

Electric Mobility Transition in India

Energy Security to Intelligent Mobility



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mahindra *Rise*



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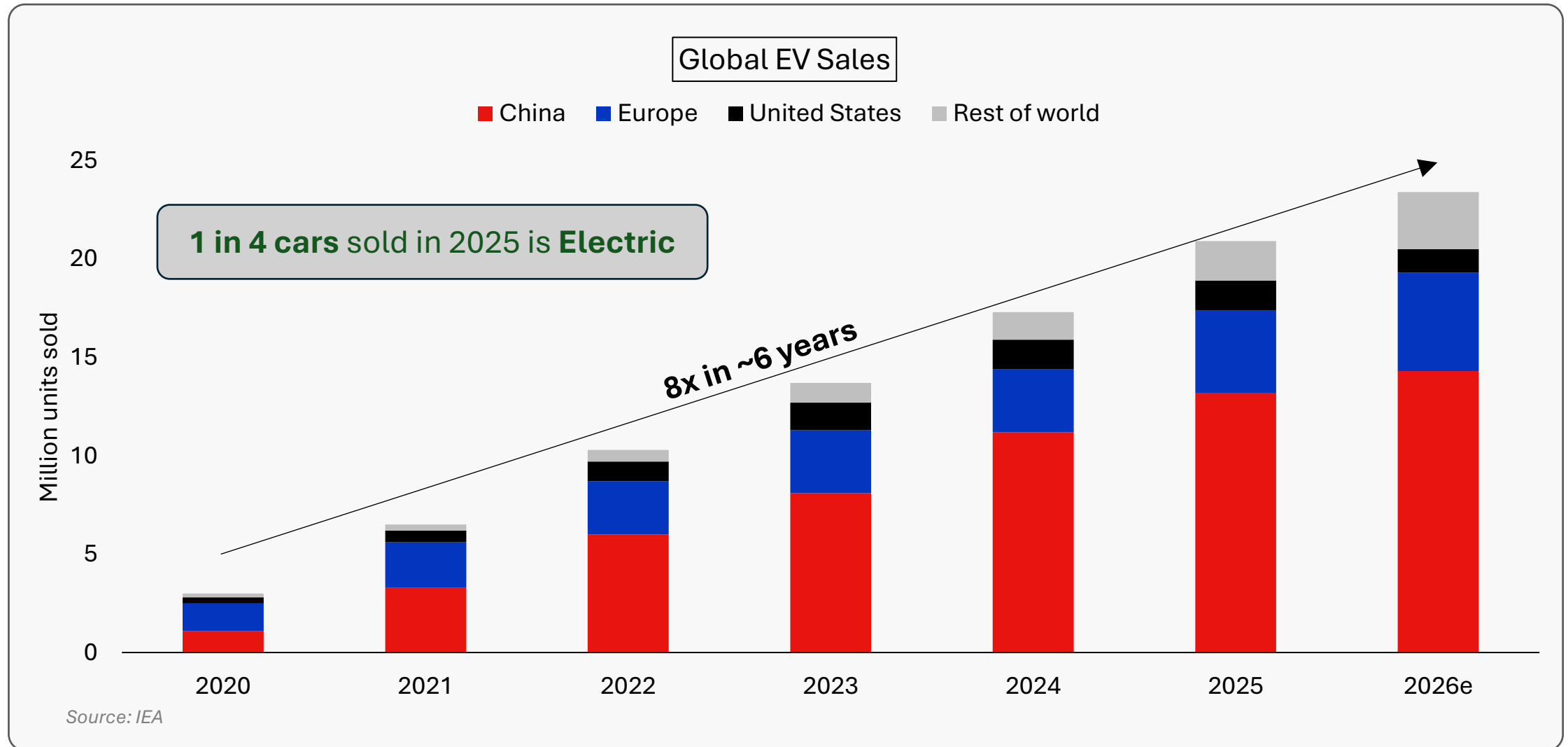
The India Electrification Story



Motivation for Transition



Global Passenger Car Electrification



Passenger Car Electrification | China & Europe

BEV and PHEV / REEV share of new passenger-car sales, 2020–2025

CHINA



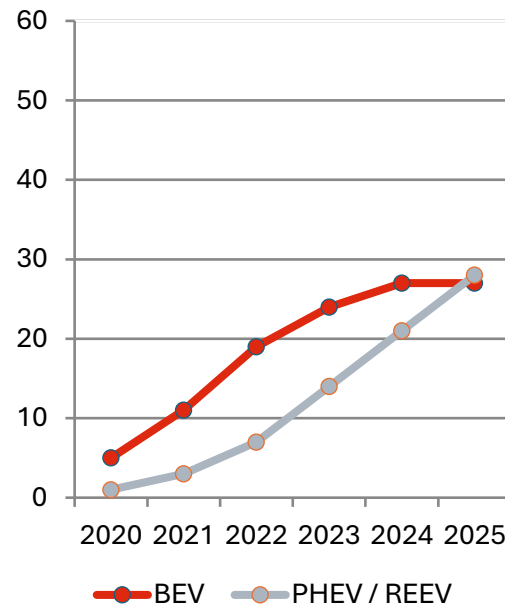
27%

BEV

28%

PHEV / REEV

2025 MARKET MIX



VS

EUROPE



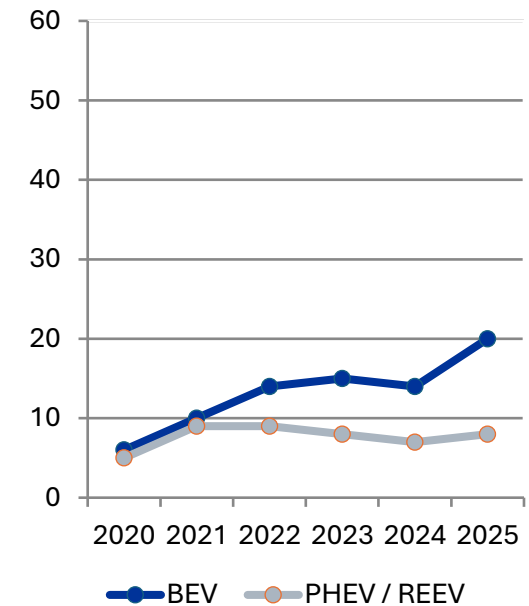
20%

BEV

8%

PHEV / REEV

2025 MARKET MIX



Dual-track growth: BEV scale plus rapid PHEV / REEV expansion

BEV-led transition; plug-in hybrids remain a supporting pathway

Why Electric Mobility Matters for India

Electric mobility is not only an automotive transition. It strengthens energy resilience, improves urban environments and enables low-carbon growth.

ENERGY SECURITY



~85% of crude usage in India is imported. Electrification shifts mobility demand toward increasingly domestic electricity.

- ~60% of imported crude is used for transport/mobility amounting to annual exposure of ~\$77 billion.
- Only ~20% of the coal requirements is through import (split between coking coal for steel and rest for electricity generation).

URBAN AIR QUALITY



ZERO tailpipe emissions from battery-electric vehicles can reduce street-level exposure in densely populated urban corridors.

CLIMATE COMMITMENT

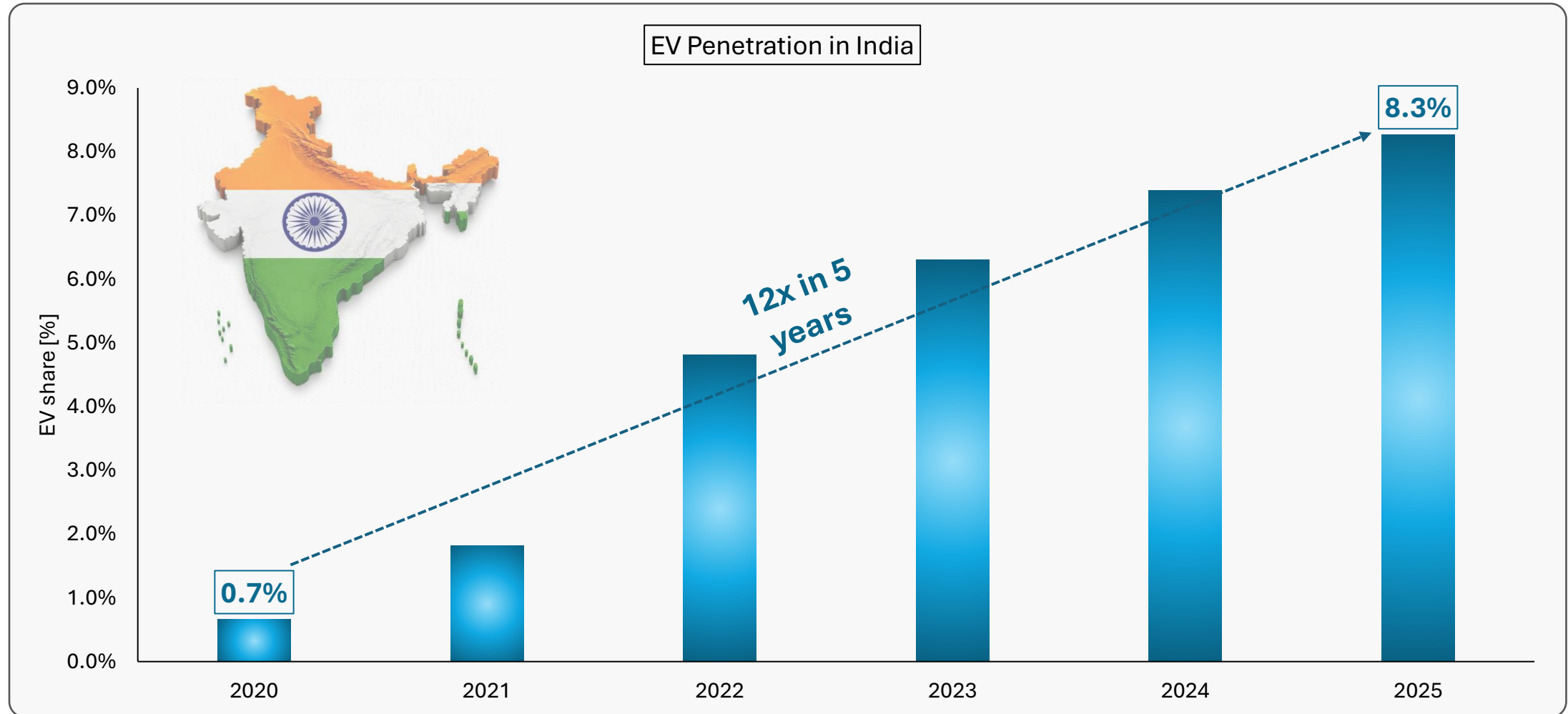


2070 is India's net-zero target. Cleaner power and efficient electric transport form a critical long-term decarbonisation pathway.

The India Opportunity Story

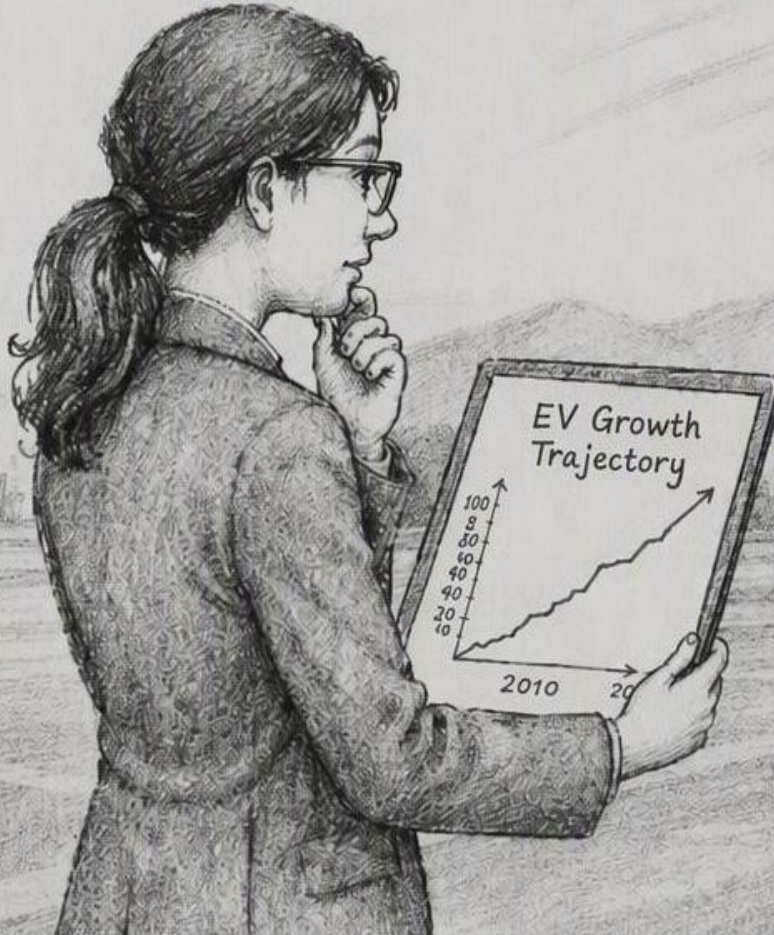
The electrification growth trajectory is positive

Including 2W, 3W, passenger cars and heavy duty vehicles

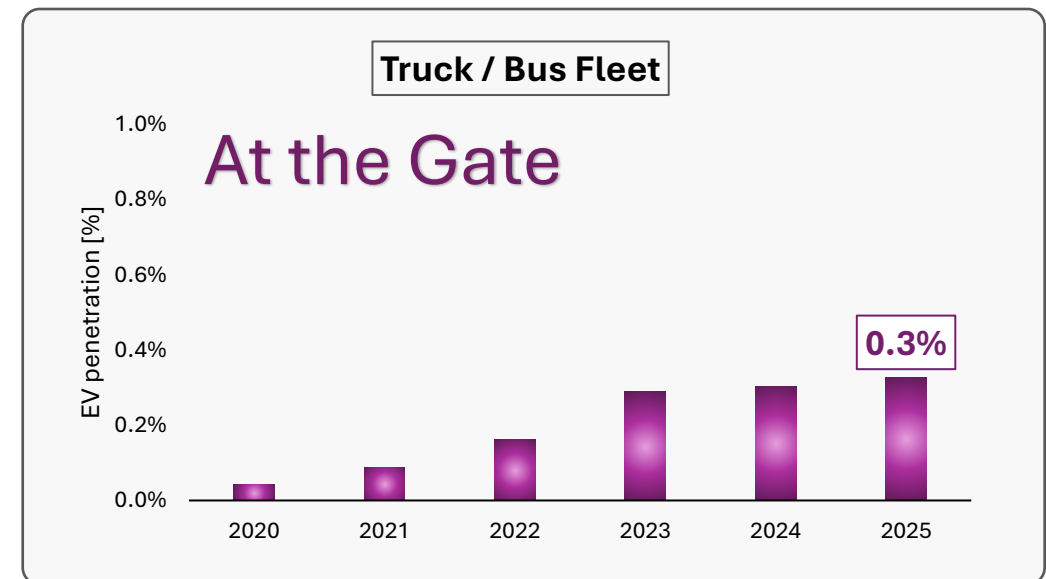
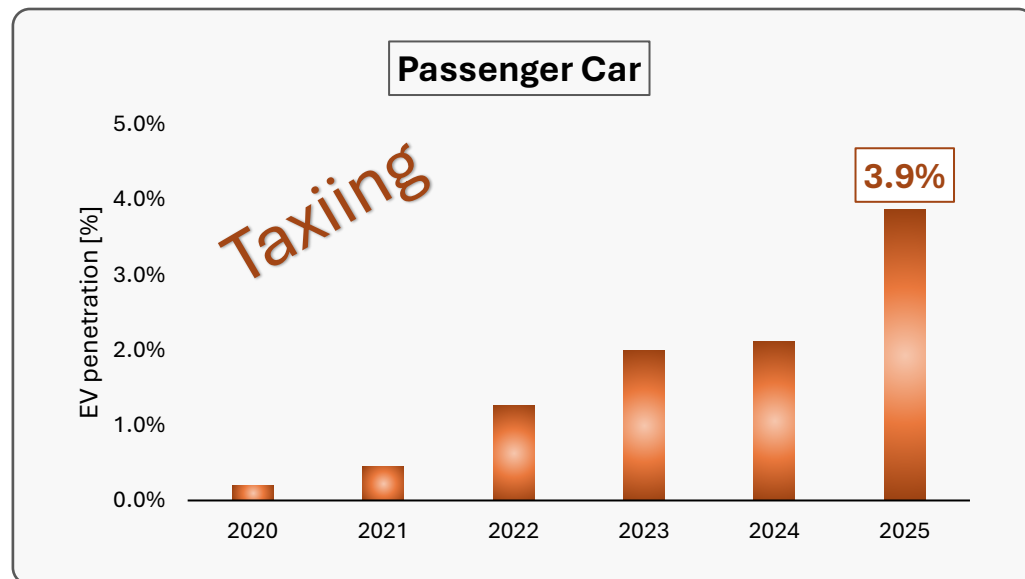
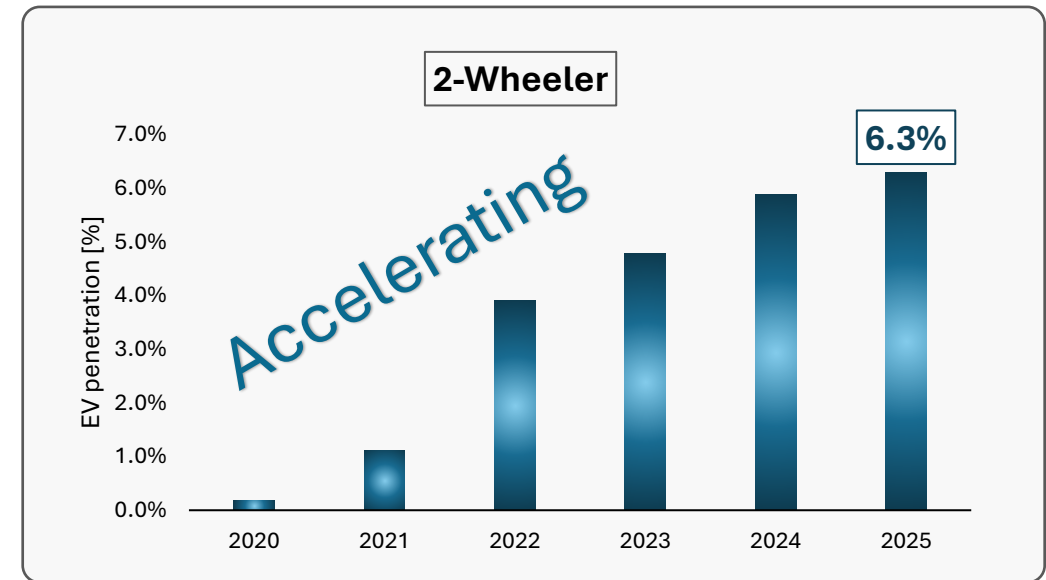
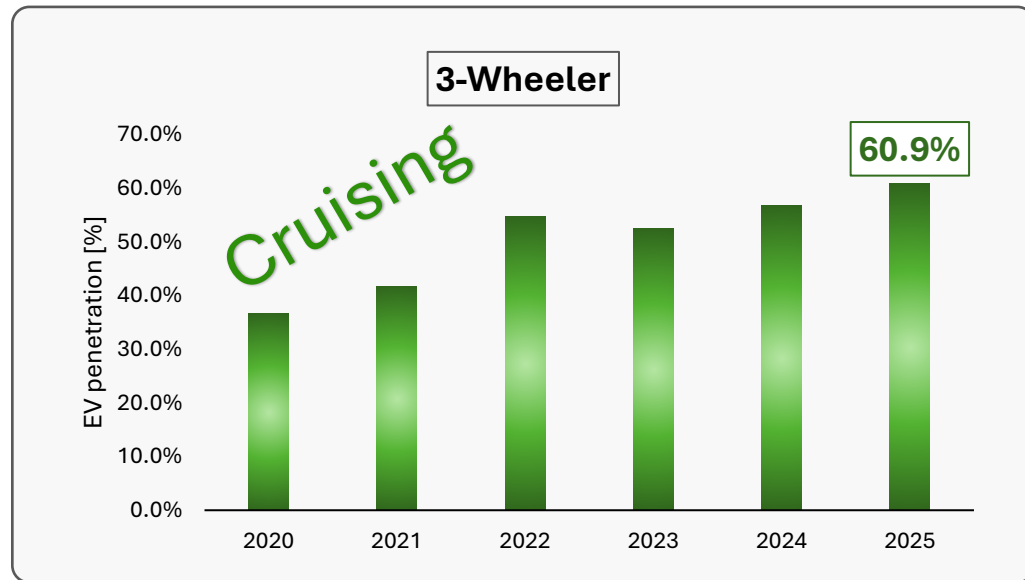


Wow! the EV
flight has taken off

Has it?

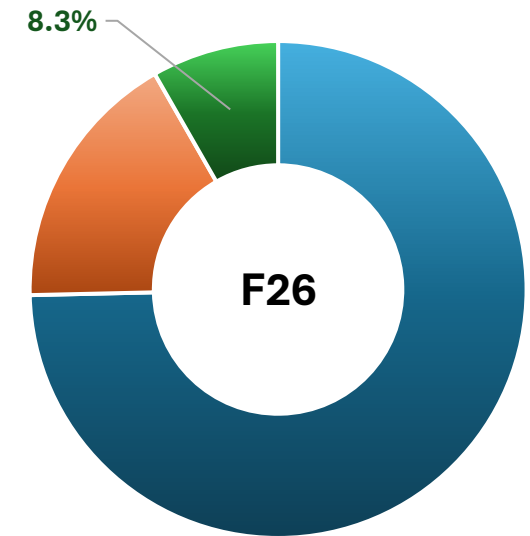
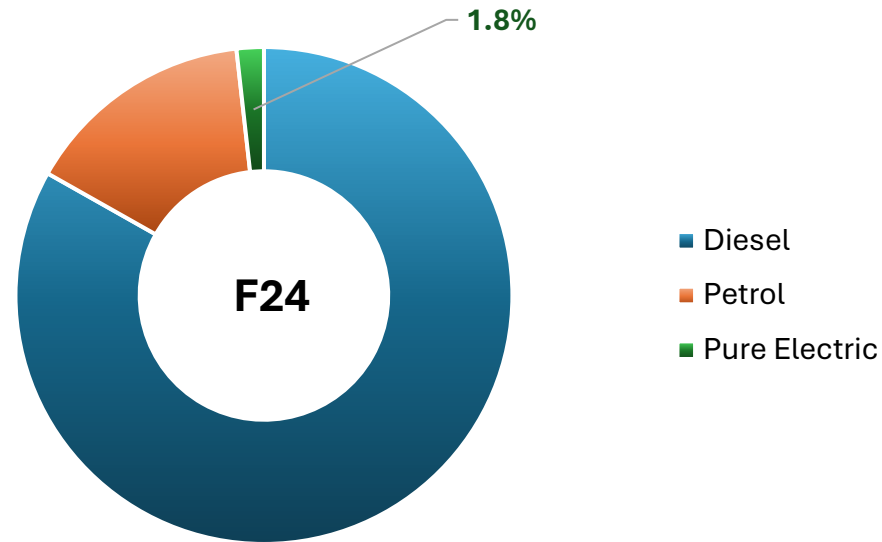


EV Penetration in India Across Segments

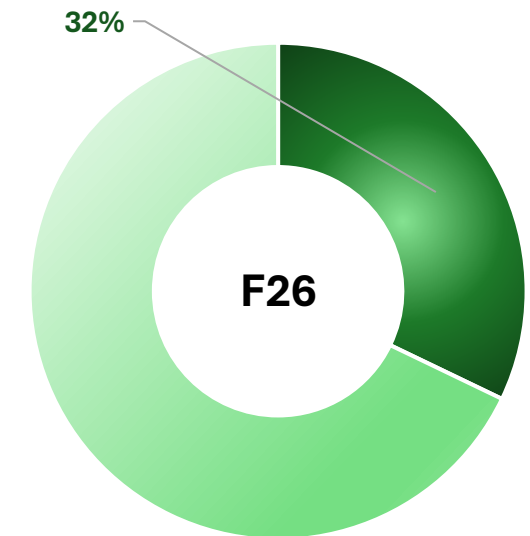
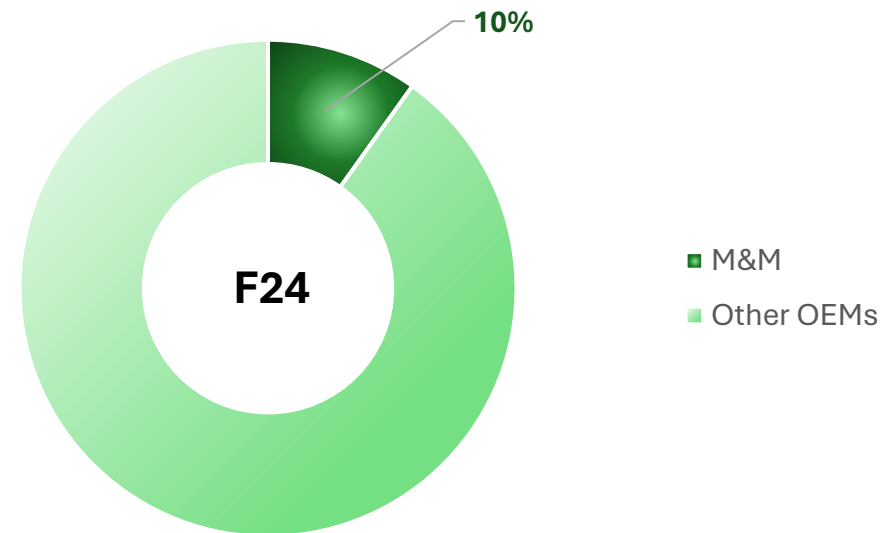


M&M PV EV Share & Market Penetration... So Far...

M&M EV Share
within our Portfolio



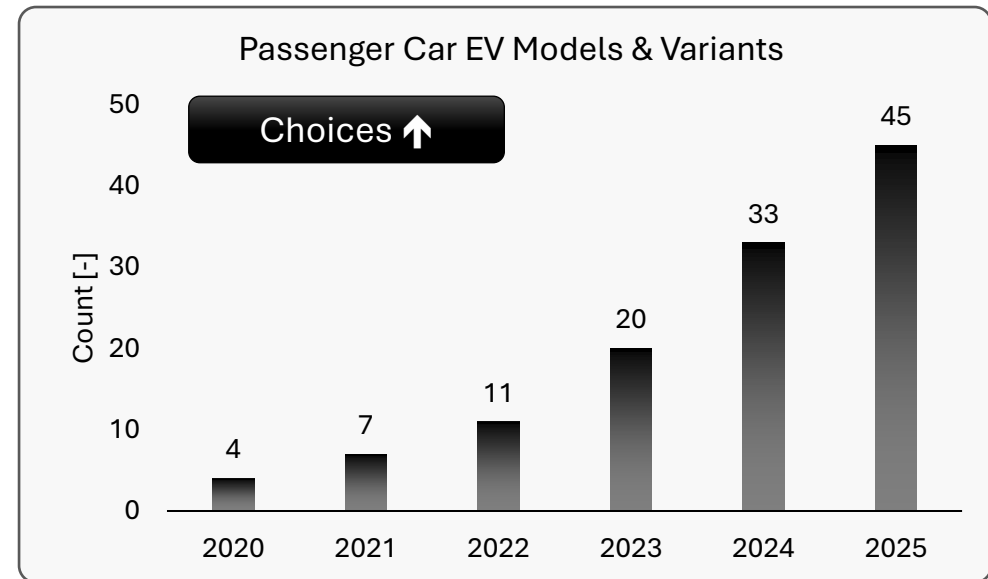
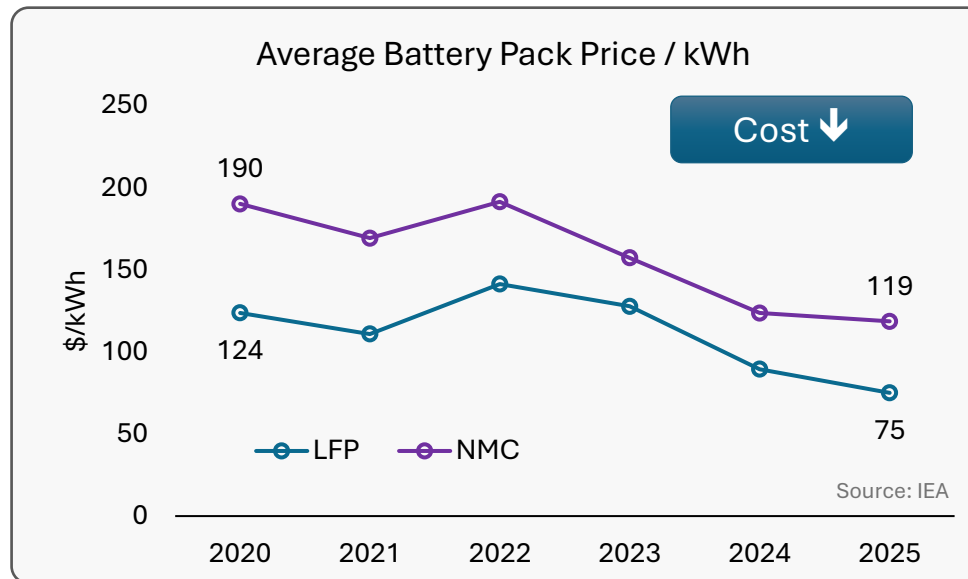
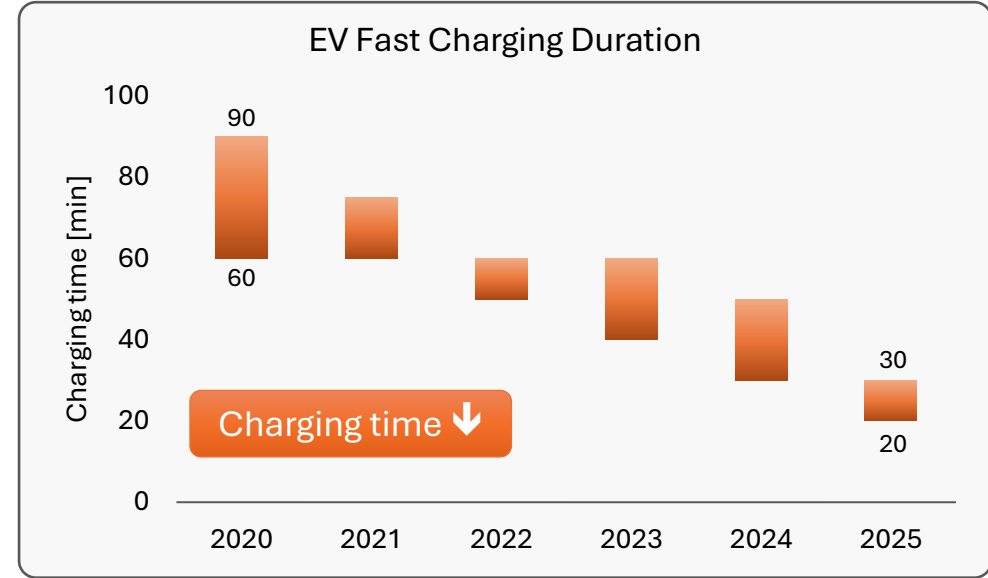
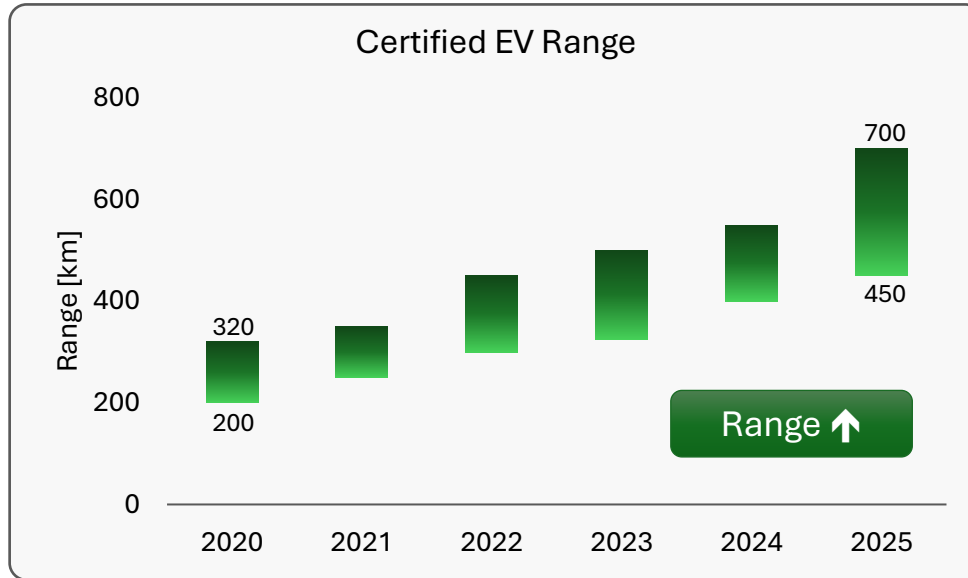
M&M Contribution
to Market EV Share



Factors Enabling Growth – Now



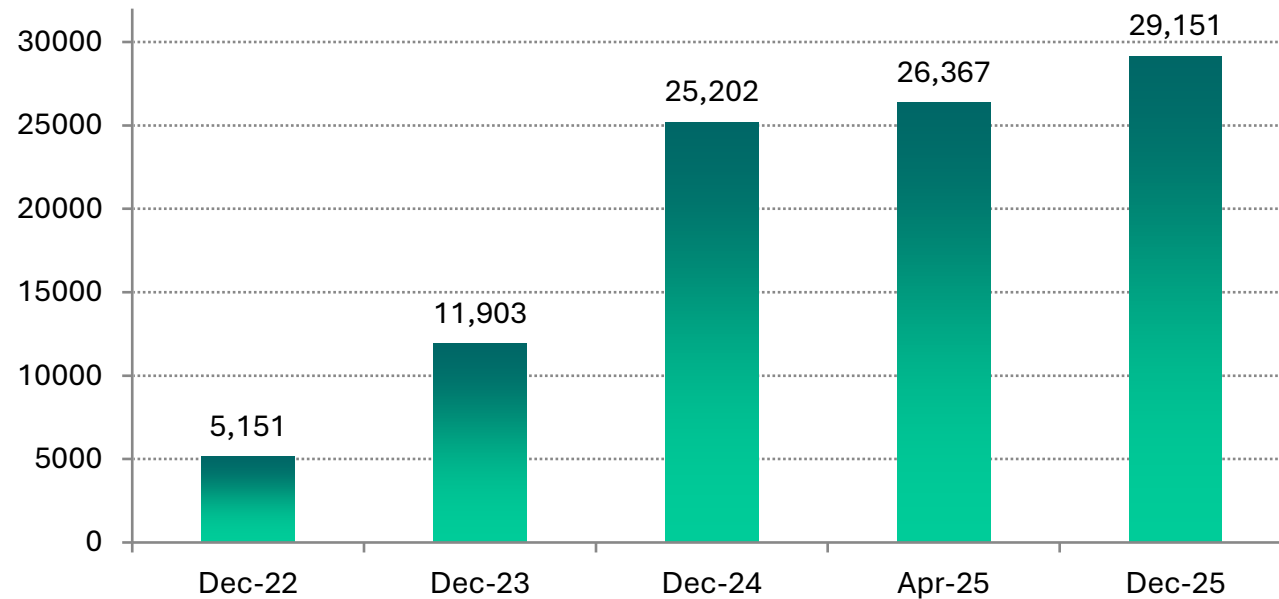
Factors Influencing EV Transition in Passenger Car Now



India Public EV Charging Network | National Scale-up

Public charging stations grew fivefold in under three years

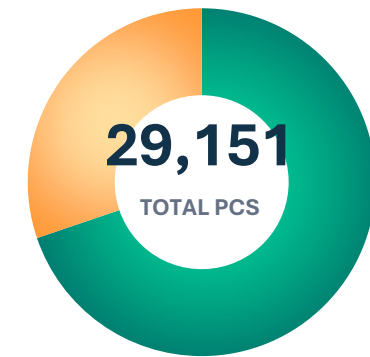
Public charging stations reported nationally



5.7× growth from Dec-22 to Dec-25

FAME deployment
479 FAME-I | 9,097 FAME-II

Dec-2025 charging mix



20,346

Slow chargers

8,805

Fast chargers

DC Fast
Chargers
India

73%

30 kW

24%

60 kW

3%

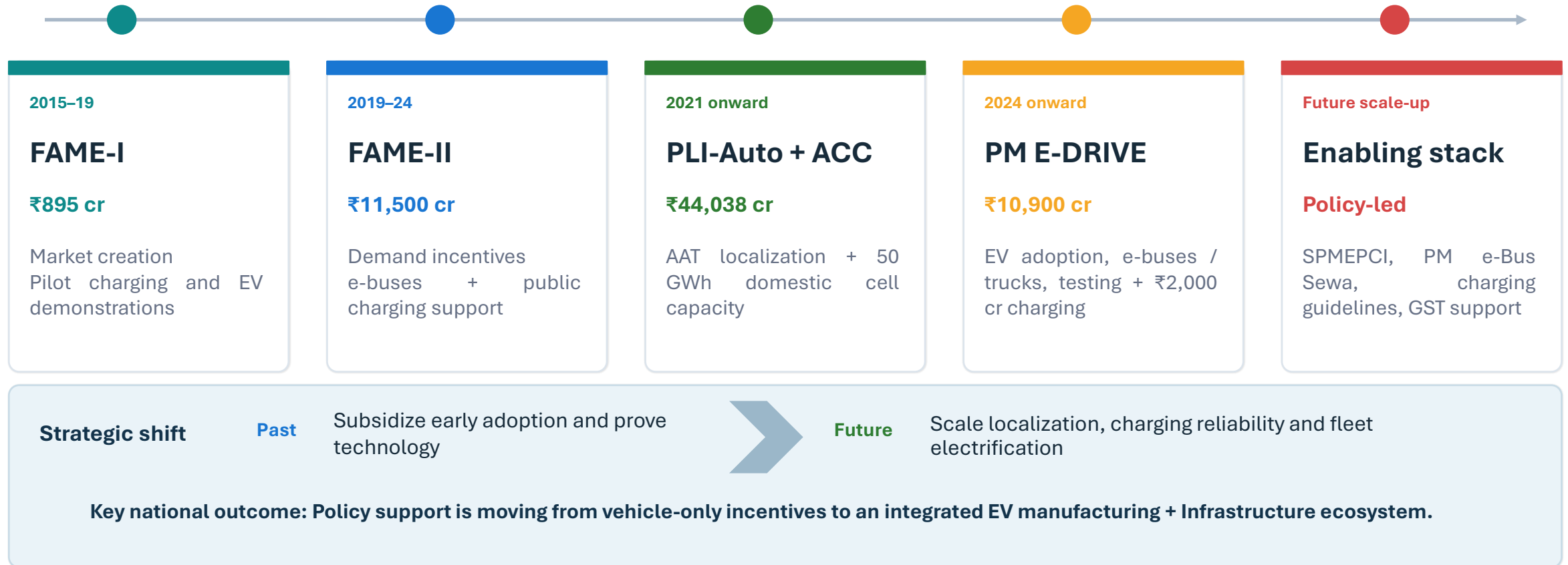
>60 kW

Policy & Regulatory Push for EV



India EV development | Policy Architecture and Pathway

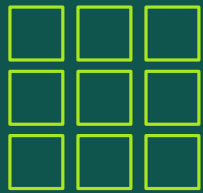
A coordinated stack spanning demand creation, domestic manufacturing, charging and fleet deployment



Vehicle Type	GST
Battery Electric Vehicles (BEV)	5%
Cars with length ≤ 4 m (petrol ≤1200 cc or diesel ≤1500 cc)	18%
Cars with length > 4 m (or petrol >1200 cc or diesel >1500 cc)	40%

PM E-DRIVE Charging Ambition

National charging design rules



URBAN

≥1 station in a
1 km × 1 km grid
by FY2030



HIGHWAYS

Charging every
20 km on both sides

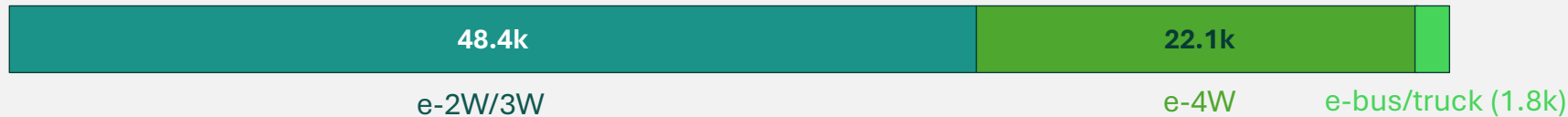


HEAVY DUTY

Every 100 km / side
≥2 × 240 kW chargers

₹2,000 cr for public charging
infrastructure

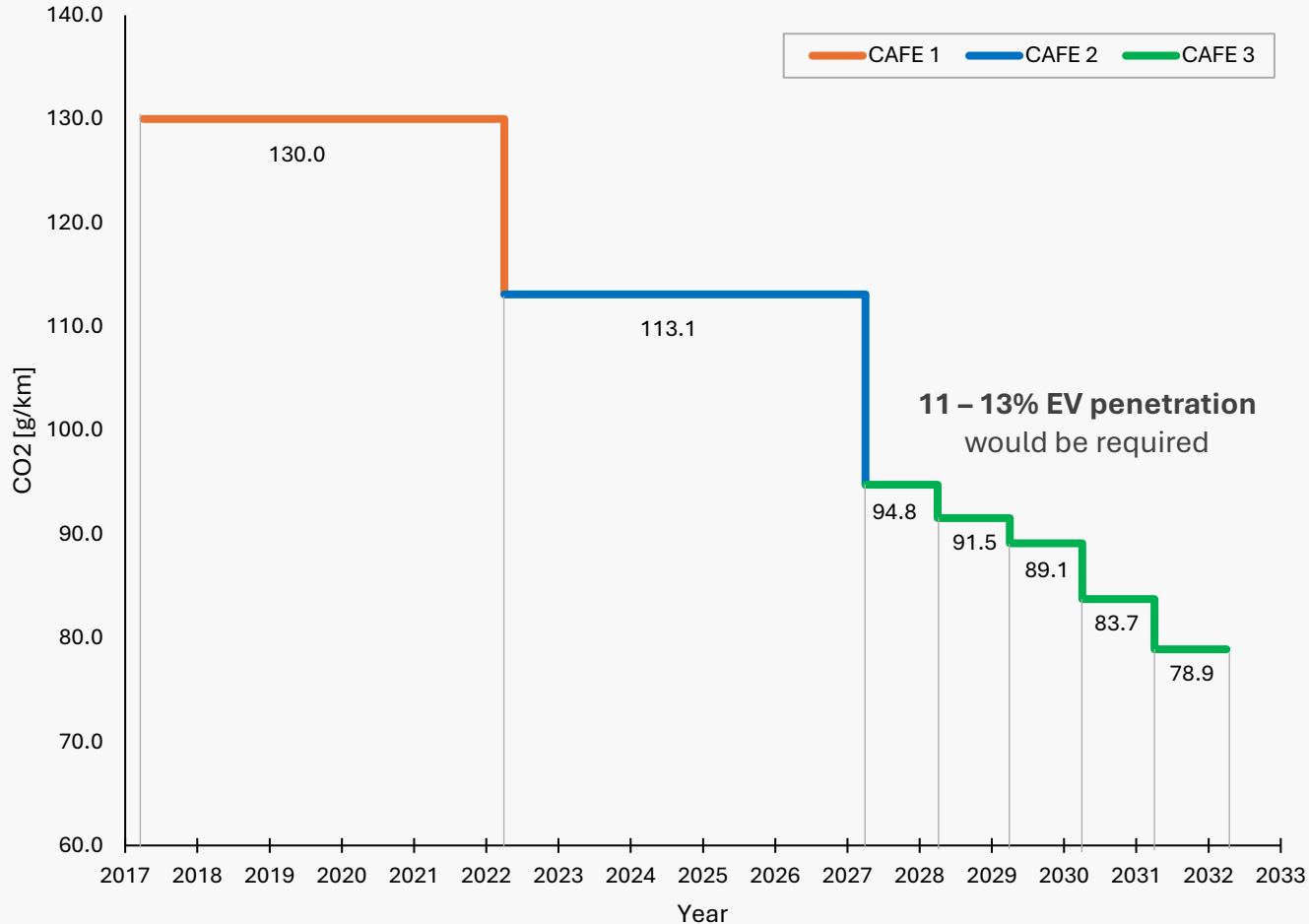
72,300 fast chargers
supported



Enabler: Charging is an unlicensed activity; private entities can build subject to technical, safety and MoP standards.

Regulatory and Policy Drive | India

CAFE Norms - India



Delhi EV Policy

- Mandatory EV from **01.01.27 – 3W & N1; 01.04.28 – 2W; 4W under discussion**
- Targets ~25% of new vehicle registrations to be electric, led by 2W, 3W and buses
- Purchase incentives with road-tax and registration-fee waivers cut upfront cost
- Dedicated EV fund plus charging-point mandates and a fast-expanding public charger network

PLI Scheme

- PLI-Auto (₹25,938 cr) rewards advanced automotive technology, including EVs and fuel-cell vehicles
- PLI-ACC (₹18,100 cr) funds 50 GWh of advanced cell manufacturing to localise batteries
- Sales-linked payouts (about 5–18%) tied to minimum domestic value addition of 50%
- With FAME and PM E-DRIVE, shifts cost competitiveness toward local EV and cell supply chains

CAFE-3 shifts the compliance strategy from pure ICE efficiency improvement to higher degree of electrification, portfolio optimization for fuel mix, and technology credits. Flexibility provided to manufacturers through pooling, trading, and block-periods.

Technology Led Mobility Transition



The Mobility Industry is Undergoing Multiple Disruptions

FOUR TECHNOLOGY SHIFTS are redefining the vehicle, the customer experience and the mobility ecosystem

CONNECTIVITY

The vehicle becomes a continuously connected node linking driver, cloud, infrastructure and services.



SOFTWARE-DEFINED VEHICLES

Vehicle functions increasingly evolve through software, centralized computing and over-the-air updates.



ELECTRIFICATION



Propulsion shifts from combustion-led mechanical systems to high-voltage electric powertrains.



ARTIFICIAL INTELLIGENCE



AI advances the journey from assisted driving toward predictive, personalized and intelligent mobility.



Together, these shifts move the industry from manufacturing vehicles to delivering **CONTINUOUSLY EVOLVING MOBILITY** experiences.

What Customers Want?



Traditional Customer

-  Reliability
-  Fuel Economy
-  Service Network
-  Resale Value
-  Ownership
-  Mechanical Quality

Product Centric



Next Gen Customer

-  Connectivity
-  Software Experience
-  OTA Updates
-  Digital Ecosystem
-  Experience
-  Software Quality

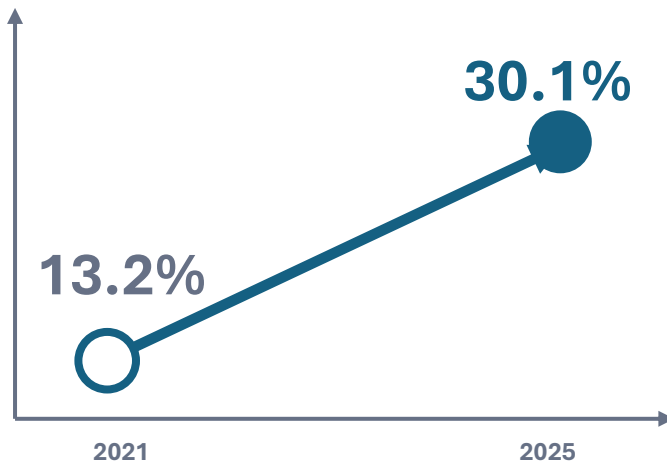
Experience Centric

Connected Vehicles as Mainstream Options

Connectivity and OTA capability are moving from premium differentiators to expected vehicle attributes

VEHICLE ADOPTION

Connected-Car Penetration

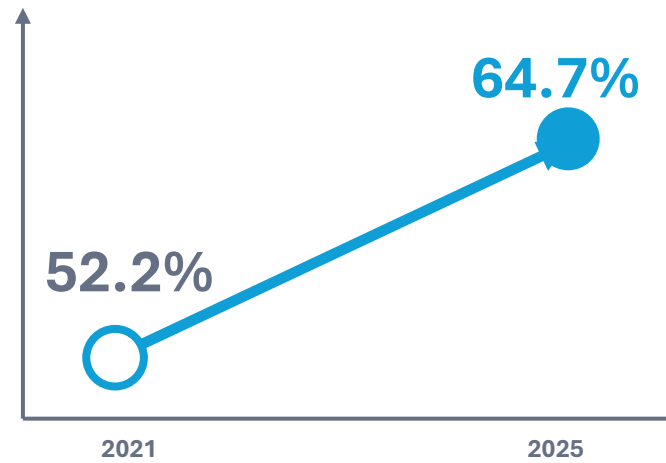


2.3×

penetration growth in four years

OTA FEATURE ADOPTION

Remote Services Backed by OTA

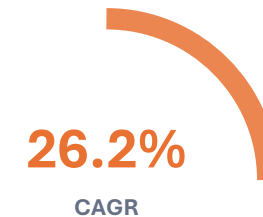


+12.5 pp

more connected services delivered with OTA support

FORWARD OUTLOOK

OTA Market Momentum



24.3%
CAGR

Overall connected-car market forecast, 2026–31

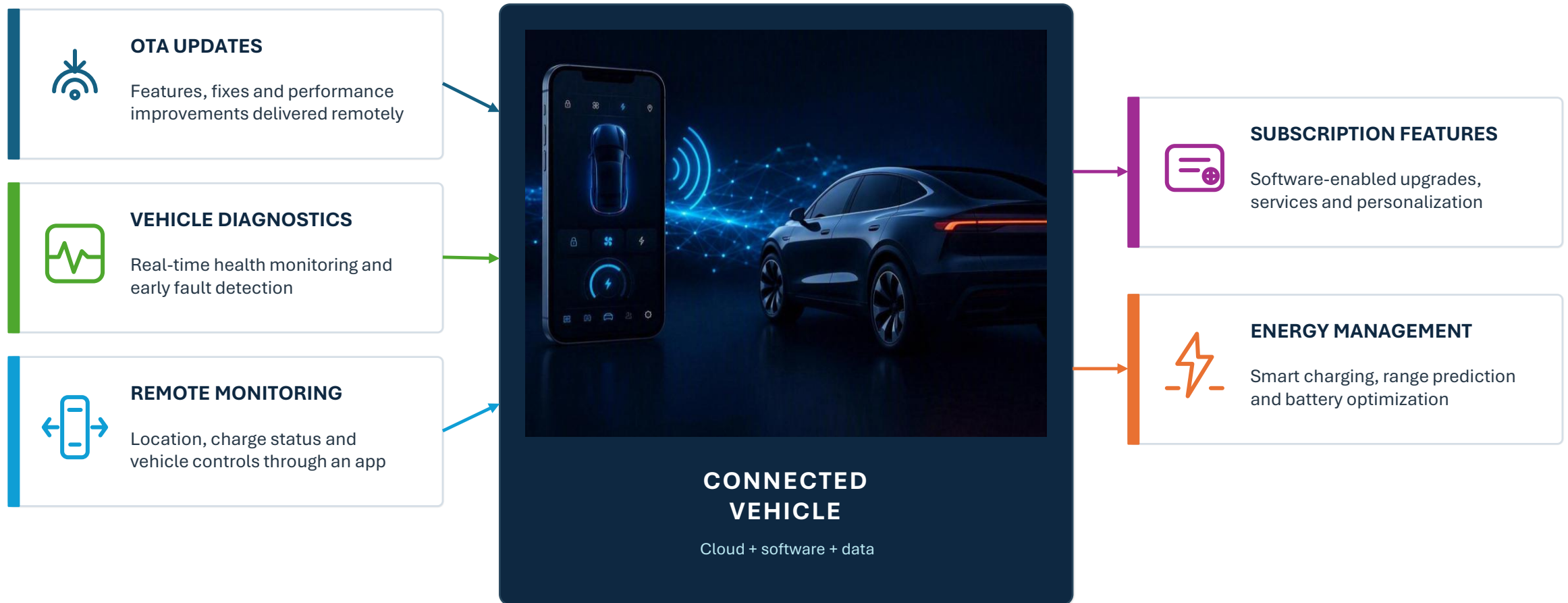
OTA updates market growth forecast

Software capability increasingly shapes purchase choice, loyalty, service retention and recurring-revenue potential.

Connected → OTA-enabled → Software-defined: The vehicle is becoming a continuously evolving digital platform.

Connected Cars Are Becoming Smartphones on Wheels

The vehicle is evolving into a connected digital platform that improves throughout its life

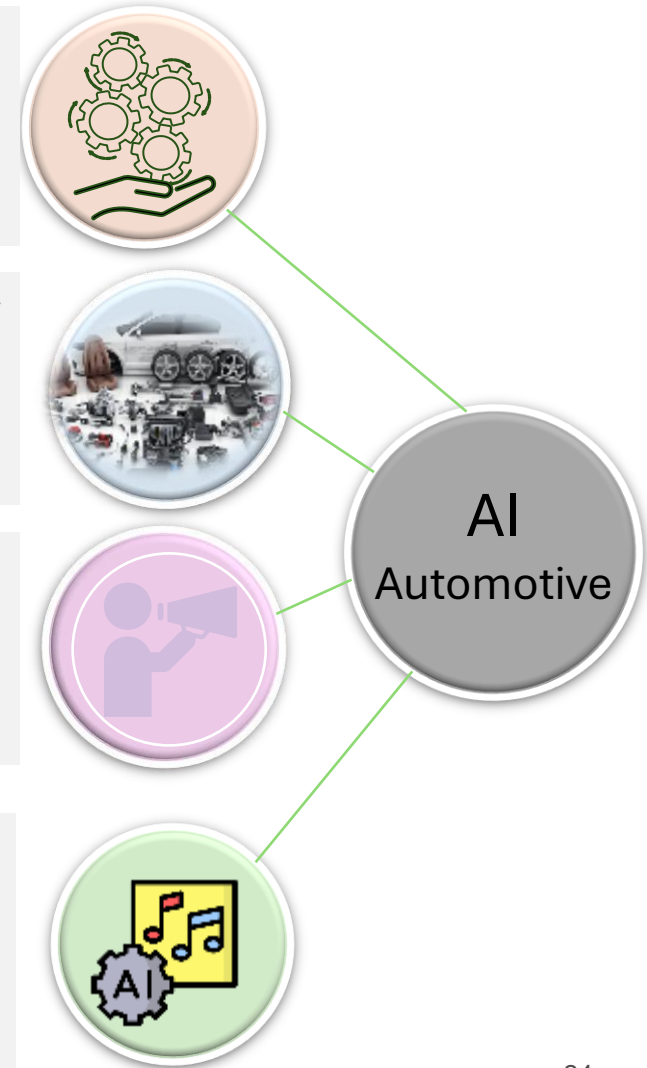
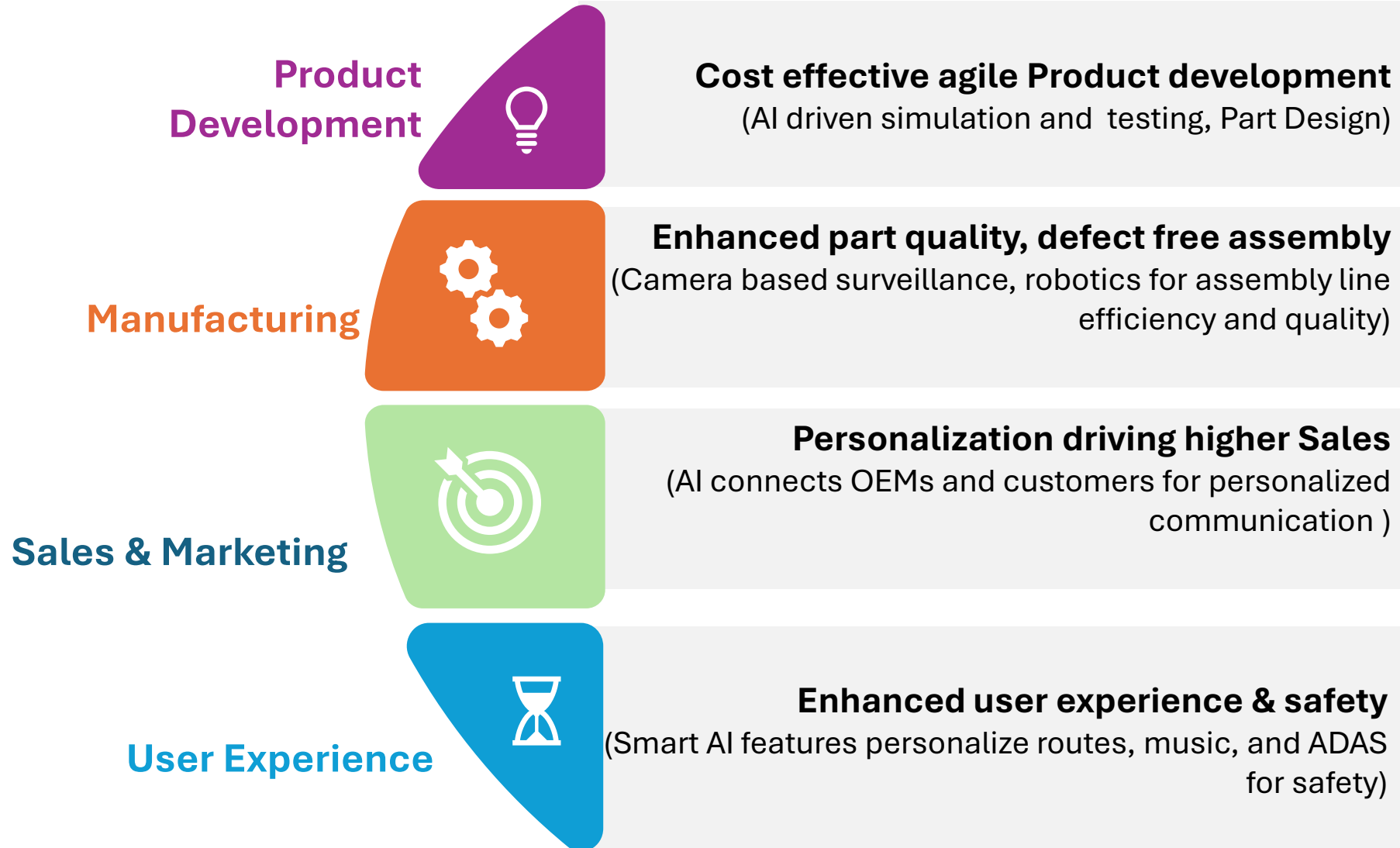


VEHICLE VALUE WILL INCREASINGLY BE DEFINED BY SOFTWARE

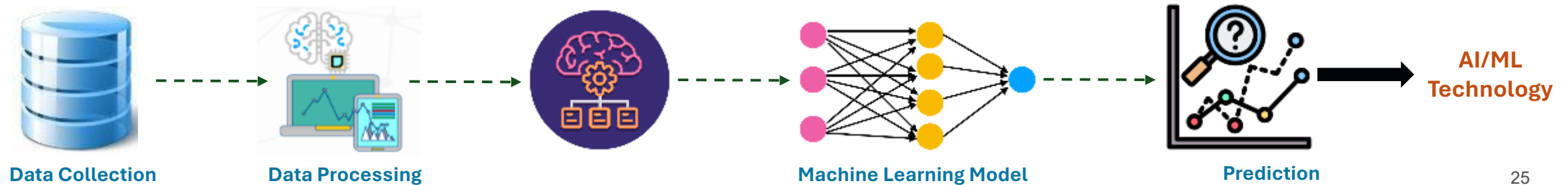
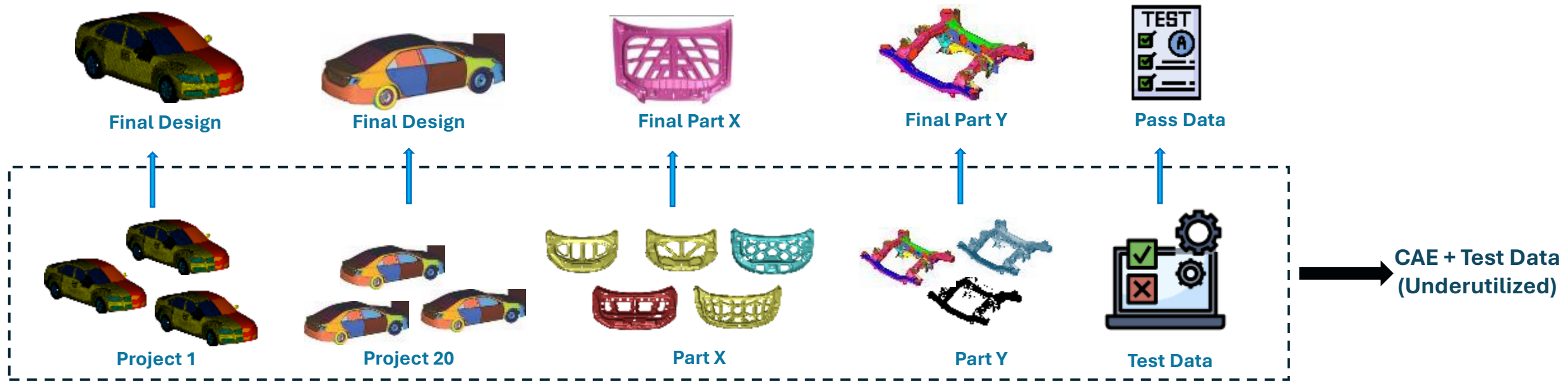
What we do at M&M



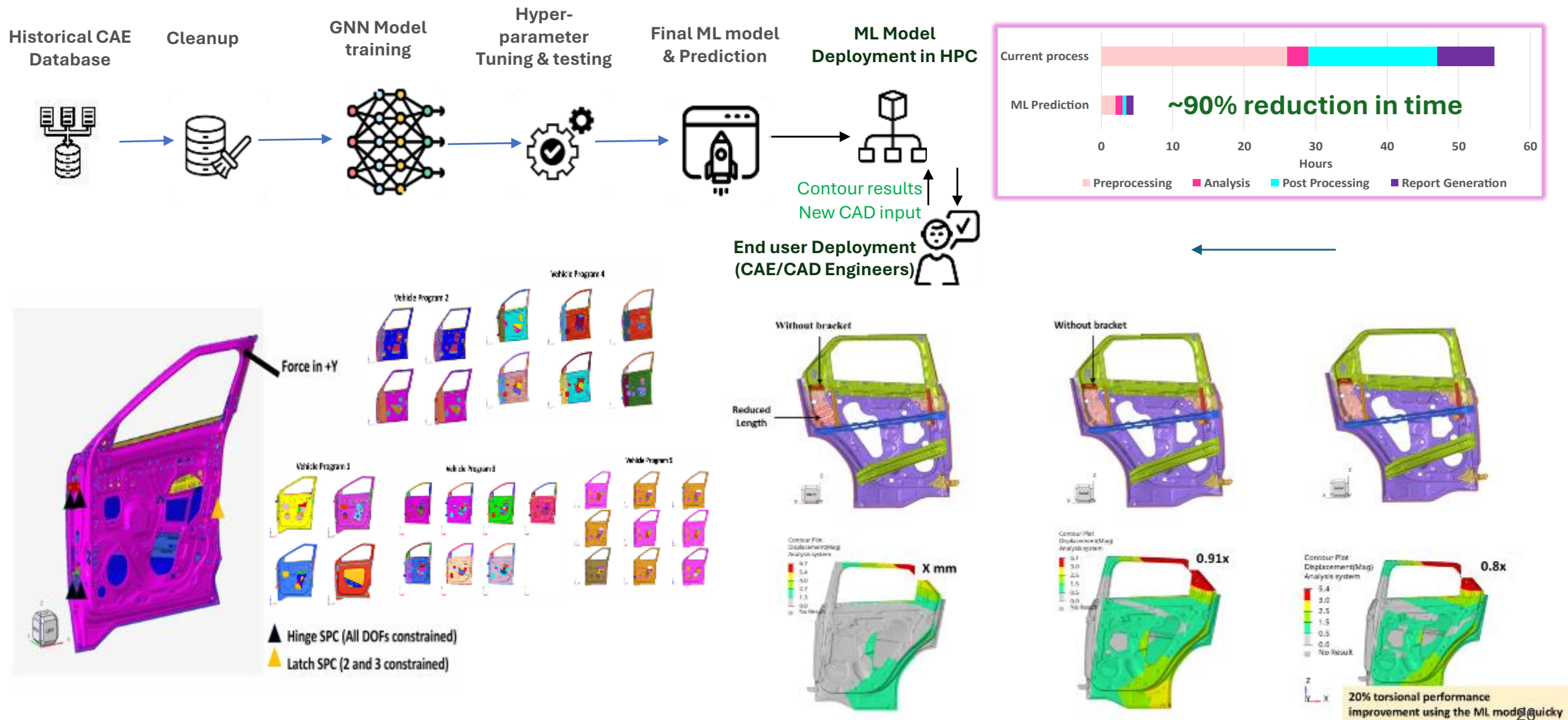
AI in Automotive Product Development



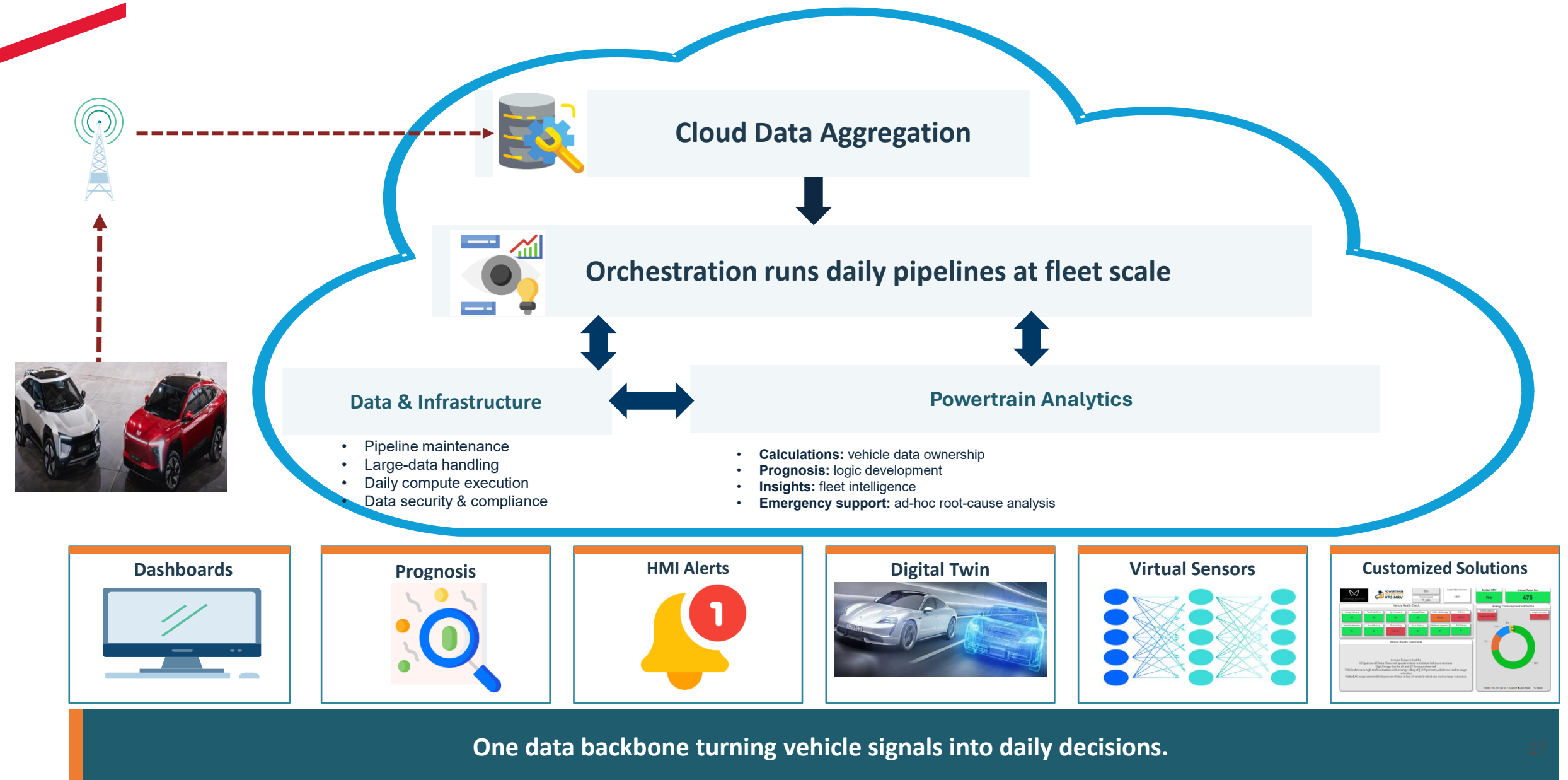
Data Architecture for AI – Driven CAE Simulation



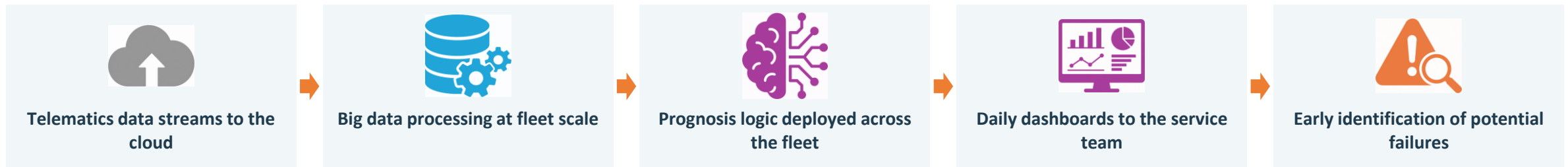
Lateral Stiffness Prediction – AI Case Study



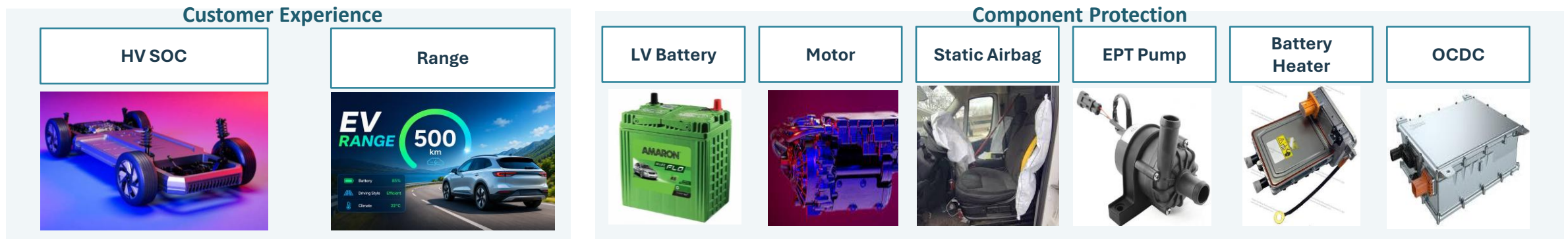
One Data Backbone – From Vehicle Signal to Daily Decision



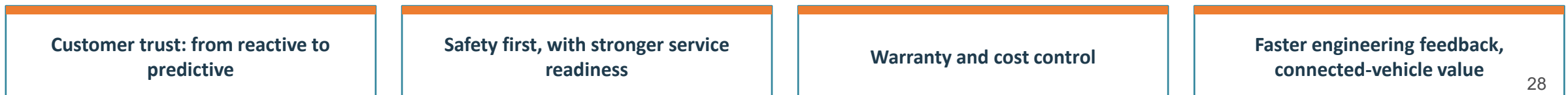
Prognosis – Reactive Repair to Predictive Action



14 prognosis deployed across the fleet, covering 12K+ customers - 8 representative examples shown



Prognosis turns early vehicle signals into customer trust and lower cost.



M&M BEVs

INGLO platform at the
heart of our BEVs

79 kWh

70 kWh

59 kWh

210 kW

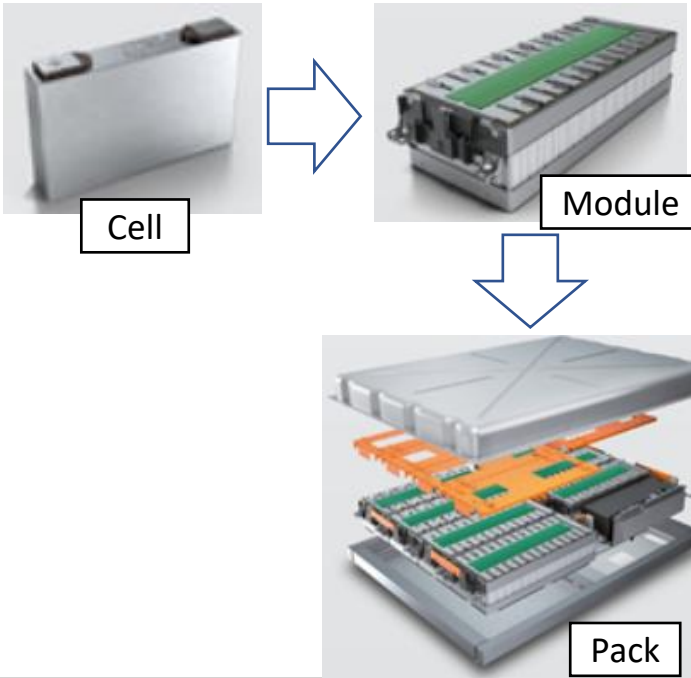
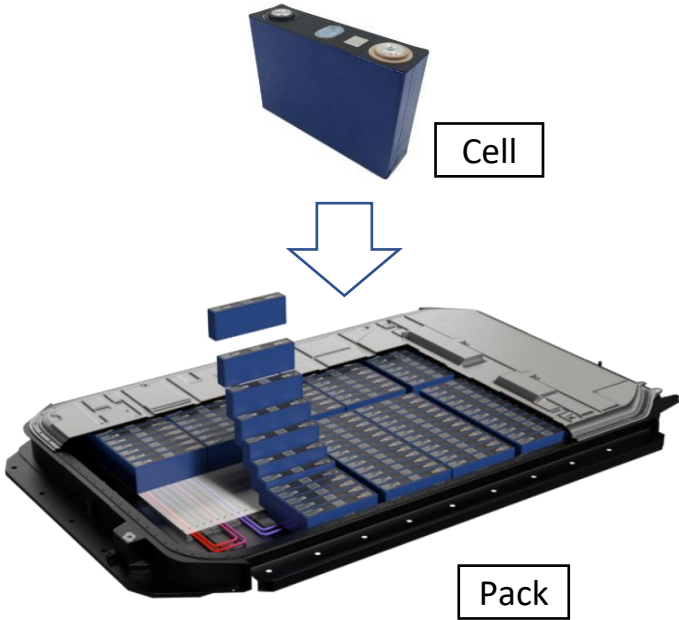
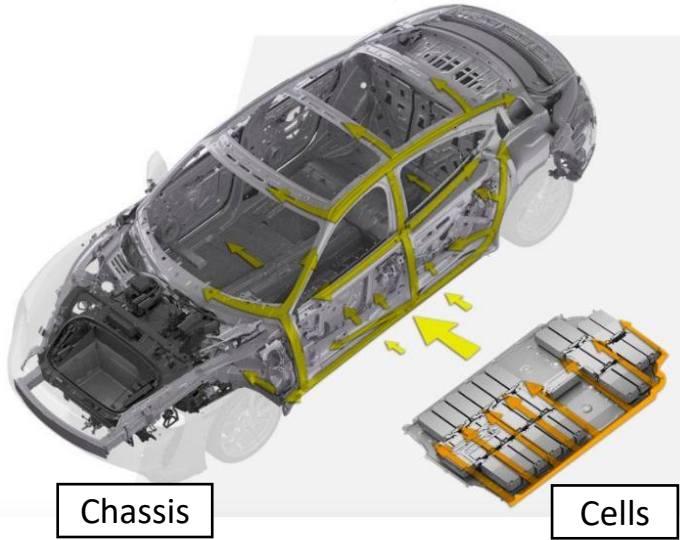
360 Nm

20-80 in 20

INGLO
mahindra



M&M BEVs | CTP/CTB Architecture

Parameter	Cell to Module; Module to Pack	CTP (Cell to pack)	CTC/CTB(Cell to Chassis/Body)
Architecture	 Cell → Module → Pack	 Cell → Pack	 Chassis ← Cells
Serviceability	+	-	--
Energy Density	○	+	++
Packaging Efficiency	○	+	++
Cost	○	+	++

+ High ○ Medium - Low

M&M BEVs | CTB

BYD SEAL



Architecture

- Battery top cover as BIW underbody floor
- BIW crash and seat mounting member part of BIW
- Gap between Battery and floor utilised
- BIW to battery pack sealing
- E&E component access outside, without pack removal

Advantage

- Z height Packaging space increase **by around 10mm**
- Weight reduction :10%
- Improved volumetric & gravimetric efficiency

Challenges

- Coolant line, HV-LV line to be passed from LH-RH of battery pack, to be protected against crash
- Top cooling plate + BIW Floor ?
- BIW passenger compartment sealing to be ensured
- Service components access without pack removal.

M&M Charging Network



AC CHARGING (7 - 11kW)

- ✓ Home charging solutions
- ✓ Apartment & residential society deployment
- ✓ Workplace charging infrastructure
- ✓ Supports the majority of customer charging needs



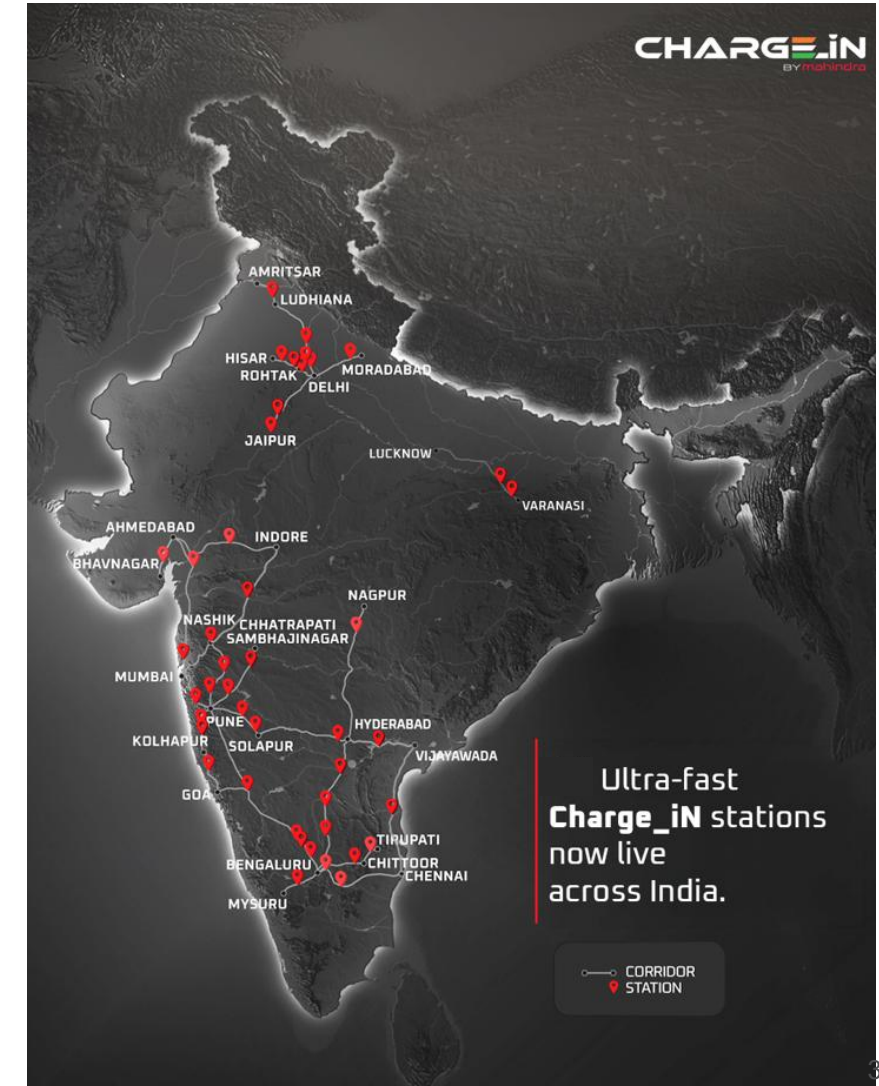
DC FAST CHARGING NETWORK

- ✓ **CHARGE_in** open access network for all e4W users
- ✓ **180 kW** ultra-fast charging
- ✓ Highway and Expressway corridor deployment
- ✓ Nationwide expansion toward **1000+ charging points by 2027**



DIGITAL CHARGING EXPERIENCE

 FIND →  RESERVE →  NAVIGATE →  CHARGE →  PAY



M&M Charging Network



Delhi-Ludhiana-Amritsar



Bengaluru-Tirupati-Chennai



Bengaluru-Chennai



Pune-Solapur



Delhi-Ludhiana-Amritsar



Bengaluru-Mysuru

Objective: Building an ultrafast, convenient and reliable public EV charging network

Location choice

Focus is on Highways and Expressways

Site type

Sites which have amenities such as restaurants, cafes & washrooms

Vehicle Focus

4W EVs only

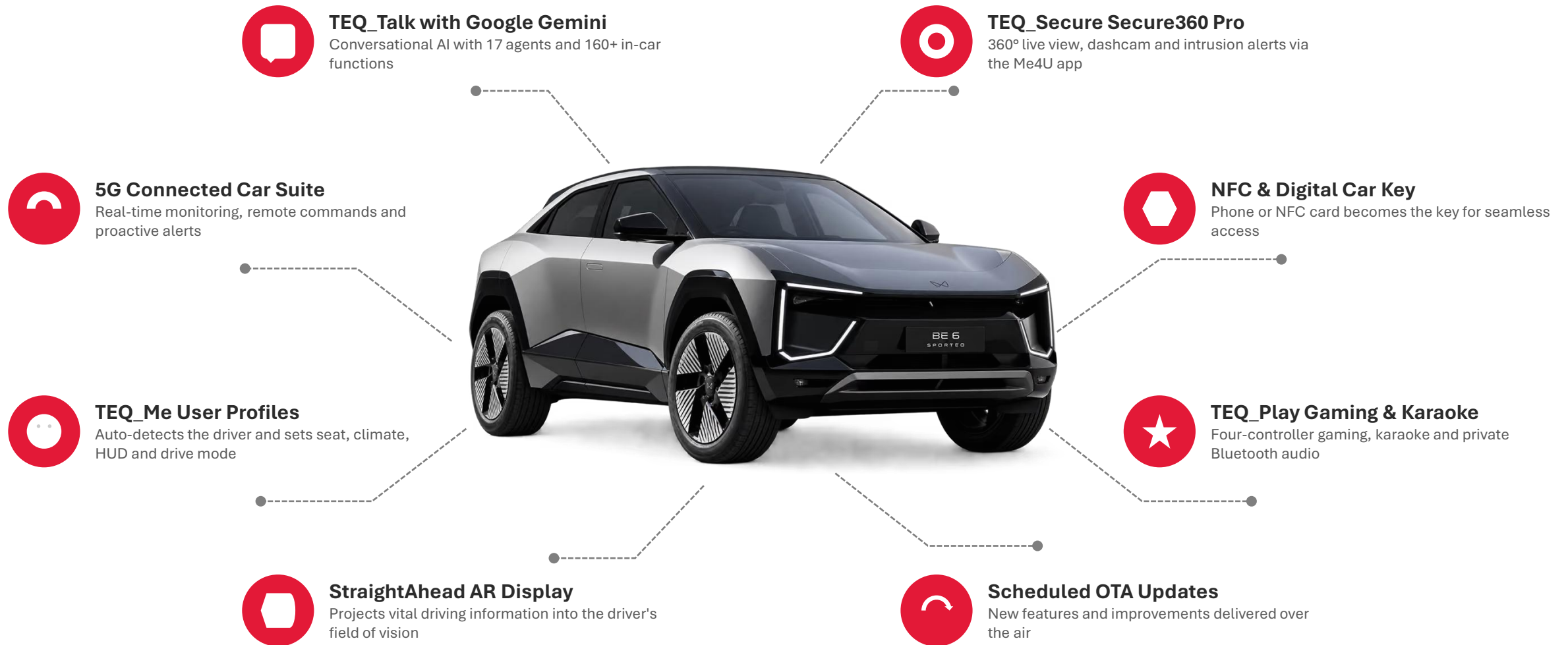
Charger type

180 kW ultrafast chargers only

Business model choice

Owned and managed by M&M

M&M BEVs | Future Readiness



The India Electrification & Technology Transition Story



Drivers for Electrification Transition



Current drivers



- ✓ Strong driver business case, high utilization
- ✓ Fixed routes with rapid return on investment

- ✓ Low running cost vs petrol
- ✓ Wide product choice, fast payback

- ✓ Running costs attractive vs ICE
- ✓ More models and longer ranges available

- ✓ Government programs supporting adoption
- ✓ Fixed depot routes suit planned charging

Future drivers



- Connected fleet telematics for uptime and routing
- Battery swapping and localised EPT cost reduction
- Earnings-linked financing and ownership models

- Connected, app-enabled smart 2W features
- Faster charging and swappable, efficient EPT packs
- Financing and resale backed by battery-health data

- SDV features and OTA updates as buying triggers
- Fast-charging corridors plus higher-efficiency EPT
- Transparent battery health to protect resale value

- Depot charging with connected fleet management
- High-voltage EPT for payload and range
- SDV diagnostics and predictive maintenance
- TCO-based leasing and financing models

Where are we headed



What will drive the mobility industry immediately?

Infrastructure

Charging scale-up

Manufacturing

Battery / Motor localization

Mass adoption

Affordability EVs across all market segments

Geopolitics de-risking strategy

What will drive the mobility industry's future?

Infrastructure

Connectivity

Design

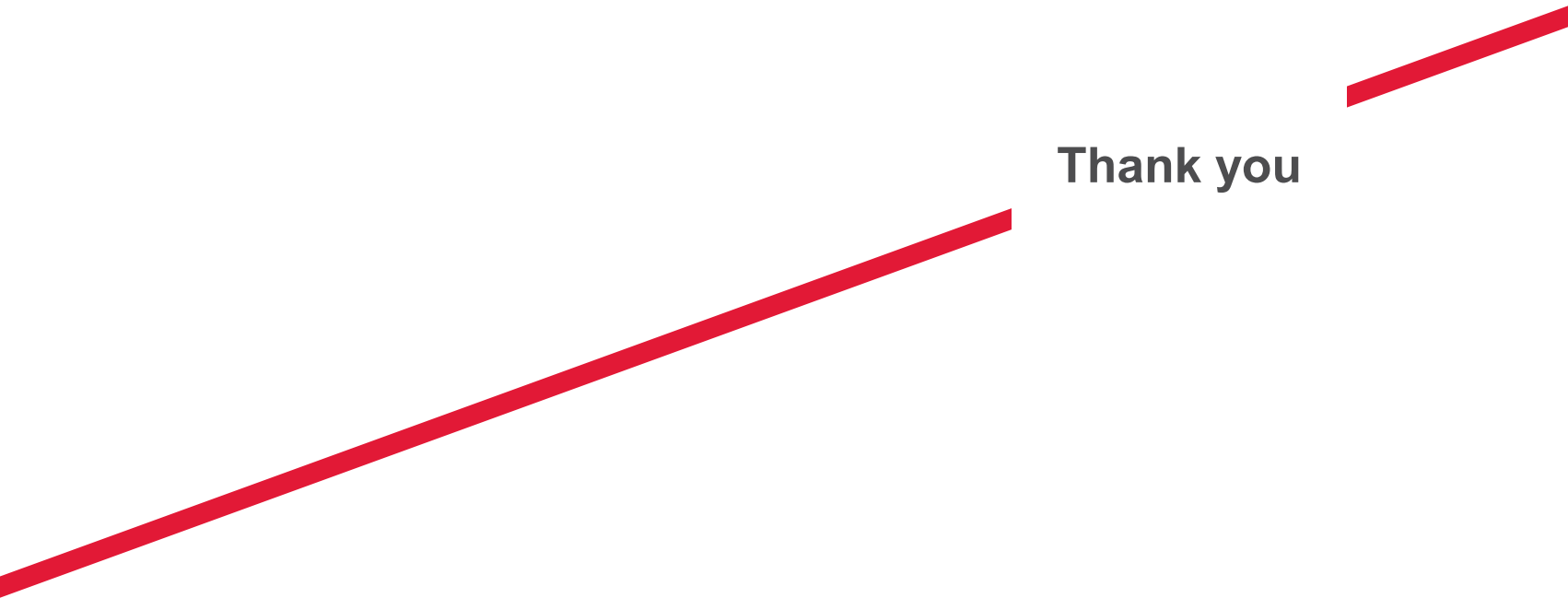
Software defined vehicle

Technology

AI-enabled mobility

India's EV transition sequence for faster electrification

Stronger economics → Simpler charging requirement → AI enabled SDVs → All at affordable price



Thank you