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Global Alliances and Opportunities for Decarbonising Transport

Transport and Climate Change Week

#TransportWeek26

Country's Journey Towards Effective Vehicle Regulations

Anannya Das Banerjee I 06.10.2026

CHANGING TRANSPORT

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On behalf of: Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety of the Federal Republic of Germany

IKI INTERNATIONAL CLIMATE INITIATIVE

Agenda

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01 Economics of an EV market

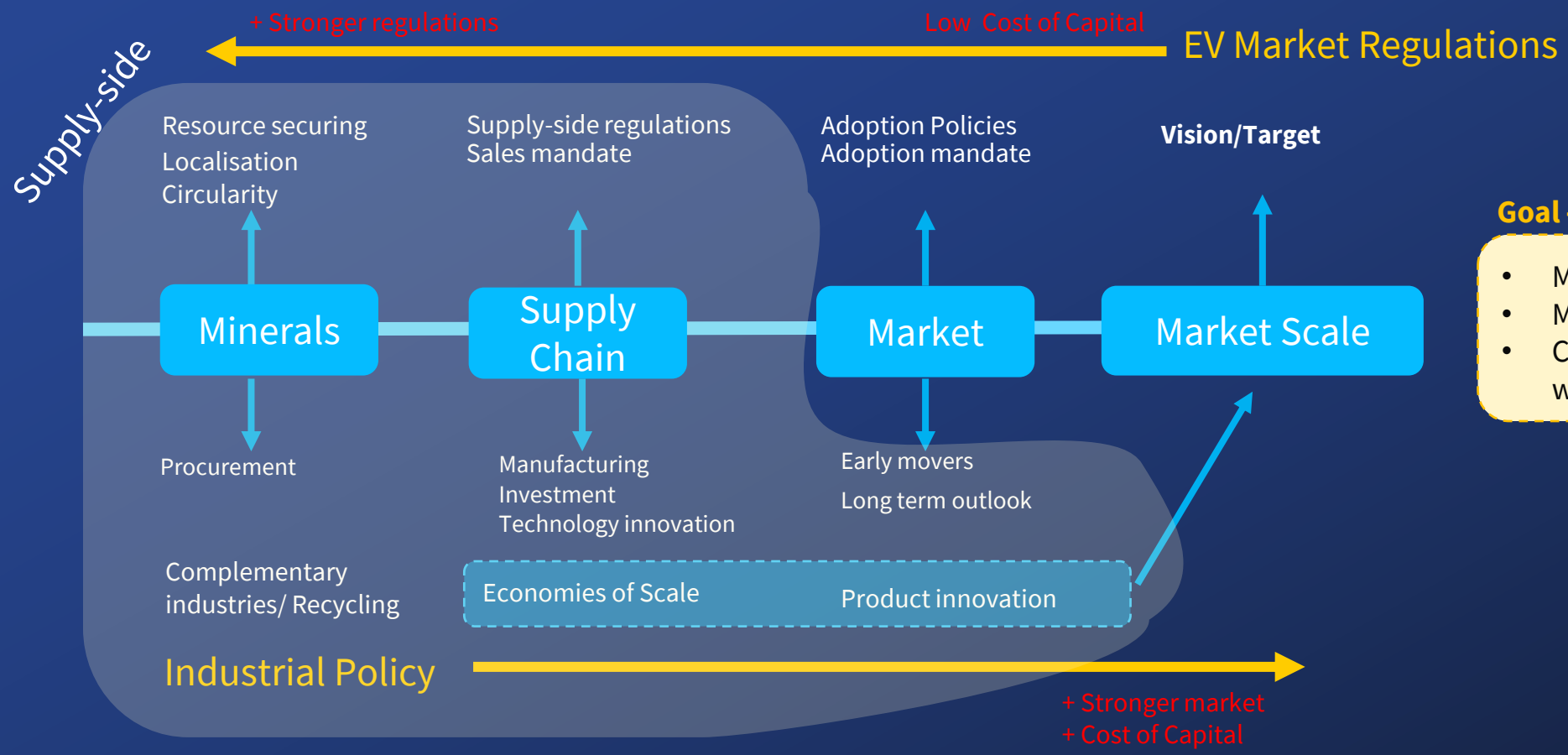
02 Supply-side regulations

03 Impact on different market segments

04 Components on an effective regulation

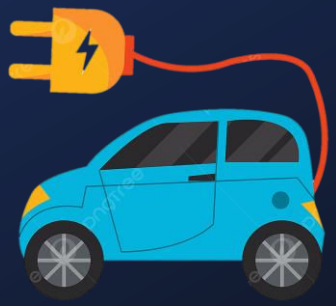
EV Market and the underlying economics

Strong policy & regulation to create **Market** and align **Supply chain**



Goal – Market equilibrium

- Multiple OEMs
- Multiple products
- Consolidation of weaker OEMs



Complementarities in regulations

Building value through regulatory interventions in the global South

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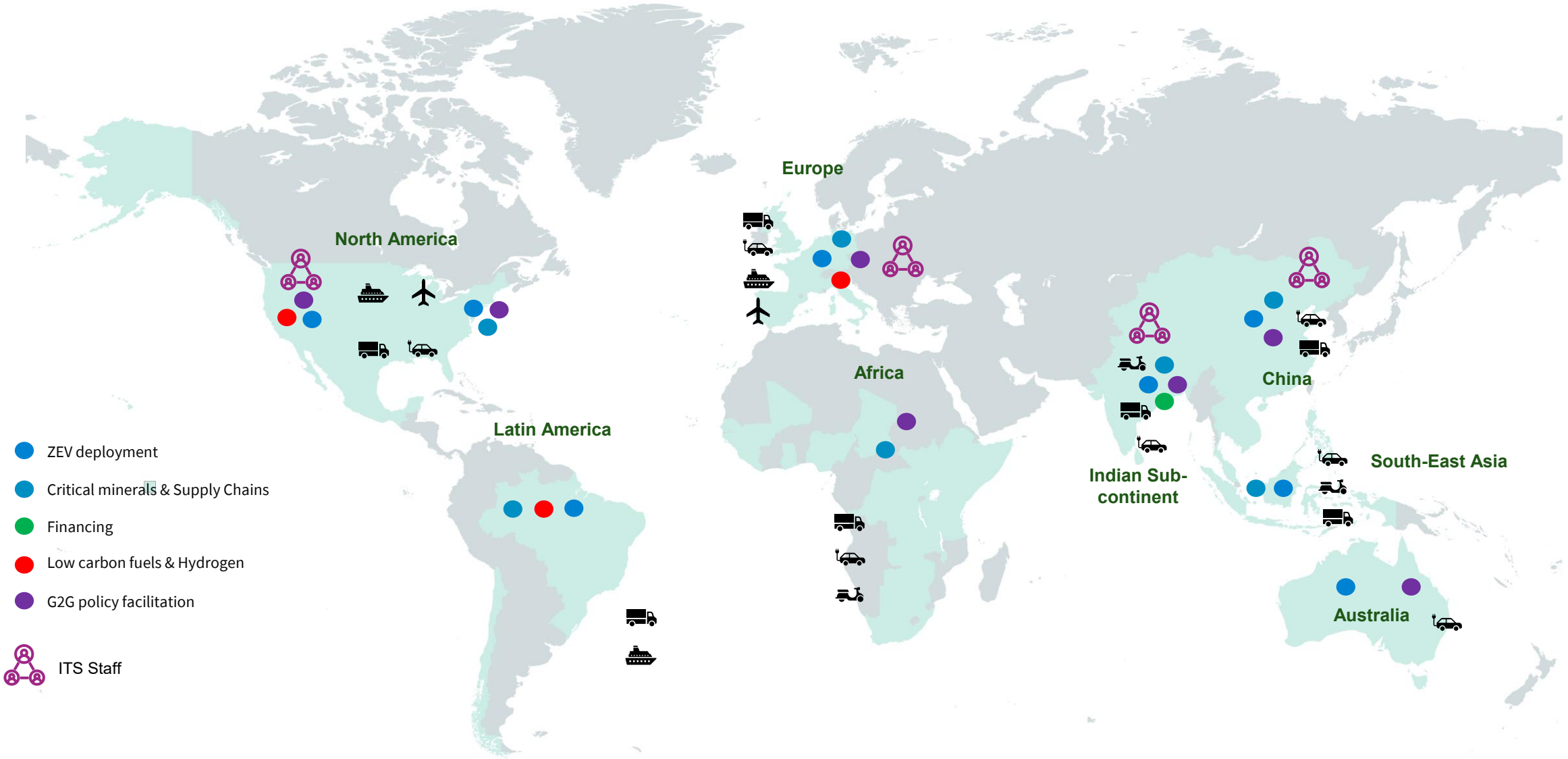
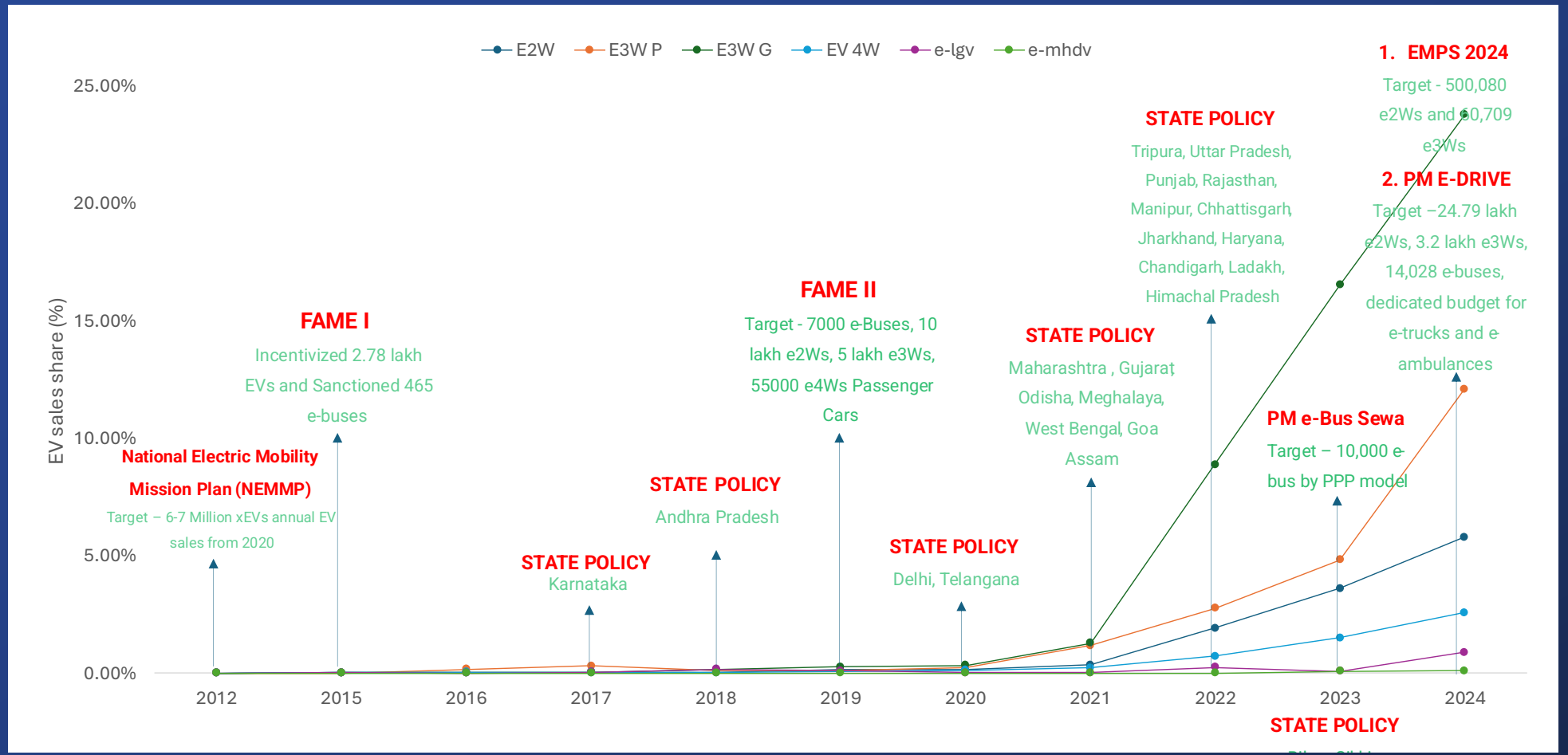


Impact of adoption incentives on electric vehicle market



Impact of demand-side policy on electric vehicle market

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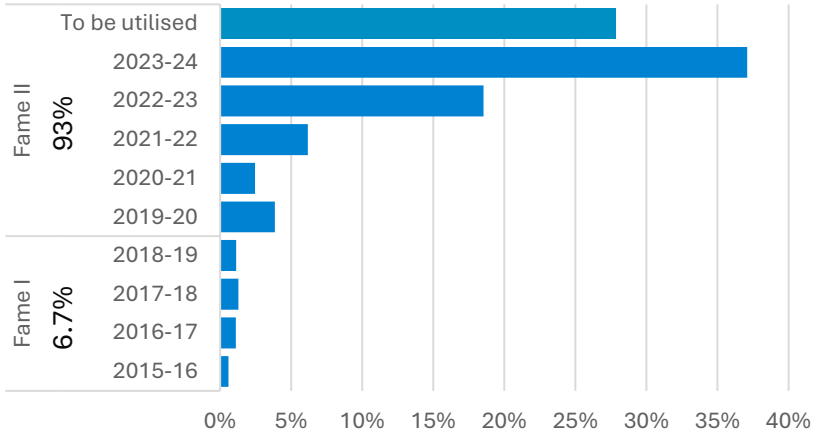
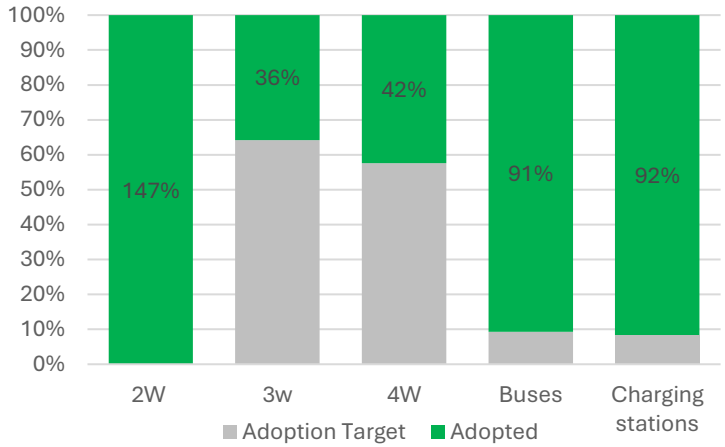
Fund utilisation under Fame Scheme



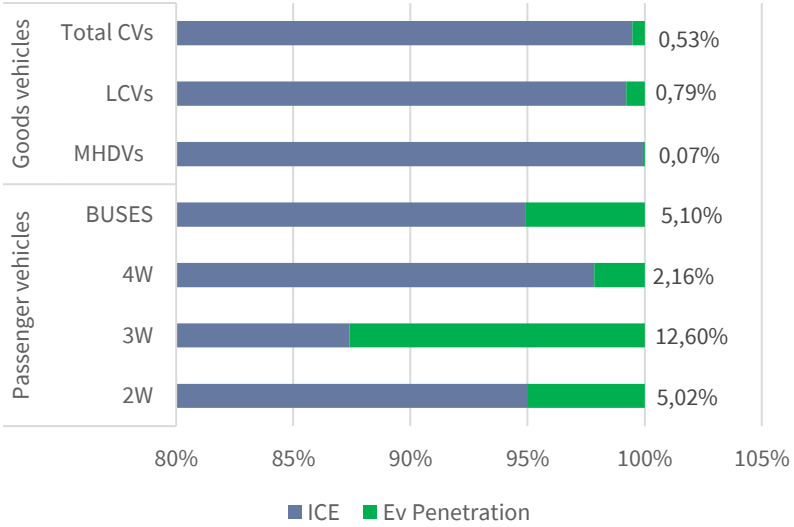
27% of fund allotted under FAME is yet to be utilized
Fund outlay – Phase I (859 cr), Phase II (11,500 cr)

EV adoption target achieved Fame II



While demand incentives alone pushed adoption in small vehicles, EV bus adoption went through a separate demand aggregation process

Segment wise EV penetration



Challenges in Fame I

- 2.12 lakh vehicle benefitted,
- 60% of fund went for adoption of 63% of hybrid passenger car and two-wheelers only which are not effective in fuel consumption standards with respect to their ICE counterparts

Changes in Fame II

- Restructured policy - benefits limited to pure EVs
- Priority was given to 2w, 3w, and 4 w (non-luxury), government vehicles and public buses
- Restriction on ex factory price to prioritize adoption of non-luxury vehicles, specially in passenger four-wheeler category
- Incentive was rationalized across vehicle segment as per battery capacity

Ongoing incentives

- **PM e-drive**
- Continuation of demand incentives for Buses
- ZET incentives
- ZET Pilots, aggregation

Fußnote

Source: Fame circulars, FAME dashboard, MHI, PIB

Impact of policy certainty on two Similar markets

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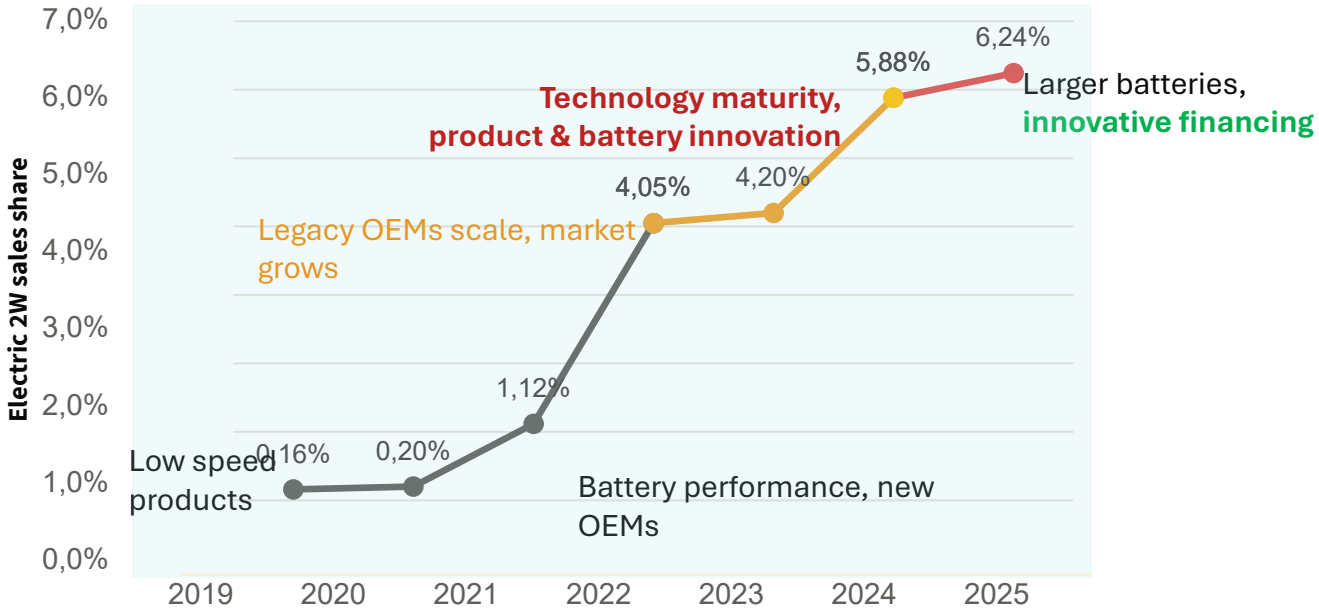
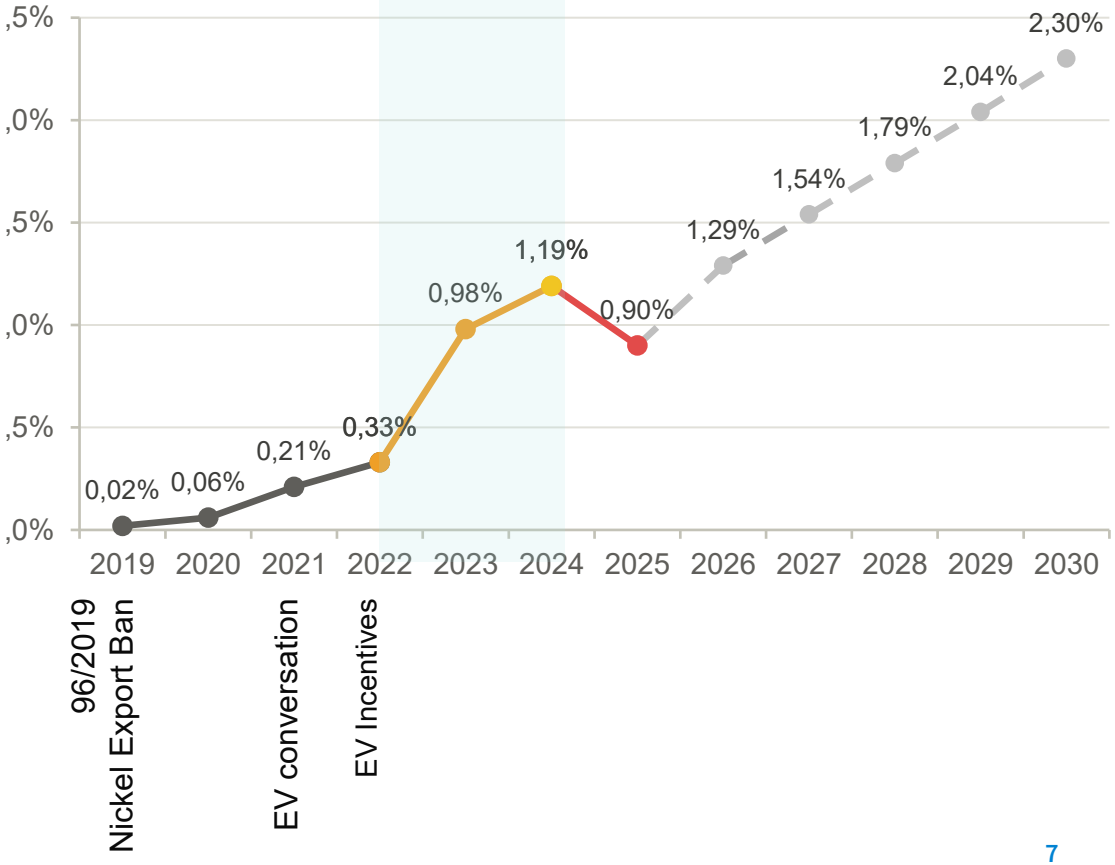
Markets need direction – Policy continuity helps product development

India



Indonesia



Two-wheelers

Impact of policy certainty on two Similar markets

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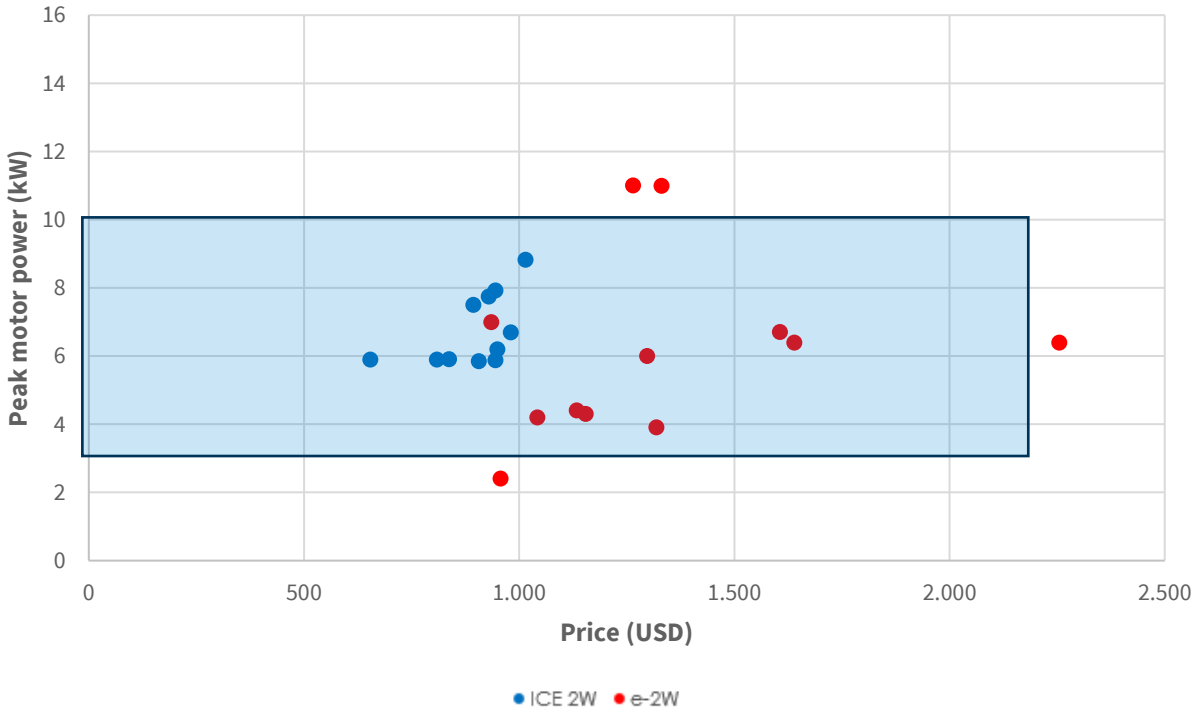
Markets need direction – Policy continuity helps product development

India



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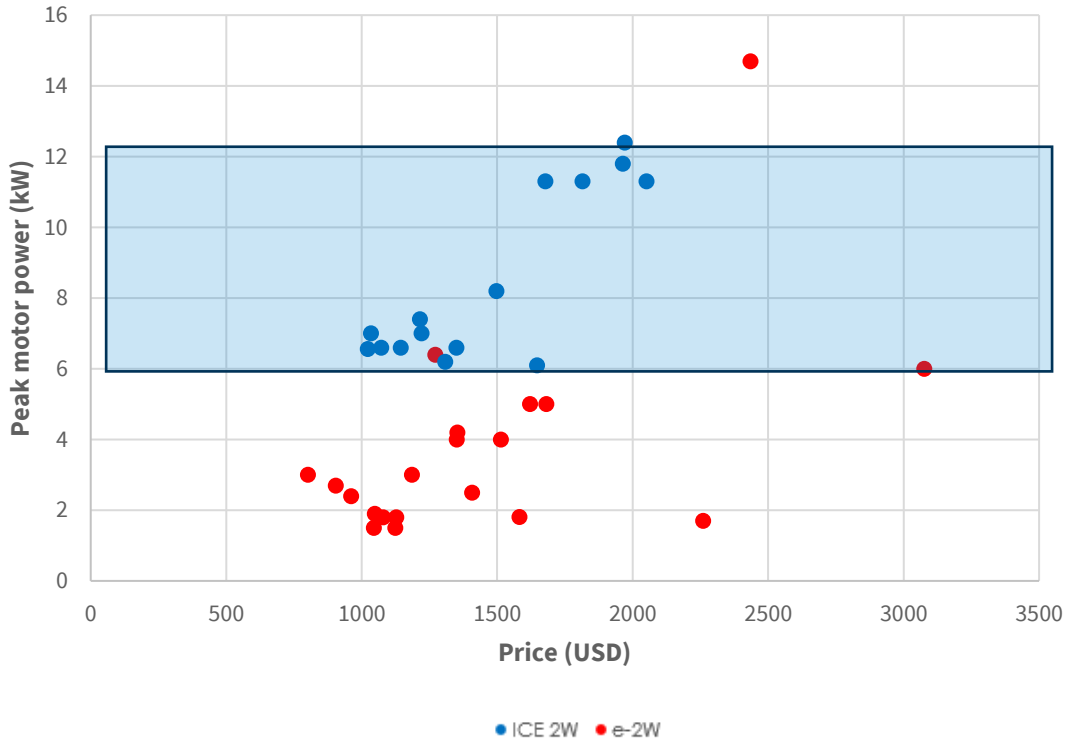

Two-wheelers

Policy certainty impacts product development

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Markets need direction – Policy continuity helps product development

From early low-speed commuters to high-performance, long-range and purpose-built models

	2016–17	2018–19	2020		2021–22	2022–23	2023–25+	
	EARLY COMMUTER E-SCOOTERS	PERFORMANCE-ORIENTED EVs EMERGE	LEGACY OEM ENTRY		PERFORMANCE + RANGE LEAP	HIGHER PERFORMANCE & MATURITY	LARGER BATTERIES & BROADER USE CASES	
	Basic mobility solutions with low speed and small batteries	*Better performance, design and connectivity*	*Established 2W OEMs enter the EV space*		*Significant jump in speed, range and features*	*More refined products, better tech and wider choices*	*Longer range, family-oriented and fleet-focused options expand*	
	Hero Electric Flash	Ather 450	TVS iQube	Bajaj Chetak	Ola S1 Pro	Ather 450X	TVS iQube ST	Ather Rizta
Battery Capacity	0.96 kWh (Lead-acid)	2.4 kWh (Lithium-ion)	2.25 kWh (Lithium-ion)	2.8 kWh (Lithium-ion)	4.0 kWh (Lithium-ion)	2.9 kWh (Lithium-ion)	5.3 kWh (Lithium-ion)	2.9 / 3.7 kWh (Lithium-ion)
Peak Motor Power	250 W	~5.4 kW	4.4 kW	4 kW	11 kW	~6.4 kW	4.4 kW	4.3 kW
Top Speed	25 km/h	80 km/h	75 km/h	60 km/h	117 km/h	90 km/h	82 km/h	80 km/h
Claimed Range	~50–55 km	~107 km	~75 km	123 km	176 km	~146 km	212 km	123 / 161 km
Battery Type	Non-removable (Lead-acid)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)	Fixed (in-vehicle charging)

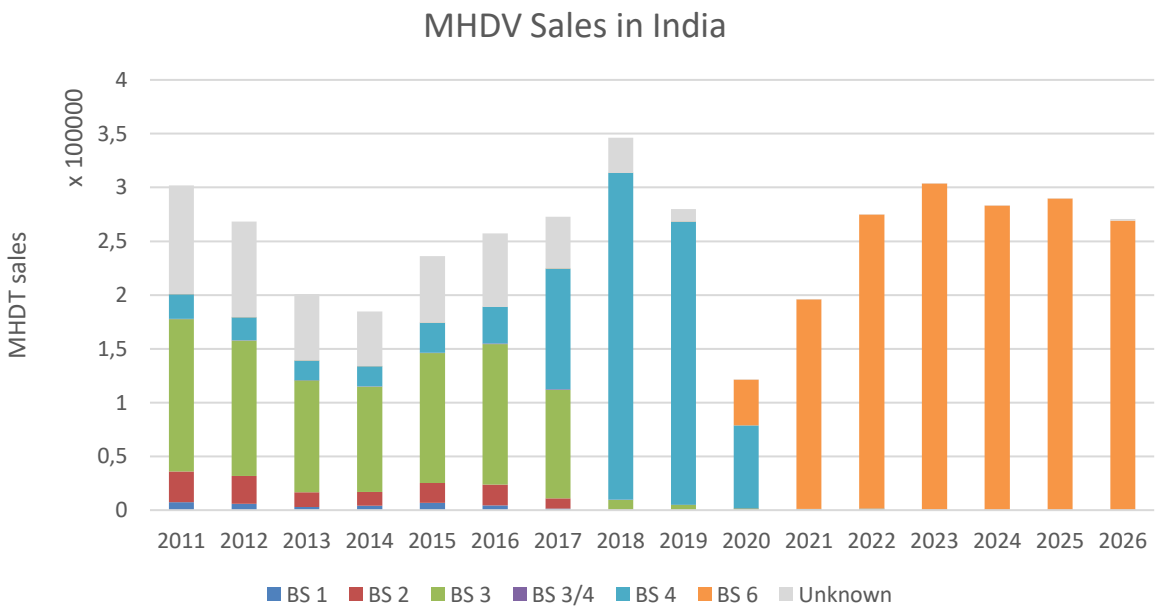
KEY TAKEAWAY

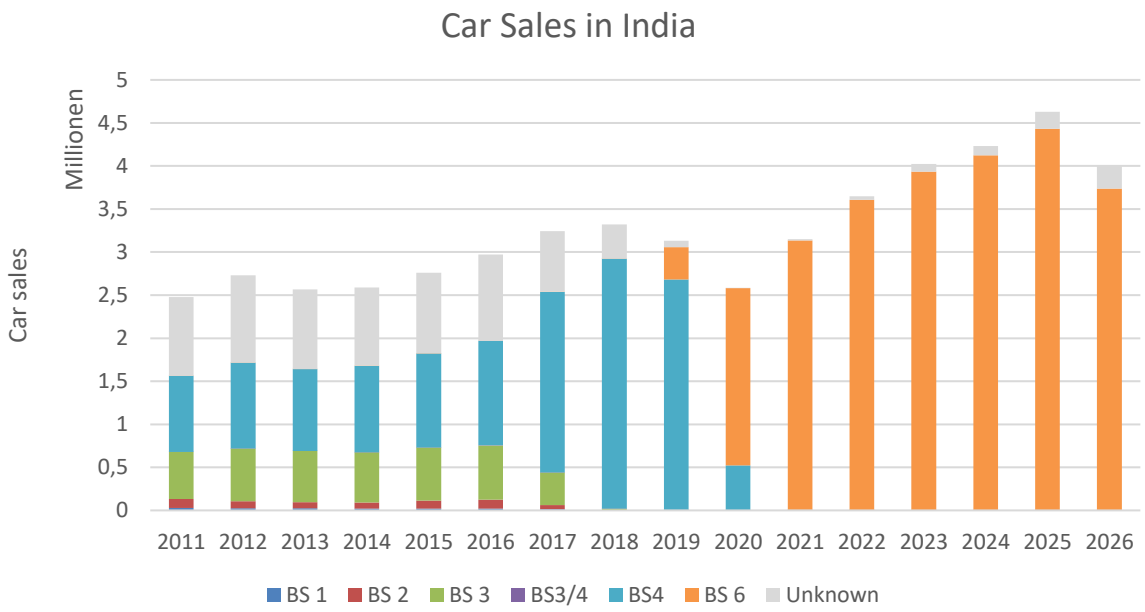
Low speed, small batteries, basic products → Better performance and new-age players emerge → Legacy OEMs enter with mainstream offerings → Major leap in performance, range and features → Maturity in technology and product refinement → Larger batteries, segmentation for family and fleet use cases

Two-wheelers

Impact of supply-side regulations on the Market

Global market - Fuel Economy standards led to cleaner Trucks





MHDV

Supply-side Regulations for Market Certainty

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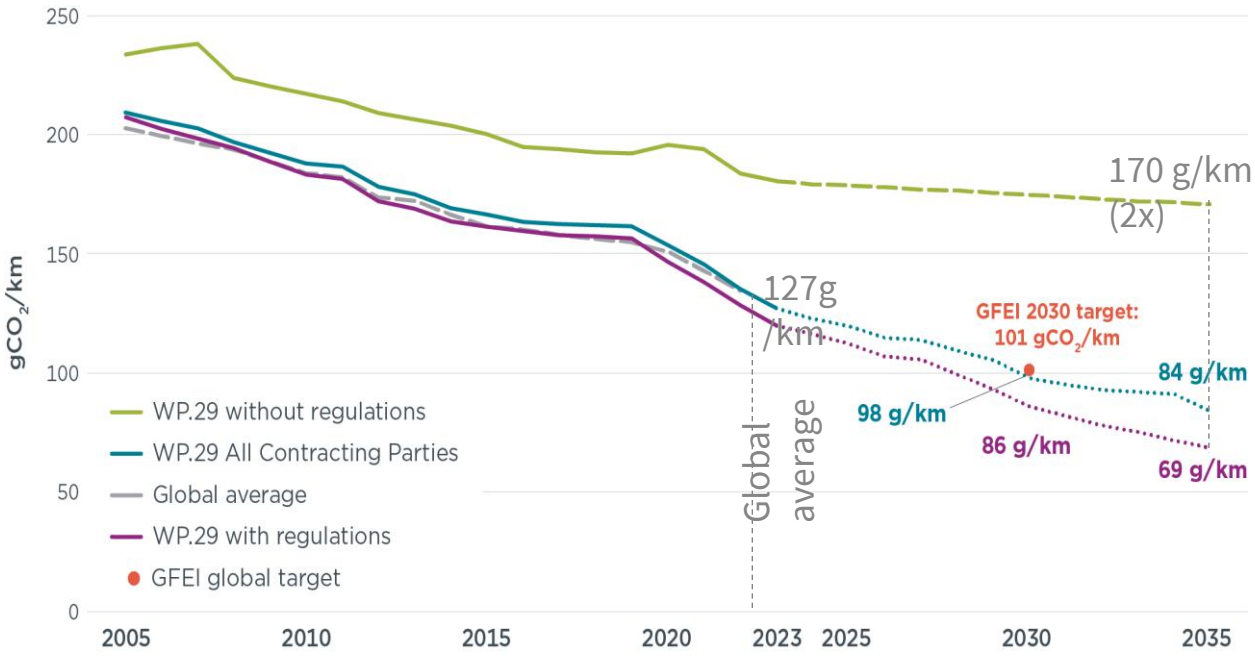
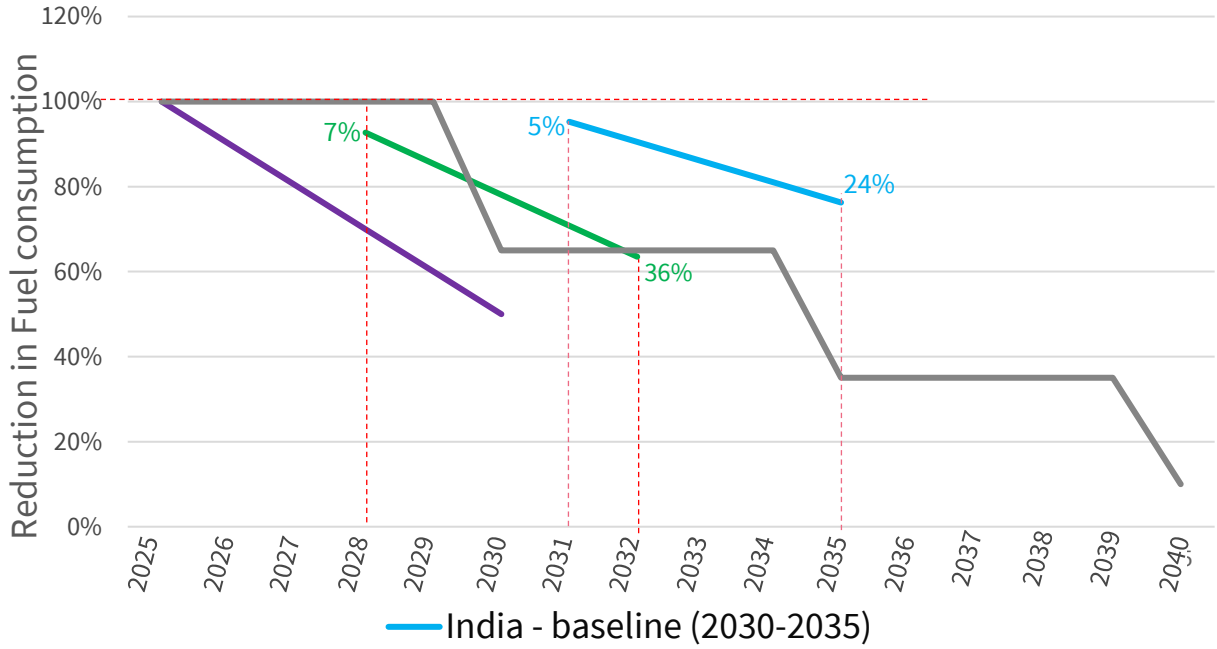
Global market - Fuel Economy standards led to cleaner vehicles

MHDV Fuel efficiency targets in India



Car Fuel efficiency targets in India



All markets with regulations have achieved EV sales share of 10 – 22% in 2024

MHDV

Supply-side Regulations for Market Certainty

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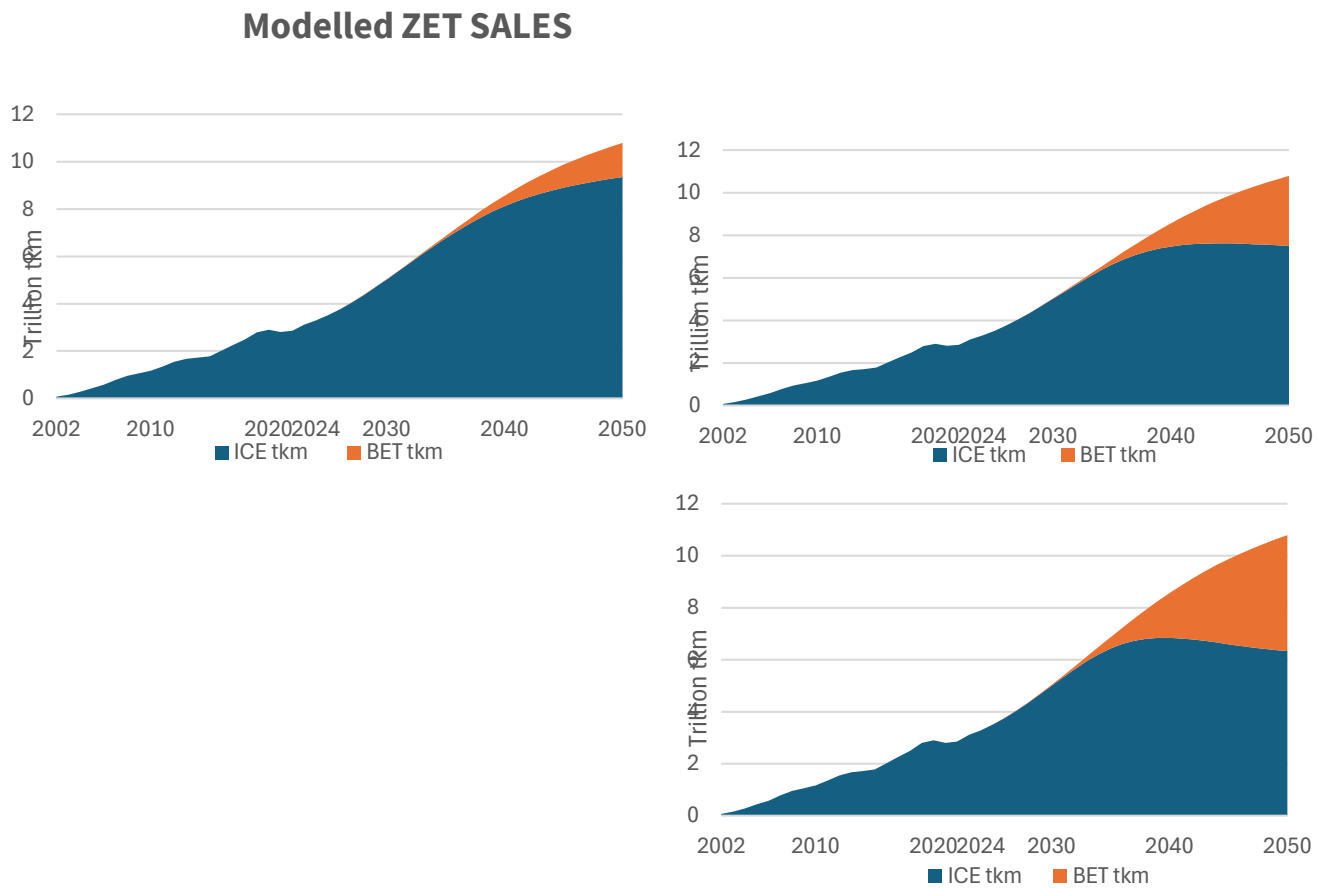
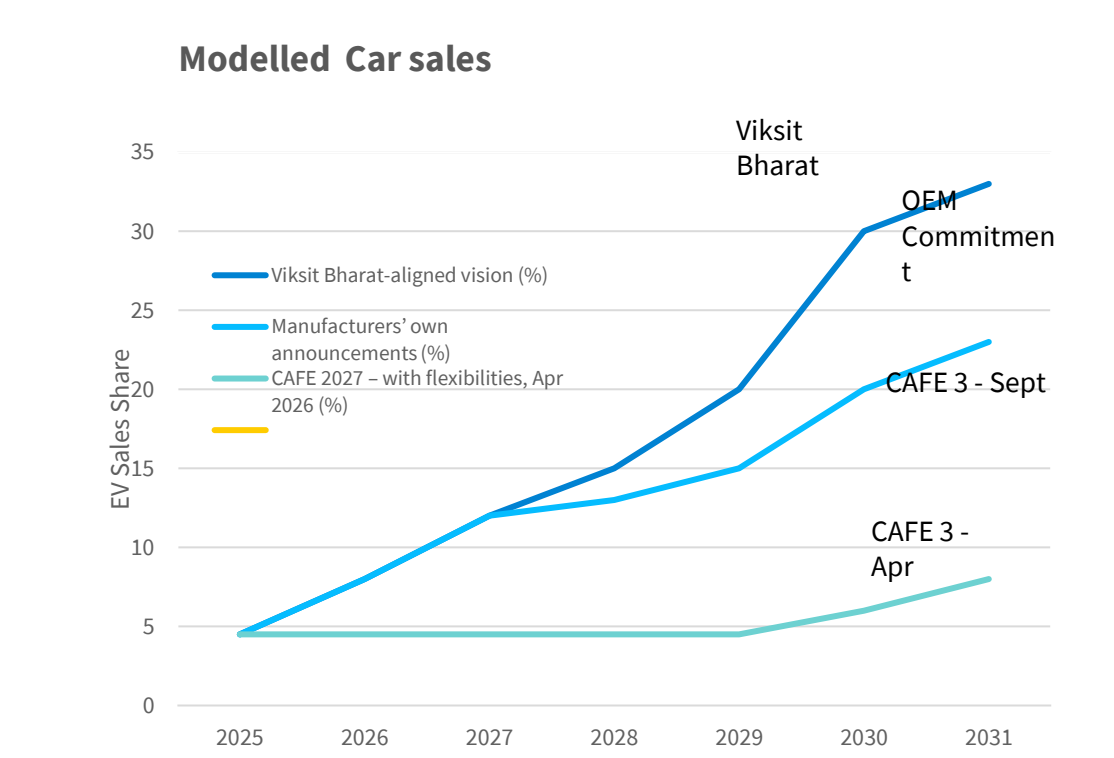
India: Fuel efficiency regulations on MHDV and its impact on e-MHDV sales





MHDV

2-4% upfront fee on ICE vehicles can support incentives and drive accelerated EV adoption

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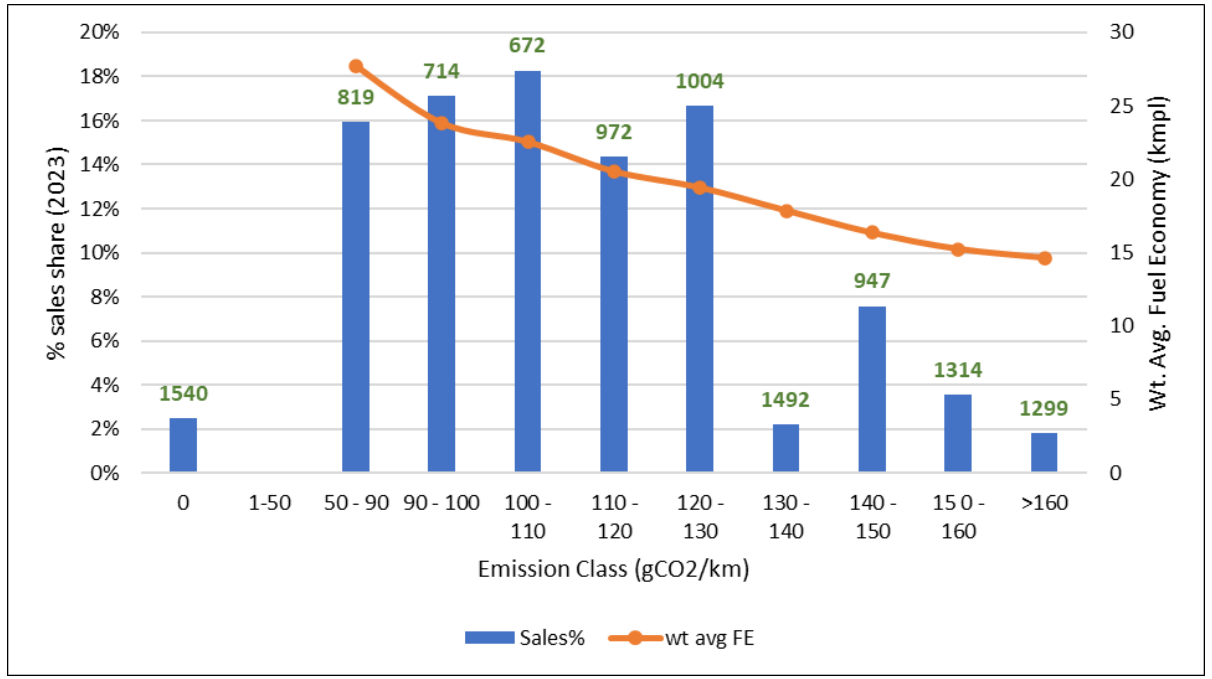
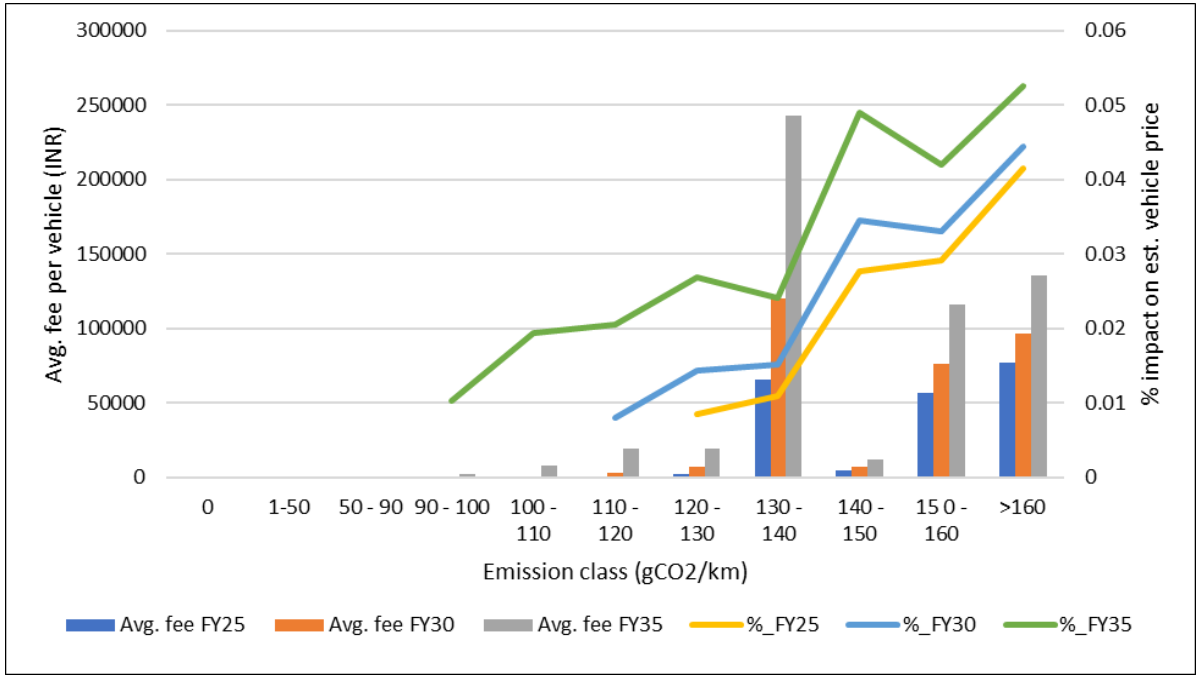
Regulations can be designed to support market creation

Distribution of PV sales by emission classes (gCO_2/km) (prices in INR thousand)



Average fee per vehicle and fee impact on vehicle price



Cars / LDV

Supply-side Regulations for Market Certainty

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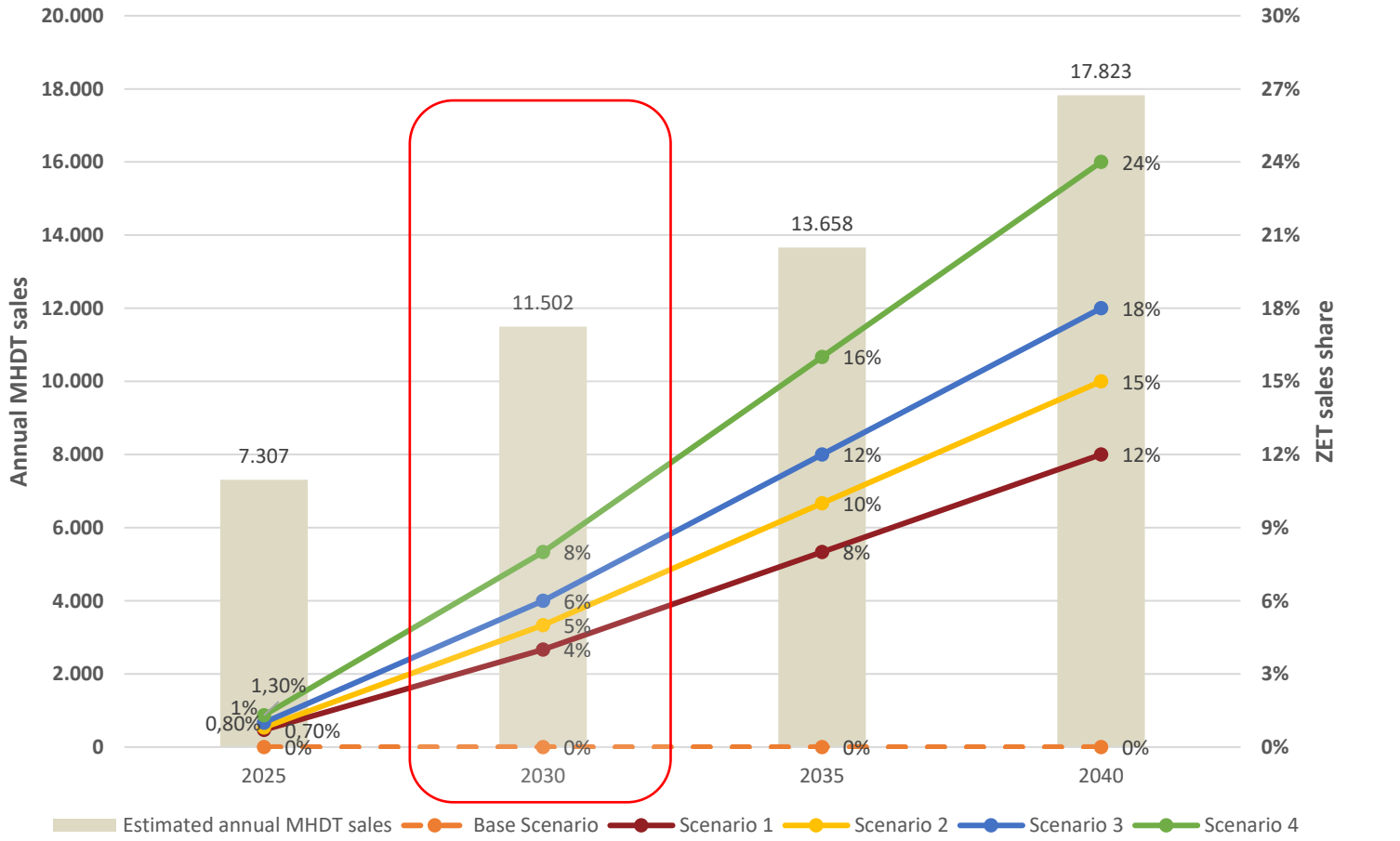
India (sub-national) Strong policies can lead to 16% ZET sales share by 2035



Sources: Sales Growth - Stakeholder consultations with OEMs and fleet operators, NITI Aayog and RMI, Transforming Trucking in India

Case study- Telangana, India

Demand-side intervention

> Purchase subsidy
> Road tax and registration fee exemption
> Road toll waiver for the first 5 years

Supply-side intervention

Incentives on manufacturing and localization of e-truck supply chain leading to 10% reduction in e-truck cost

Reduced cost of financing

5% interest subvention for e-trucks reducing their lending rate to 12%

Disincentivizing diesel trucks

> INR 0.5/l cess on diesel
> Doubling the green tax applied on diesel trucks older than 7 years
> 25% increase in road tolls for diesel trucks

Note: Each scenario is bult by stacking on intervention of the previous scenario

MHDV

Policies to reduce GHG emissions and fuel use, and to accelerate MHDV electrification

Policy options

Supply-side
(impact vehicle production & tech availability)

Demand-side
(impact buyer choices, operating behaviour)

Regulatory
- GHG/fuel economy standards
- ZEV sales requirements
- Low/zero-emission zones
- Clean fleet mandates

Fiscal Policies
- Manufacturer incentives / R&D funding
- Purchase subsidies/tax credits
- Fuel/carbon taxes
- Charging infrastructure investments
- Government procurement

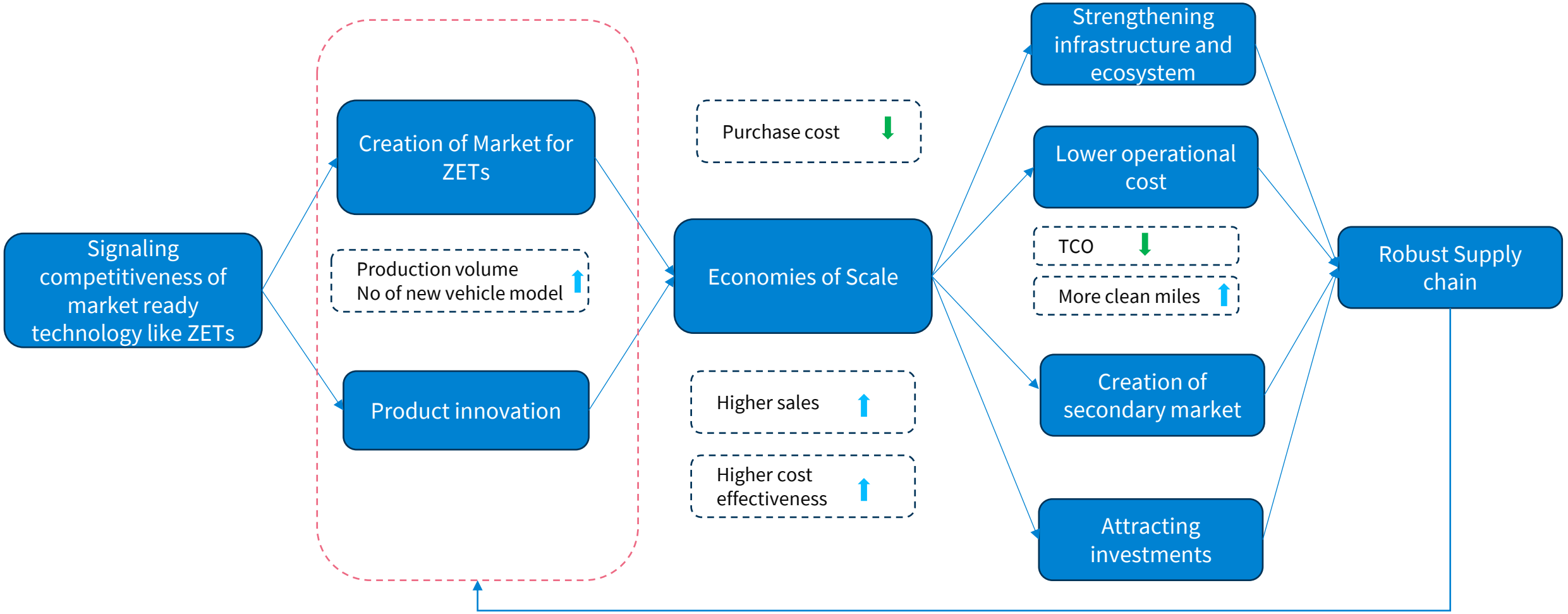
Many policies impact all goals simultaneously:

- **ZEV mandates, subsidies, and infrastructure investments** reduce fuel use, emissions, and promote electric HDVs.
- **Reduces emissions and fuel consumption** while indirectly encouraging electrification by raising fossil fuel costs.
- **Fuel economy/GHG standards** primarily target emissions and fuel use, but can also **push OEMs toward electrification for compliance**.

Policy	GHG Reduction	Fuel Use Reduction	Accelerate electrification	Type
Fuel economy/GHG emissions standards	✅	✅	🟡	Regulatory
Zero-emission vehicle (ZEV) mandates	✅	✅	✅	Regulatory
Vehicle purchase subsidies/incentives	✅	✅	✅	Fiscal
Carbon pricing (fuel taxes or carbon tax)	✅	✅	✅ (indirectly)	Fiscal
Low-emission/zero-emission zones	✅	✅	✅	Regulatory
Charging/refuelling infrastructure investment	✅	✅	✅	Fiscal
Research & development grants	✅	✅	✅	Fiscal
Public procurement of electric buses/trucks	✅	✅	✅	Fiscal/Regulatory
Labelling and efficiency information (fleet benchmarking)	🟡	🟡	⛔	Informational
Training and operational best practices for fleets	🟡	🟡	⛔	Informational

Sources: elaboration based on data from UC Davis 2025, ICCT 2025, IEA, 2024, Calstart, ACEA, 2025

Benefits of Fuel efficiency regulations on ZETs



Align supply chain & resource flow

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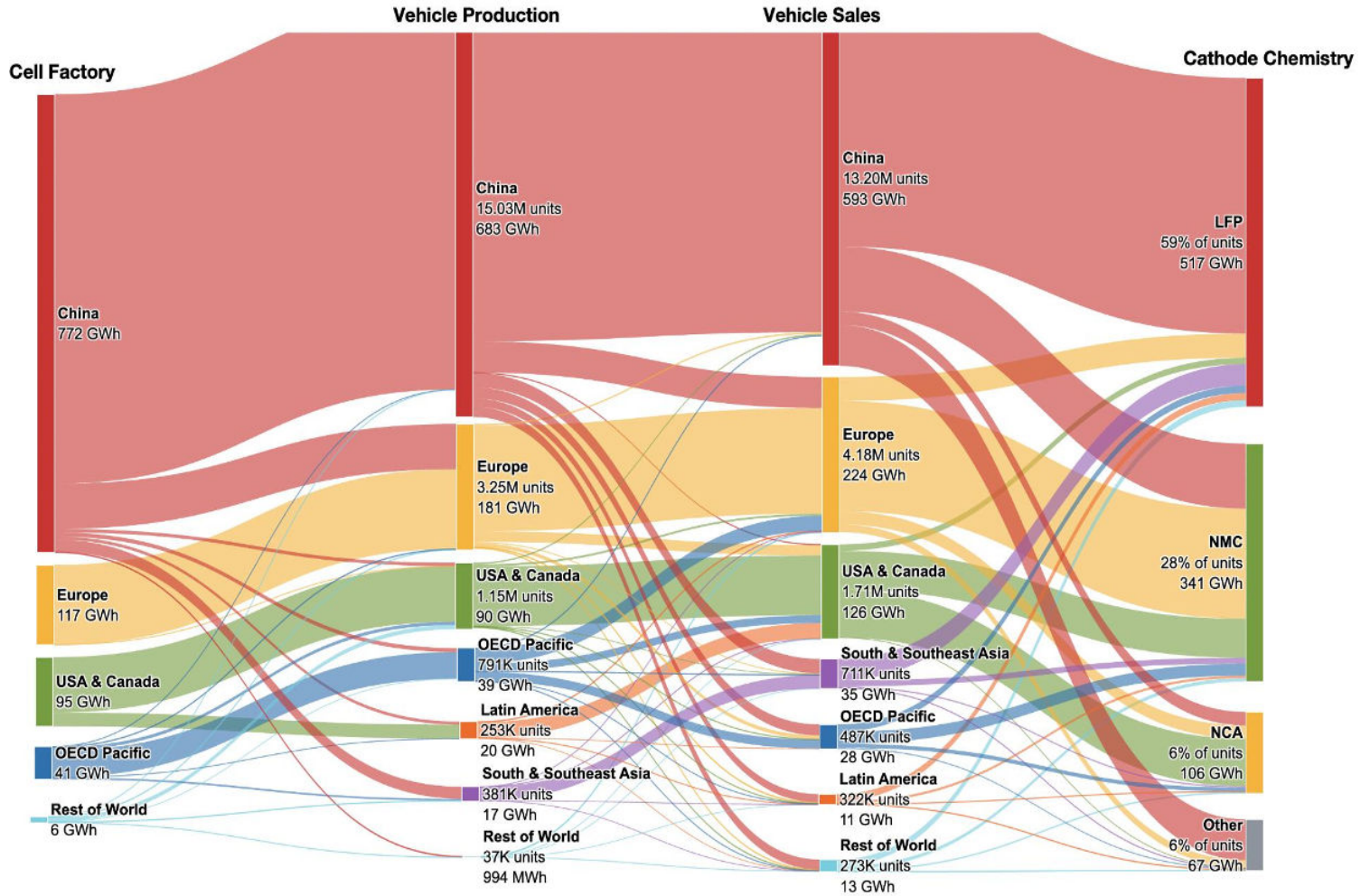
EV Battery supply chain mapping (2025)



Dominant chemistry type across regions

China	→	LFP
EU / Europe	→	NMC
USA & Canada	→	NMC, NCA — Nickel-based mix
South & Southeast Asia	→	LFP
OECD Pacific	→	NMC, NCA — Nickel-based mix (includes Japan & Korea)

Emerging markets are increasingly LFP-heavy, while many advanced markets outside China remain nickel-based.

Supply-chain

Regulations create Market Certainty

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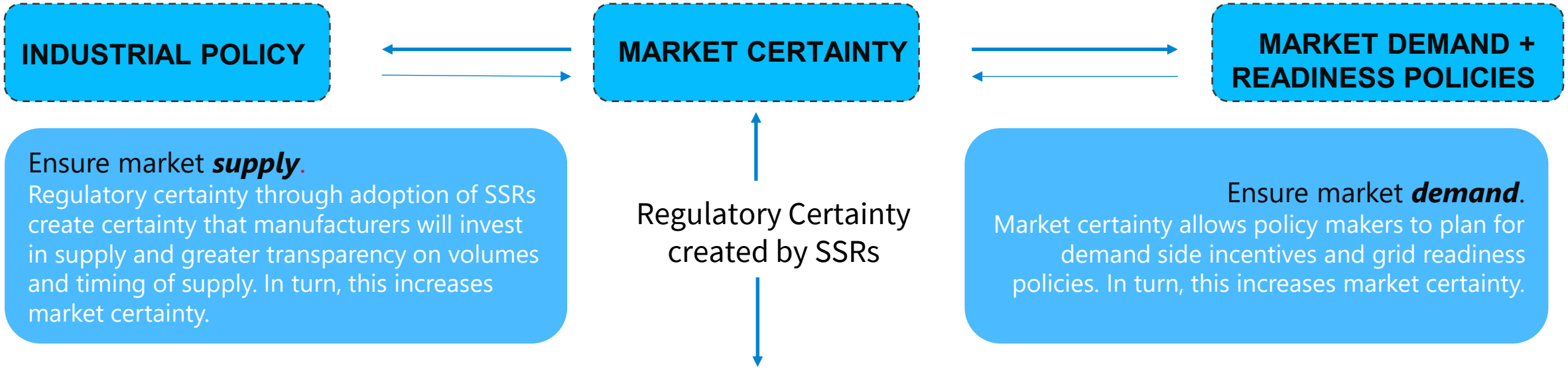


Regulatory and? Market certainty crowds-in & derisks private investments reducing the amount of government funds needed for production incentives.

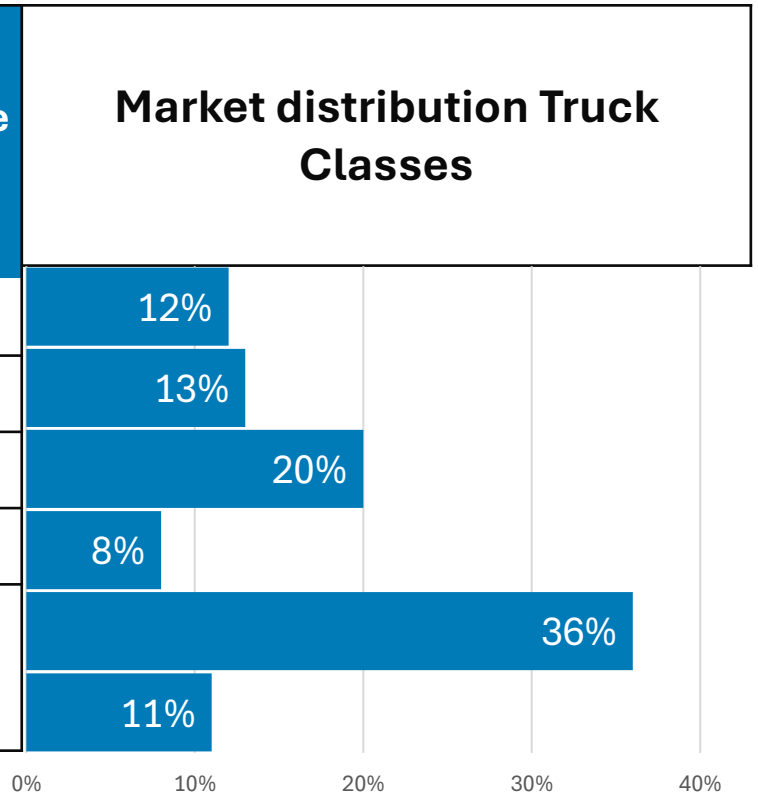
Regulatory and? Market certainty increases fiscal efficiency of government incentives by allowing incentives to be reduced over time based on expected volumes increase and cost reductions.

Components of an effective Vehicle regulation

Regulations		Activity	Market behavior	Timeline
Vision	Market Segmentation	Opportunity Mapping	Adoption through incentives Emergence of early use cases Product categories	Short
	Vision	Target setting		
Demand side	Incentivize early market movement Fiscal policies	EV Policy with adoption targets		
		• Upfront incentives • Tax exemptions etc. • Interest rate subvention		
Supply side regulation + Industrial policy	• Emission standards • Fuel efficiency regulations, • Sales mandates • Fiscal Policies	Incentivize production - Pli, investment attraction, tax holidays, import-export policies - Localization, scale	Investment scale Bring down cost	Longest – Leads to some of the most innovative industrial policies Market Scale happens here
		For manufacturers • Compliance structure with flexibility mechanism	Competition & Consolidation of OEMs	
		On road vehicles • Incentivize clean technology • Disincentivize polluting vehicles	Restrain/phase out old technology	
Demand side policy	• Adoption mandates • Segment specific policies	Government owned, buses, School buses Corporate fleet, ride-hailing	Target specific segment	Short

Market Segmentation for Trucks in India

MHDV Categories	Truck Classes by GVW	Battery Size (kWh)	2024 Model Price (ex-factory)		Ratio of price increase
			ICE truck price INR	E-Truck Price (Max price) INR	
N2a	3.5 to 7.5 T	90	12,37,358	23,62,500	1.91
N2b	7.5 T to 12 T	120	17,34,555	34,65,000	2.00
N3a	12-18.5 T	200	20,00,000	57,75,000	2.90
N3b	18.5-25 T	275	23,41,539	79,40,625	3.35
N3c	N3 >25 T	350	39,37,872	1,26,32,813	3.2-3.5
N3 Tractor	N3 >30T Tractor	350	35,00,000	1,12,28,106	



Source: Categories - AIS-117 (Part 6)/D5 (5.6.1)

Data – Vahaan portal, SIAM ; Prices – OEM websites, aggregator websites

Incentive structure that can work on the market segmentation

MHDV category	Truck Classes by GVW	Incentive	Battery Size (kWh)	E-Truck Price Threshold	Max Subsidy amount as a % of ex-factory cost	
	Tonnes	INR/kWh	kWh	INR	INR	%
N2 (491 e-trucks)	3.5 to 7.5 T	10,000	90	23,62,500	5,00,000	20% of cost
	7.5 T to 12 T	10,000	120	34,65,000	7,00,000	20% of cost
N3 (1483 e-trucks)	12-18.5 T	15,000	200	57,75,000	17,50,000	30% of cost
	18.5-25 T	15,000	275	79,40,625	24,00,000	30% of cost
	N3 >25 T	15,000	350	1,26,32,813	40,00,000	30% of cost
	N3 >30T Tractor	15,000	350	1,12,28,106	34,00,000	30% of cost

Variable Structure
Differentiated for N2 and N3

Maximum battery size & max price ratio in the category is considered

- PM e-drive can accommodate more e-trucks as more price competitive models are launched in the market

N3 Volume : higher % incentives :70% of truck market is N3 trucks
Price : 3-3.5% higher than ICE variant
VKT : More clean kilometers
Emission : Eliminate more emission