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Can the EU and US meet their electric vehicle targets while derisking supply chains?

11 June 2024

Electric vehicle and battery supply chain service

Agenda

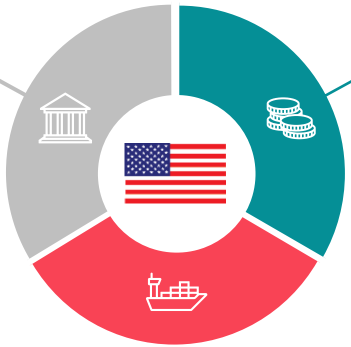
Policy landscape for EV adoption and supply chain resiliency

Prateek Biswas

Wood Mackenzie

US: Consumer tax credits remain the strongest drivers of EV adoption

Long-term EV growth however hinges upon the stringency of federal emission norms



COMPLIANCE NORMS

EPA Tailpipe Emission Standard	68% EV by 2032
NHTSA Fuel Economy Standard	58 mpg fleet average by 2032
California+ Advanced Clean Cars (ACC II)	100% ZEV by 2035

SUBSIDIES

Clean Vehicle Credit (30D and 45W)	US$7,500-US$40,000 tax credit for EVs
Domestic Manufacturing Conversion Grants	US$2 billion in grants to retrofit auto plants to EV
Advanced Manufacturing Production Credit (45X)	US$45/kWh for domestic battery production

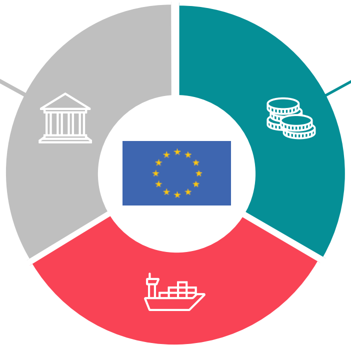
TRADE RELATIONS

Section 301 tariffs on Chinese products	102.5% tariff on EVs, 27.5% tariff on batteries
Critical Minerals Agreements (CMA)	Free trade agreement specifically pertaining to critical minerals – Japan, *EU (potential)*
Minerals Security Partnership (MSP)	Collaborated investment in critical mineral projects

Source: Wood Mackenzie

Europe: Tax exemptions and corporate incentives continue to drive EV adoption

Electrification is being aided by lower range requirements and high market acceptance of Chinese investments



COMPLIANCE NORMS

Tailpipe emission standard	100% ZEV by 2035
Corporate fleet ZEV mandate (potential)	*100% ZEV purchase targets by 2030*
Euro 7 battery durability requirements	72% battery durability up to 8 years

SUBSIDIES

Point-of-sale subsidy	Subsidies in France, Italy
Road/registration tax exemptions	Available in France, Germany, Italy, Spain
Aid for domestic manufacturing	State aid available for EV, battery plants

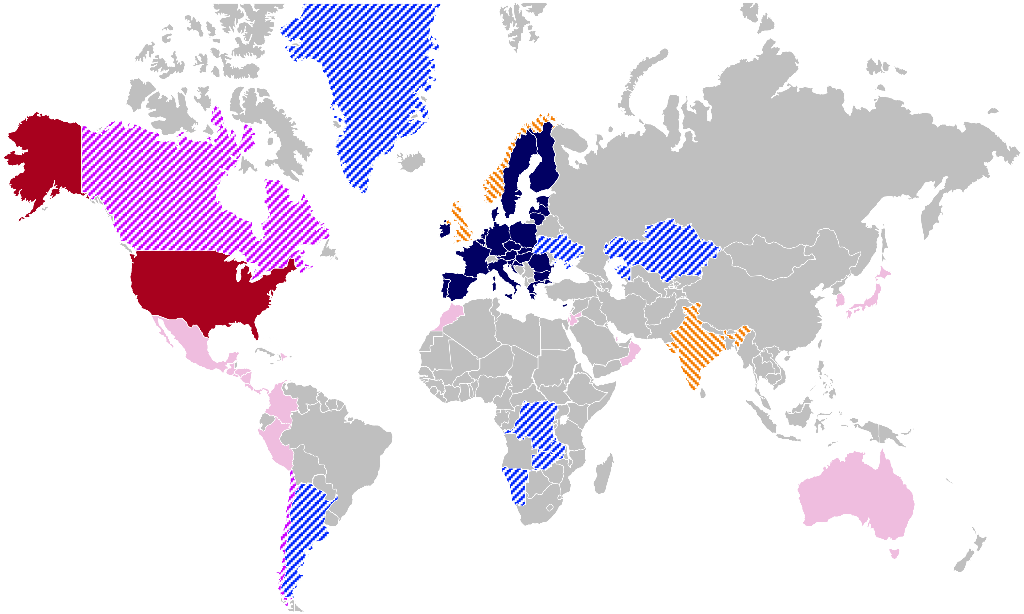
TRADE RELATIONS

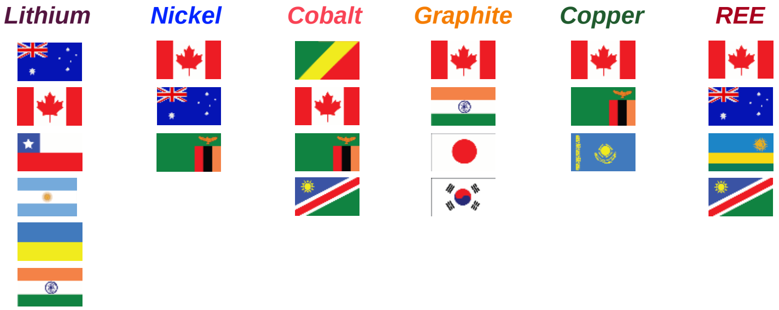
Counter-vailing duties on Chinese EVs (potential)	*Expected ~25-30% additional duties on Chinese EV imports*
EU-MERCOSUR FTA (potential)	*Reduced restrictions on imports of lithium from Argentina, Bolivia, nickel from Brazil*
MoUs with Chile, DRC, Zambia, Argentina, Canada	Eased access to battery minerals for EU companies, eased investment rules

Source: Wood Mackenzie

Both US and EU are attempting to diversify their EV supply chains for future resiliency

Trade agreements and “strategic partnerships” are emerging as key tools for reducing reliance on China





- United States
- Countries the United States has an FTA or CMA with
- European Union
- Countries the EU has critical mineral-focused strategic partnerships with
- Countries that have partnerships with EU and free trade deals with the US
- Other countries part of the Minerals Security Partnership

Source: Wood Mackenzie, FTA: Free Trade Agreement, CMA: Critical Minerals Agreement, REE: Rare Earth Elements, Graphite includes both natural and synthetic versions

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Ramifications for automakers

Egor Prokhodtsev

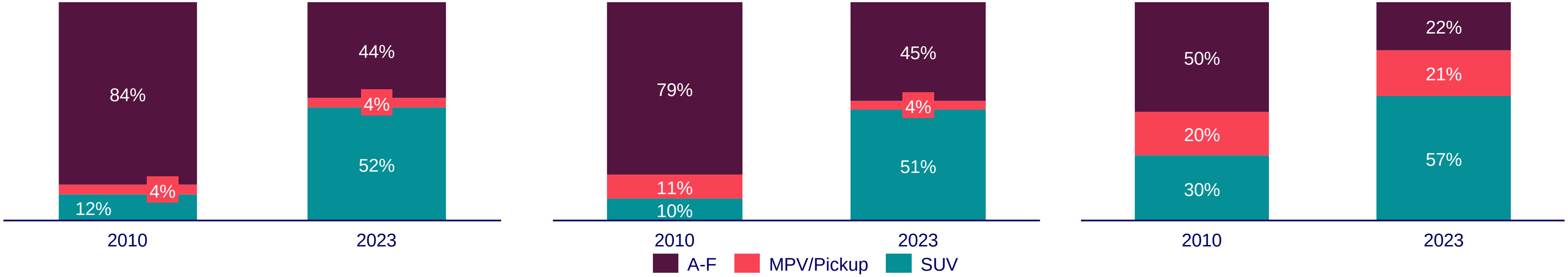
Since 2010 the automotive market has strongly shifted to SUV vehicle segments

Long-standing regional leaders face the challenge of required emission reduction and electrification rates

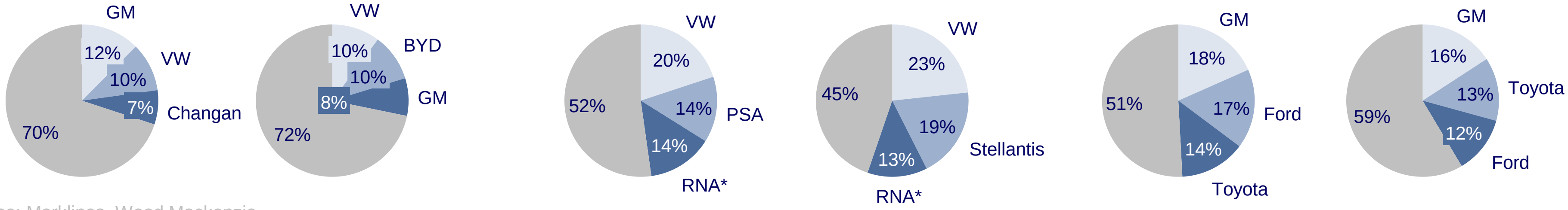
Vehicle sales by segment, China

Vehicle sales by segment, Europe

Vehicle sales by segment, N.America



Vehicle sales by automaker group



Source: Marklines, Wood Mackenzie

*Renault Nissan Alliance

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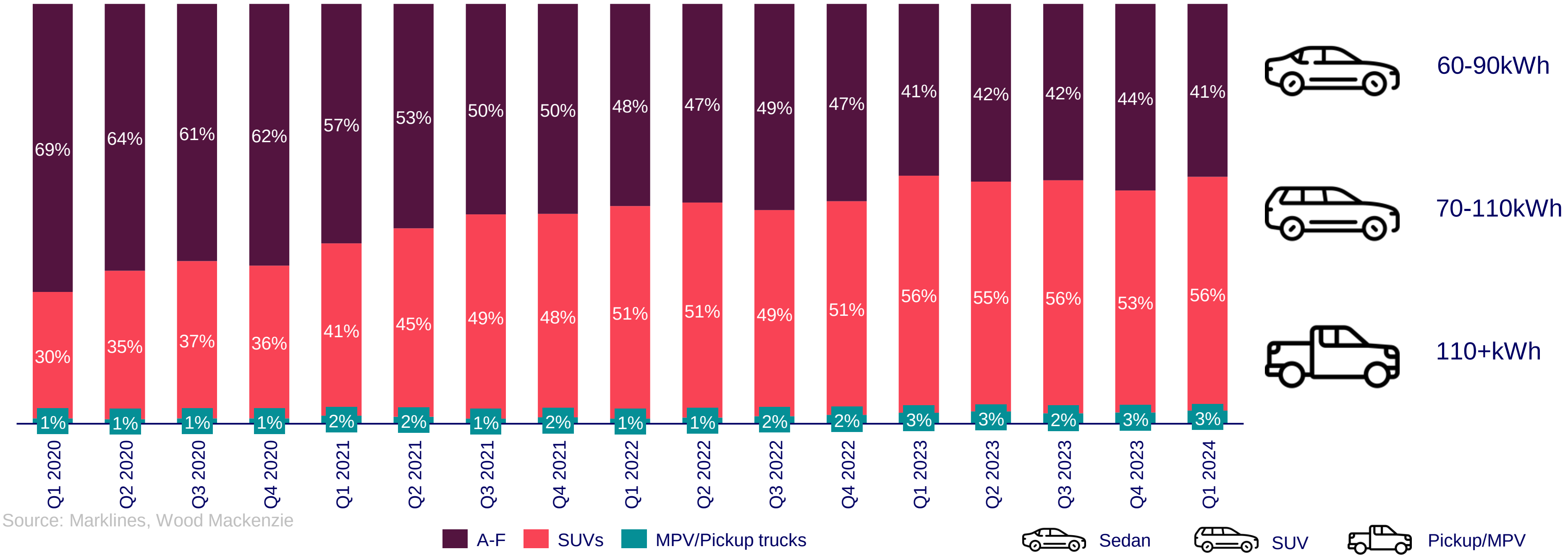
Plug-in EV segment share is trending with the overall automotive market

While the battery pack sizes for SUVs and A-F segments overlap, SUVs are generally less energy efficient

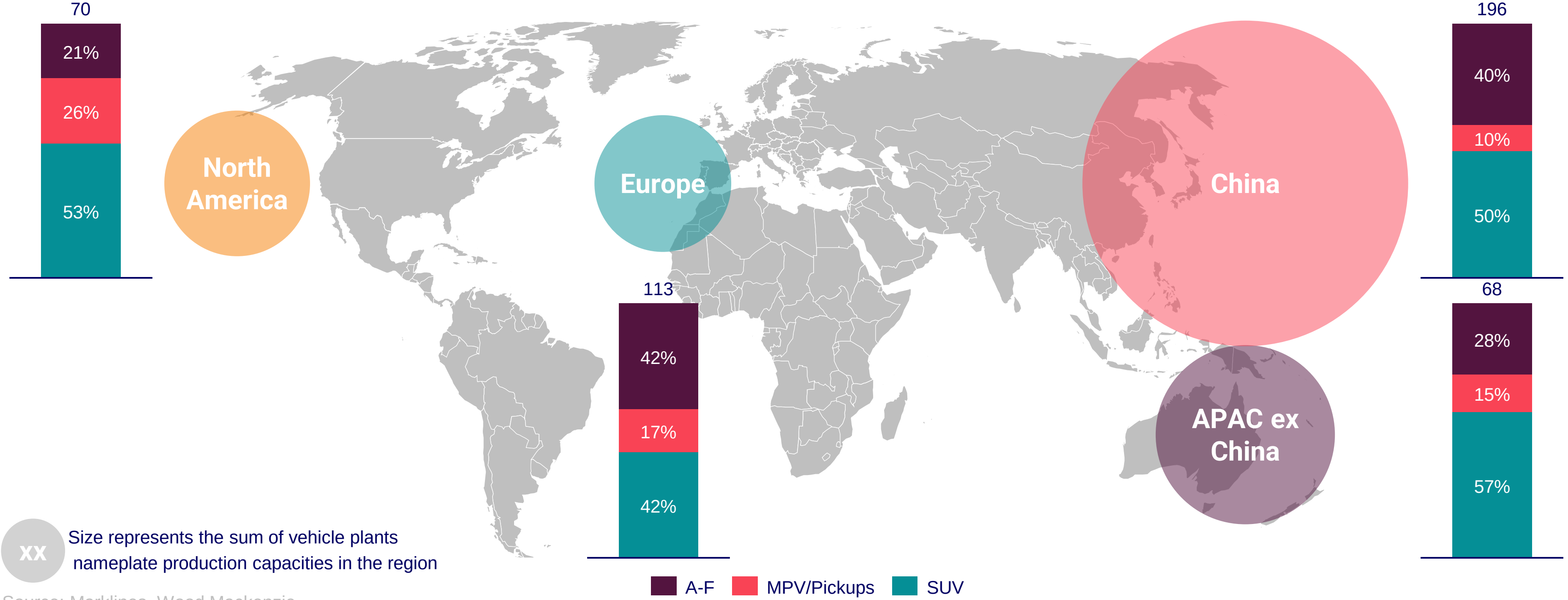
Quarterly plug-in EV sales by segment share



Source: Marklines, Wood Mackenzie

Asia-Pacific will remain a leader vehicle producer, both in capacity and model rollout

We don’t expect strong shifts in market structure by 2030, with SUVs remaining the most popular segment



Source: Marklines, Wood Mackenzie

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Repercussions for incumbent suppliers

Max Reid

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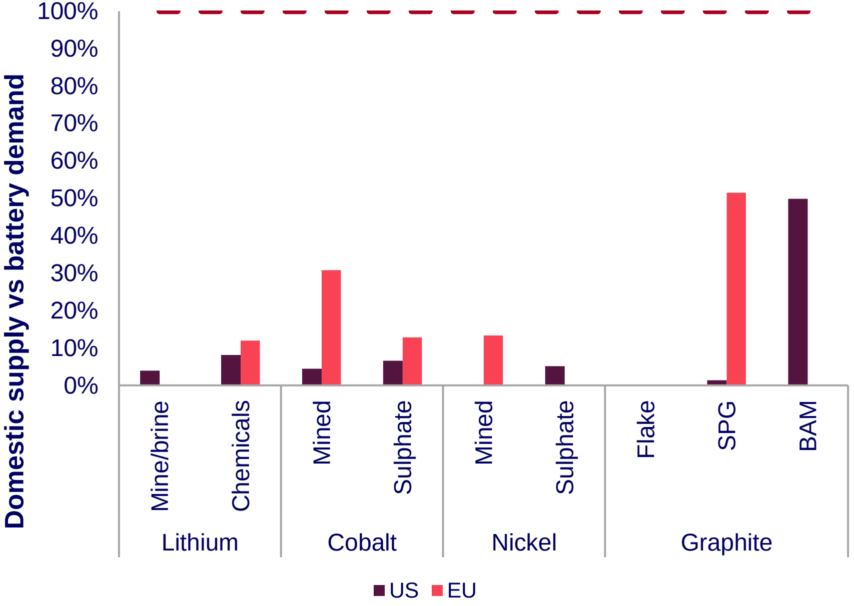
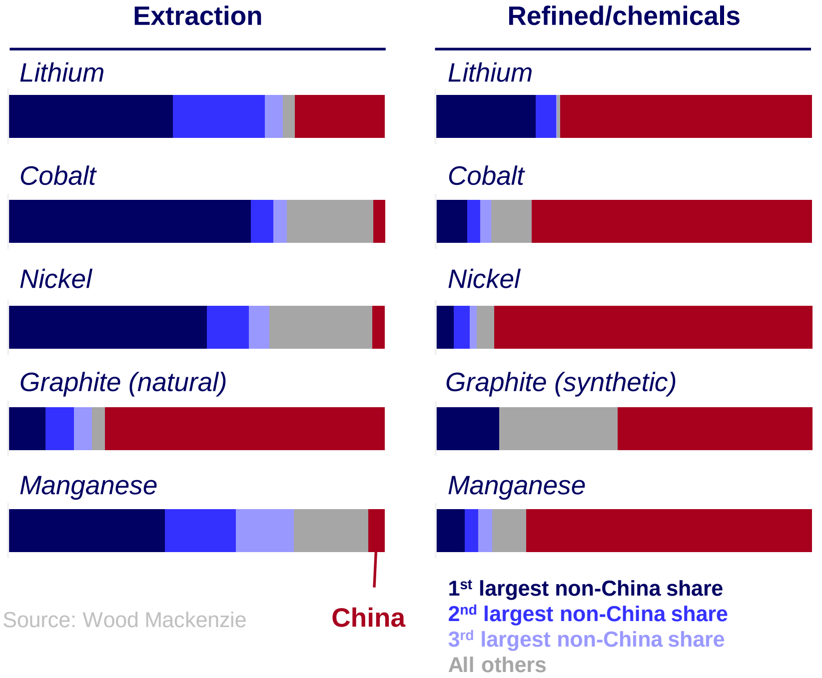
The EU and US will heavily rely on allies to make up for its short-fall in battery raw material supply

The EU and US lack domestic battery raw material resources extraction and processing capacity



Source: Wood Mackenzie

China has a high concentration of battery supply chain capacity



Source: Wood Mackenzie

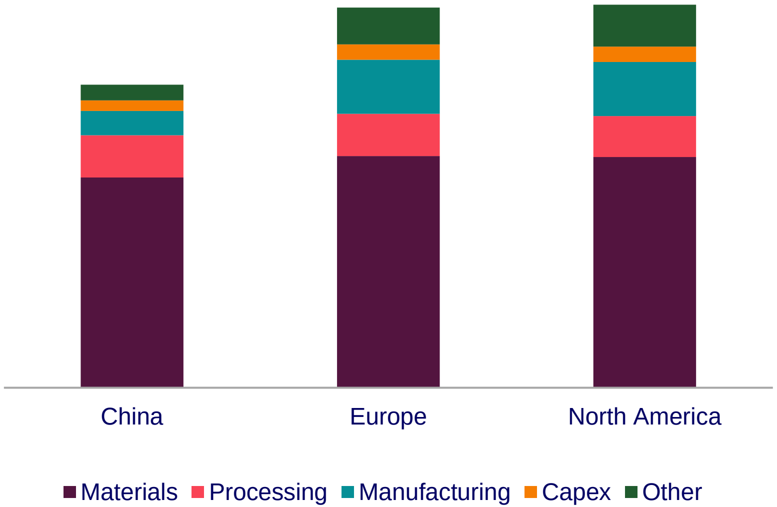
How robust are selective battery supply chains?

Sakshi Mehra

Wood Mackenzie

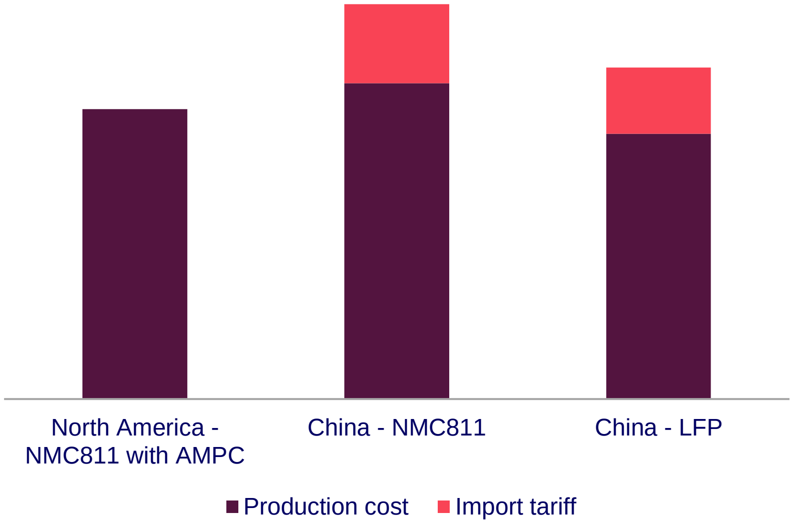
Higher average manufacturing costs hinder the EU and US being competitive in cell production

EV cell costs by region



Source: Wood Mackenzie

Chinese vs domestic cell costs in North America with AMPC and import tariffs



Source: Wood Mackenzie

Feasible mechanisms to decarbonise

Alasia Zhang

Wood Mackenzie

Non-battery powertrains are also transitional solutions to decarbonised road transport

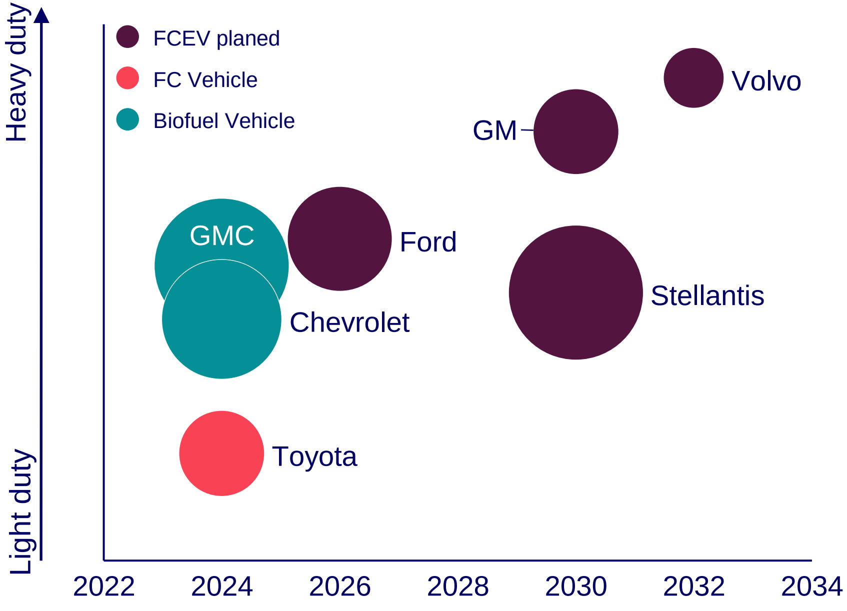
However, EV alternatives are difficult to commercialise by 2035

Comparison chart of different powertrain types

Technology capabilities				
	xEV	FCEV	Biodiesel vehicle	Flexible Fuel Vehicles
Cost Average US$/vehicle	●●●	●	●●	●●●
Energy Gasoline Gallon Equivalent	●	●●●	●●●	●●
Range km	●●	●●●	●●●	●●●
Carbon offset Potential	●●●	●●●	●●	●●
Accessibility of infrastructure	●●	●	●	●●
Maturity of manufacture	●●●	●	●●●	●●
Policy Support	●●●	●●	●●	●●

Source: Wood Mackenzie

OEMs investing in FC and Bio fuel vehicles



Source: Wood Mackenzie. Size represents model roll-out numbers.

Q&A

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