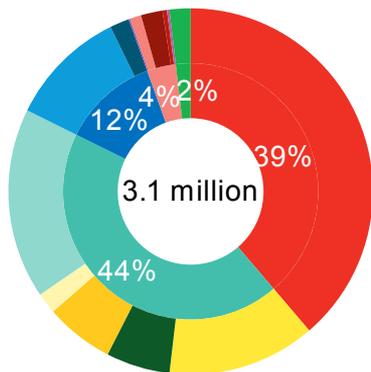


Source: BNEF.

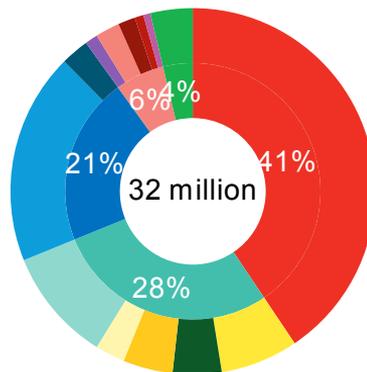
Not all countries move at the same pace

Global EV sales by main markets in 2020, 2030 and 2040 (Economic Transition Scenario)

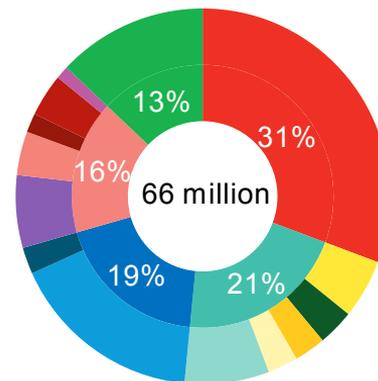
EV sales 2020



EV sales 2030



EV sales 2040



■ China

■ Europe

■ North America

■ Other APAC

■ Rest of World

■ China

■ Germany

■ U.K.

■ France

■ Italy

■ Rest of Europe

■ U.S.

■ Canada

■ India

■ Japan

■ South Korea

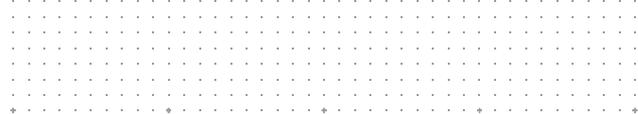
■ Southeast Asia

■ Australia

■ Rest of World

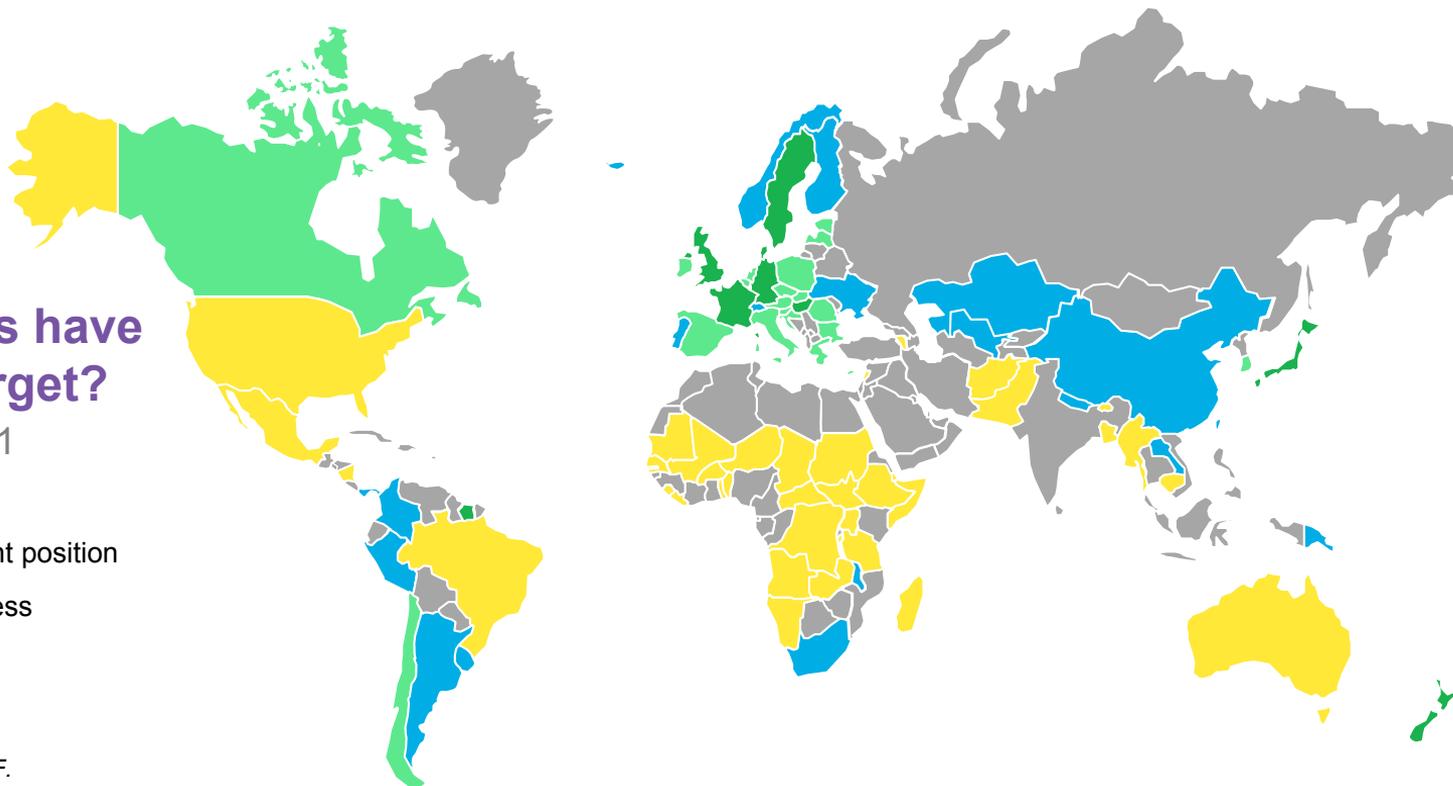
Source: BNEF. Note: Inner ring shows global market share for grouped markets in outer ring.

Is it fast enough though?



Which parties have a net-zero target?

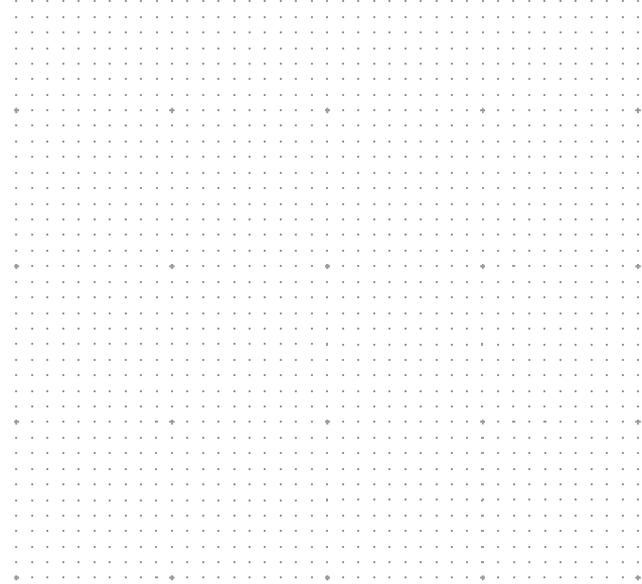
As at June 8, 2021



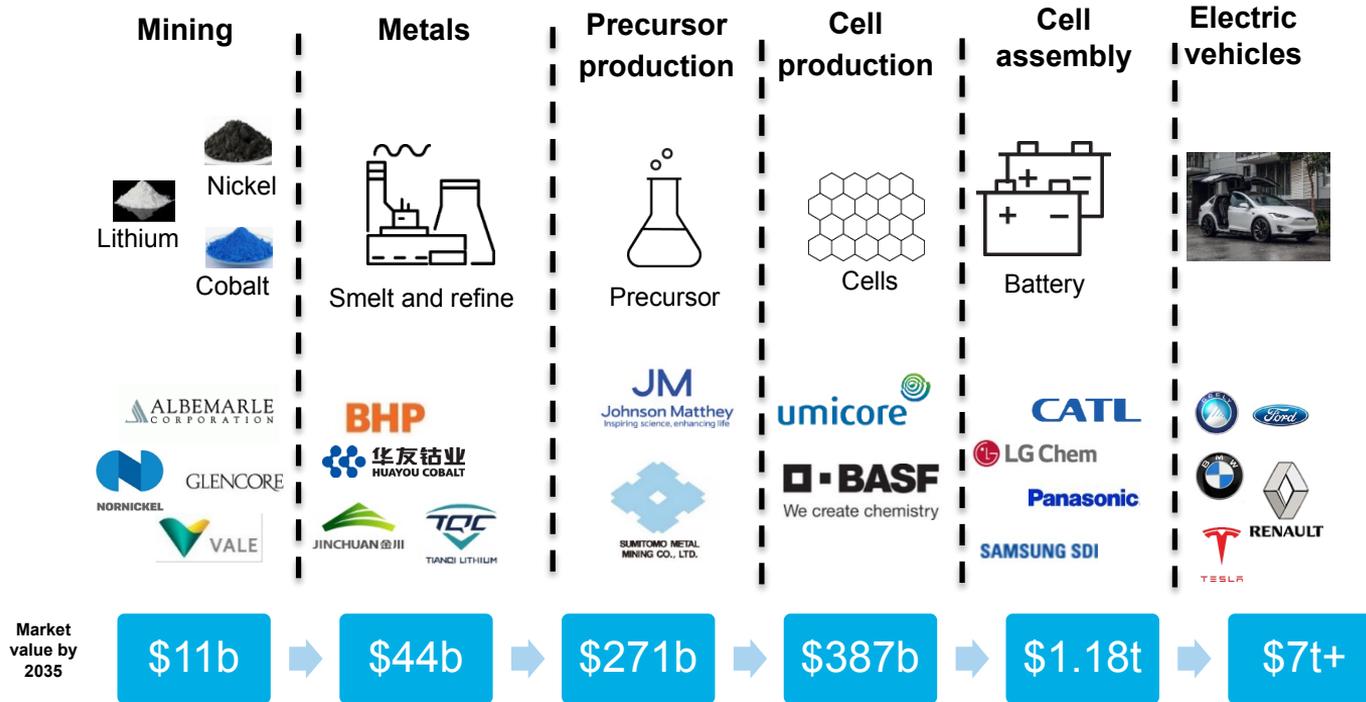
Source: Governments, BNEF.

Africa's opportunity 1

Industrialization



Understanding the electric vehicle value chain

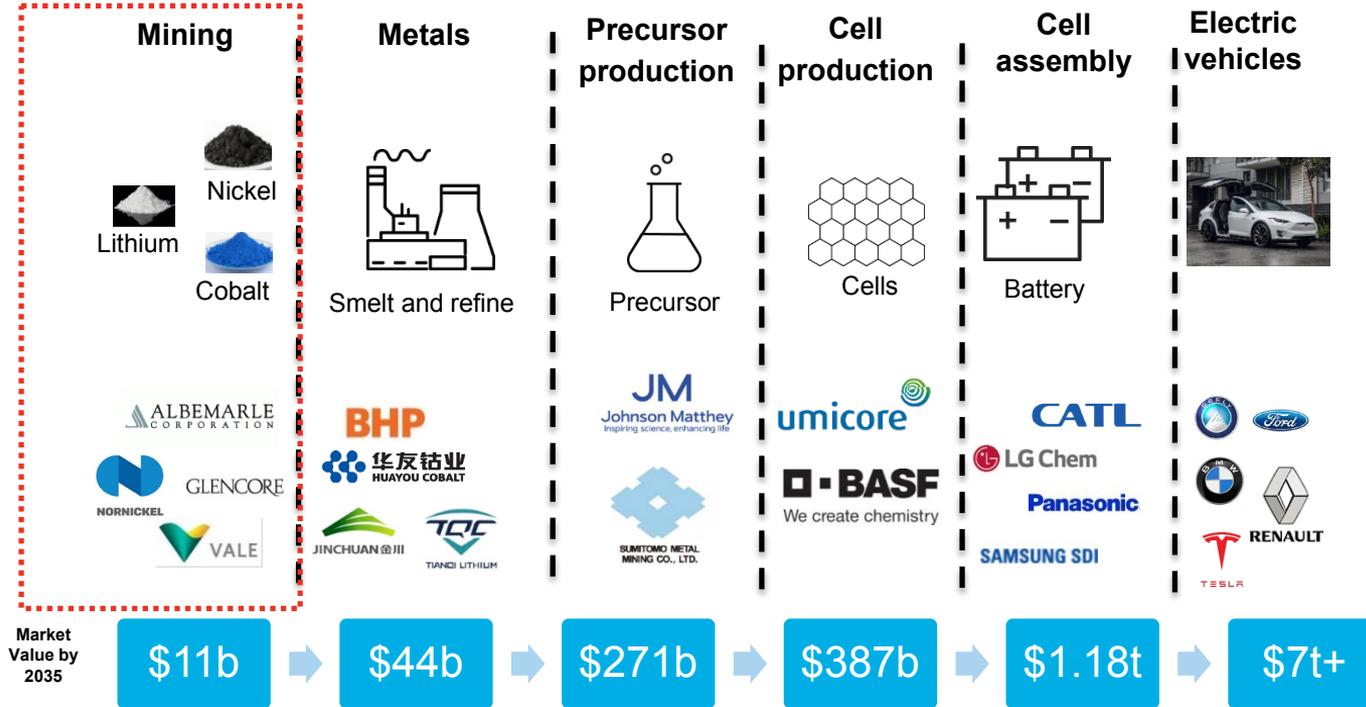


Source: BNEF, Australia Government's Future Batteries Industry CRC

What is Africa's Focus?

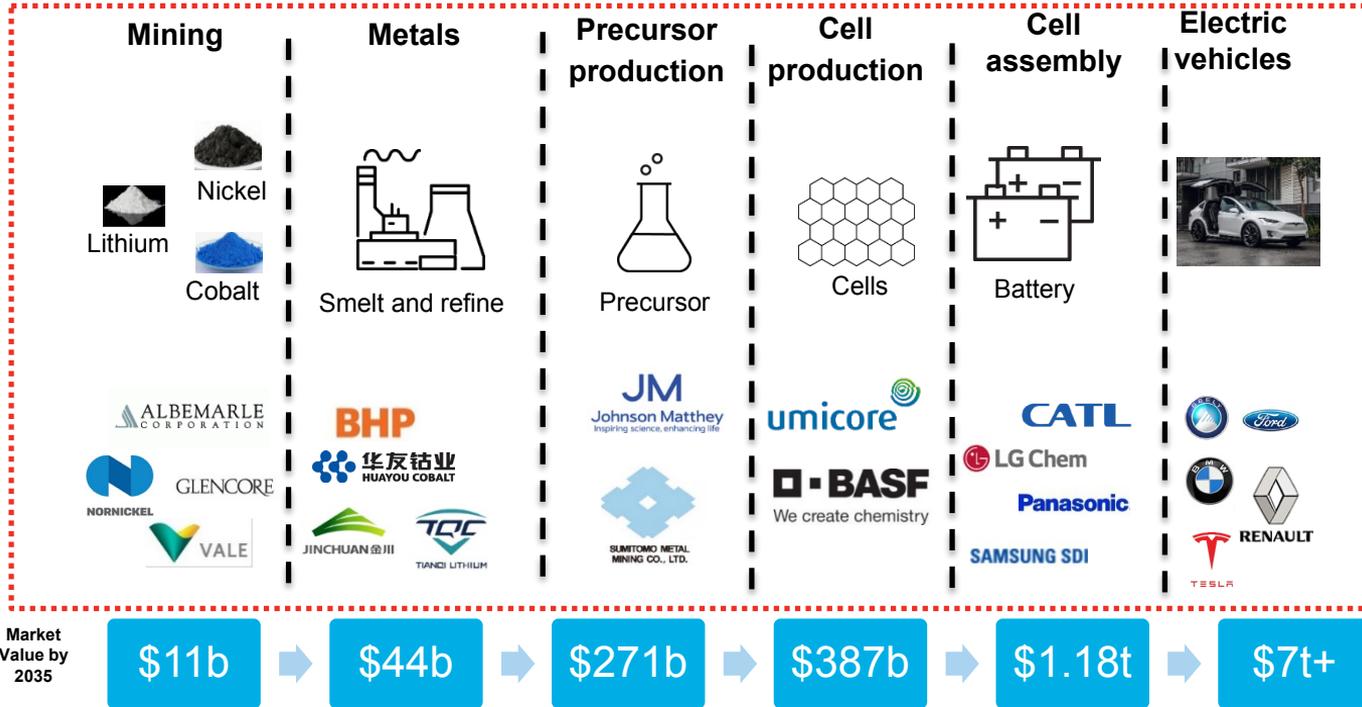


Africa's focus...



Source: BNEF, Australia Government's Future Batteries Industry CRC

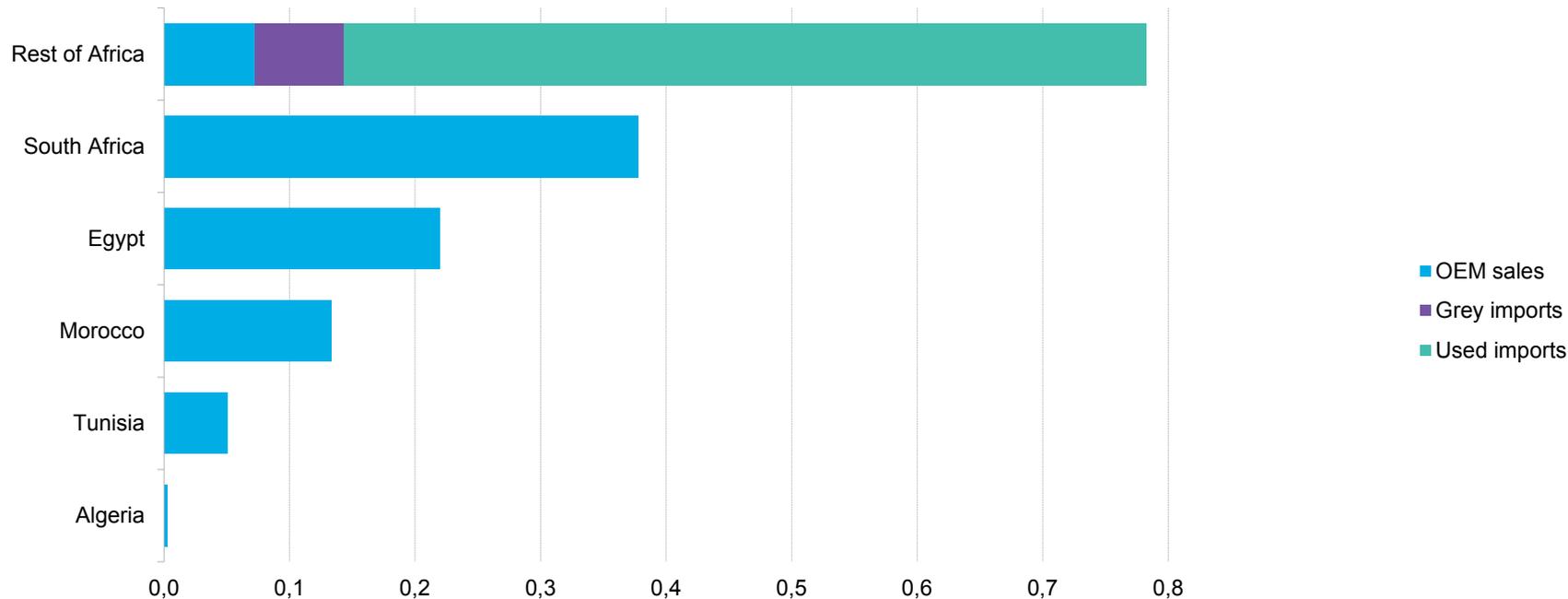
Africa's opportunity...



Source: BNEF, Australia Government's Future Batteries Industry CRC

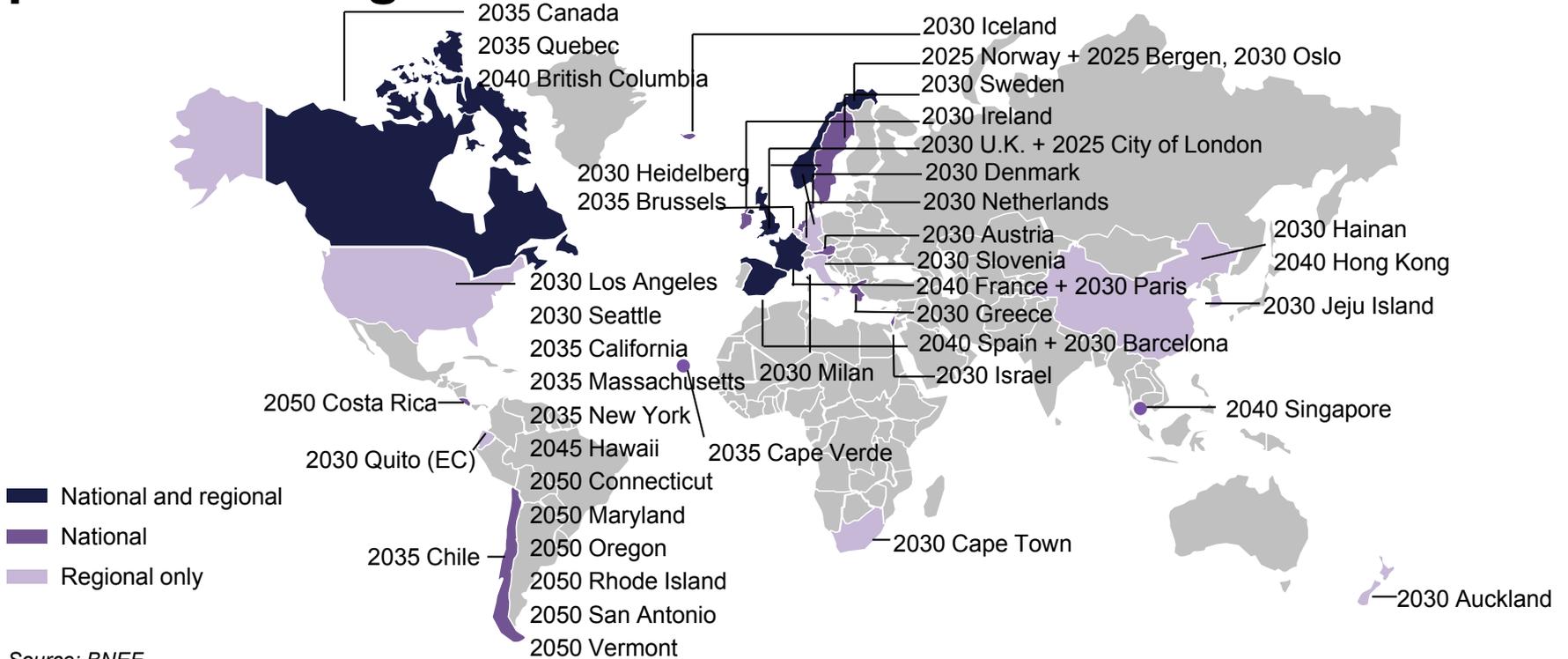
Africa's auto market in 2020

Vehicle sales in millions



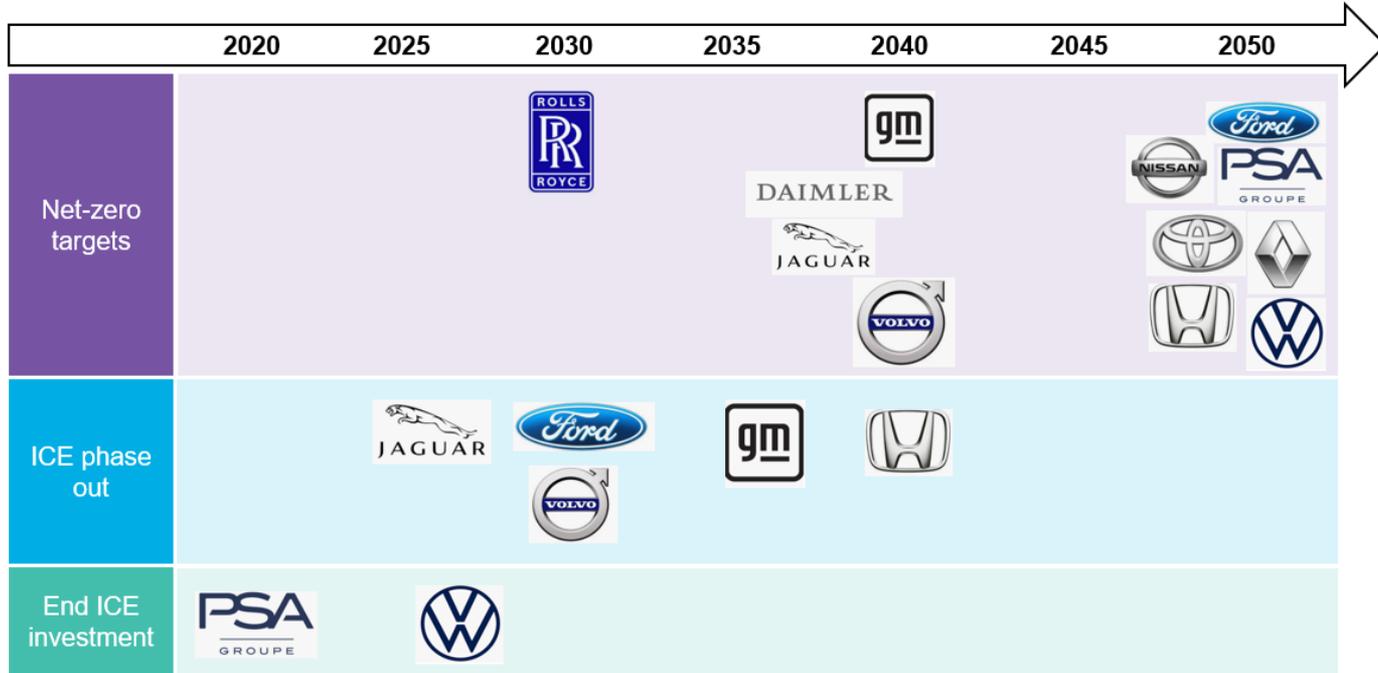
Source: Africa Automotive Data Network, BNEF

National and regional ICE vehicle phase-out targets



Source: BNEF.

Automakers' drivetrain development targets



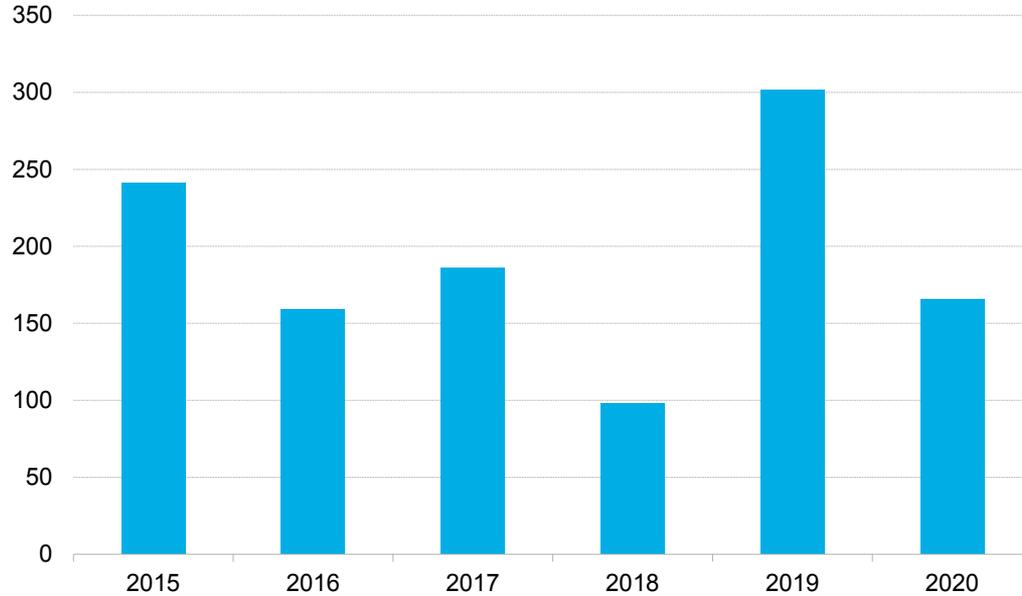
Source: BNEF. Note: Honda and Ford ICE phase-out targets are for Europe only.

Africa's opportunity 2

Demand

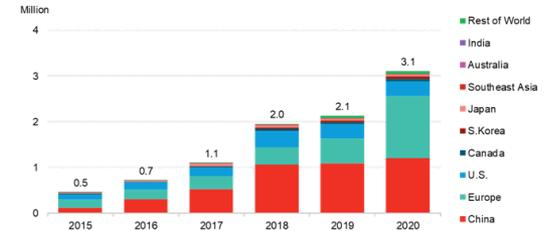
Africa has low electric vehicle sales

EVs sold per year in Africa

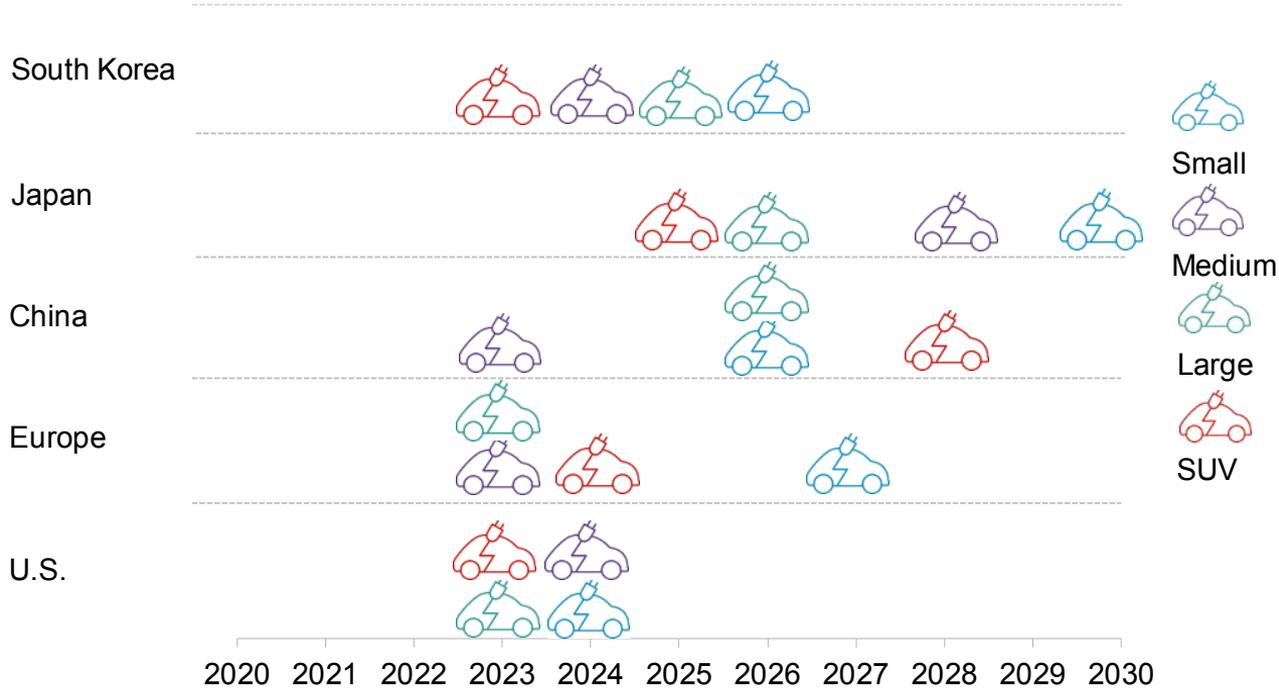


Source: BNEF, Marklines. Totals include BEVs and PHEVs. Includes highway-capable passenger vehicles. Excludes low-speed EVs, buses and other commercial vehicles. South Korean EV sales prior to 2016 are excluded. The excluded data does not have a material impact on the results.

Global electric vehicle sales



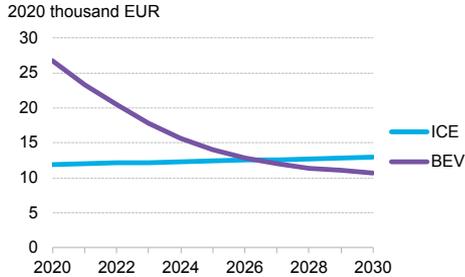
Year of expected upfront price parity for BEVs vs. ICEs



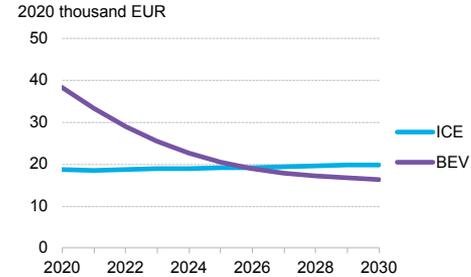
Source: BNEF. Note: Includes direct manufacturing cost and additional cost. Tax not included. Might vary by country depending on local policy.

Estimated pre-tax retail prices for ICE and BEV in Europe

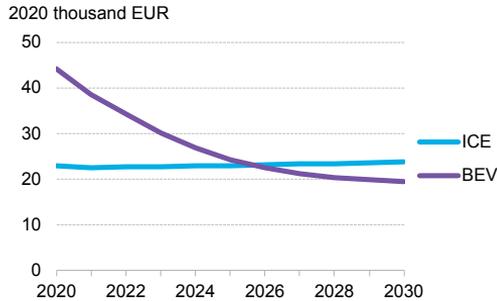
B-segment



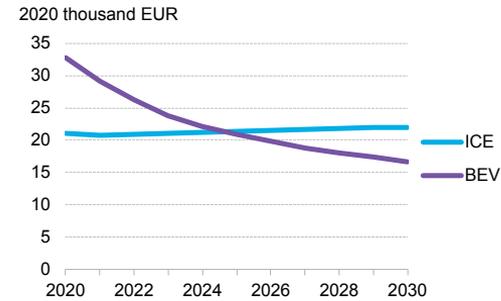
C-segment



SUV-C



Light van

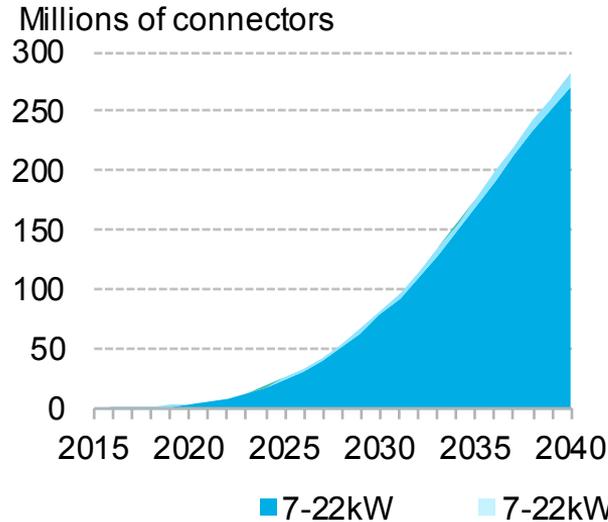


Source: BNEF. Note: Includes direct manufacturing cost and additional cost (see figure 12). Tax not included. Might vary by country depending on local policy.

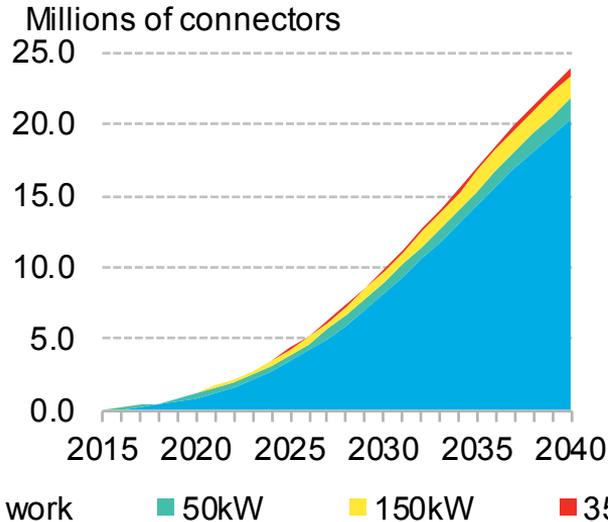
309 million electric vehicle chargers required by 2040

Cumulative global charging infrastructure by category – ETS

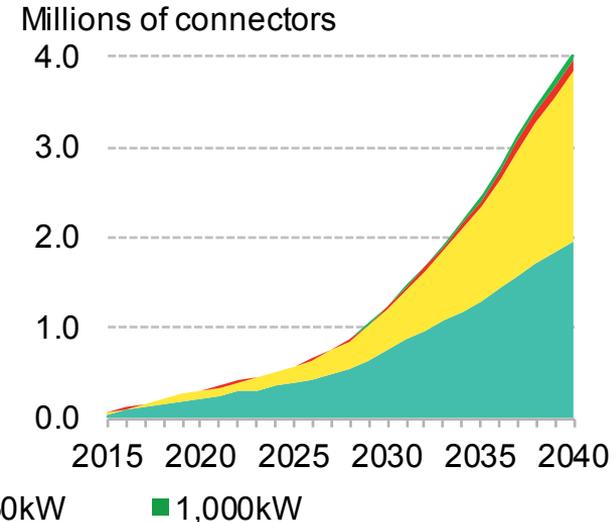
Home and work



Public



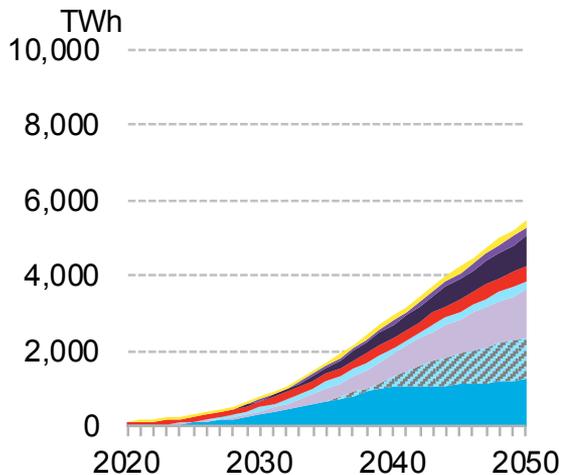
E-bus and truck



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

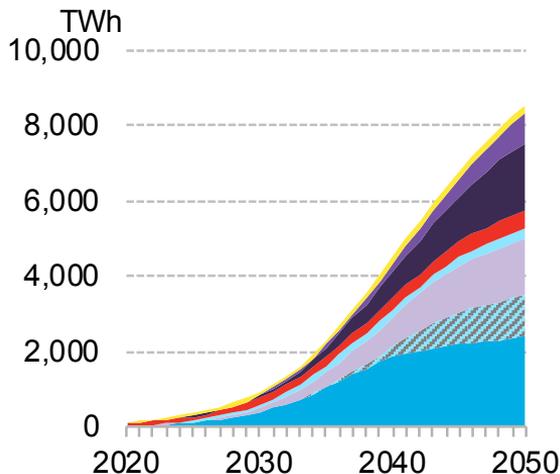
EV Electricity demand is 14~24% of global electricity demand by 2050

ETS – by vehicle type

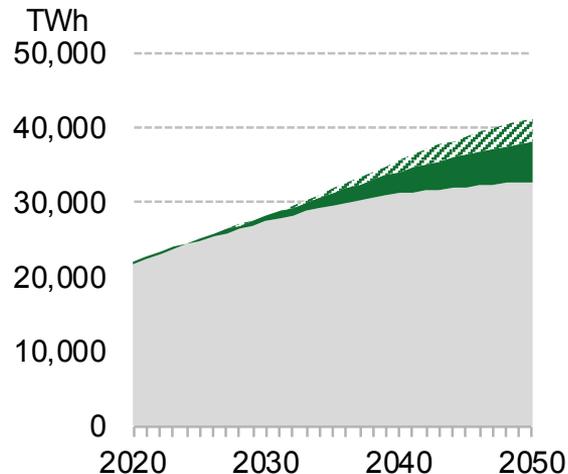


- Private cars
- E-bus
- ▨ Robotaxi
- HCV
- LCV
- MCV
- Shared
- 2/3W

NZS – by vehicle type



EV demand relative to general demand

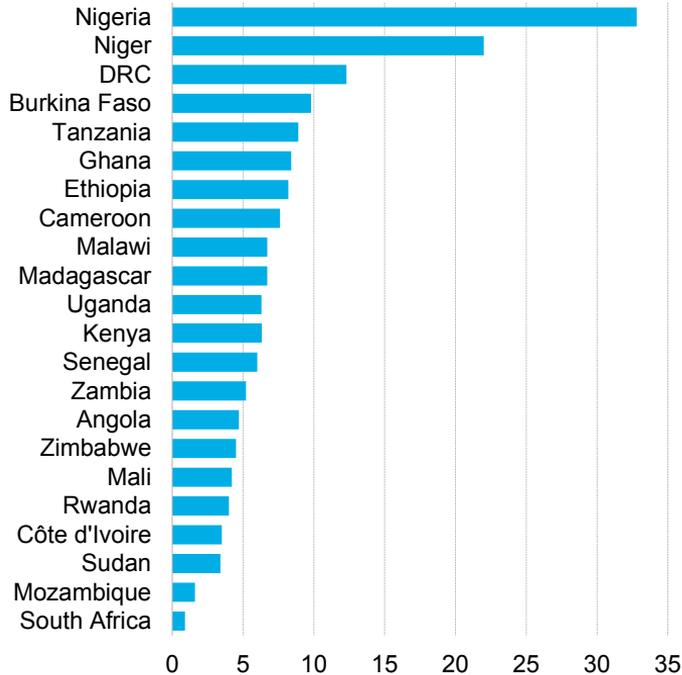


- ▨ EV additional demand - NZS
- EV demand - ETS
- General electricity demand

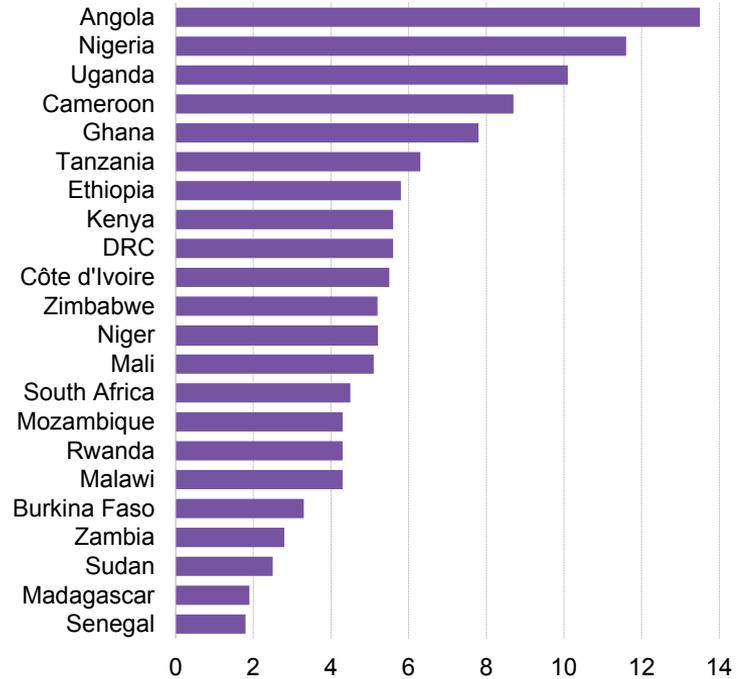
Source: BNEF. Note: General electricity demand is from BNEF's 2020 New Energy Outlook. 'Shared' is shared mobility vehicles.

Electricity is unstable in Africa

Number of outages in a typical month

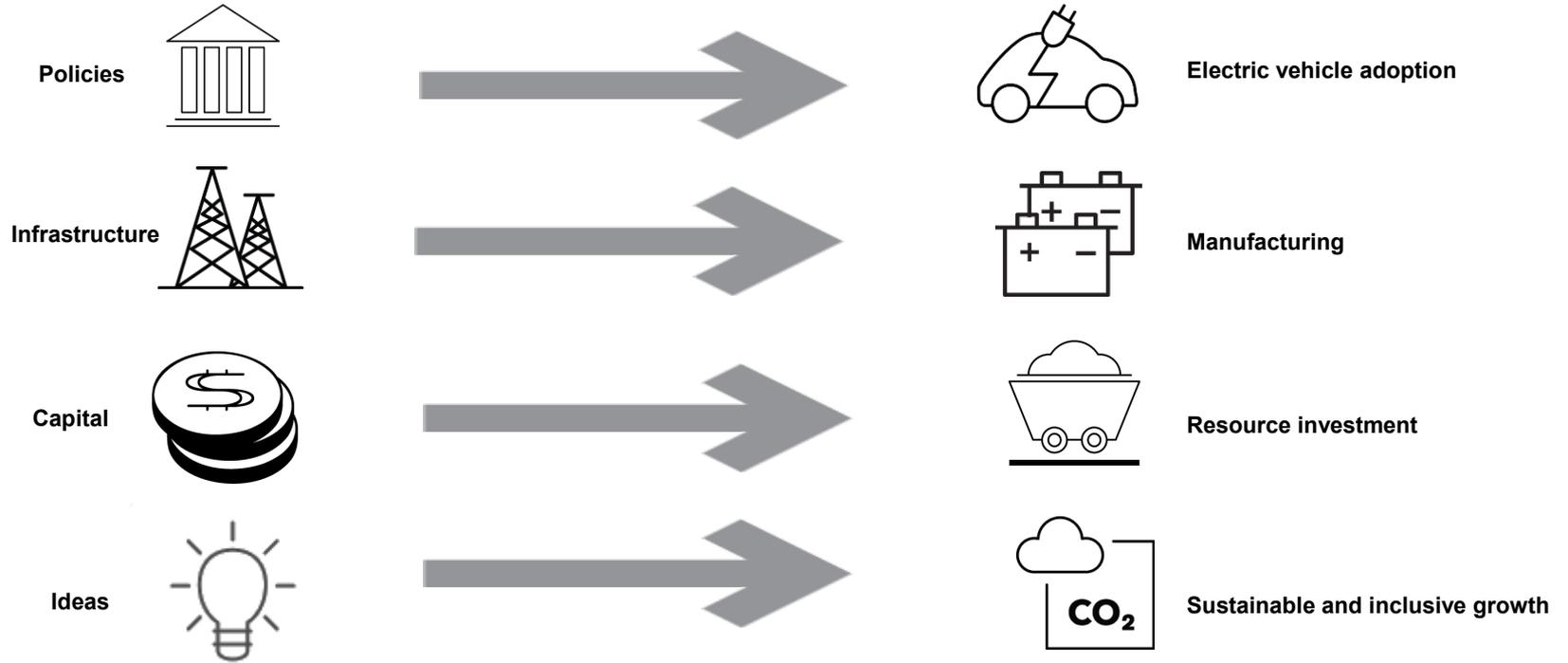


Hours per outage



Source: World Bank, BNEF. Note: Data refers to latest available for country.

Capitalizing on the next trillion-dollar market



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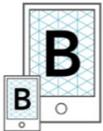
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