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Government of India

Azadi Ka Amrit Mahotsav

EV Charging Infrastructure

Distribution Utility Meet Nov 2024

Lucknow

Dr Hanif Qureshi,

Additional Secretary (Automobiles Division)

Ministry of Heavy Industries (MHI), Govt of India

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e-4W Sales, 2010-2024

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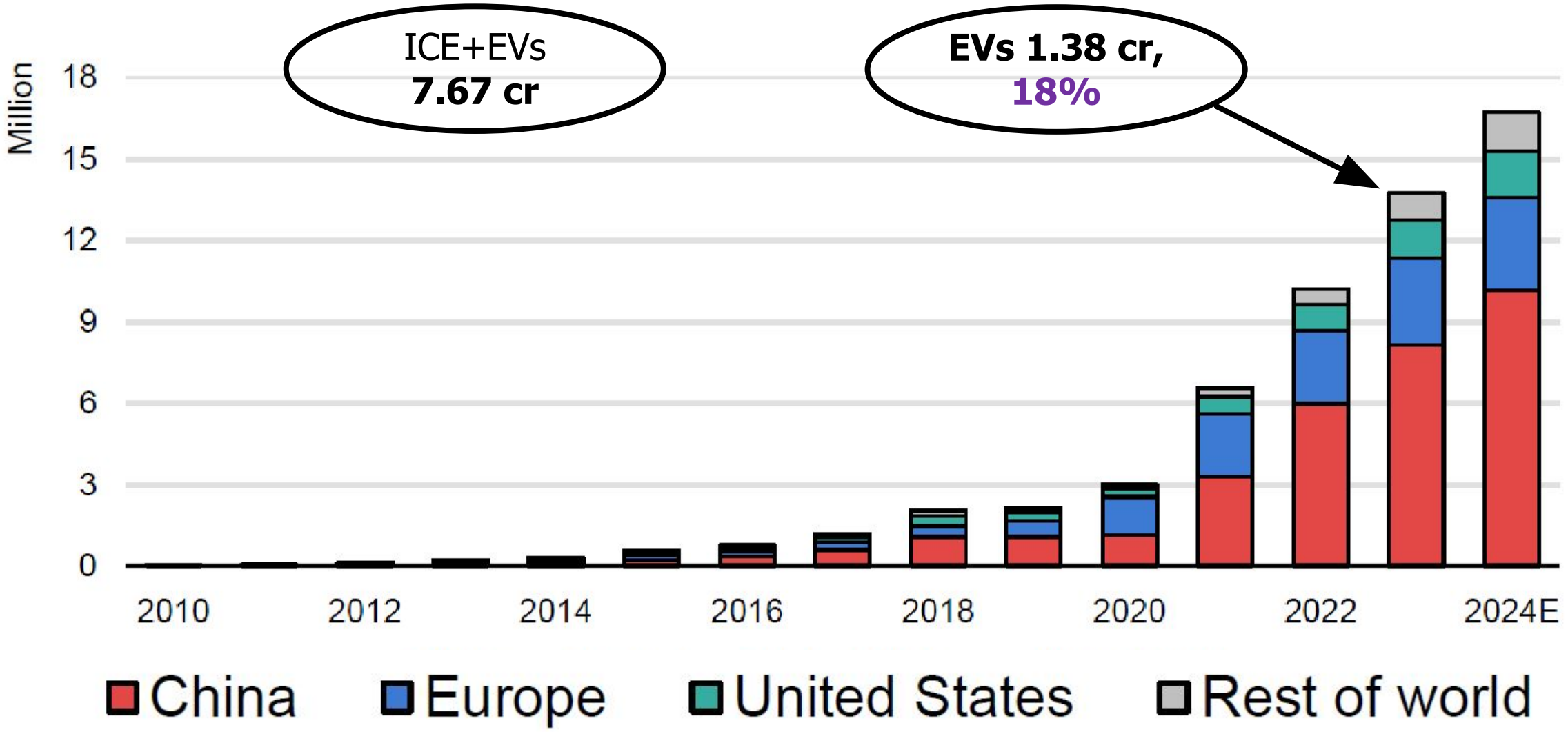

Source: IEA EV Outlook 2024

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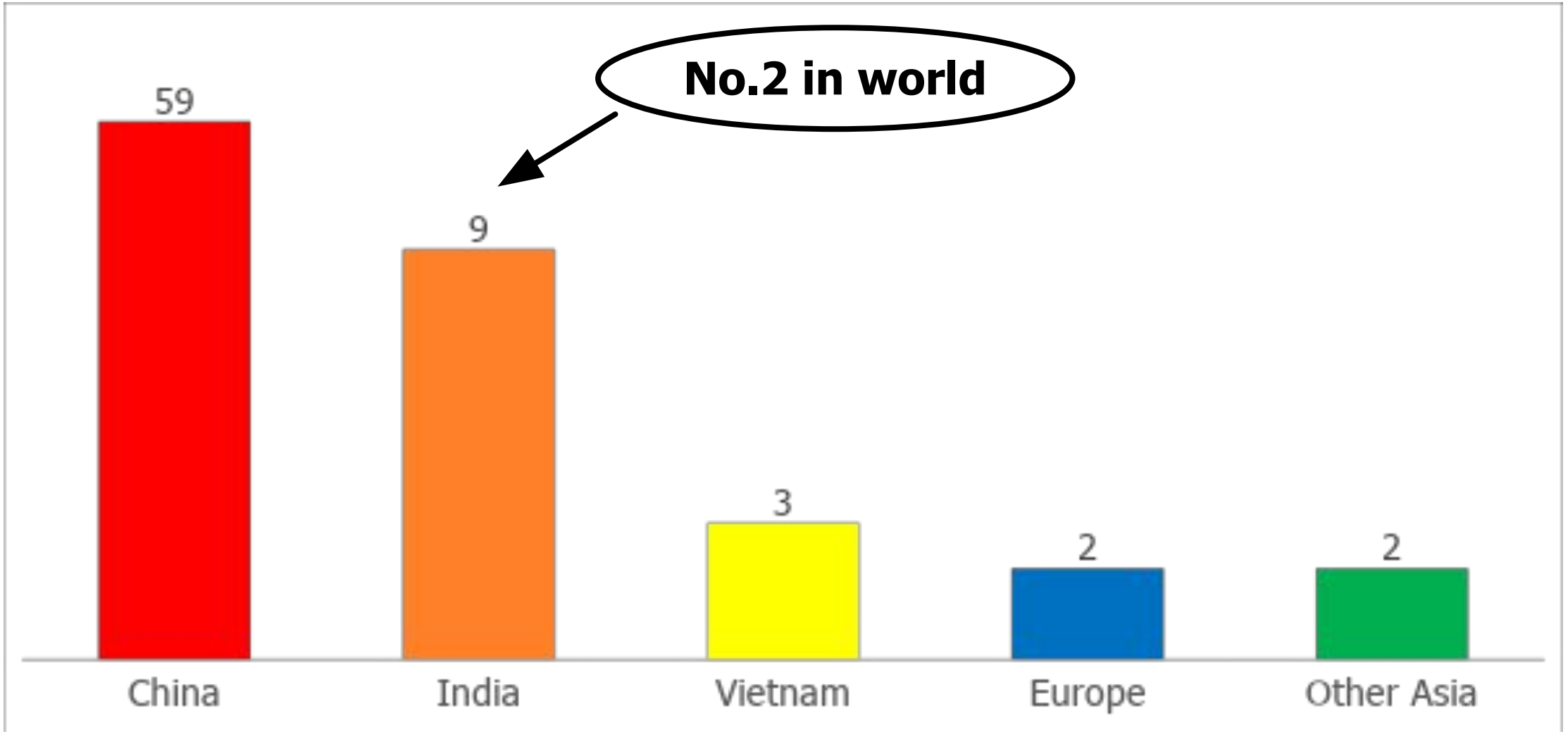
Sales of e-2W in 2023 (nos. in lakh)



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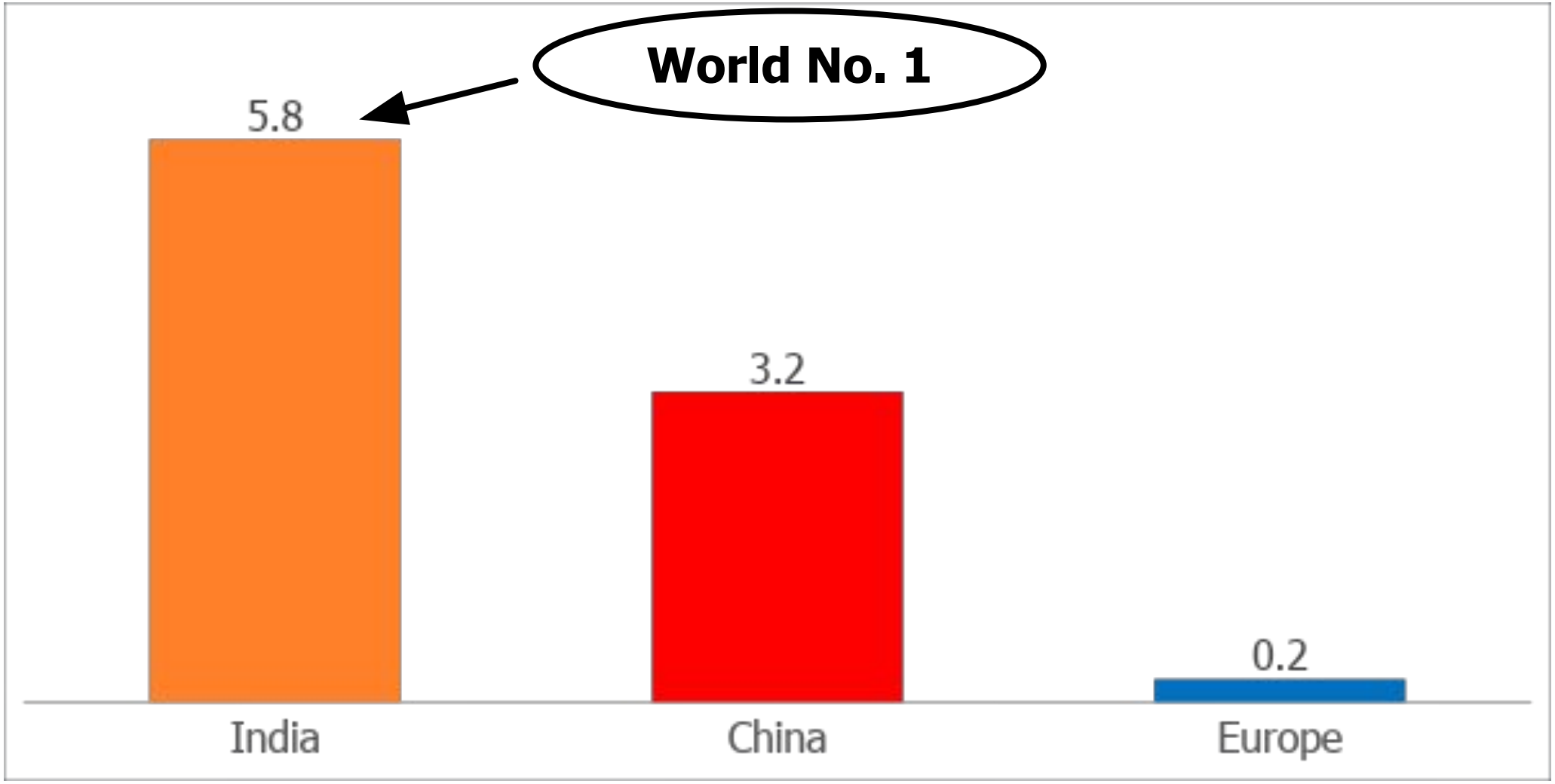
Sales of e-3W in 2023 (nos. in lakh)



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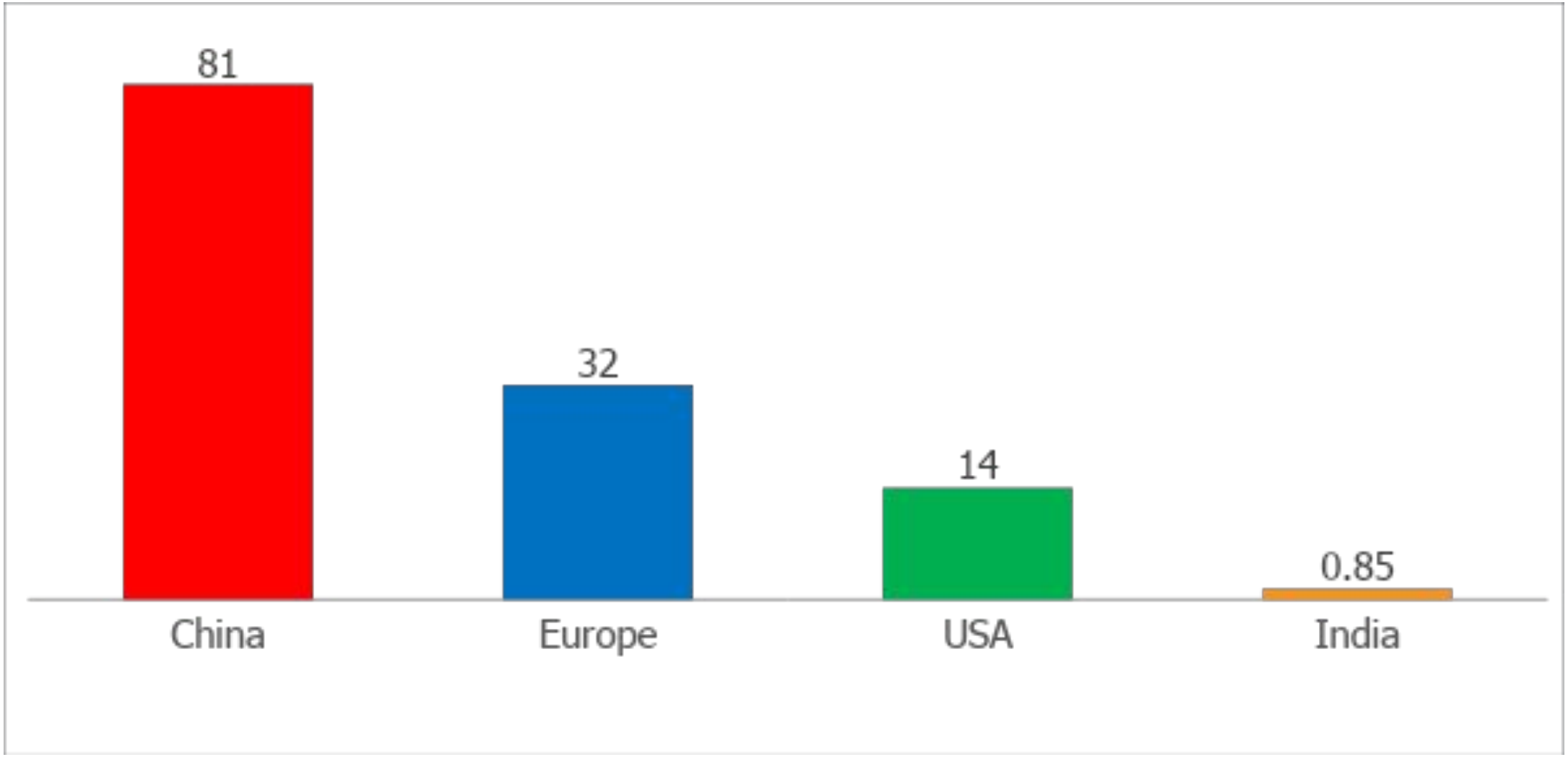
Sales of e-4W in 2023 (Nos. in lakh)



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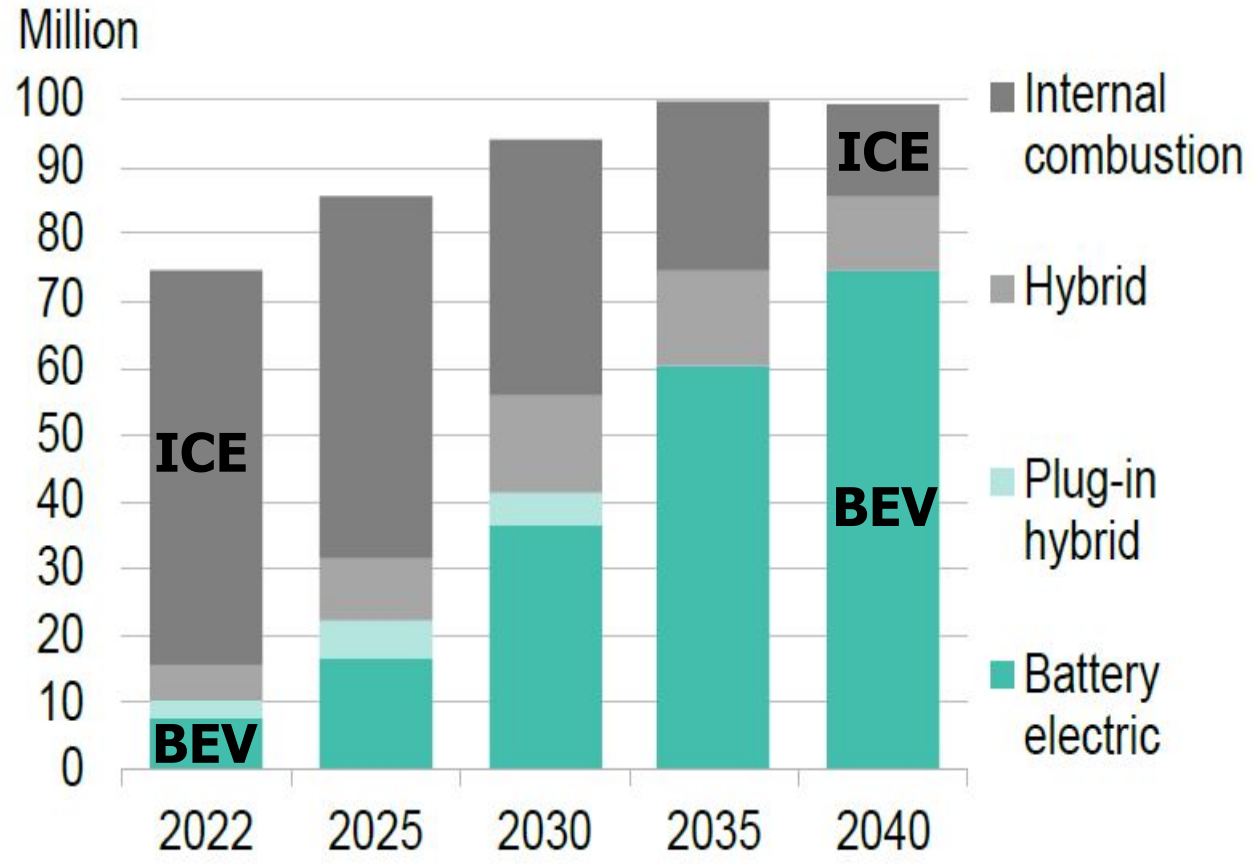
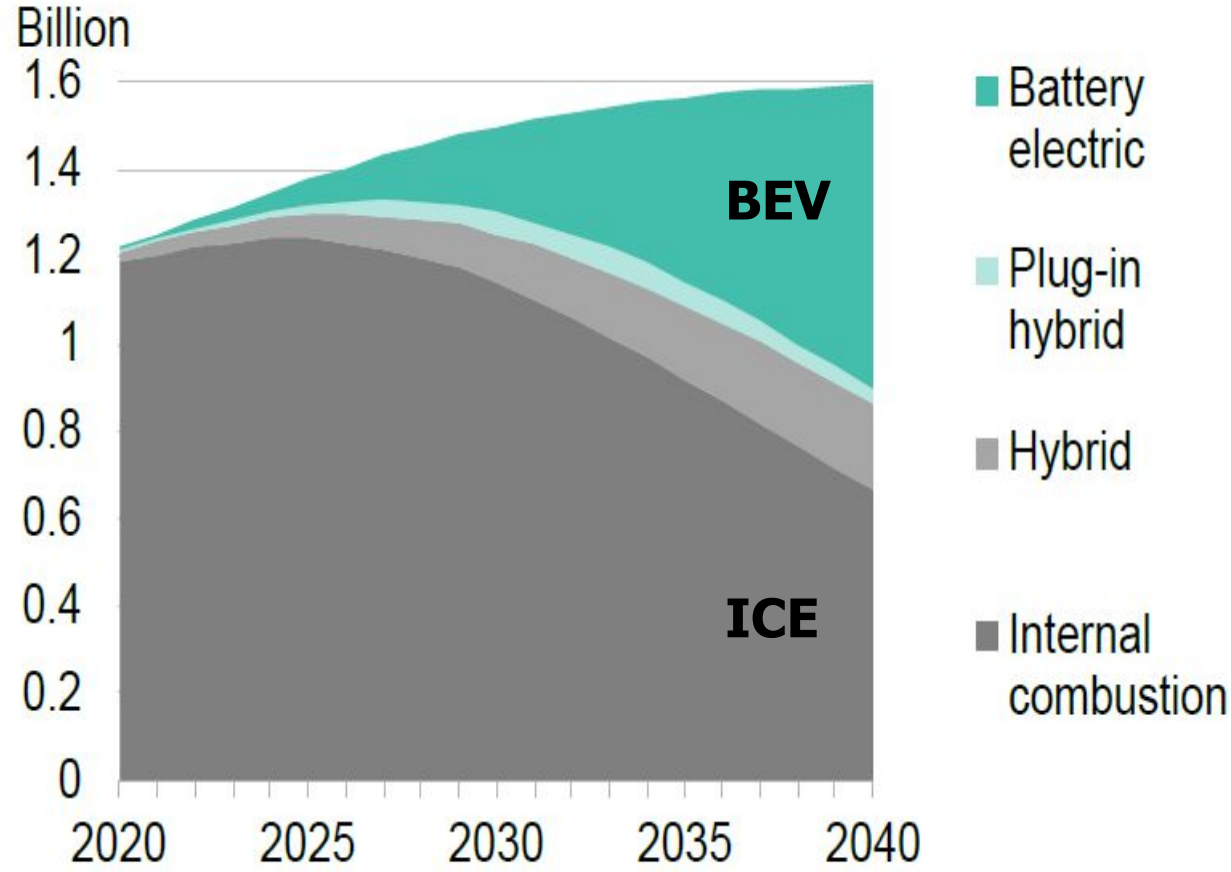
Global PV Sales & PV Fleet: Projections by drivetrain

Global passenger vehicle sales by drivetrain – Economic Transition Scenario



Global passenger vehicle fleet by drivetrain – Economic Transition Scenario



Source: BloombergNEF.

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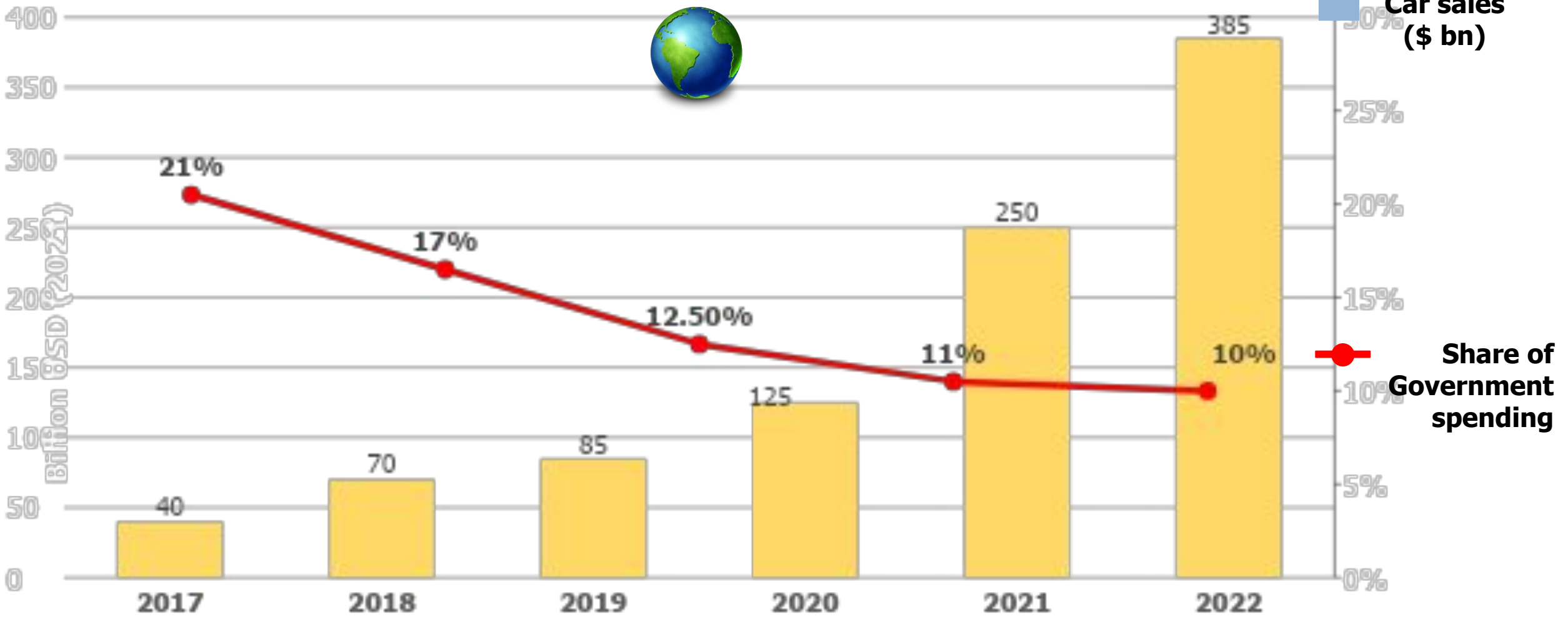
Tapering of Government support to EVs (2017-2022)



Source: IEA EV Outlook 2023

3. FAME I & II


DELTA
Smarter.
Greener.
Together.
fortum
Fortum
charge
& drive
EV Charger

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FAME I & II have accelerated %EV penetration

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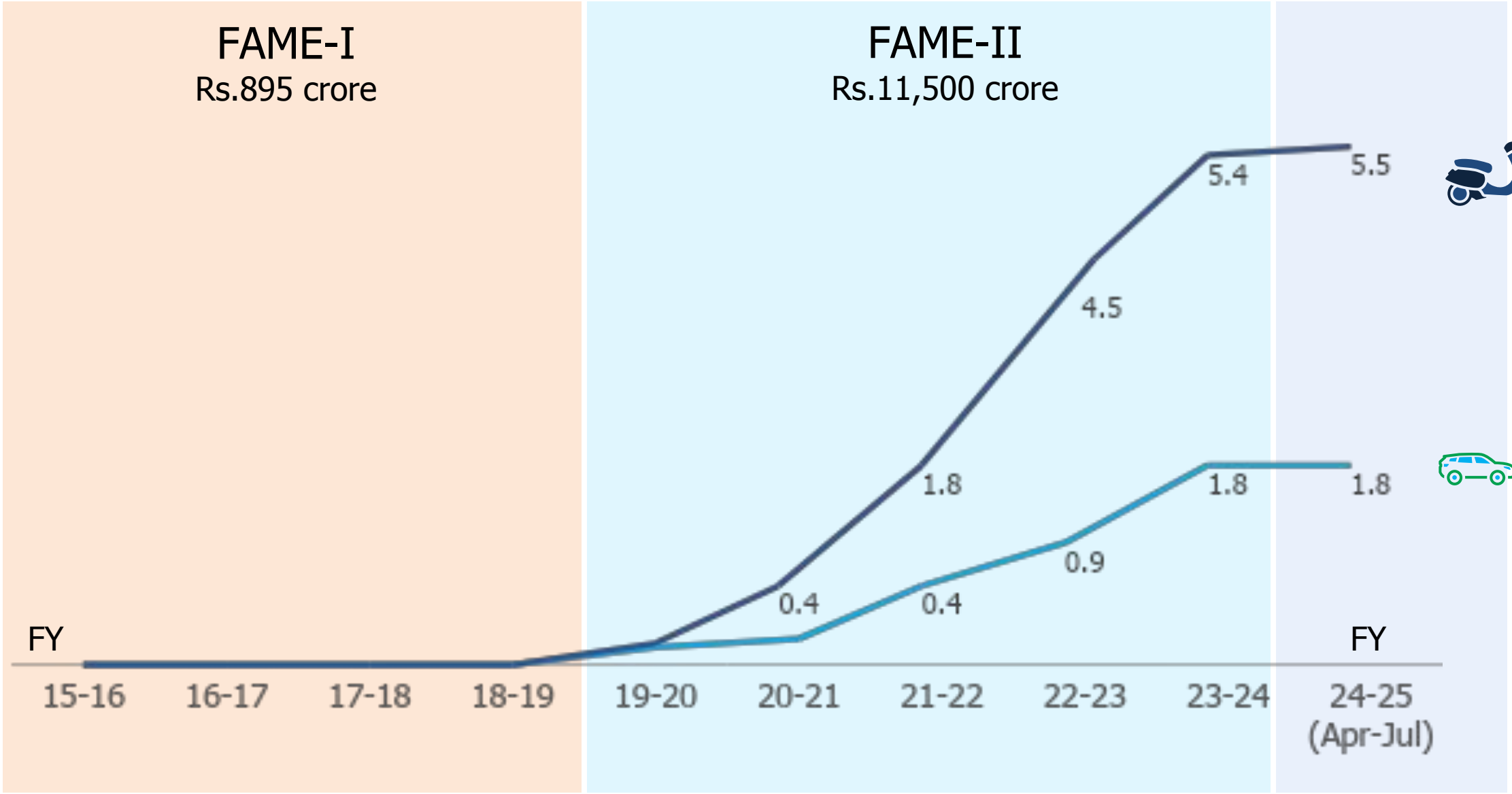

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FAME I & II have accelerated %EV penetration

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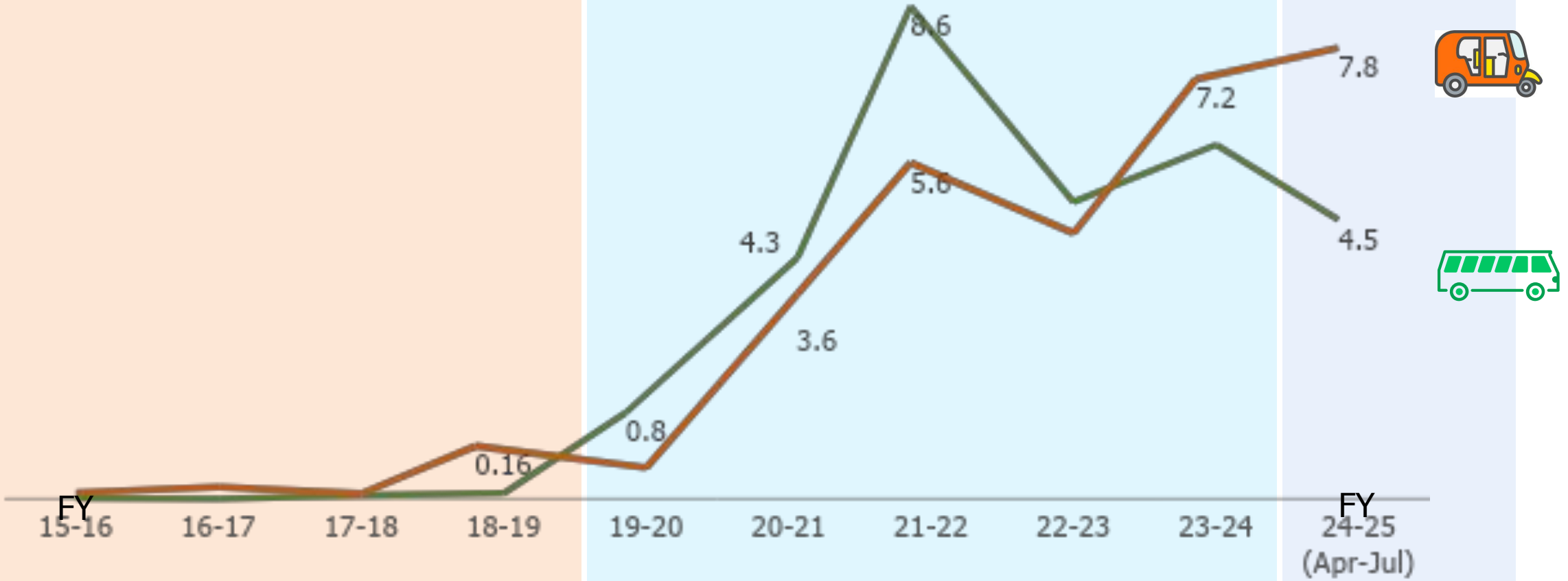
FAME-I
Rs.895 crore

FAME-II
Rs.11,500 crore



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Proposed outlay for PM E DRIVE

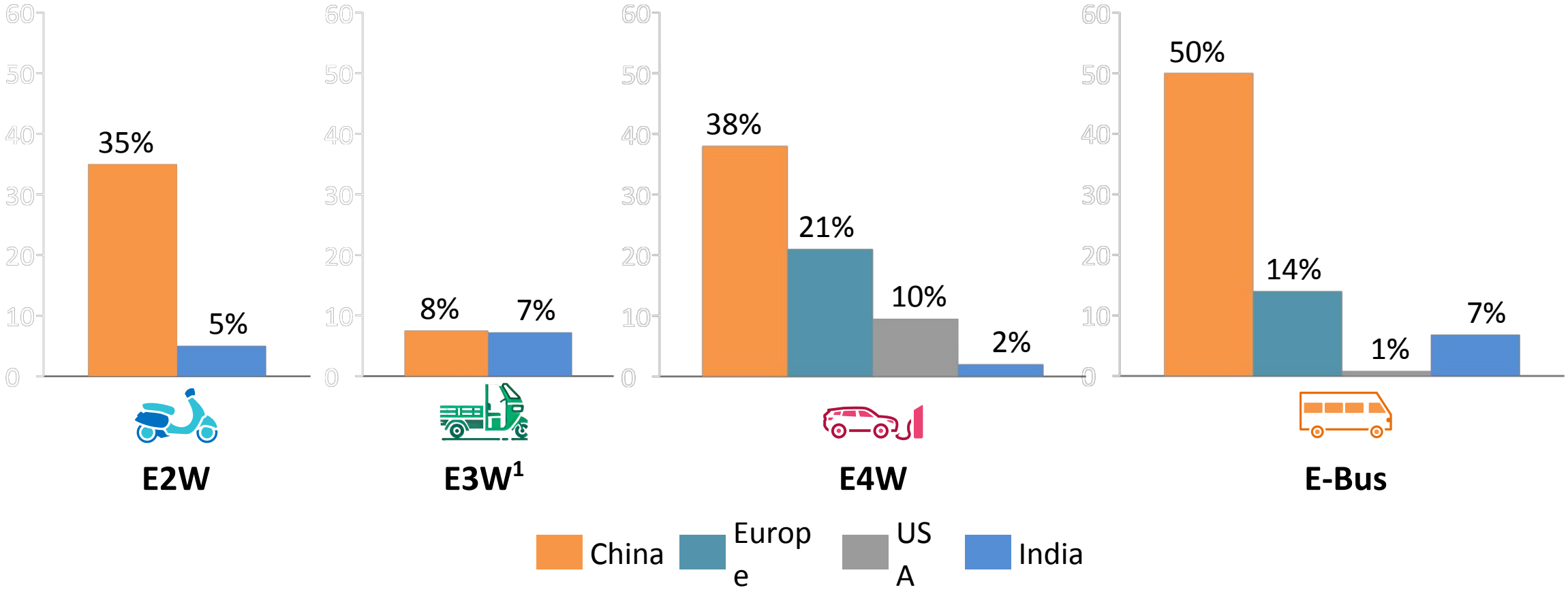
Duration: **2 years 2024 - 26**

Category	Outlay (in Rs. crore)	# of vehicles
e-2W	1,772	**28.67 Lakh**
e-3W	907	
e-4W	500	
e-Trucks	500	
e-Buses	4,391	
Charging infra	**2,000**	**22,100 (e-4W), 1,800 (e-Bus)**
Testing agencies upgradation	780	
Total Outlay	**10,900**	

1. Global Landscape

EV adoption: Global benchmarking

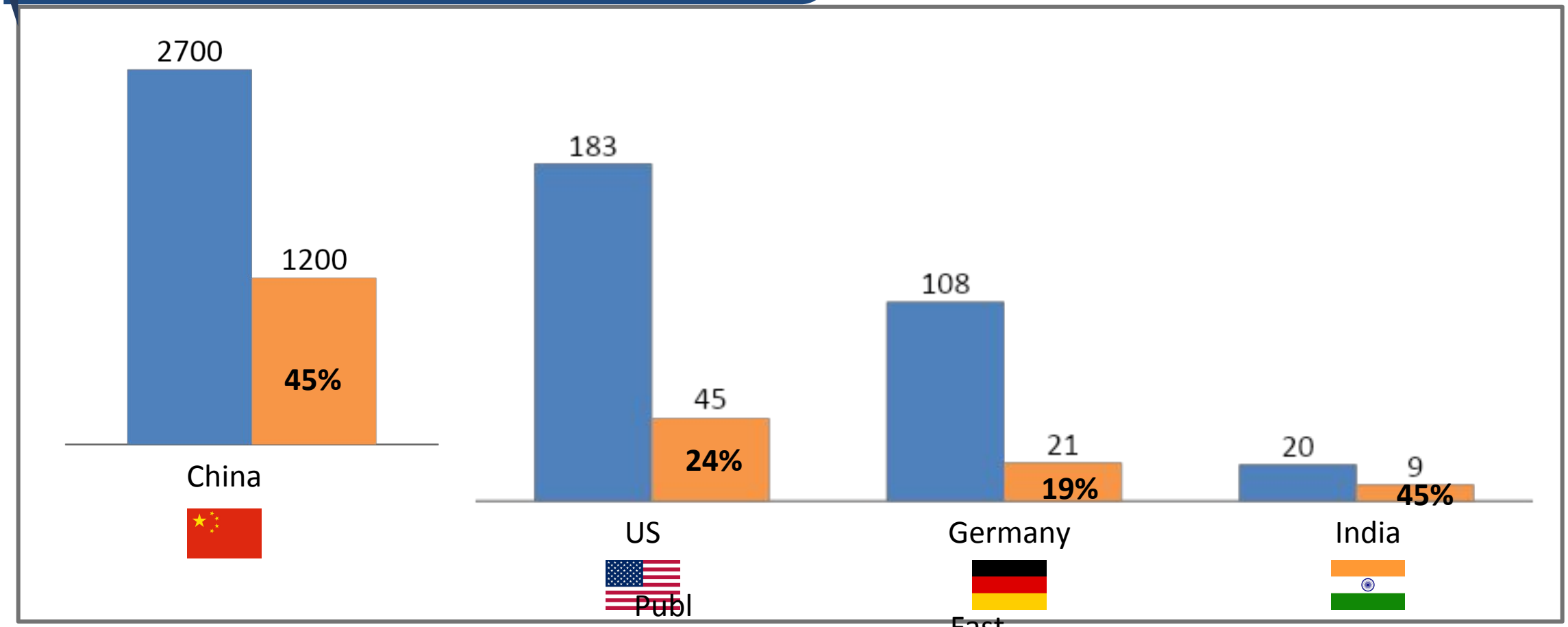
EV adoption (as % of total annual vehicle sales) across countries, CY23



Source: IEA Global EV Data Explorer
1. Assuming Li-ion:Lead-acid sales split of 50:50 in China. Overall E3W penetration 15%.

Global benchmarks: Public chargers & Fast Chargers

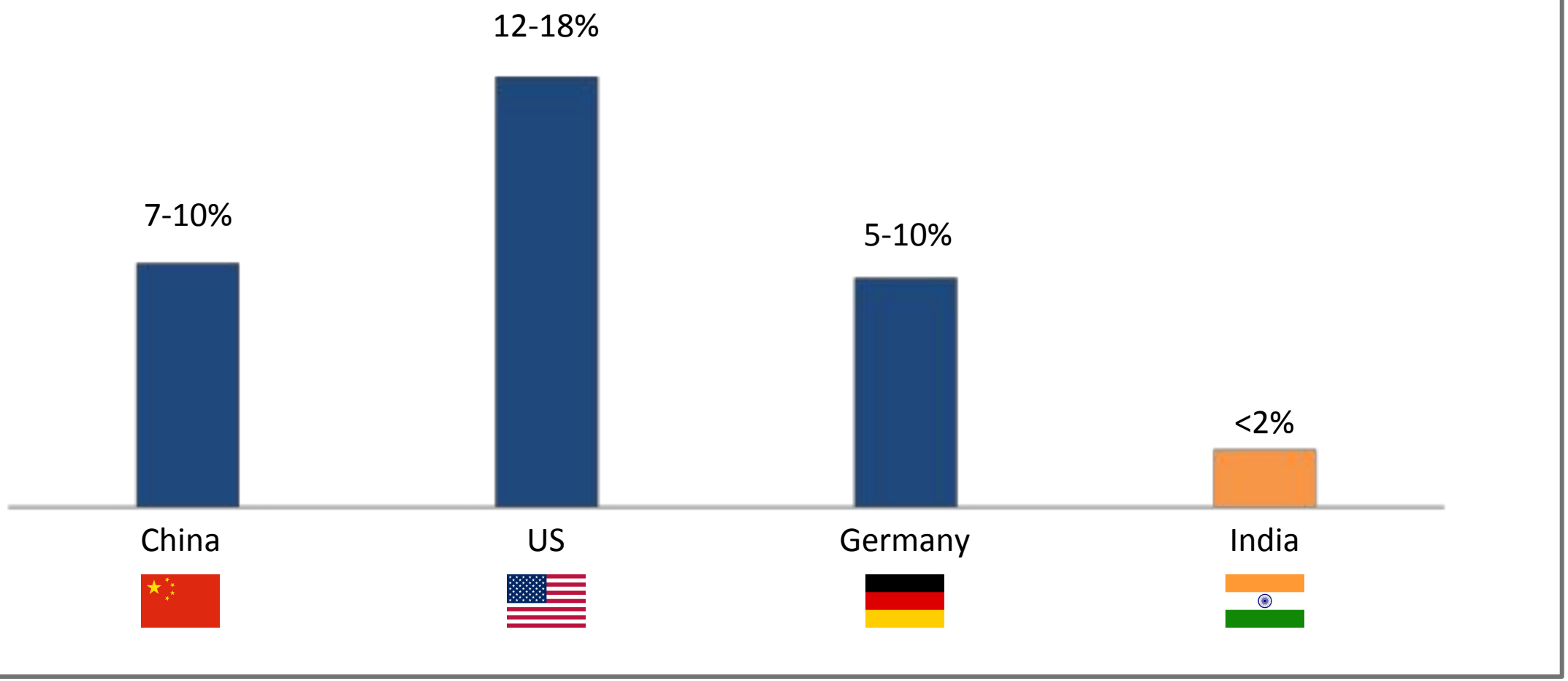
Public E4W Chargers as of 2023 ('000)



Source: Reuters, Bloomberg, CPO discussions

Global benchmarks: Public charger utilization

E4W PCS Utilization Rate as of 2024 (%)



Low utilization rate in India points to lower uptake of EVs, less developed infrastructure, lower share of public infra

Source: Reuters, Bloomberg, CPO discussions

2. India Landscape

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Key Charge Point Operators

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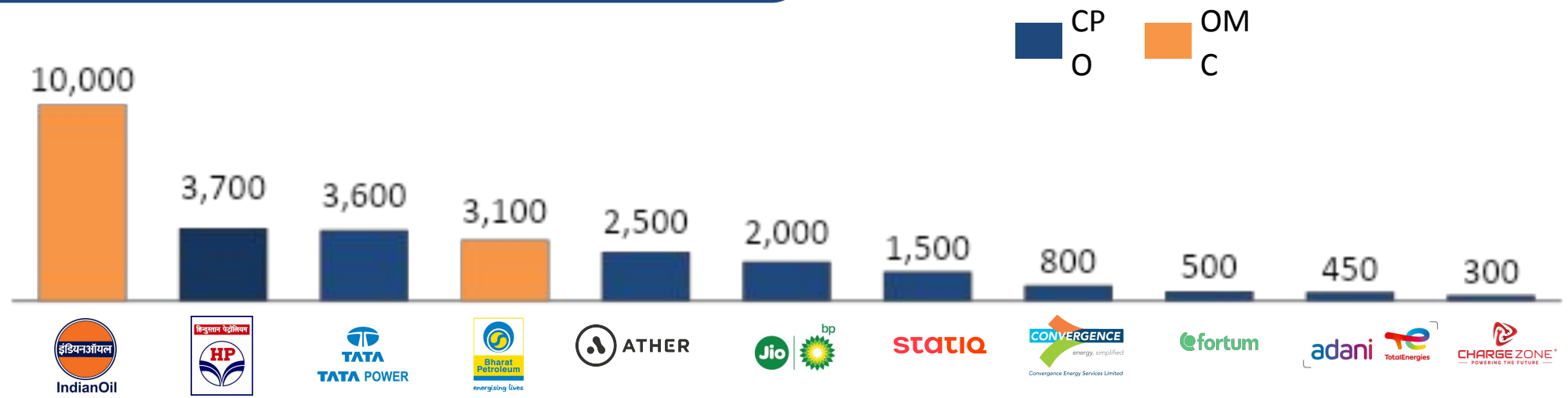
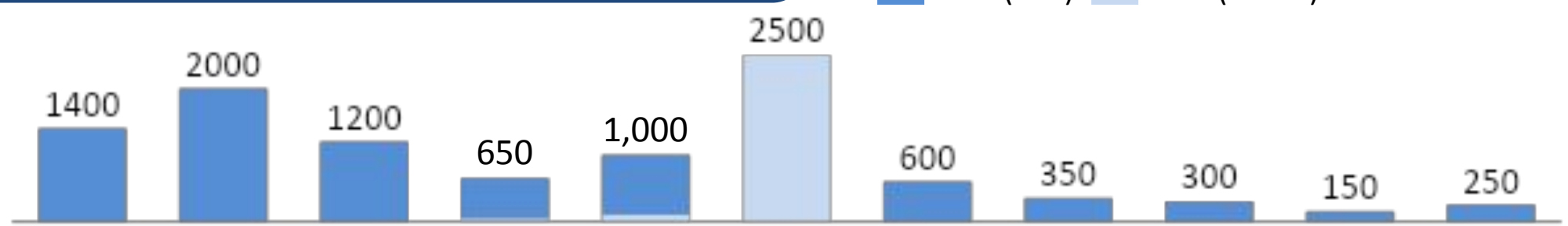
of public chargers (Total) – 31K



of public chargers (Fast)[1] - 10K (75% 4W, 25% 2W)



1. Doesn't include DC-001 15kW fast charger as obsolete technology which will be replaced

Source: Provided by CPOs

Support by MHI to deploy EV chargers at OMCs
EV charger supply (slow and fast)

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MoPNG plans to set up total ~26.5k chargers

Current and planned public charger supply by each OMC (including both fast and slow)

	Commissioned (supported by MoPNG)			Sanctioned by MHI (FAME-II)			Total supply		
Player	Total	City	Highway	Total[1]	City	Highway	**Total[2]**	City	Highway
IndianOil	9,953	5,362	4,591	4,149	921	3,228	**14,102**	6,283	7,819
Bharat Petroleum	3,144	1,179	1,965	3,505	787	2,718	**6,649**	1,966	4,683
HP	3,634	1,666	1,968	2,931	381	2,550	**6,565**	2,047	4,518
OMC total	**16,731**	**8,207**	**8,524**	**10,585**	**2,089**	**8,496**	**27,316**	**10,296**	**17,020**

1. The total number of MHI-sanctioned chargers is 10,585, which includes 980 chargers for upgradation; no additional chargers will be supplied against these.
2. Hence, the total number of EV chargers supplied by OMCs will be 26,336 (27,316-980)

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State Wise EV PCS Distribution

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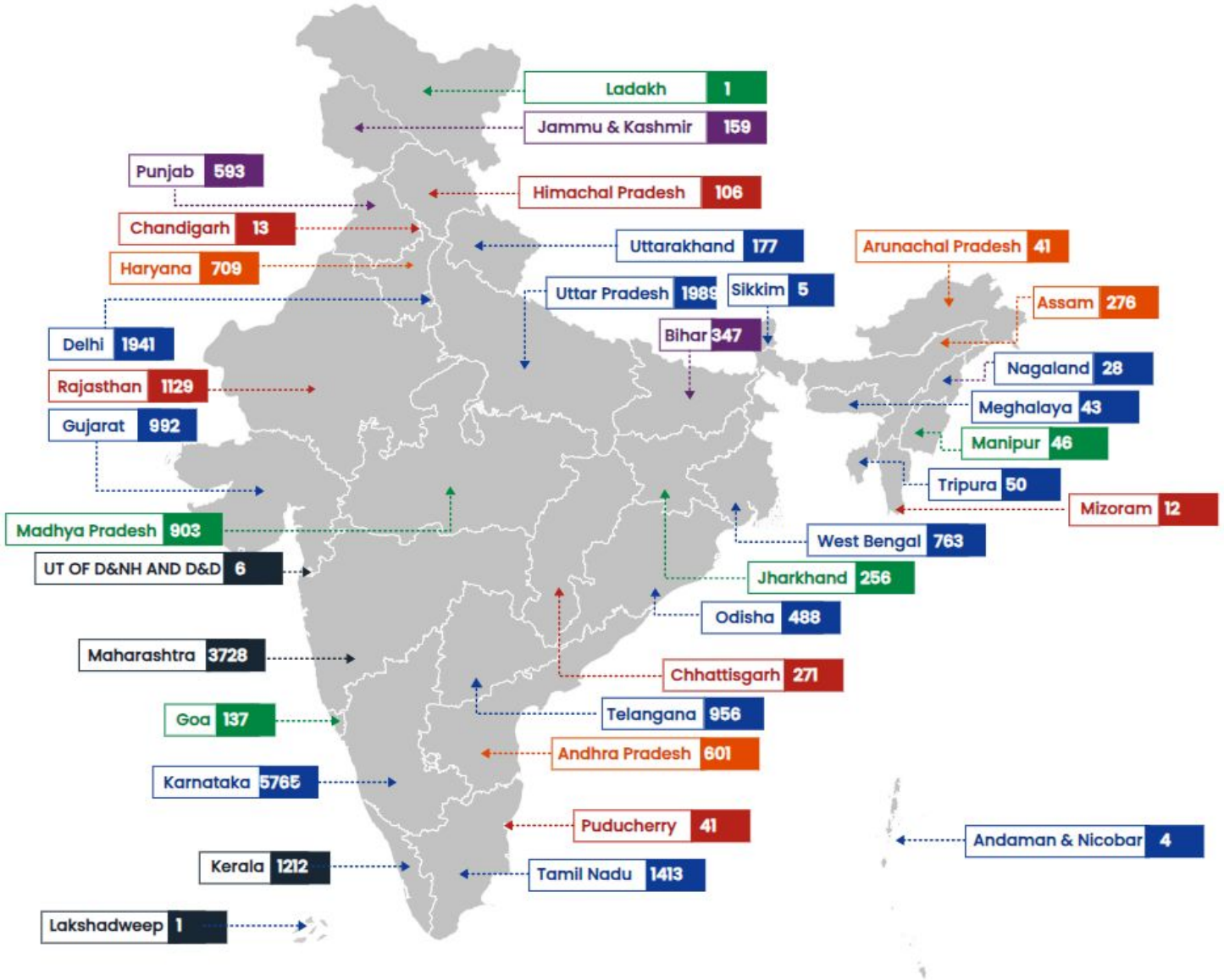


25,202 public charging stations mapped by states and UTs

Key Highlights

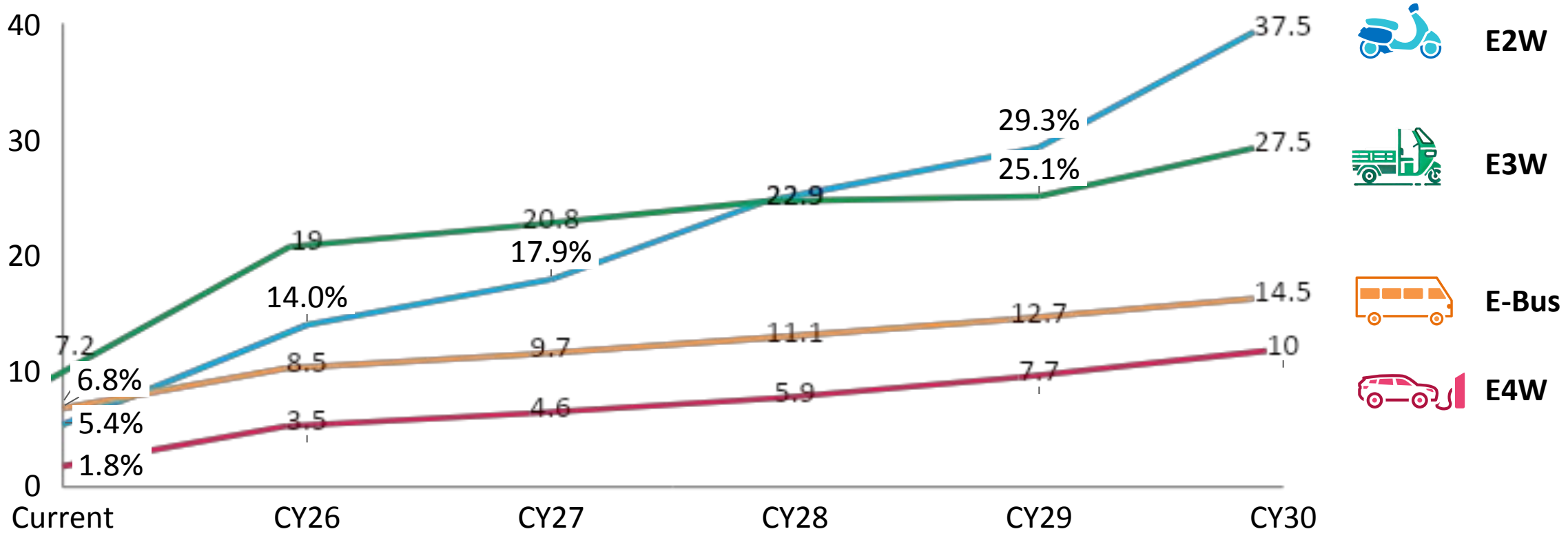
- Top 5 States with highest PCS are Karnataka, Maharashtra, Uttar Pradesh, Delhi, Tamil Nadu which comprise 53% of total chargers
- Delhi has one of the lowest electricity tariffs for charging.
- Maharashtra has one of the best subsidy structures for the installation of EVPCS.

Sources: BEE (As on July '24)

3. EV Charging Requirement by 2030

EV adoption projection across vehicles (till 2030)

EV adoption projections across vehicles, CY26-30



Source: NITI Aayog Report: https://www.niti.gov.in/sites/default/files/2023-07/Niti-Aayog_Report-VS_compressed_compressed.pdf

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Public charging requirement by vehicles: 2030

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Share of fast public charging requirement to increase by 2030

Vehicle Segment	Share of Charging Modes				
	Current 2023				Target 2030
	Residential	Semi-public	Captive	Public	Public
E2W	85%	10%	0%	5%	10%
E3W	40%	0%	60%	0%	20%
E4W (Private)	65%	15%	0%	20%	25%
E4W (Commercial)	20%	10%	40%	30%	45%
E-Bus[2] (Inter-City)	0%	0%	80%	20%	40%

Note: 30% public charging for E4W in China
Public charging requirement for E-buses (Intra-city) and Trucks to be low till 2026 and not considered for FAME III
Source: Consultations with EV OEMs and Operators; NITI Aayog – BCG Report: https://www.niti.gov.in/sites/default/files/2023-07/Niti-Aayog_Report-VS_compressed_compressed.pdf

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EV chargers: Way forward

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Vehicle Segment	Public / Captive Charging	Residential/Semi-Public Charging
E2W	12 kW LECCS / LEVDC	3.3 kW AC-001
E3W		
E4W / light e-freight	60/120 kW CCS-II	7.2 kW Type-2 AC
E-bus / trucks	240 kW CCS-II	

Source: Bureau of Energy Efficiency, NITI Aayog Report and Industry Inputs

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Public fast charger requirement (2030)

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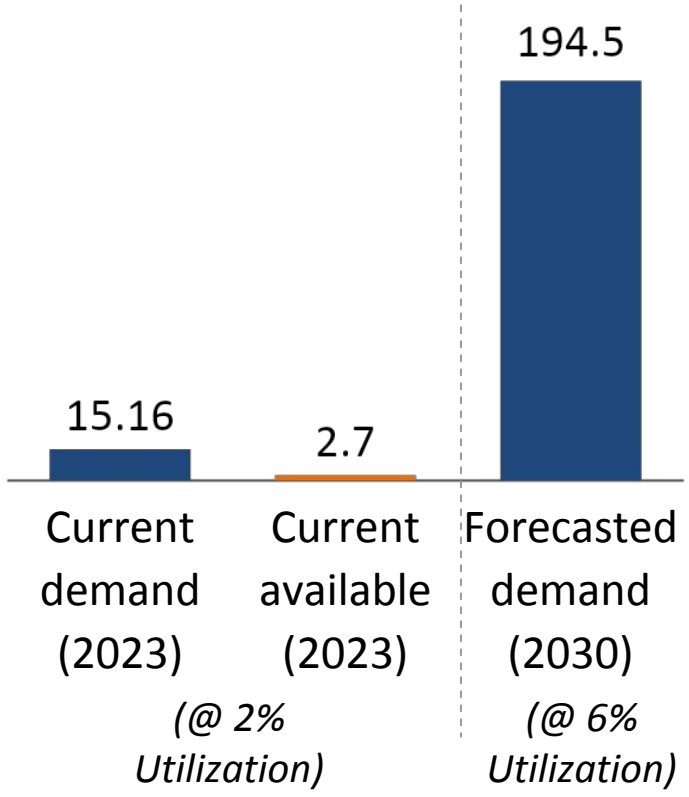
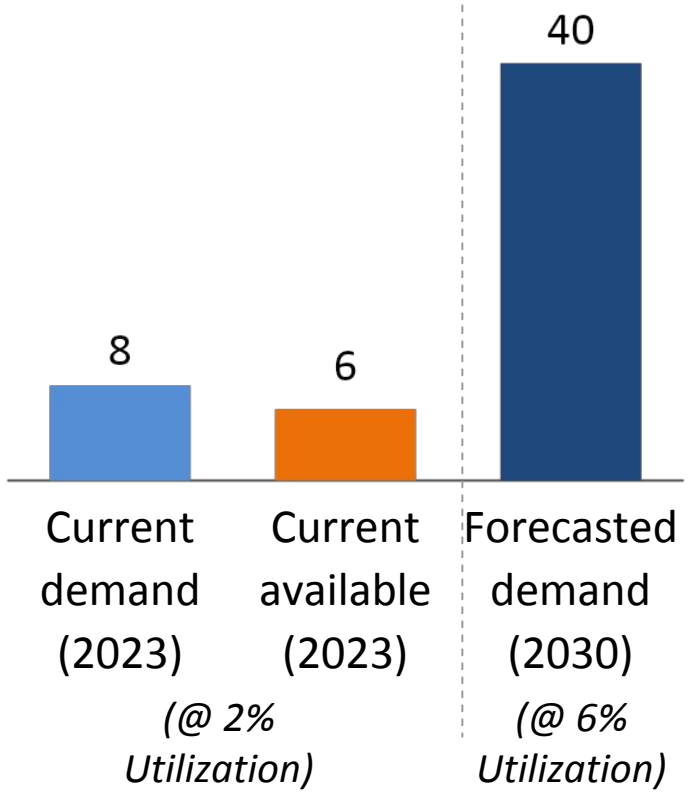
12kW LECCS/LEVDC

 # chargers (in '000)



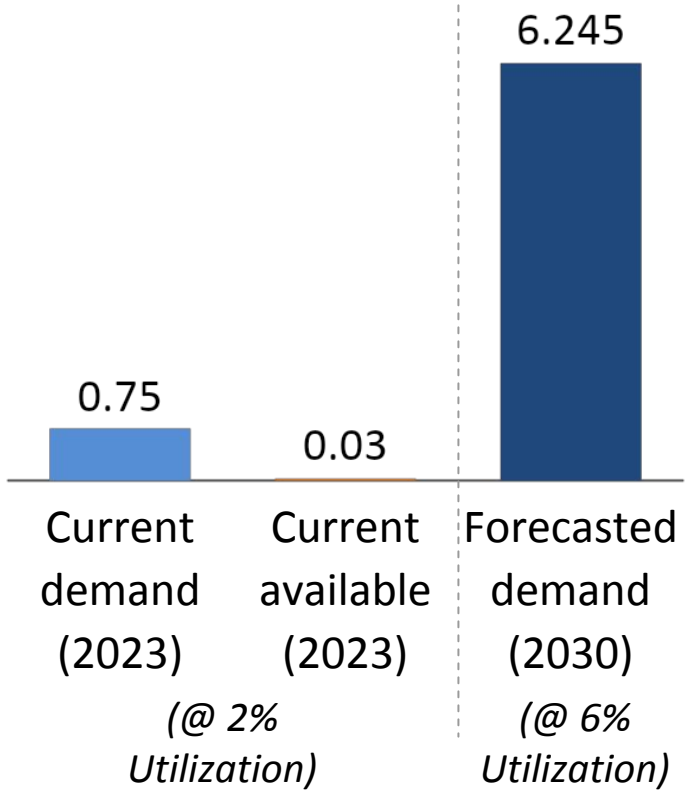
60kW CCS-2

 # chargers (in '000)



240kW CCS-2

 # chargers (in '000)



Source: Demand Sourced from consultations with CPOs, EV OEMs. Supply sourced from submissions from CPOs, BEE EV Yatra Portal

Peak power demand for EV charging

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Peak power load: Across regions & seasons

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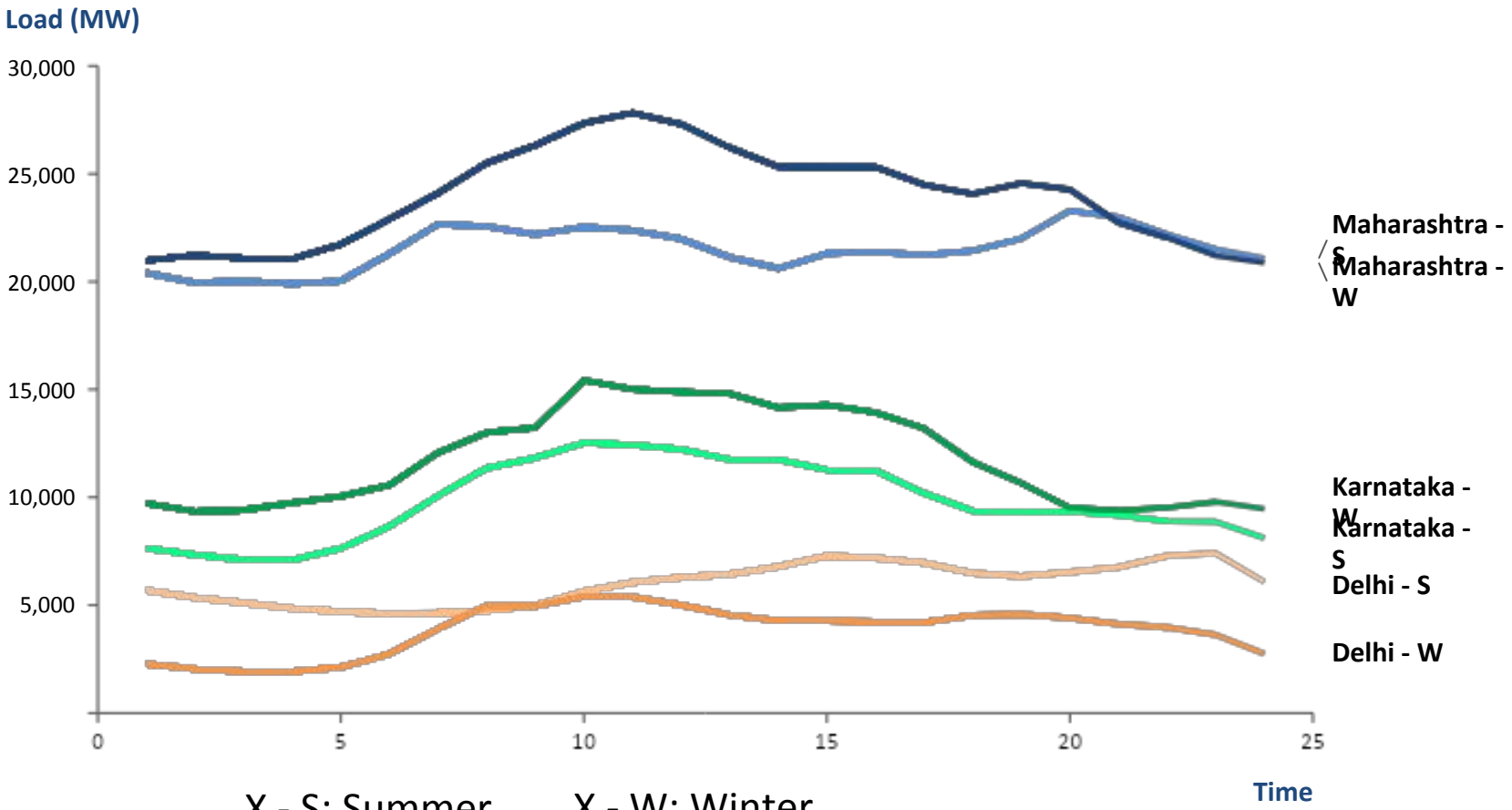

X - S: Summer (11-Jul-24)

X - W: Winter (18-Jan-24)

◆ Peak Load

Peak load timing varies across regions

Regions may experience minimal (KA) to large (DL) seasonal variations

Source: Delhi SLDC; UK SLDC; Maha SLDC; KA SLDC
Note: Uttarakhand Summer data taken for 04-Jul

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Nationwide EV Power Load Curve (GW) (2023)

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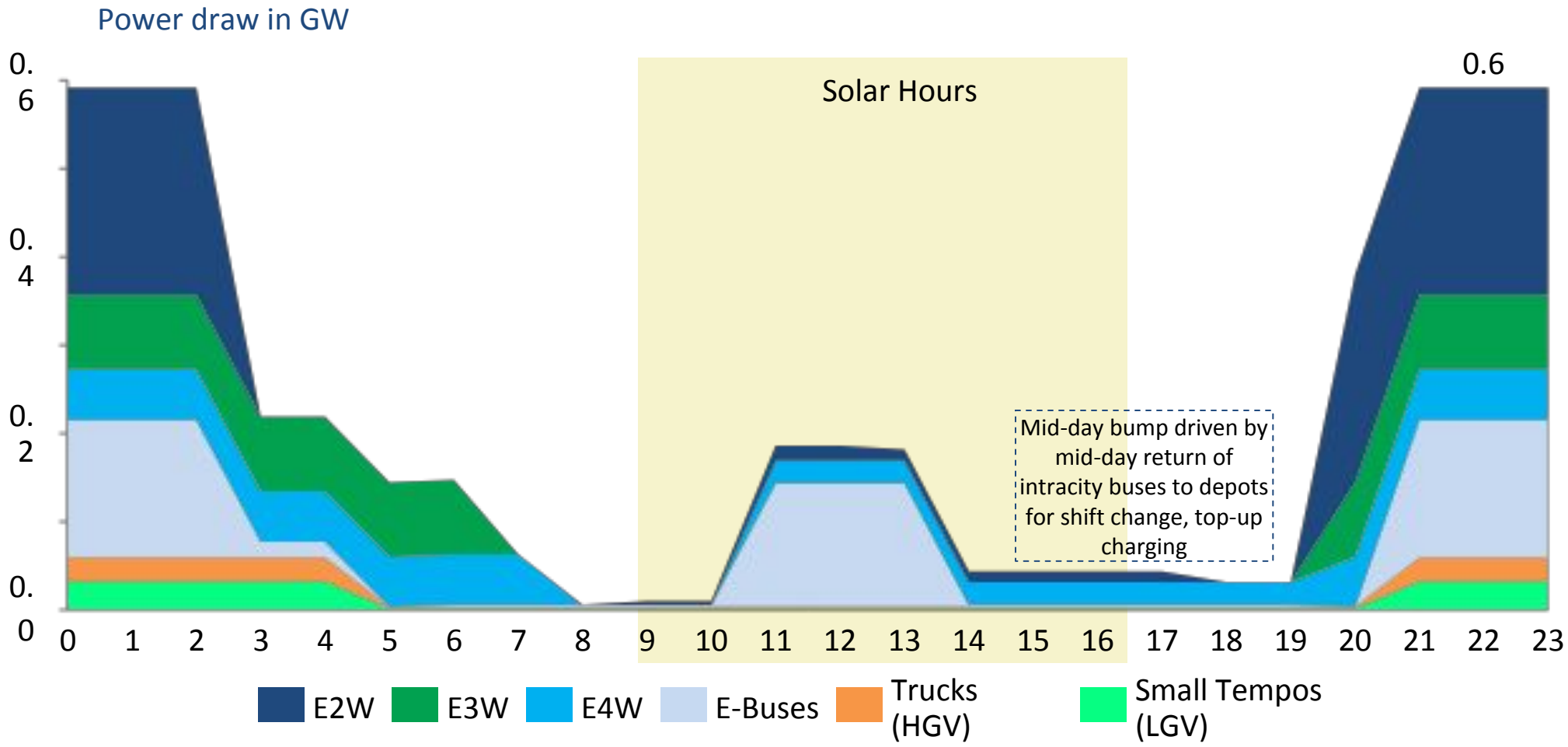
Majority Captive and Residential charging happening at Night causes peak draw (0.6 GW) at night



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Nationwide EV Power Load Curve (GW) (2030) (with workplace charging)

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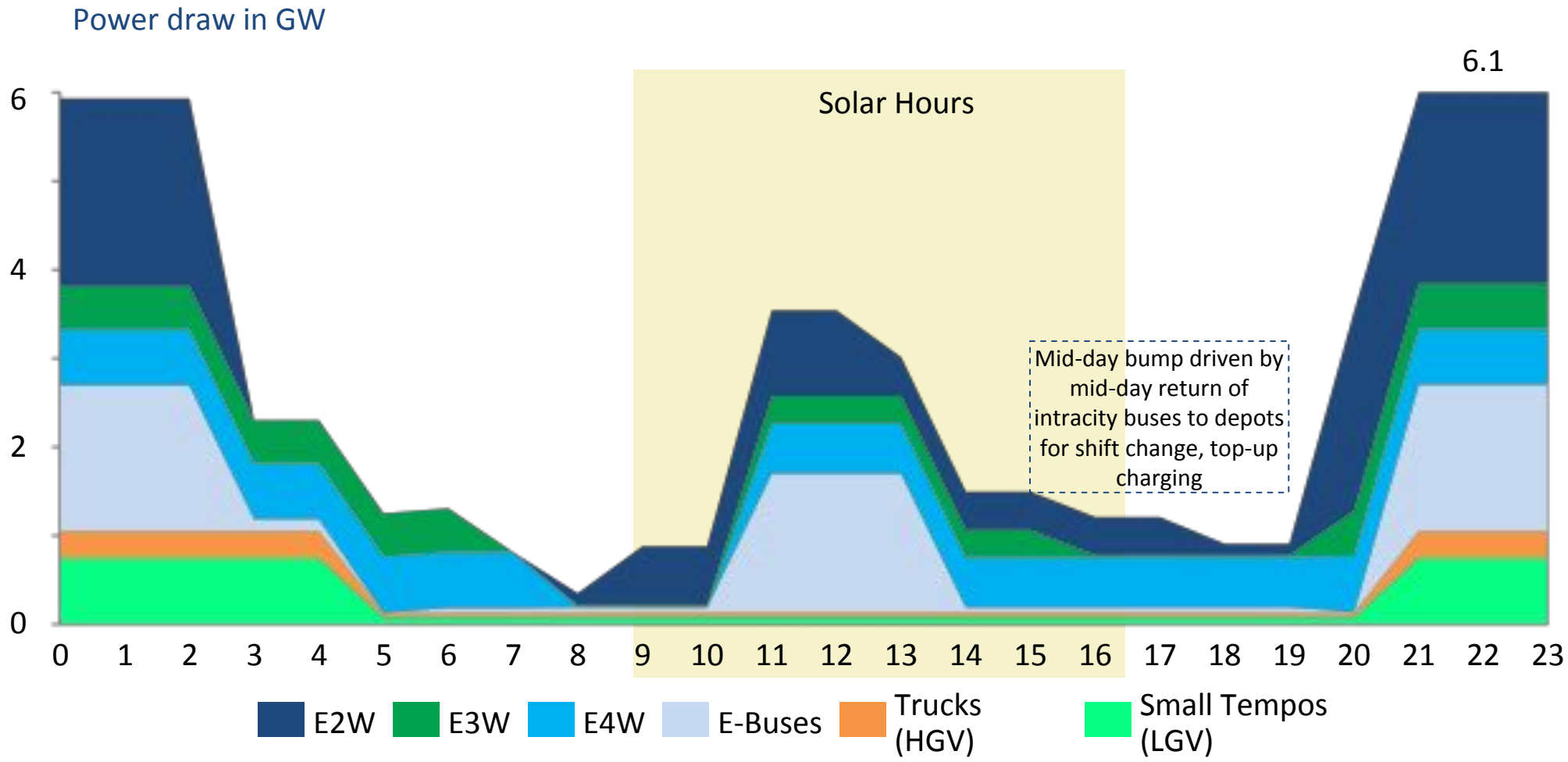
Majority Captive and Residential charging happening at Night causes peak draw (6.1 GW) at night



Peak load comparison – India Total vs EV Charging

EVs expected to contribute to 1.5% of India's peak power demand in 2030

	Power Peak Demand (2023)	Power Peak Demand (2030) (with workplace charging)	Power Peak Demand (2030) (without workplace charging)
India Total	243 GW	~400 GW	~400 GW
EV Charging	0.6 GW	6.1 GW	6.5 GW
EV's share of Total	0.2%	1.5%	1.6%

Source: Ministry of Power; BCG Analysis

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Localized peak load comparison – Delhi Total vs EV Charging

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Peak load contribution from EV charging higher for leading EV adopters

	Power Peak Demand (2023)	Power Peak Demand (2030) (with workplace charging)	Power Peak Demand (2030) (without workplace charging)
Delhi Total	7438 MW	~12250 MW	~12250 MW
EV Charging	48 MW	880 MW	898 MW
EV's share of Total	0.6%	7.2%	7.3%

Source: Delhi SLDC; Press; BCG Analysis

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Localized Peak energy comparison – BLR Total vs EV Charging

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Peak load contribution from EV charging higher for leading EV adopters

	Power Peak Demand (2023)	Power Peak Demand (2030) (with workplace charging)	Power Peak Demand (2030) (without workplace charging)
Bengaluru Total	3,520 MW	~5,800 MW	~5,800 MW
EV Charging	53 MW	803 MW	838 MW
EV's share of Total	1.5%	13.9%	14.5%

Source: Karnataka SLDC; Press; BCG Analysis

4. Challenges in EV PCS and Support Required

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Key challenges faced today

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Limited financial viability

- High upstream infra costs
- GST @18%
- Low utilization rates of 2%
- High customer tariff

DISCOM/ Power related

- Two-part tariff
- High lead time for HT connection
- Power cost for PCS higher than ACoS[1]

Land related issues

- Land availability
- Building codes not amended as per MoHUA guidelines

Standardization & Interoperability

- Non-uniform charging standards in E2W
- Absence of Unified Energy Interface (UEI)

Operational challenges

- Charger distribution inadequate across regions
- BEE Yatra portal not up-to-date

Financial | Non-Financial Challenges

1. Average Cost of Supply

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State-wise Fixed Demand charges

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State	Category	Fixed Demand Charges
Andhra Pradesh	Nil	Nil
Bihar		Nil
Chandigarh		Nil
Chhattisgarh		Nil
Delhi		Nil
Goa		Nil
Himachal Pradesh		Nil
Odisha		Nil
Puducherry		Nil
Punjab		Nil
Uttarakhand		Nil

State	Category	Fixed Demand Charges
Uttar Pradesh	Nil	Nil
West Bengal		Nil
Gujarat		25 INR/month
Tripura	>₹100 /kVA/ month	45
Manipur		85
Madhya Pradesh		100
Telangana		100
Jharkhand		100
Rajasthan	>₹100 /kVA/ Month	135
Sikkim		150
Jammu & Kashmir		150

State	Category	Fixed Demand Charges
UT of Ladakh	>₹100/kVA/ Month	150
Haryana		165
Assam		170
Karnataka		200
Nagaland		200
Meghalaya		230
Kerala		270
Maharashtra		270
Tamil Nadu		550
UT of Ladakh		150
Haryana		165

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State-wise Electricity Tariff for PCS

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State/UT	Electricity Tariff
Tamil Nadu	12.0
Meghalaya	9.9
Uttar Pradesh	7.3
Manipur	7.2
Assam	7.0
Tripura	6.9
Andhra Pradesh	6.7
Bihar	6.4
Haryana	6.2
Jharkhand	6.0
Kerala	6.0

State/UT	Electricity Tariff
Punjab	6.0
Rajasthan	6.0
Telangana	6.0
West Bengal	6.0
Madhya Pradesh	5.9
Himachal Pradesh	5.7
Maharashtra	5.5
Sikkim	5.5
Uttarakhand	5.5
Chhattisgarh	5.0
Karnataka	5.0

State/UT	Electricity Tariff
Odisha	5.0
UT of Jammu & Kashmir	4.9
UT of Ladakh	4.9
Puducherry	4.5
Delhi	4.0
Gujarat	4.0
Chandigarh	3.6
Goa	3.5

Upstream subsidy recommended for PM E-DRIVE

Three areas for subsidy intervention possible

CAPEX

Electric Vehicles Supply Equipment (Chargers)

Upstream Electricity Infrastructure (Transformers, Cabling)

OPEX

Cost of Power/tariff

Upstream subsidy preferred because

- Learnings from exemplar tenders (e.g. DTL, UPEIDA, BEST, WBSEDCL)
- Outcome of stakeholder interactions with CPOs
- Upstream infra has higher share of overall cost compared to Chargers/EVSE
- Cash-strapped Discoms unable to provide upstream infra/ power subsidy without support

Charging Infra Components: Upstream vs Downstream

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	Upstream (Behind the Meter)						Downstream (In front of the Meter)	
Component								
	1	2	3	4	5	6	7	8
	DISCOM-POLE	Cabling	11 kV - CTPT	11 kV 1 WAY RMU	11 kV Transformer	LT Metering & Dist. Panel	Distribution Box *(Optional)*	EV Charger

Cost

Charger	Upstream (Behind the Meter)	Downstream (In front of the Meter)
12kW	₹1.5L	₹1.8L
50/60kW	₹6.0L	₹7.3L
240kW	₹24.0L	₹21.3L

Note: The scope of power wiring is same as the scope of supply for different components. However the scope of wiring from "Transformer (4)" to "LT Meter & Distribution Panel (5)" will vary from DISCOM to DISCOM in case of LT Connection
Transformer will step down from 11kV tap to 440V (with limit of upto 1MW draw – for larger draw will need step down from 33-66kV lines to 440V)
Source: BEE Benchmark

5. EV PCS under PM E-DRIVE

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Comprehensive Government (MHI) support for EVs

Demand side
Reduce upfront cost – subsidy to buyer

PM E DRIVE
- Outlay of **₹10,900 crore**
- 2024 - 2026

Electric Vehicles

Supply side
Reduce manufacturing cost

PLI-AUTO
- Outlay of **₹25,938 crore**
- Sep, 2021 – Mar, 2027

PLI-ACC
- Outlay of **₹18,100 crore**
- Jun, 2021 – Dec, 2029

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e-Ambulances & e-Trucks

Outlay ₹ 500 crore

Initially 2,000 e-ambulances as per standards required by **MoHFW**

Outlay ₹ 500 crore

Incentive available only against **scrapping** through MoRTH authorized Registered Vehicle Scrapping Facility **(RVSF)**

To be notified separately

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Testing Agencies

ARAI, Pune

ICAT, Manesar

Testing Agencies

GARC, Chennai

NATRAX, Indore (Test Tracks)

₹ 780 crore

Upgradation of technology and equipment in testing agencies

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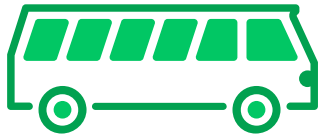
e-Buses and charging infrastructure

e-Buses ₹4,391 cr



No. of E-Buses	14,028
Avg Subsidy (₹ lakh)	31.3

9 cities with > 40 lakh population

Delhi, Kolkata, Mumbai,
Chennai, Ahmedabad, Surat,
Bangalore, Hyderabad, Pune

EV Charging Infra ₹2,000 cr

Subsidy	80% of Upstream

No. of fast chargers
- e-2W/3W 48,400
- e-4W 22,100
- e-bus 1800

Eligible Entities

1) State Govt.
2) NHAI / NHLML
3) Central Ministries / CPSEs

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EV Charging Infrastructure under PM E-DRIVE

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Eligible Entities

1 **States**

ULBs, State PSUs, DISCOMs, State Highway Authorities, State Departments

2 **Central Ministries /Departments**

Central Ministries CPSEs- OMCs,

Scheme Components

E-2W/E-3W	E4W (Incl E-LCV)	E-Bus/E-Truck
48,400	22,100	1800

Support by MHI

I. **80% Subsidy on Upstream Infrastructure Costs** (MoP benchmarks)
II. Subsidy to be disbursed in 3 tranches

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Deployment of Rs.2,000 crore subsidy

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Upstream Infrastructure cost and Subsidy utilization

Segment	Charger Capacity	Upstream Cost per charger	Upstream Subsidy / charger (@80%)	# of chargers to be installed	Total Subsidy
e-2W/3W	LECCS/LEVDC 12 kW	1.5 L	1.2 L	48,100	Rs. 581 crore
e-4W	CCS-II 60 kW	6.0 L	4.8 L	22,100	Rs. 1,061 crore
e-Buses/ e-trucks	CCS-II 240 kW	24.0 L	19.2 L	1,800	Rs. 346 crore
				Total	**Rs. 1,988 crore**

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City charger guidelines

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	E2W/E3W	E4W
Charger configuration	• 12kW • LECCS / LEVDC	• 60kW • Dual Gun CCS-II
Number of chargers	• Minimum **2**	• Minimum **1**
Land area	• **2-4** parking spaces x **6m²**	• **2** parking space x **12m²**

= Approx **40-60m²** of total parking space

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Highway charger guidelines

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	E-buses/trucks	E4W
Charger configuration	• 240kw • Dual gun CCS-II 	• 60kw • Dual gun CCS-II 
Number of chargers	• Every **100km** on **both sides** of highway • **Minimum 1 charger** per PCS	• Every **20km** on **both sides** of highway • **Minimum 2 chargers** per PCS
Land area	• **2** parking spaces x **105m²**	• **4** parking space x **12m²**

= Approx **250-300m²** of total parking space

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Project Approval Mechanism

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	States	Central Ministries /Departments
Proposal Submission	Nodal Department appointed by State	GOI Ministry or PSU
Tendering Issuing Authority (TIA)	Nodal Department appointed by State	GOI Ministry or PSU
Approving Authority	State-Level Committee, led by Chief Secretary MHI will sanction	PISC, headed by MHI, will approve MHI will sanction

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Implementation Mechanism

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1 **Demand Aggregation**

I. Entities shall appoint a Nodal Agency to aggregate demand for EV PCS

II. Nodal Agency shall submit proposal to MHI

2 **Project Approval**

I. MHI will review the proposal and approve

3 **Tendering Process**

Upon approval from MHI, entities will initiate tendering process

4 **Financial Support by MHI**

I. MHI will disburse subsidies

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Jai Hind!

Dr Hanif Qureshi,

AS MHI

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Appendix

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Prioritization of cities and highways

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Location Type	Factors considered for ranking	Priority locations
Cities 	1 E4W share = E4W stock in city / E4W stock pan-India	**Top 40 cities in EV share**
Highways 	1 Bus volume traffic on highway; 2 EV penetration on end points	**40 Corridors for Cars /Buses**
Highways 	1 Traffic density on highways; 2 Truck share on high traffic density highways	**40 Corridors for Trucks**

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Ecosystem Enablers

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Interoperability

Universal Energy Interface

- A one-stop back-end application for all CPOs
- Facilitates slot booking and payment for charging
- Allowing interoperability across CPOs

RE-Based EV Charging Solutions

- **ToD Tariff** to promote off-peak/day-time charging
- Reduce Open Access limit for charging connection
- Allowing **Group Net Metering** for EVPCS

Standardization

E2W / E3W Fast Charging

- Focus on standardization of LECCS / LEVDC
- Functionalities to enable fast charging for E3Ws

Financing Support

- **Risk sharing facility** for financers backed by MDB
- **Rationalizing GST on services** (currently 18%)

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Implementation Mechanism

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5	Tendering Process	Upon approval from MHI, entities will initiate tendering process
6	Financial Support by MHI	I. Post tender award, the entity will send a copy of LoA to the MHI II. MHI will disburse subsidies for upstream infra (3 tranches), covering upto 80% of cost
7	Setting up EV Charging Stations	I. Entities to extend support in providing access to land and getting necessary clearances II. CPOs to bear the remaining costs for upstream infra, capex for EVSE etc.
8	Project Approval	I. CPOs will manage the operations of EV charging stations, pay to land-owning agency II. Nodal agency will oversee the implementation of the approved proposals

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Impact of Subsidy on Upstream Infrastructure

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60kW CCS-2

80% upstream subsidy for viable tariff

Cost Contribution (INR / kWh)		CAPEX		OPEX			Price / unit paid by end consumer		
		Charger (EVSE)	Upstream Infra	Land Lease	Overhead cost[1]	Electricity Cost[2]	Sub-Total	GST	Total
4% Utilization	No subsidy	6.2	5.2	1	2.5	7	21.9	3.9	**25.9**
	80% Subsidy	6.2	1	1	2.5	7	17.8	3.2	**21.0**

1. Overhead costs include Comprehensive Maintenance Costs, Charger Management System Costs, Payment gateway charges, SIM charges etc.
2. Electricity cost assumed to be single-part tariff of 7 Rs per unit

Viability for : E-buses, 2W/3W

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Assumption: Vehicle charging time vs charging modes

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Vehicle type	Charging Hours at Location[1]				
	Residential / Nighttime Semi-public (RWAs, Societies)	Daytime Semi-public (Offices)	Captive	Battery Swapping	Public
E2W	8pm – 3am	9am – 1pm	-	8am-12am	11am – 6pm
E3W	8pm – 7am	11am – 4pm	8pm – 7am	8am-12am	11am – 4pm
E4W (Private)	8pm – 8am	11am – 8pm	-	-	11am – 8pm
E4W (Commercial)	8pm – 8am	11am – 8pm	8pm – 8am	-	11am – 8pm
E-Buses (Intracity)	-	-	11am – 2pm & 9pm – 3am	-	-
E-Buses (Intercity)	-	-	9pm – 5am	8am-12am	6am – 8pm
Trucks	-	-	9pm – 5am	-	24 hours

Illustration ahead

1. Sourced from AEEE Analysis with Delhi Case Study; CPO Discussion

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Agenda

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1. Global Landscape
2. India Landscape
3. EV Charging Requirement by 2030 and Peak power demand
4. Challenges in EV Charging and Support for Upstream Infra
5. EV PCS Under PM E-DRIVE

Methodology for EV charging load estimation

Illustrative : E4W 2030 Power demand at 10pm

Daily Units needed from Charging Mode ÷ **Hours of Charging Mode** = ***Power demand each hour by charging mode***

Number of EVs	×	Daily energy consumption per EV[1] (kWh)	×	% Charging demand met by charging mode	÷	Typical Charging Hours of Charging Mode	=
2,135K		3.5 kWh		50%		12 (8pm-8am)	~311 MW
2,135K		3.5 kWh		10%		12 (8pm-8am)	~62 MW
							~373MW

At 10 pm, 2 charging modes will be active:

- Residential — 8pm-8am
- Semi-Public (Workplace) — 11am-8pm
- Semi-Public (RWA) — 8pm-8am
- Public — 11am-8pm

Residential Charging

Semi-Public (RWA) Charging

Power load at 10 pm from E4W charging

1. Sourced from Consultations with EV OEMs

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EV power load (MW) peak[1] : India (2030)

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Hour	E2W	E3W	E4W (Private)	E4W (Commercial)	E-Buses (Intracity)	E-buses (Intercity)	Trucks HGV)	Small Tempos (LGV)	Total EV Power Draw (MW)
0	2,119	487	373	260	1,512	134	306	744	**5,935**
1	2,119	487	373	260	1,512	134	306	744	**5,935**
2	2,119	487	373	260	1,512	134	306	744	**5,935**
3	-	487	373	260	-	134	306	744	**2,304**
4	-	487	373	260	-	134	306	744	**2,304**
5	-	487	373	260	-	-	56	74	**1,250**
6	-	487	373	260	-	56	56	74	**1,306**
7	-	-	373	260	-	56	56	74	**818**
8	132	22	-	-	-	62	56	74	**346**
9	662	22	-	-	-	62	56	74	**876**
10	662	22	-	-	-	62	56	74	**876**
11	965	308	331	231	1,512	62	56	74	**3,539**
12	965	308	331	231	1,512	62	56	74	**3,539**
13	435	308	331	231	1,512	62	56	74	**3,010**
14	435	308	331	231	-	62	56	74	**1,497**
15	435	308	331	231	-	62	56	74	**1,497**
16	435	22	331	231	-	62	56	74	**1,212**
17	435	22	331	231	-	62	56	74	**1,212**
18	132	22	331	231	-	62	56	74	**909**
19	132	22	331	231	-	62	56	74	**909**
20	2,251	510	373	260	-	6	56	74	**3,530**
21	2,251	510	373	260	1,512	140	306	744	**6,096**
22	2,251	510	373	260	1,512	140	306	744	**6,096**
23	2,251	510	373	260	1,512	140	306	744	**6,096**

1. With workplace charging

Illustrated previously

Peak

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Potential mechanisms for Peak Shifting/Shaving & encouraging Daytime charging

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Time of Day (ToD) tariffs

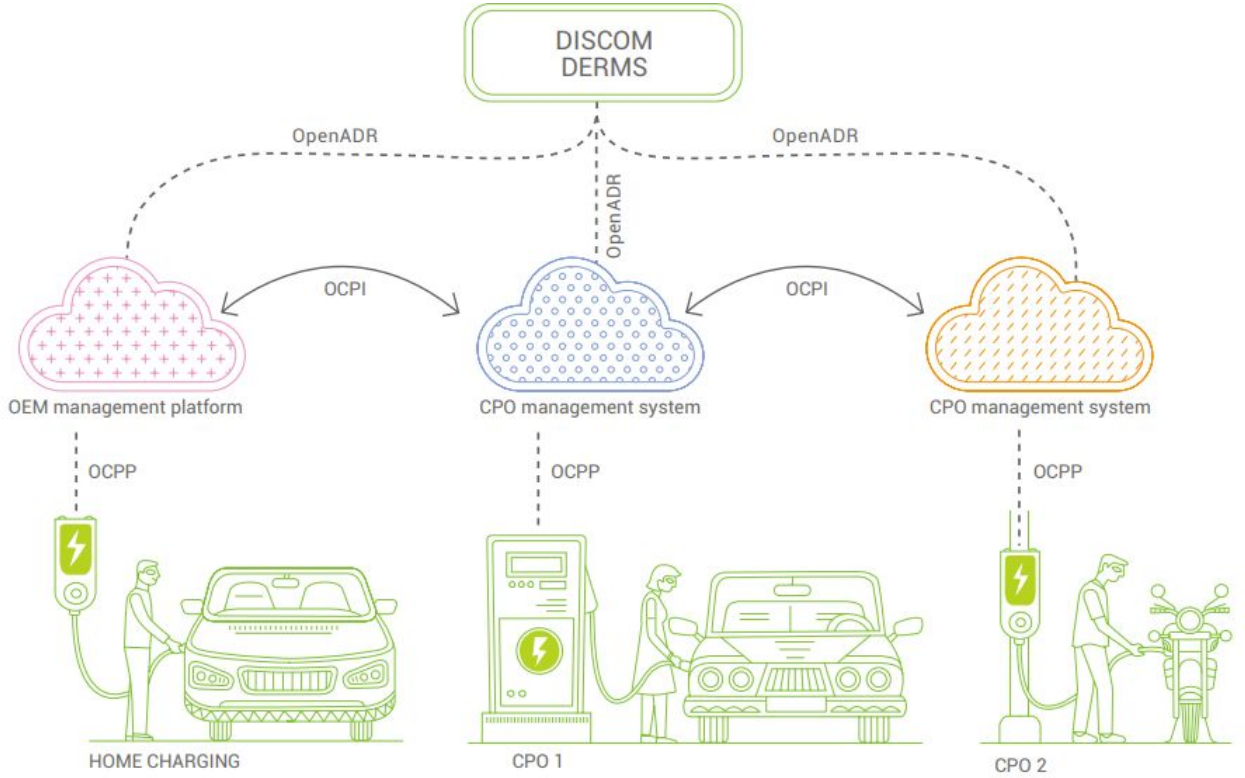
(Peak hours are charged more)

Time of Use (ToU) tariffs

(Real Time Tariff adjustment)

Smart Chargers

- Intelligence to adjust power draw/tariff/other parameters in real time[1]
- Integrated with back-end architecture via 3G/4G SIM/wired communication
- App for monitoring & management
- Data connection with EV



Backend-architecture for responsive, smart charging network

1. Basis input signals from Discom (available power, ToU Tariff etc), CPO (Central management system signals)
Source: Niti Aayog Handbook for EV Charging Infrastructure Implementation HandbookforEVChargingInfrastructureImplementation081221.pdf (niti.gov.in)
ADR: Automated Demand Response OCPI: Open Charge Point Interface OCPP: Open Charge Point Protocol DERMS: Distributed Energy Resource Management System

Priority cities for 4W: Top 40 cities

Pan India E4W stock[1] 2.0L

Total E4W share (stock) Top 40 cities 83%

#	City	E4W stock	E4W share
	Delhi	29.7 K	14.6%
	Bangalore	24.8 K	12.2%
	Mumbai	19.3 K	9.5%
	Hyderabad	15.0 K	7.4%
	Pune	10.5 K	5.2%
	Chennai	6.7 K	3.3%
	Jaipur	5.5 K	2.7%
	Ahmedabad	5.4 K	2.7%
	Kochi	3.9 K	1.9%
	Thiruvananthapuram	3.4 K	1.7%
	Kolkata	4.2 K	2.1%
	Surat	2.8 K	1.4%
	Thrissur	2.6 K	1.3%
	Goa	2.5 K	1.2%
	Coimbatore	2.4 K	1.2%
	Chandigarh	2.2 K	1.1%
	Nagpur	2.3 K	1.1%
	Malappuram	2.1 K	1.0%
	Bhubaneswar	2.0 K	1.0%
	Lucknow	1.9 K	0.9%

#	City	E4W stock	E4W share
	Kozhikode	1.7 K	0.80%
	Kollam	1.5 K	0.70%
	Visakhapatnam	1.5 K	0.70%
	Raipur	1.4 K	0.70%
	Nashik	1.3 K	0.70%
	Kannur	1.3 K	0.60%
	Indore	1.3 K	0.60%
	Bhopal	1.1 K	0.50%
	Vadodara	1.1 K	0.50%
	Patna	1.0 K	0.50%
	Aurangabad	0.9 K	0.40%
	Vijayawada	0.9 K	0.40%
	Rajkot	0.9 K	0.40%
	Dehradun	0.8 K	0.40%
	Kolhapur	0.7 K	0.40%
	Kanpur	0.7 K	0.30%
	Bhilai Nagar	0.6 K	0.30%
	Ludhiana	0.6 K	0.30%
	Jodhpur	0.6 K	0.30%
	Udaipur	0.6 K	0.30%

1. Till June 2024 (Vahan data, MoRTH)

Priority highways for bus: Top 40 highways basis current traffic and EV penetration

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Total length (km) Top 40 18,000

#	Point A	Point B	Length (km)	Traffic (Bus)
1	Hyderabad	Vijayawada	270	1124
2	Pune	Kolhapur	230	568
3	Chandigarh	Delhi	240	564
4	Delhi	Agra	240	540
5	Delhi	Lucknow	554	529
6	Bangalore	Tirupati	250	502
7	Chennai	Madurai	460	496
8	Jaipur	Delhi	310	453
9	Delhi	Haridwar	170	438
10	Mumbai	Kolhapur	380	427
11	Hyderabad	Bangalore	580	406
12	Delhi	Dehradun	250	399
13	Indore	Bhopal	194	391
14	Hyderabad	Ongole	320	345
15	Ahmedabad	Mumbai	520	330
16	Bangalore	Nellore	390	325
17	Mumbai	Nashik	160	314
18	Delhi	Manali	550	251
19	Coimbatore	Bangalore	363	243
20	Coimbatore	Chennai	500	239
21	Bangalore	Ernakulam	540	238
22	Bangalore	Vijayawada	650	234
23	Chennai	Bangalore	334	229
24	Hyderabad	Visakhapatnam	620	209
25	Bangalore	Mangaluru	400	177
26	Hyderabad	Nellore	460	174
27	Guntur	Hyderabad	280	160
28	Pune	Nagpur	800	146
29	Bangalore	Mumbai	1020	146
30	Hyderabad	Tirupati	560	145
31	Goa	Pune	480	137
32	Bangalore	Madurai	420	132
33	Mumbai	Hyderabad	700	128
34	Chennai	Nagercoil	700	125
35	Delhi	Amritsar	460	92
36	Mumbai	Indore	580	85
37	Bangalore	Goa	560	69
38	Pondicherry	Bangalore	310	60
39	Chennai	Vijayawada	450	54
40	Hyderabad	Chennai	630	53

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Priority highways for trucks : Top 20 highways

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#	Point A	Point B	Length (km)
1	Delhi	Chandigarh	223
2	Jaipur	Delhi	292
3	Gorakhpur	Lucknow	277
4	Vijayawada	Vishakhapatnam	338
5	Chandigarh	Ludhiana - Amritsar	228
6	Ahmedabad	Mundra	336
7	Jaipur	Jodhpur	328
8	Delhi	Agra	189
9	Aurangabad	Pune	228
10	Paradeep	Barbil	290
11	Coimbatore	Kochi	173
12	Dhanbad	Ranchi - Jamshedpur	263
13	Pune	Nashik	204
14	Indore	Bhopal	163
15	Chennai	Bengaluru	344
16	Kolkata	Haldia	115
17	Chennai	Viluppuram	164
18	Mumbai	Nashik	160
19	Coimbatore	Salem	140
20	Hosapete	Chitradurga	123

Source: ICCT analysis

9 covered in 40 priority highways for inter-city e-buses

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Split of public chargers: Fast vs Slow

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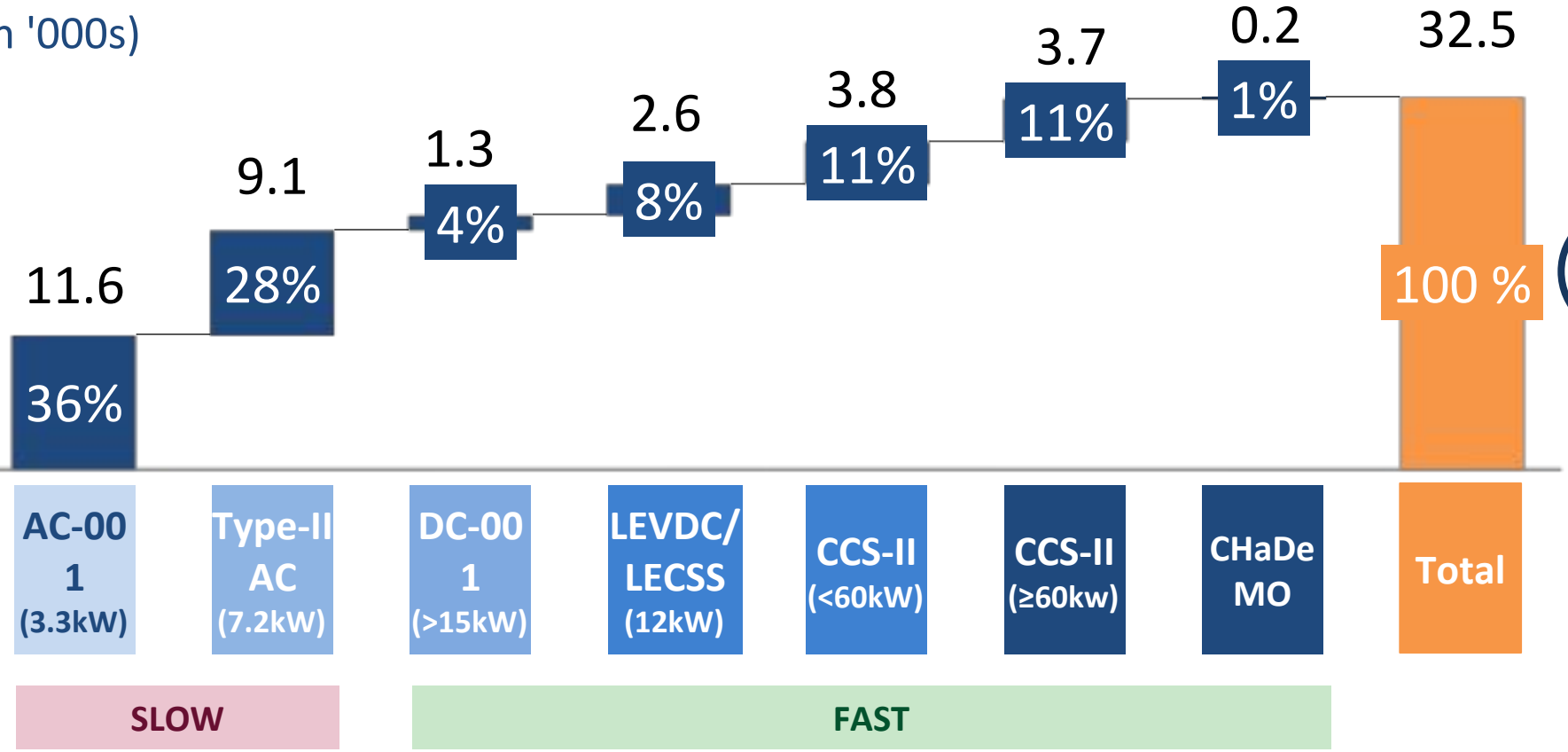
Share of public fast charging very limited

EV charger presence pan-India
(in '000s)



~35%

Fast charging

Source: Data submitted by CPOs

CPO wise EVPCS utilization

Charger type →	*LECCS/LEVDC*	*CCS2 30-60kW CCS 2 >60kW CHaDeMO*	*CCS 2 120kW*	Total	Utilization %
		2,000	800	2,800	1-1.8%
		1,400		1,400	<1%
		1,200		1,200	~2%
	120	900		~1,000	<1%
	50	620		~700	<1%
		600	4	~600	2-3%

Key takeaways:

- Low utilization (<2%)
- 4%+ Utilization seen only in select EVPCS:
  - On highways
  - Good amenities such as food option, seating

Source: CPO discussions

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PM E-DRIVE Scheme

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Scheme Notification	• Scheme Notified on September 29, 2024 vide Gazette notification S.O. 4259 (E)
Scheme Period	• 2 years - 1st October 2024 to 31st March 2026 • EMPS-2024 (Mar'24-Sep'24) is subsumed under this scheme
Components	• **Demand incentives** for e-2W, e-3W, e-ambulances, e-trucks • **Creation of capital assets**: e-buses, charging & testing agencies • **Scheme Administration** including IEC activities and fee for PMA
Outlay	• Total Outlay - Rs. 10,900 crore • Charging Infrastructure - Rs. 2,000 crore