

Business Breakthrough Barometer 2024

Road



World Business
Council
for Sustainable
Development

BAIN & COMPANY 

29 October, 2024

Key messages

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- **Aside from the power sector, businesses are most positive about the road sector transition**
 - 19% thought the sector was “mostly” on track” for a Paris aligned transition, 28% of businesses though had no confidence that the Breakthrough Agenda goal for transport would be met
- **Businesses are navigating an accelerating transition in the road transport sector**
 - In 2023, global EV adoption continued to outpace most market expectations, with ZEV sales reaching 12% of sales globally (18% incl. PHEV) up 30% on 2022
 - If growth rates continue at the last three-year average, over 50% of LDV sales could be EV by 2033, but if rates of growth continue to increase as they have, it could be in the next few years
- **Road Transport businesses were most likely to see company action as in step with, if not more ambitious, than government policy**
 - In US, sales have been driven by IRA subsidies and hybrid penetration.
 - OEMs are reacting by launching new models (e.g., Toyota offering Camry as hybrid in 2024).
 - China is pushing forward, offering models across segments, where businesses see China as a clear example of government policy support matching company action, driving rapid EV adoption and global competition
- **Most leading OEMs remain fully committed to an electrified world**
 - Many major OEMs have set much more ambitious targets for European operation in response to ambitious ICE bans, and around half of the executives surveyed view their company as on track to meet company targets
 - Almost all observed an increase in net zero aligned investment over the last three year, with the majority of leading auto manufacturing expect to be selling no more than 50% ICE vehicles between 2030 and 2035
- **In Europe, the US, and China ZEV sales continue to increase, but there’s some scepticism on the future pace of growth**
 - Businesses point to a moderation of government commitments: during the past 12 months, EU members states (e.g., Sweden Germany) have dialed back on previously set targets of 80% EVs by 2030
 - There are also indications that BEV sales in Europe while still growing are slowing as subsidies have been rolled back across several major states, and in the US, the market is growing, but slowing, as market moves from early adopters to mainstream
- **Some OEMs in the EU and US have scaled back EV targets in the last year**
 - Industry leaders note that lower than anticipated market growth is causing sector to double check plans, where Businesses cite inadequate charging infrastructure as a critical barrier to broader consumer adoption
- **Outside Europe and the US, business also point to growing momentum - Swing States will determine the pace of the transition**
 - Emerging auto markets with low EV penetration but rapid adoption will shape the global transition, while bold policies in Vietnam, Malaysia, Indonesia are fueling industry investment
 - Traditional OEMs, however, are wary of venturing beyond core markets due to policy risks and fierce competition from low-cost Chinese EV makers
- **Businesses note leading countries defining ambitious targets and offering incentives for EV adoption are spurring investments**

Key messages

2/2

- **On freight EV businesses cite need for coordinated infrastructure investment to maintain and accelerate the pace of growth**
 - Businesses report slower freight EV adoption due to high upfront costs and uncertain market demand, while the industry sees inadequate charging infrastructure as the key barrier to scaling freight EVs
 - Businesses note that Europe, the US, and China lead in freight EVs, while Latin America and Africa lag due to limited incentives and infrastructure
- **Businesses are still navigating considerable headwinds - top of that list is charging infrastructure**
 - OEMs continue to be frustrated by pace of charging infrastructure buildout
 - Although in absolute term growth rates are strong, infrastructure investments are not keeping pace with adoption rates
 - Business point to land permitting challenges, unclear ROI and lack of clarity on financing options, and describe public and depot charging as the key bottleneck for commercial fleets
- **Sector leaders no longer view range anxiety as a fundamental barrier**
 - According to automakers, range anxiety is no longer driven by the vehicles themselves, but purely from the lack of infrastructure
 - Companies however agree to considerable misconceptions on battery reliability among consumers holding back adoption
 - Automakers emphasized that expanding fast-charging networks is crucial to overcoming range anxiety, as infrastructure limitations continue to deter adoption
- **Business report a significant increase in EV models available and progress on reaching price parity on premium vehicles**
 - TCO gap largely closed at the premium end of the market, but in the US/EU there is still a significant gap to purchase price parity in the mass market segment.
 - In 2023, business introduced 15% more electric car models – but disproportionately aimed at the premium market.
 - In the US more than 75% of EV mix is in premium market, putting the transition out of reach for many households
- **This however is not the case in China, where explosion of low-cost Chinese EVs is set to have a profound effect on the global industry 25 % of EVs sold in Europe made in China (increase of 15% in 2023)**
 - 25 % of EVs sold in Europe made in China (increase of 15% in 2023)
 - China has made massive infrastructure investments in emerging EV markets (e.g., \$4.5B in Vietnam 2023 and a \$38.5B package incl. EV infrastructure in Malaysia)
 - Many businesses concerned about potential disruptions due to competing trade and industrial policies, while the U.S. and Canada have imposed tariffs on Chinese EVs to protect domestic industries
 - Businesses agree that influx of mass-market Chinese EVs, bolstered by significant infrastructure investments in emerging markets, presents a major opportunity to accelerate EV adoption in regions where affordability and infrastructure are key barriers to transition
- **EV players cite higher costs, range anxiety, grid buildout and charging infrastructure as key barriers holding back the transition**
- **The Road sector sees key policy focus for passenger vehicles as addressing supply chains, ensuring harmonized standards, and increasing fuel & carbon pricing on ICE**
- **Businesses all agree on key policy interventions by governments within infrastructure upgrades, supply chain resilience, and engine mandates**

Aside from the power sector, businesses are the most positive about the road sector transition

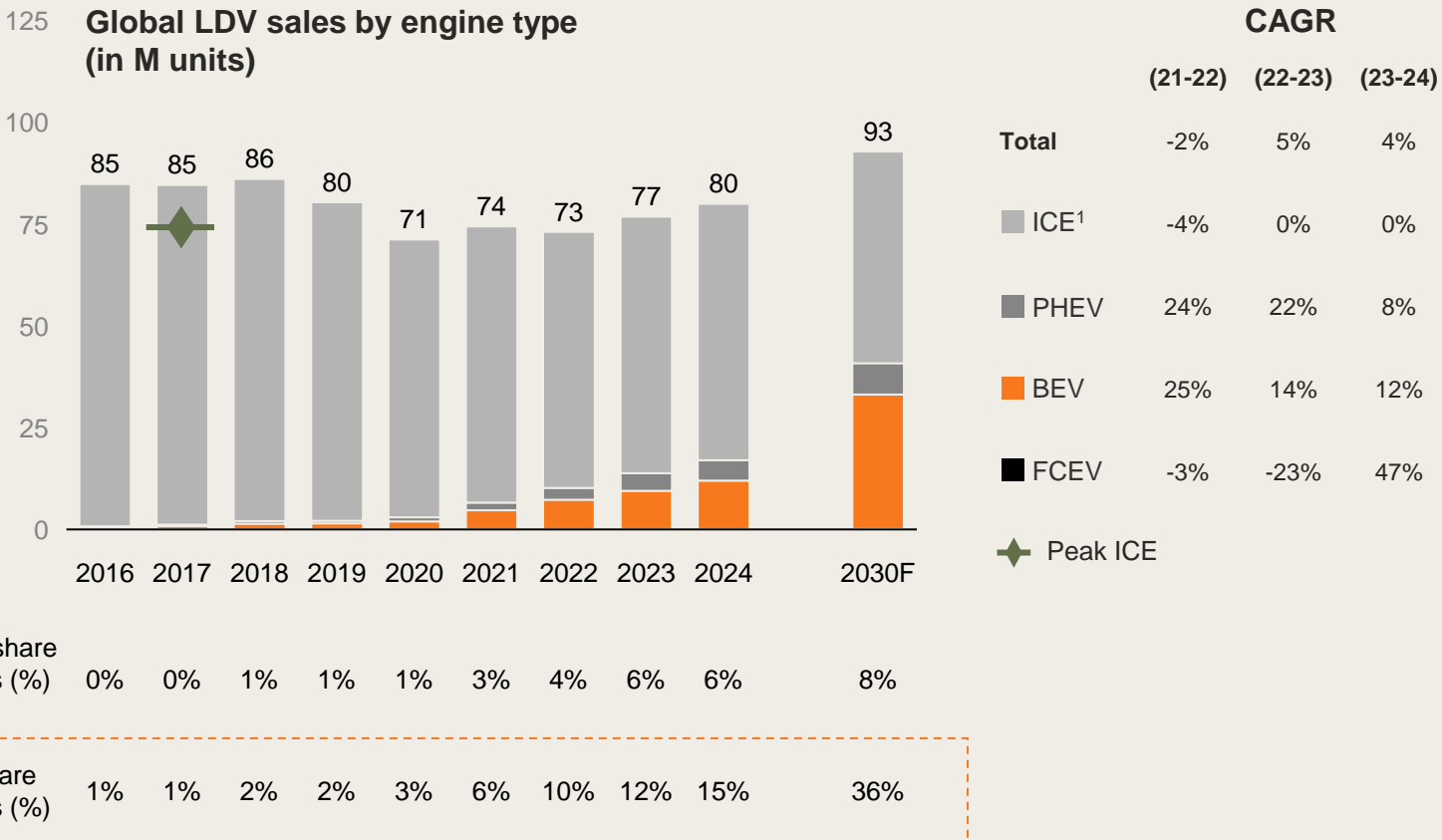


19% thought the sector was “mostly” on track” for a Paris aligned transition

However, 28% of businesses though had no confidence that the Breakthrough Agenda goal for transport would be met

Source: Business Breakthrough Barometer Sector Survey (N=250)

Businesses are navigating an accelerating transition in the road transport sector



- In 2023, global EV adoption continued to outpace most market expectations, with **ZEV sales reaching 12% of sales globally** (18% incl. PHEV) up 30% on 2022
- If growth rates continue at average pace, **over 50% of LDV sales** could be EV by 2033
- But if **rates of growth continue to increase as they have**, it could be in the next few years

Note: 1) Incl. MHEV & HEV; 2) EV share = BEV + PHEV + FCEV; LDV = light duty vehicle; PHEV = plug-in hybrid electric vehicle, ZEV: zero emission vehicle
 Source: IHS Markit/ S&P Mobility (Jan 2024); Bain EV Market Model

Road Transport businesses were most likely to see company action as in step with, if not more ambitious, than government policy

94%

94% of executives feel their organizations are as ambitious as governments, if not more

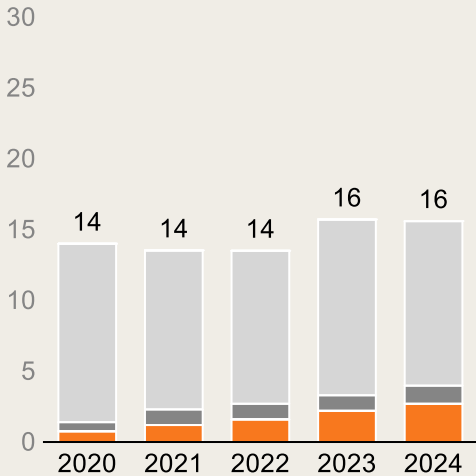
- In US, sales have been driven by **IRA subsidies and hybrid penetration**
- OEMs are reacting by **launching new models** (e.g., Toyota offering Camry as hybrid in 2024)
- Businesses see **China as a clear example of government policy support matching company action**, driving rapid EV adoption and global competition
- China is pushing forward, **offering models across segments**

*"We expect to be ahead of the government's target. The government's target is 30% EV penetration by 2030, but **we expect our portfolio to reach that much sooner.**"*


CSO, AUTOMOTIVE MANUFACTURER

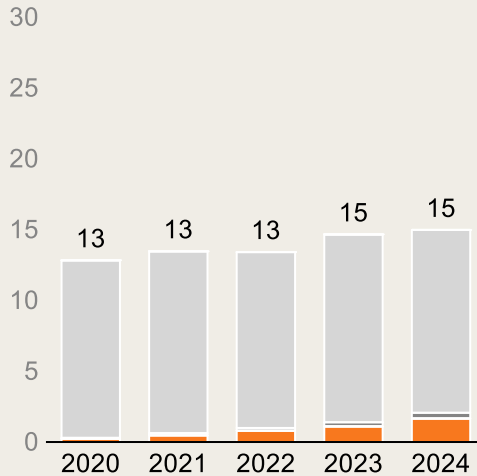
In Europe, the US, and China ZEV sales continue to increase, but there's some scepticism on the future pace of growth

 EUROPE 1
LDV sales by engine type
(2020-24, in M units)




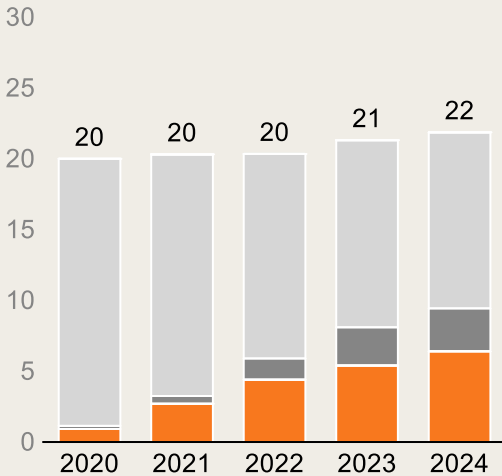
PHEV share	0%	8%	8%	7%	8%
ZEV share	0%	9%	12%	14%	17%

 USA
LDV sales by engine type
(2020-24, in M units)



PHEV share	0%	1%	1%	2%	3%
ZEV share	2%	4%	6%	8%	11%

 CHINA
LDV sales by engine type
(2020-24, in M units)



PHEV share	1%	3%	7%	13%	14%
ZEV share	5%	13%	22%	25%	29%

- Businesses point to a moderation of government commitments: during the past 12 months, EU members states (e.g., Sweden Germany) have dialled back on previously set targets of 80% EVs by 2030
- There are also indications that BEV sales in Europe while still growing are slowing as subsidies have been rolled back across several major states
- In the US, the market is growing, but slowing, as EV moves from early adopters to mainstream

Note: LDV = Light duty vehicle; 1) Europe includes European Union (EU) countries and 4 additional countries United Kingdom, Iceland, Norway and Switzerland
Source: IHS Markit/ S&P Mobility (Jan 2024); Bain EV Market Model

Most leading automakers are already planning for a fully electrified world

EV targets	Global	EU	USA	Remarks
		100%	50%	Targets 100% BEV sales in EU and 50% BEV sales in US by 2030
	100%			No specific target set, but aspiration to sell only zero-emission vehicles past 2035
		100%	50%	Ford may sell gas-powered vehicles after 2030 if there's demand, says European head Martin Sander
		80%	80%	VW plans to bring hybrids to North America soon, utilizing VW group's technology
	50%			BMW aims for about 50% global EV sales by the end of the decade, but won't declare an end date for ICEs
	50%			The company initially targeted a 50% target to be achieved by 2025
		50%	70%	Toyota do not believe BEVs are the ultimate solution, therefore focusing on hybrids and hydrogen drivetrains as well
	100%	100%		Hyundai targets that by 2035, all vehicles sold in Europe will be 100% electrified, and by 2040 their global sales
	90 - 100%			Volvo aims to achieve 90 – 100% BEV and PHEV share by 2030
		100%		Renault Nissan Mitsubishi aims for 100% BEV in Europe by 2030 and 100% CO2 neutral worldwide by 2050
	100%			BYD targets to achieve complete sale of zero emission by 2040

- Many major OEMs have set much more ambitious targets for European operation in response to ambitious ICE bans
- Around half of the executives surveyed view their company as on track to meet company targets
- Almost all observed an increase in net zero aligned investment over the last three year, with the majority of leading auto manufacturers expect to be selling no more than 50% ICE vehicles between 2030 and 2035

TARGET SCOPE XX% TARGET YEAR ■ 2025 ■ 2030 ■ 2035 ■ 2040 ■ Not specified

Source: Company sustainability reports, press release

Some OEMs in the EU and US have scaled back EV targets in the last year

**GM Won't Hit 1 Million EV Target in 2025:
'Market Not Developing'**

**Volkswagen Walks Back EV-or-Bust
Strategy That Rankled Rivals**

**Mercedes-Benz delays electrification goal,
beefs up combustion engine line-up**

**Stellantis threatens to kill production in
the UK, saying the country has set sales
targets for electric cars way too high**

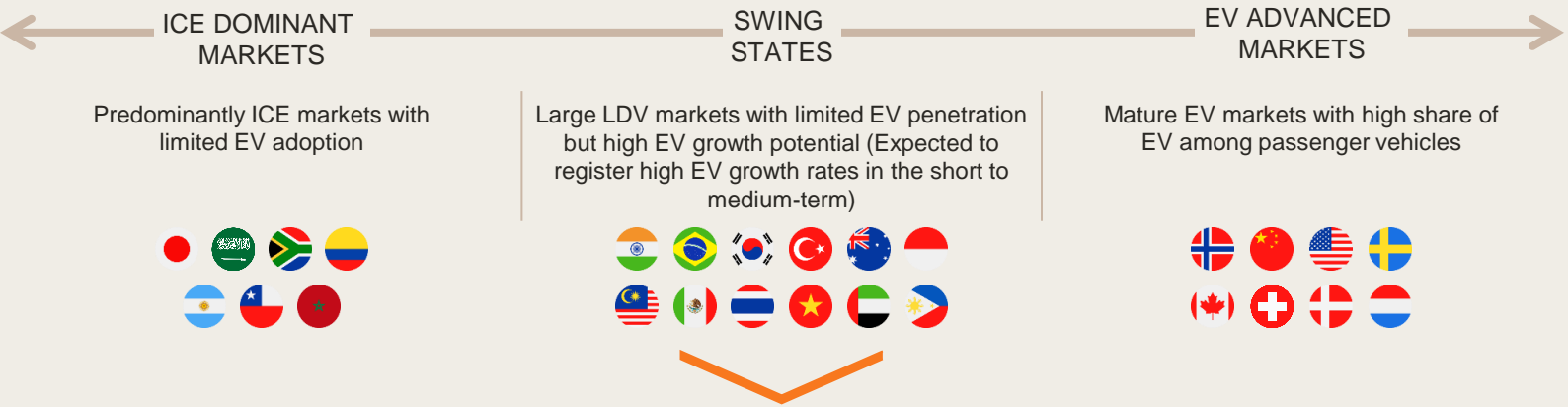
- Industry leaders note that **lower than anticipated market growth** is causing sector to double check plans
- Businesses cite **inadequate charging infrastructure** as a critical barrier to broader consumer adoption

*"It's going to be very tight for some OEMs to meet 2030 targets they set. We are **not seeing the market signals that show sufficient EV adoption by then.**"*

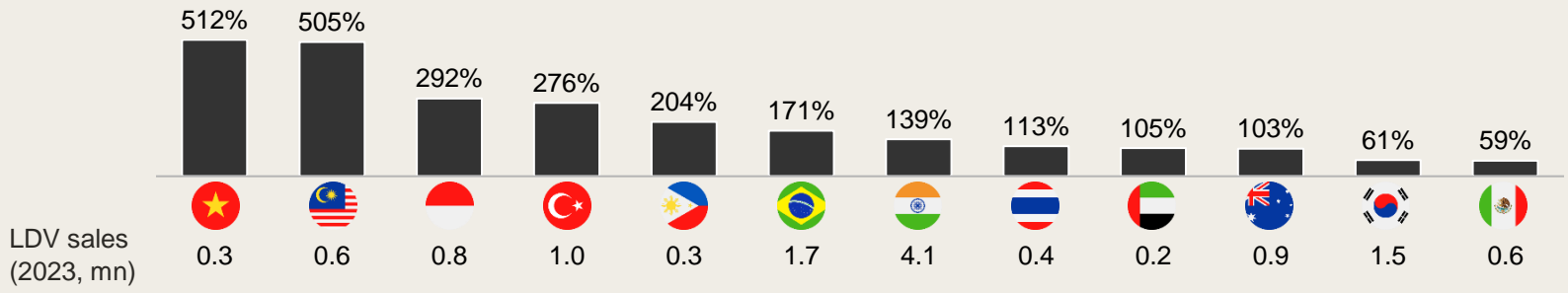
CSO, FREIGHT AUTOMOTIVE
MANUFACTURER

Outside Europe and the US, business also point to growing momentum - Swing States will determine the pace of the transition

Swing states are rapidly gained share of EV



The EV Swing States EV CAGR (% , 2020-2023)



- Emerging auto markets with low EV penetration but rapid adoption will **shape the global transition**
- **Bold policies in Vietnam, Malaysia, Indonesia** are fuelling industry investment
- Traditional OEMs, however, are **wary of venturing beyond core markets** due to policy risks and fierce competition from low-cost Chinese EV makers

Note: EV Swing State criteria: A) EV sales share (2023) <25% of total passenger vehicle sales; B) Total EV sales (2023) >10,000 units; C) EV growth rate (2020-2023) >50% CAGR
 Source: IEA, BMI auto industry research, Bain analysis

Businesses note leading countries are spurring investments by defining ambitious targets and offering incentives for EV adoption



TARGETS

- 2030: 10% EV penetration
- 2040: ICE phaseout
- 2050: 100% EV penetration



- 2030: 20% EV new car sales
- 2040: 50% EV new car sales
- 2050: 80% EV new car sales



- 2025: Low emission vehicles 20% of annual production
- 2030: 2M EV on the roads
- 2035: Low emission vehicles 30% of annual production

INCENTIVES

- Tax breaks and subsidies for buyers
- Reduced excise rate for electric vehicle producers
- EV road tax exemption from 2025 onwards
- Individual income tax relief for EV charging facilities
- VAT reduction on EVs
- Luxury and import tax scrapping on electric vehicles

RECENT OUTCOMES

Omoda & Jaecoo announced partnership with Vietnamese Geleximco for \$800 million EV manufacturing facility

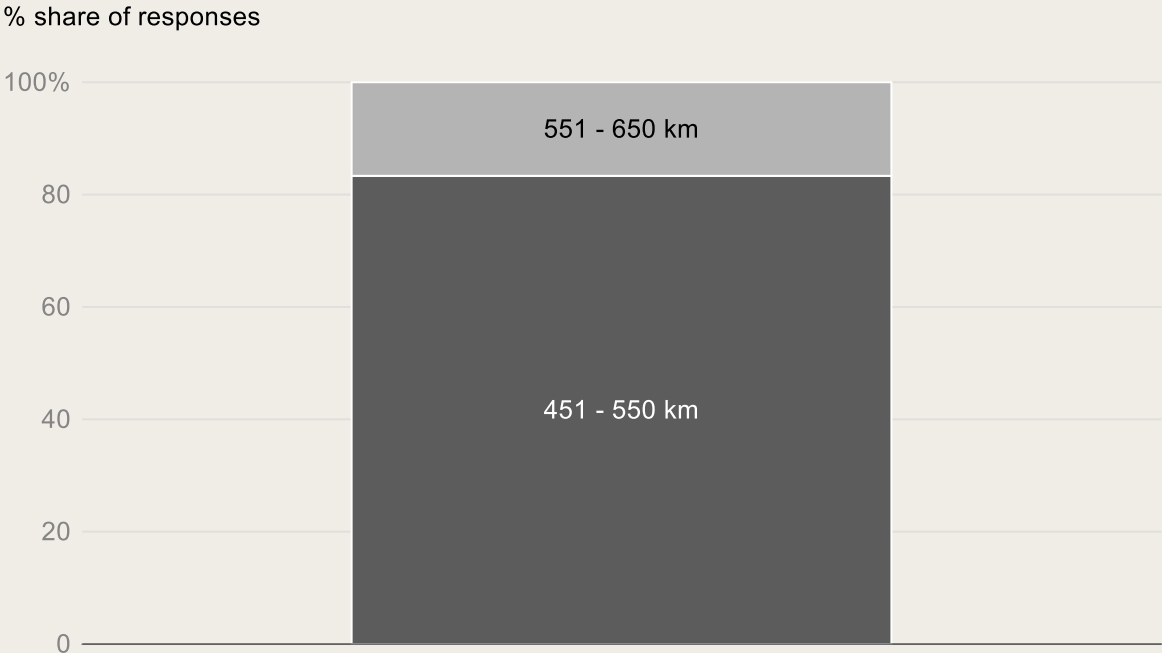
Malaysia's two largest domestic automakers, Proton and Perodua, have announced plans to produce EV locally by 2025

VinFast is opening manufacturing plants in Indonesia, with completion timeline expedited from 2026 to 2025

Source: Government website, press release

The transition faces several barriers, but sector leaders no longer view range anxiety as a fundamental issue

What is the battery range threshold you believe would largely eliminate range anxiety for the majority of drivers?

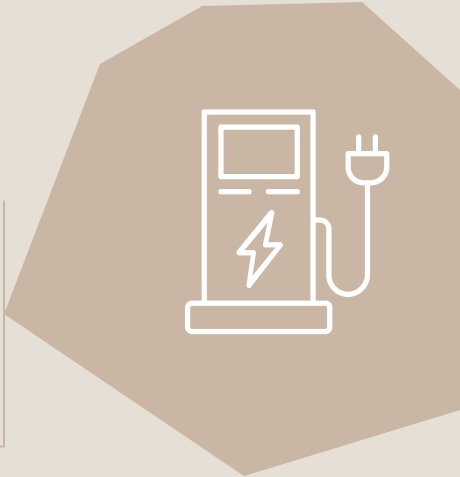


Source: Business Breakthrough Barometer Sector Survey (N=250)

- According to automakers, **range anxiety is no longer driven by the vehicles themselves**, but purely from the lack of infrastructure
- Average range for EVs has reached around **480 km in 2024**
- Companies however agree to **considerable misconceptions on battery reliability** among consumers holding back adoption
- Automakers emphasized that expanding fast-charging networks is crucial to overcoming range anxiety, as **infrastructure limitations continue to deter adoption**

*“Even though our vehicles now offer a 500 km range, customers are still worried about being able to find adequate charging stations. **Range is not the issue** – but rather **infrastructure.**”*

CSO, PASSENGER OEM



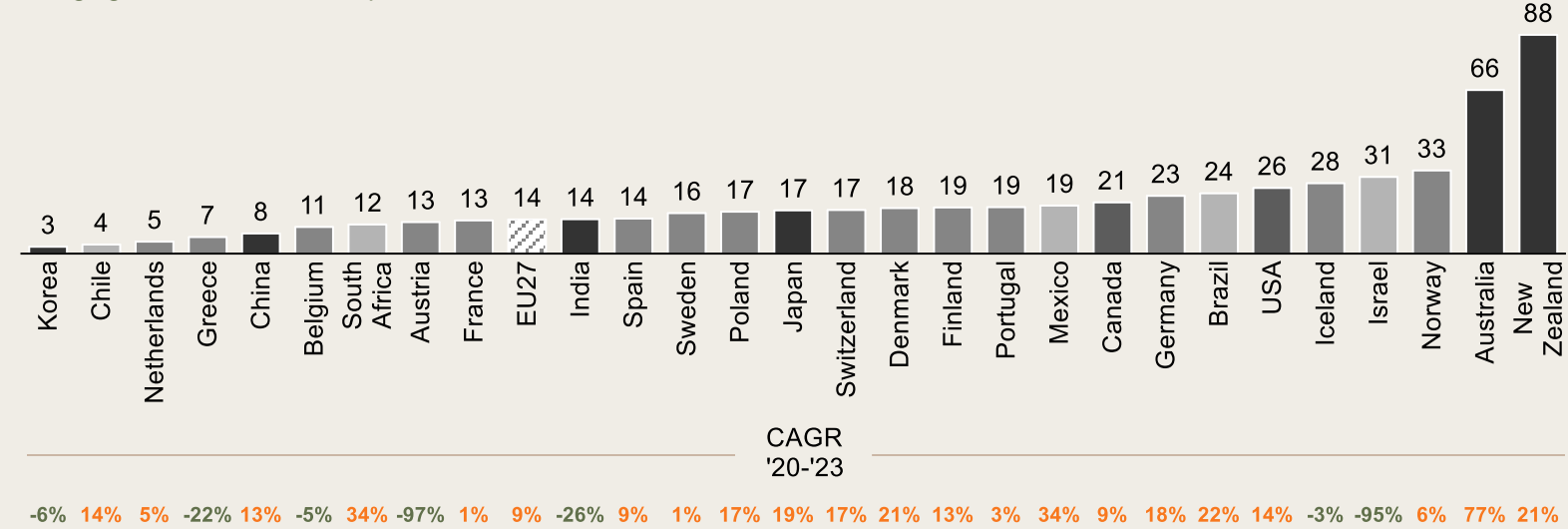
The biggest issue is charging infrastructure – OEMs are frustrated as the build out is not keeping pace with sales growth

Number of EVs per public charger in 2023

■ APAC ■ North America ■ Europe ■ Other

Charging infrastructure develops slower than BEV sales

Charging infrastructure develops faster than BEV sales




Increasing the share of public chargers per EV represents significant factor in driving transport electrification, calling for unified action from public and private stakeholders

- OEMS continue to be frustrated by **pace of charging infrastructure buildout**
- Although in absolute terms growth rates are strong, **infrastructure investments are not keeping pace with adoption rates**
- Business point to **land permitting challenges, unclear ROI and lack of clarity** on financing options
- Businesses describe **public and depot charging as the key bottlenecks** for commercial fleets

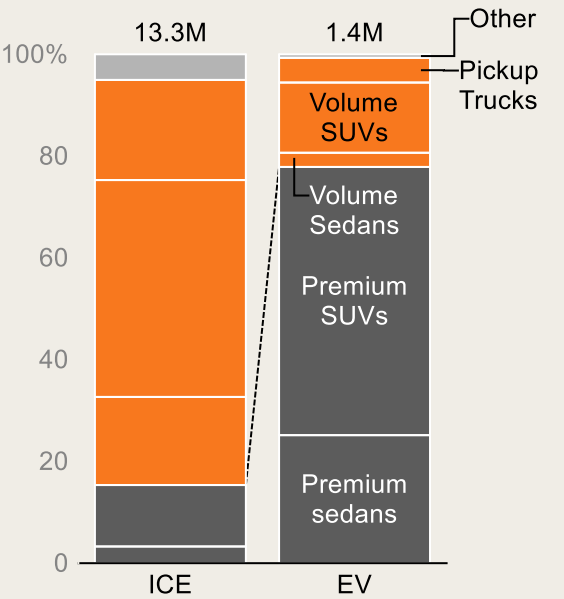
Note: LDV = Light-duty vehicle; Public charging points include both slow and fast chargers | Source: IEA, Bain analysis




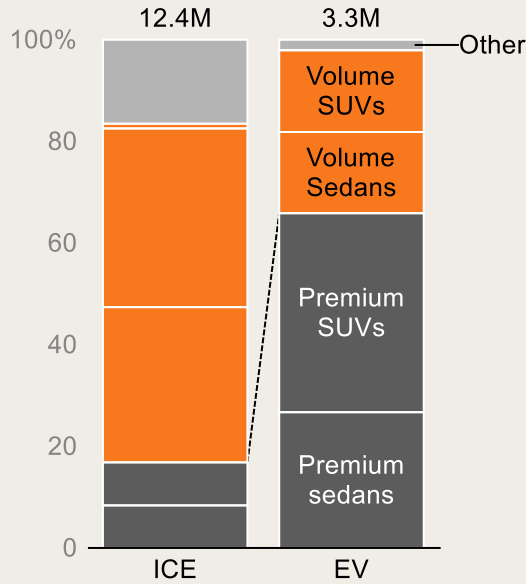
Business report a significant increase in EV models available and progress on reaching price parity on premium vehicles

 **USA**
2023E LDV unit sales

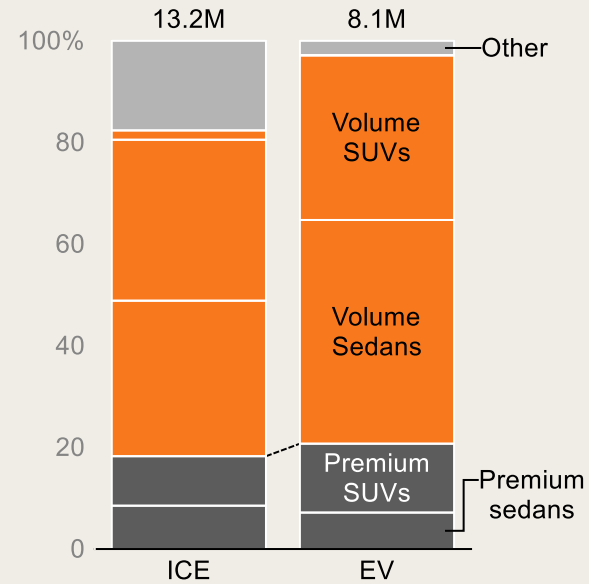
■ Luxury / Premium classes ■ Volume classes ■ Other



 **EUROPE**
2023E LDV unit sales



 **CHINA**
2023E LDV unit sales

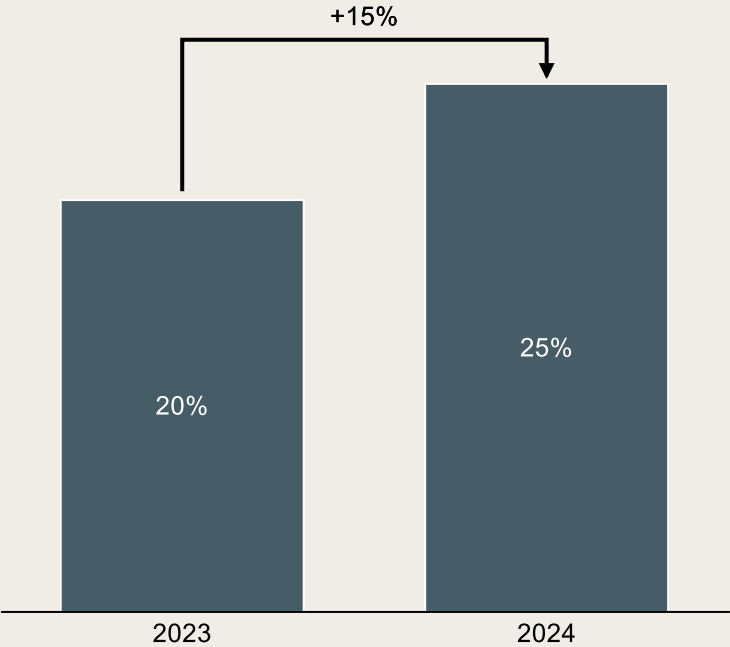


- TCO gap largely closed at the premium end of the market, but in the US/EU there is still a significant gap to purchase price parity in the mass market segment
- In 2023, the sector introduced 15% more electric car models – but disproportionately aimed at the premium market
- In the US more that 75% of EV mix is in premium market, putting the transition out of reach for many households

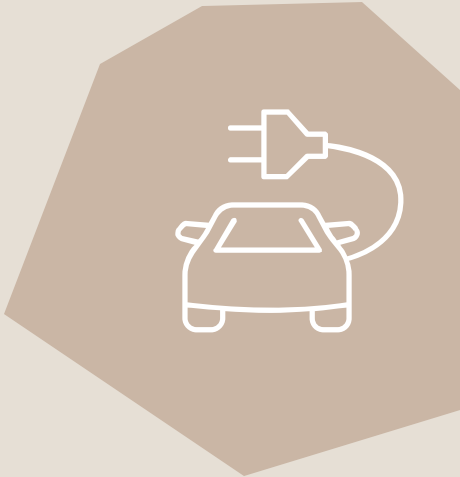
Note: Premium/luxury cutoff was \$35K for SUVs and \$30K for sedans. Data captures actual sales from Q1'23-Q3'23 and includes forecasted sales for Q4'23; "Other" includes vans and multi-purpose vehicles (MPVs)
Source: Bain analysis; Lit search; Company filings; JP Morgan Analyst report; HSBC; S&P Mobility 2023, Bank of America, IEA

In China, there is an explosion of low-cost EVs - which is set to have a profound effect on the global industry

Share of EV sales produced in China, %



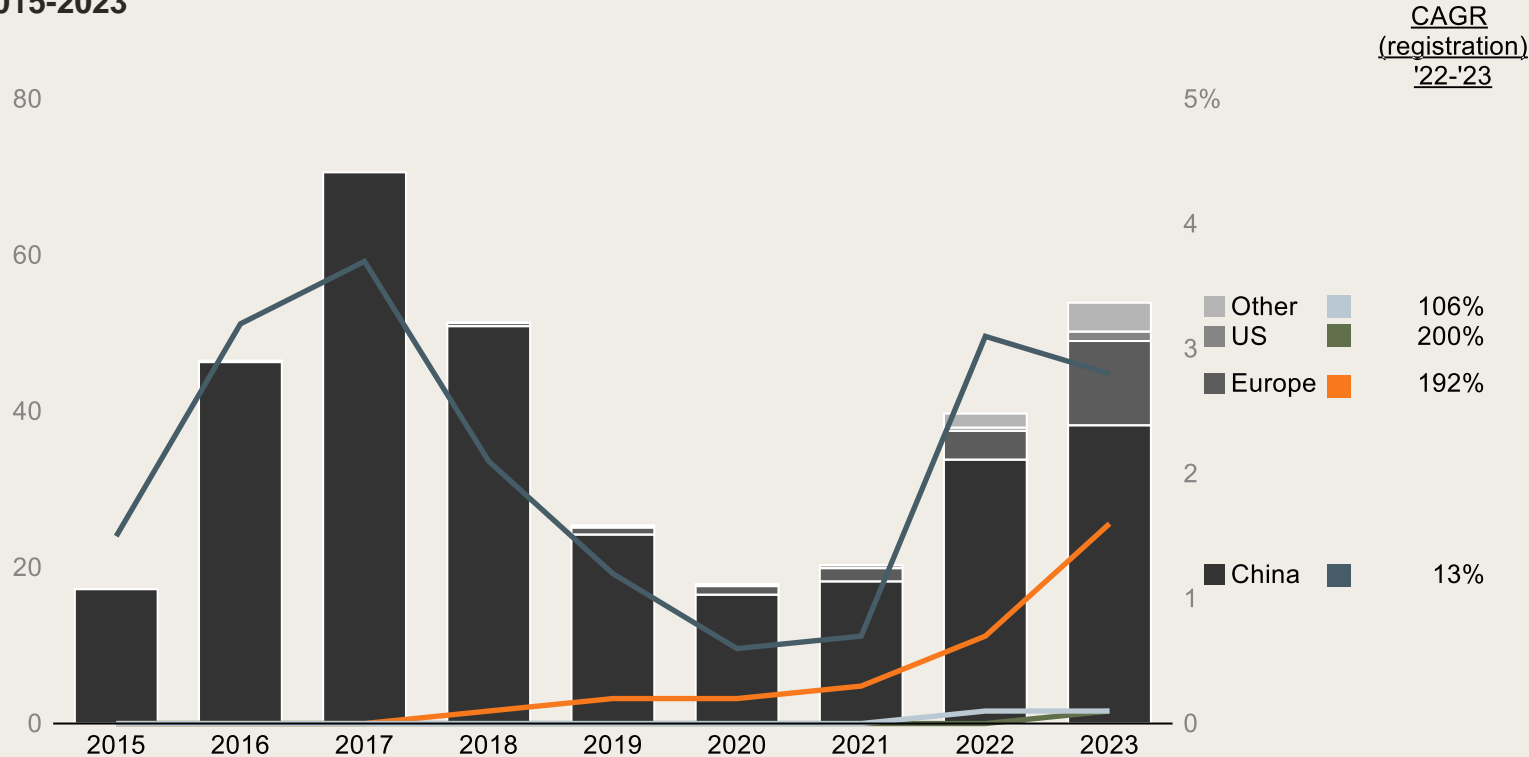
- 25 % of EVs sold in Europe made in China (increase of 15% in 2023)
- China has made massive infrastructure investments in emerging EV markets (e.g., \$4.5B in Vietnam 2023 and a \$38.5B package incl. EV infrastructure in Malaysia)
- Many businesses concerned about potential disruptions due to competing trade and industrial policies, while the U.S. and Canada have imposed tariffs on Chinese EVs to protect domestic industries
- Despite some trepidation, businesses agree that influx of mass-market Chinese EVs, bolstered by significant infrastructure investments in emerging markets, presents a major opportunity to accelerate EV adoption in regions where affordability and infrastructure are key barriers to transition



Source: T&E, European Commission, Lit. search, Bain analysis

On freight EV businesses cite need for coordinated infrastructure investment to maintain and accelerate the pace of growth

Electric truck registrations (thousands) and sales share (%) by region, 2015-2023



- Businesses report **slower freight EV adoption** due to high upfront costs and uncertain market demand
- The industry sees **inadequate charging infrastructure** as the key barrier to scaling freight EVs
- Businesses note that Europe, the US, and China lead in freight EVs, while Latin America and Africa lag due to **limited incentives and infrastructure**

*“The outlook is grim. We’re seeing the **order intake coming down significantly across the board**. Customers are assessing if they can run their old trucks for longer, making new investments in EV technology difficult in this environment.”*

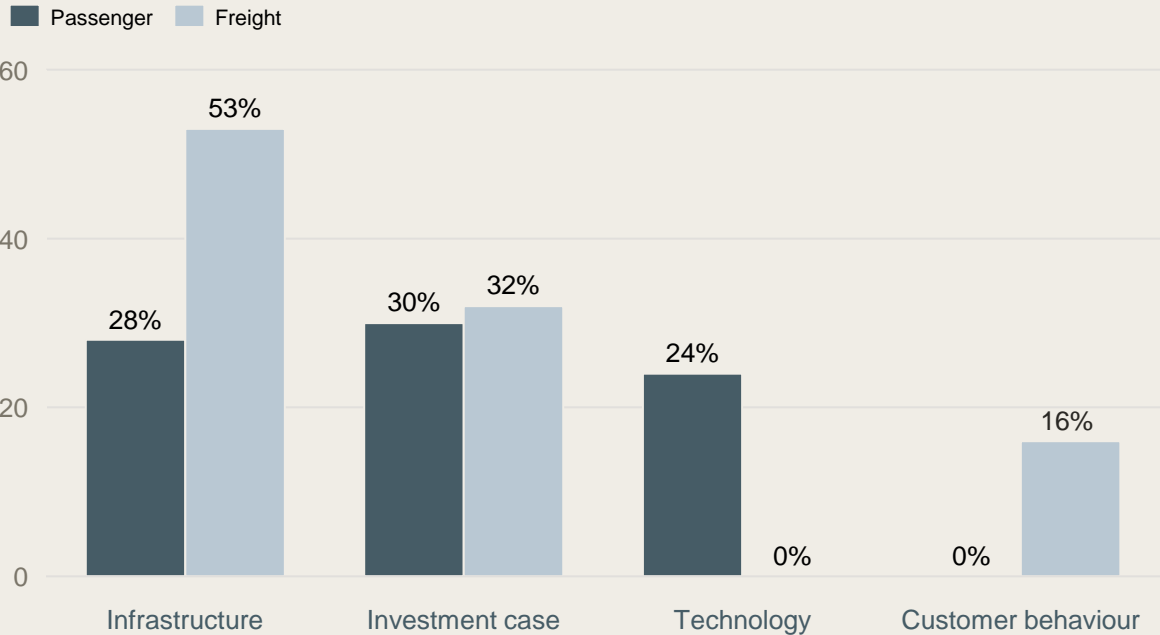
CSO, FREIGHT AUTOMOTIVE MANUFACTURER

Source: IEA, Lit. search

EV players cite higher costs, range anxiety, grid buildout and charging infrastructure as key barriers holding back the transition

Which of the following do you view as the road transport sector's largest barriers towards accelerating and investing in the development and deployment of EV technology?
Please select the top 3 most impactful barriers

Share of survey responding barrier in the top 3 (%)



Source: Business Breakthrough Barometer survey 2024



INFRASTRUCTURE

- Passenger: Businesses cite inadequate charging infrastructure, particularly outside urban centers, with lack of reliable stations fueling persistent range anxiety
- Freight: Freight companies face a shortage of high-capacity charging stations on key logistics routes, delaying large-scale fleet electrification



INVESTMENT CASE

- Passenger: Automakers report that high upfront EV costs continue to hinder widespread adoption, despite available subsidies
- Freight: Businesses stress that in leading markets like the EU there are limited incentives for freight customers and operators to adopt BEV, which combined with uncertainty around resale values is slowing deployment



TECHNOLOGY

- For both passenger and freight businesses see opportunities to accelerate the transition through charging speed and battery longevity, but do not see them as fundamental barriers



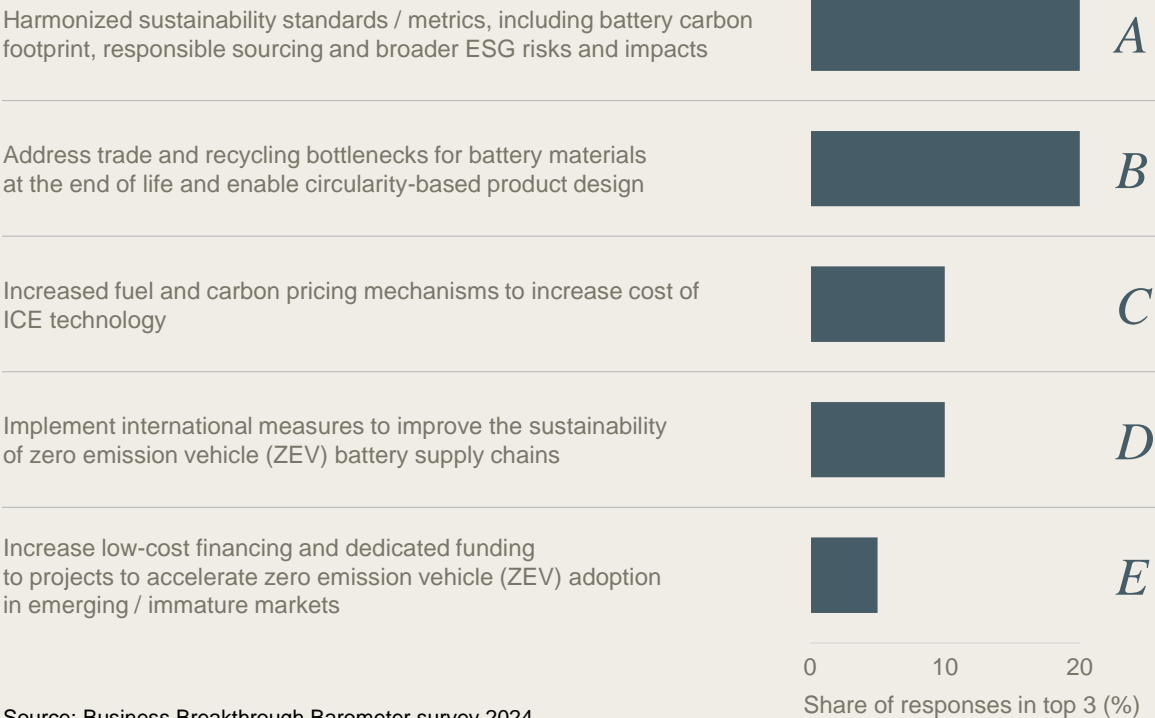
CUSTOMER BEHAVIOUR

- Freight: Some consumer hesitancy remains, driven by misconceptions about EV performance and lack of familiarity with charging infrastructure

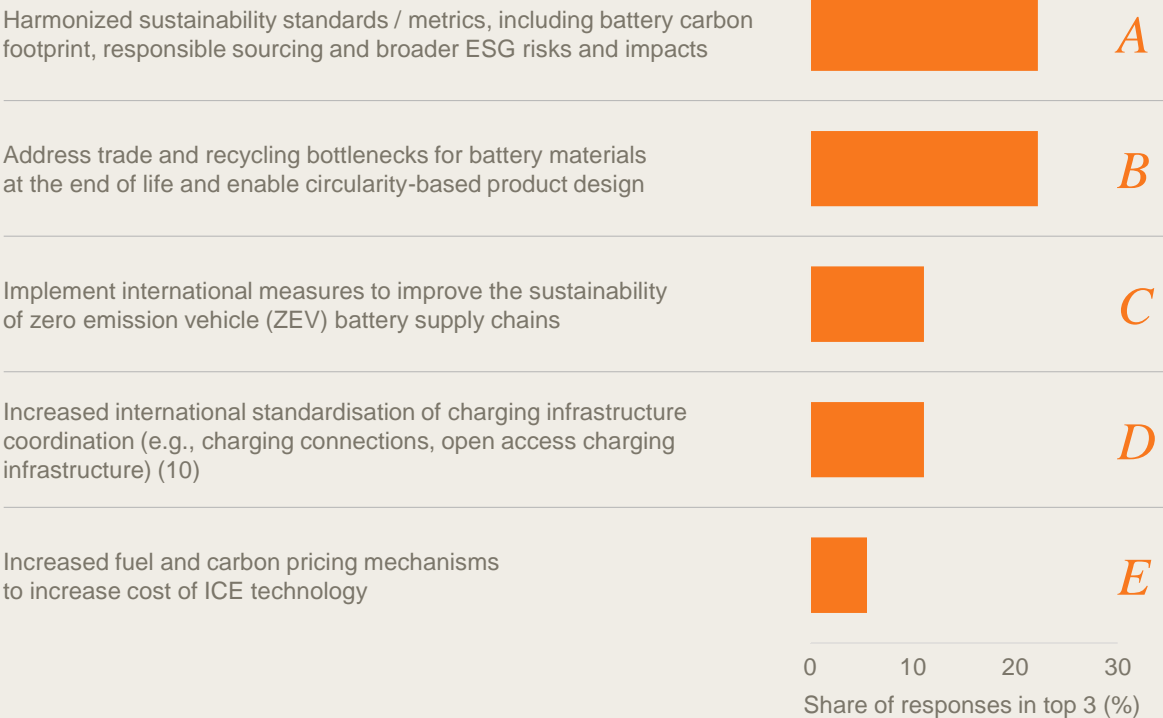
The Road sector sees key policy focus for electric vehicles as addressing supply chains, ensuring harmonized standards, and increasing fuel & carbon pricing on ICE

WHAT ARE THE TOP THINGS REGULATORS SHOULD FOCUS ON IN THE NEXT 12 MONTHS TO ACCELERATE INVESTMENT IN THE DEVELOPMENT AND DEPLOYMENT OF KEY TECHNOLOGIES AND SOLUTIONS TO ENABLE THE NET ZERO TRANSITION WITHIN THE PASSENGER EV SECTOR?

NATIONAL



INTERNATIONAL



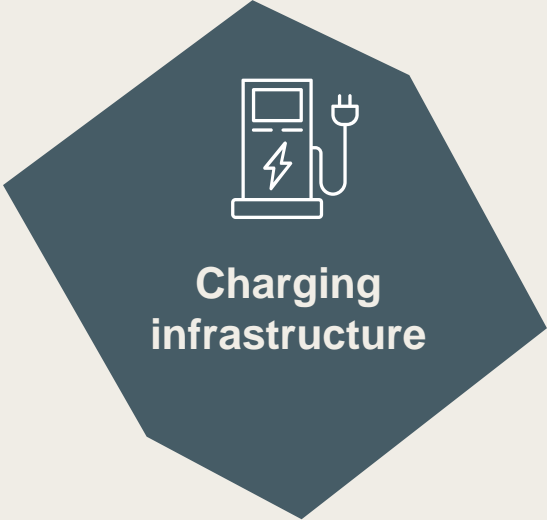
Source: Business Breakthrough Barometer survey 2024






Businesses all agree on key government intervention within supply chain standards and resilience, infrastructure upgrades, and engine mandates




Policy focus

National  International 






-  Businesses see the **build out of charging infrastructure as the top priority** for policy makers
-  The industry calls for a combination of policy interventions, including **simplifying permitting, and offering financial incentives** to build out charging along key routes through guaranteed floor pricing, and inclusion in public road contracts
- 



-  Business leaders are calling for **greater supply chain transparency**, including harmonized material footprints and recycling standards, to level playing field across geographies as they **decarbonize their own Scope 1 and 2 emissions**
-  Leaders stress that international coordination on standards and disclosures will **ensure fair competition for those at transition forefront**
- 



-  Businesses note that **ZEV mandates have been game changing in driving investments** from manufacturers
-  Across the board, OEMs are calling for more **stable roadmaps for ICE vehicle phase out and support for zero carbon fuels**, particularly in public and freight transportation outside of leading geographies
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Source: Business Breakthrough Barometer survey 2024

Thank
You



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