Comparison of EV Policies and Institutional Arrangements

National Consultative Workshop on Strategy for Electrification of Public Transport

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Presented by

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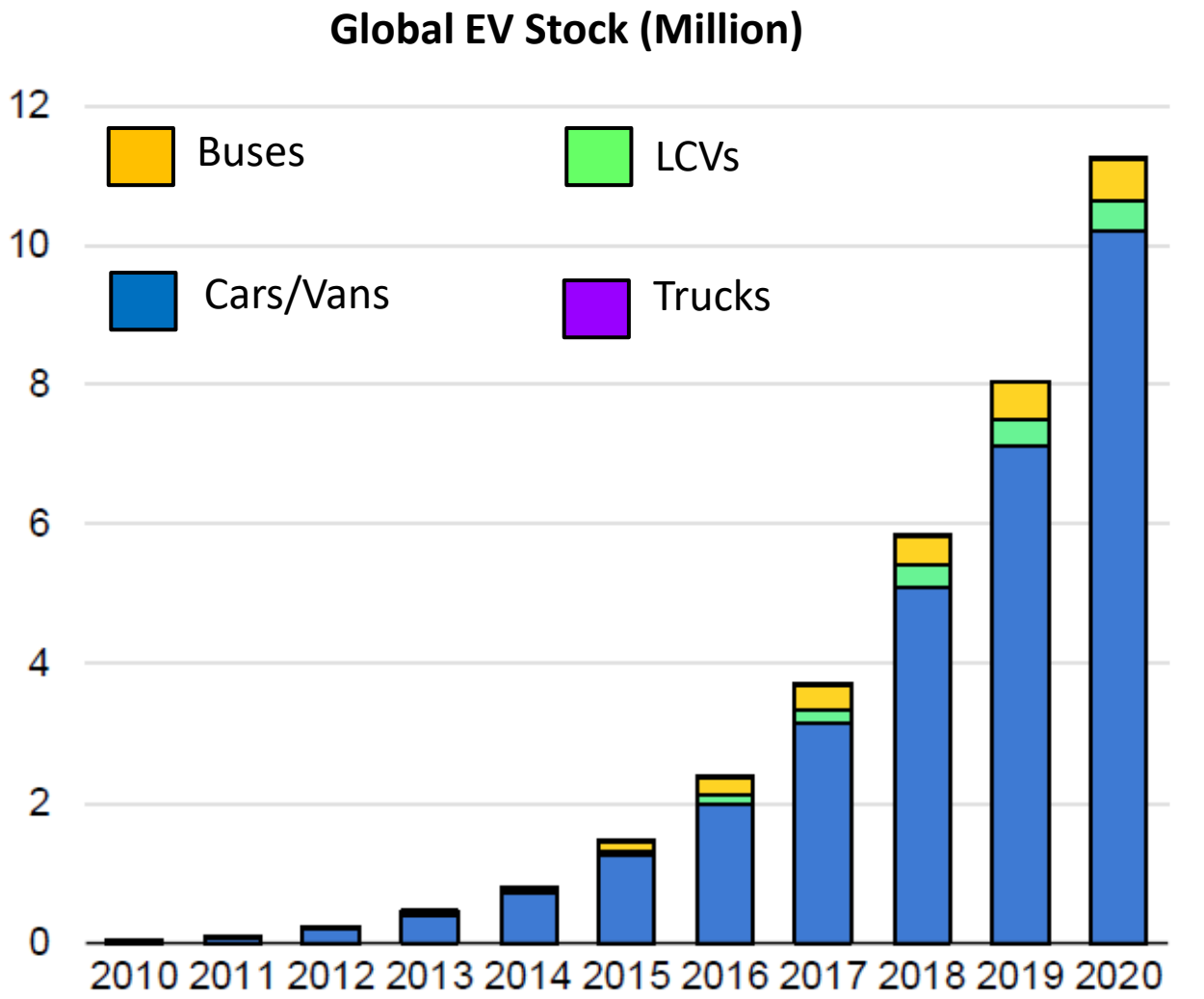
UNITED NATIONS ESCAP
Economic and Social Commission for Asia and the Pacific

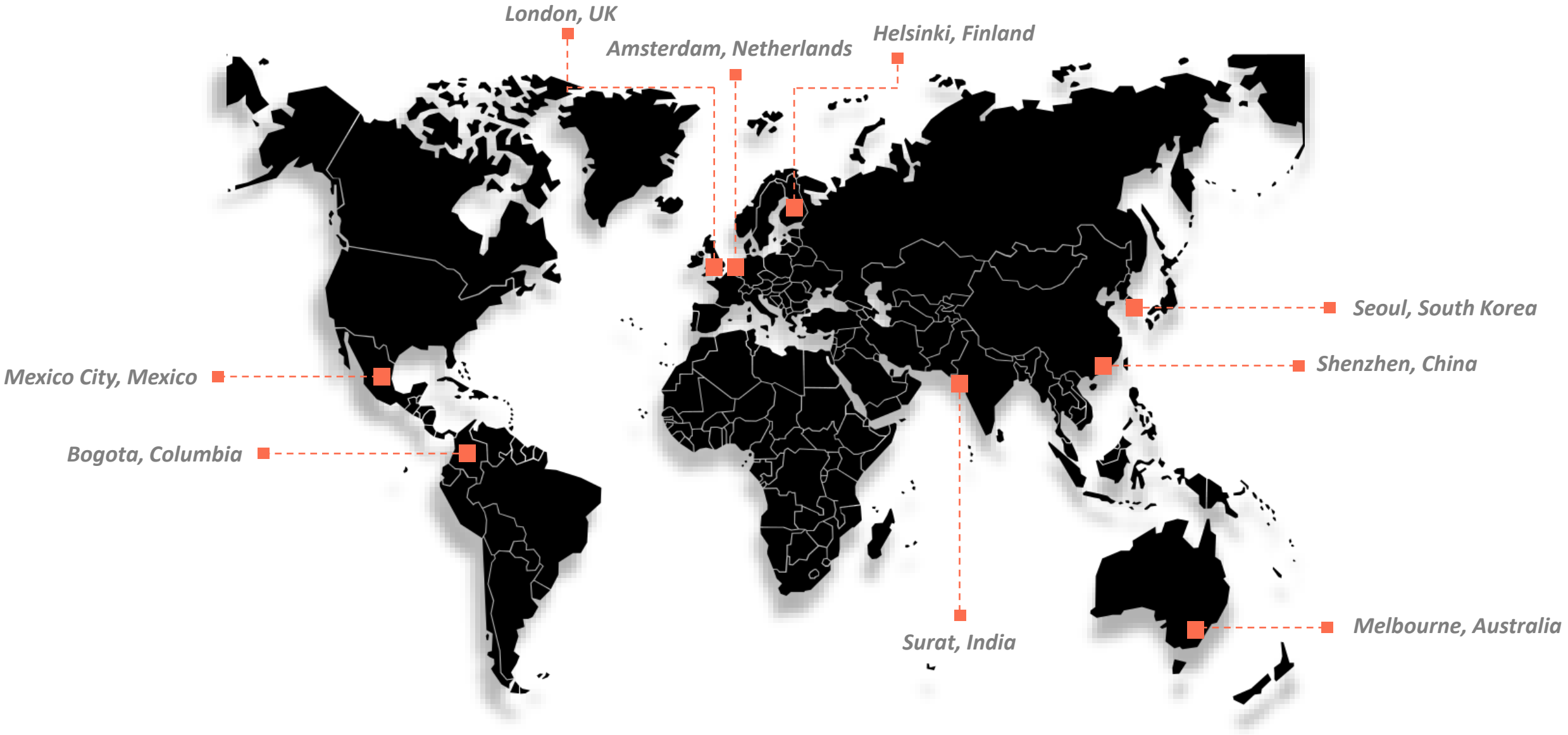
Global Policy Support

- Growing Global Policy Support for Electric Vehicles leading to high EV population growth globally
- Falling battery prices and improved energy densities (20-100% higher than 2010) have contributed further.
- Initial policy support for even private vehicles (USD 120 b spent on supporting E-car sales !!!)
- Clear long term goals prevalent in many countries (Global EV stock could reach 7% by 2030)
- Policy support shifting from direct subsidies to regulatory measures such as ZE mandates and fuel economy standards.
- Policy support also shifting to Buses and LCVs due to their greater emission reduction potential Transport



Source: IEA, Global EV Outlook 2021 ©

International Case Cities



London, United Kingdom

1,572

Area
(Km^2)

8.6

Population
(Million)

87,308

GDP per Capita
(USD)

FOCUSED MODES: **Private Vehicles, Buses and Taxis**

FISCAL INCENTIVES

- Over £900 million for the development, manufacture, and use of the ultra-low emission vehicles (ULEVs) in the UK.
- Reduce company car tax to two per cent for vehicles with zero- emission mileage of at least 130 miles.

REGULATORY STRATEGIES

- Creating Ultra Low Emission Zones
- All 25,000 central government fleet vehicles to be Electrified
- Recommending sales targets of 15 % by 2022, 45 % by 2025 and 85 % by 2030.

GOAL

100% zero emissions by 2034

At least 50% and as many as 70% of new car sales to be ultra-low emission by 2030

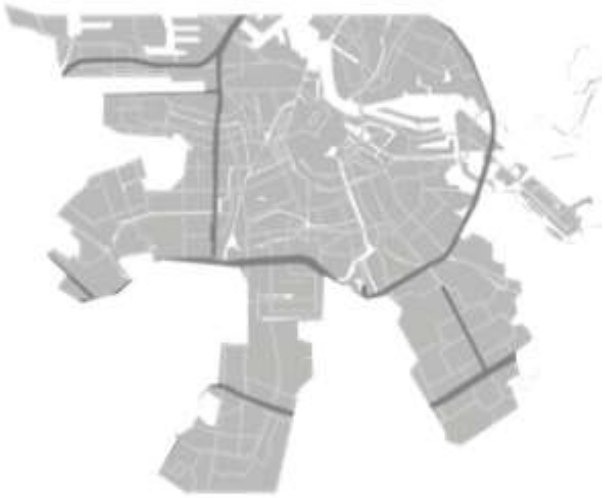
PUBLIC TRANSPORT

- **The city buses will use only biofuel or renewable energy.**
- **All new buses ordered by Transport for London (TfL) will be electric moving forward**

CHARGING INFRASTRUCTURE

- Invest £1 billion per year on charging infrastructure
- **Charging stations will be required for all new homes and businesses in the UK starting in 2022.**

Amsterdam, Netherlands



219.3

Area
(Km^2)

8.22

Population
(Million)

91,365

GDP per Capita
(USD)

FOCUSED MODES: **Delivery Vans, Trucks, Buses**

FISCAL INCENTIVES

- Subsidies for EV Purchase and setting up of charging stations.
- **20% support on prices of vans, buses and trucks.**
- **Used emission-free vehicles are also eligible for subsidisation.**
- Motor Vehicle Tax exempted initially

REGULATORY STRATEGIES

- Presenting EV as an attractive proposition.
- Only EVs allowed in environmentally sensitive or congested areas after target years

GOAL

Target of deploying 15,000 - 20,000 EVs with three or more wheels on the roads by 2015; 200,000 vehicles by 2020; and 1 million vehicles by 2025.

The nation aims to sell only zero-emission cars in the Netherlands from 2030.

PUBLIC TRANSPORT

- **Subsidy of 20% on the purchase value (a maximum of 40,000 euros)**
- **Only emission-free buses and coaches will be allowed in the city centre after 2022.**

CHARGING INFRASTRUCTURE

- **Using VAMIL and MIA** allows companies purchasing new environmental technologies to reduce their overall cost.
- Application and installation of a new public charging point is free.

Helsinki, Finland

217

Area
(Km^2)

0.65

Population
(Million)

64,473

GDP per Capita
(USD)

FOCUSED MODES: **Public Transport, 4W**

FISCAL INCENTIVES

- 2,000 EUR subsidy on the purchase or minimum 3-year lease of EV, with a maximum purchase price of 50,000 Euro (incl. taxes).
- Tax benefit for employers, if charging points made available at the workplace. (In effect from 2019)

REGULATORY STRATEGIES

- **E-cars are provided access to Bus Lanes at specific times.**
- **Specific areas or streets would be reserved exclusively for low-emission cars.**
- **Increased Taxes, road tolls, parking costs on purchase of ICE Vehicles.**

GOAL

Achieve 2,50,000 EV stock by 2030 and all registered passenger vehicles shall be capable of using alternative fuels or power sources

Achieve emissions-free passenger vehicle transport by 2050.

PUBLIC TRANSPORT

- **While appointing Bus Operators through the bidding process, the contract should mandate electric buses or buses running on alternate fuels.**

CHARGING INFRASTRUCTURE

- 3 million EUR subsidy allocated for charging infrastructure and alternate fuel pumps.
- Subsidy rate for fast chargers is 35% and for normal chargers 30% of purchase cost

Seoul, South Korea

605.25

Area
(Km^2)

9.96

Population
(Million)

408,265

GDP per Capita
(Million USD)

FOCUSED MODES: **Cars, Buses, 2-wheelers**

FISCAL INCENTIVES

- Subsidies for the purchase of electric and hydrogen vehicles was 94,000 units, an increase of 57% from 60,000 units in 2019.
- Reduction in Vehicle Tax is proposed

REGULATORY STRATEGIES

- Lowering the prices of electric vehicles by 10 million KRW by 2025 by focusing on Local Manufacturers like Hyundai.
- **Battery Leasing to cut CAPEX by nearly half.**

GOAL

In 2020, the Korean government plans to subsidise 99,950 electric vehicles;

- 65,000 passenger cars
- 13,000 freight cars
- **650 buses**
- 21,000 motorcycles, and 300 PHEVs (Plug-in Hybrid Electric Vehicles).

PUBLIC TRANSPORT

- **From 2021, public bus companies are required to purchase only zero-emission vehicles starting with replacing the older fossil fuel vehicles.**

CHARGING INFRASTRUCTURE

- **The Government to install 70 units of 350kW-class ultra-fast chargers, that can charge vehicles three times faster than chargers already installed from next year on PPP Basis**

Shenzhen, China

1,993

Area
(Km^2)

12.5

Population
(Million)

27,275

GDP per Capita
(USD)

FOCUSED MODES: **Buses, Private cars**

FISCAL INCENTIVES

- Regional subsidies, tax incentives provided to BEV passenger car (based on the electric range were provided) and BEV Buses.
- Electric taxis were exempted from fuel tax
- China to end EV Subsidies by 2022.

REGULATORY STRATEGIES

- Car number plate lottery (20,000 NEV) scheme introduction. Number plate restrictions for fuel vehicles.

GOAL

Carbon emission reduction by 40-45% by 2020, compared to the 2005 level.

New Energy Vehicles (NEV) targets : 10% of the conventional passenger vehicle market in 2019 and 12% in 2020.

PUBLIC TRANSPORT

- For NEV Buses, funding covered by the Shenzhen city and Bus Supplier BYD through third party finance.

CHARGING INFRASTRUCTURE

- Optimized charging and operation to have 1:3 ratio of charging station to e-buses.
- All e-buses charged overnight when electricity prices are low, and recharged at terminals during off-peak travel times.

Mexico City, Mexico

1,485

Area
(Km^2)

8.85

Population
(Million)

17,696

GDP per Capita
(USD)

FOCUSED MODES: **Public Transport (Buses)**

FISCAL INCENTIVES

- Vehicle tax exemption, road toll exemption, free parking, tax reduction
- The EcoTAG (Toll service) is exclusively for electric and hybrid vehicle owners and grants them a 20% discount on the regular fee.

REGULATORY STRATEGIES

- Vehicles with emission that failed to meet Euro-I standard were given “Yellow labels”, and the ones that fulfilled the criteria were given “Green labels”. Yellow labelled vehicles are being phased out.

GOAL

To improve mobility by replacing local transportation with zero emission vehicles.

They plan to increase generation of electricity through clean energies from 25 to 35 percent by 2024.

PUBLIC TRANSPORT

- Supports are available for providers of sustainable public transportation. In Mexico City, operators of PT electric or hybrid vehicles are exempt from the requirement to renew their fleet every ten years.

CHARGING INFRASTRUCTURE

- Over 900 EV charging stations in Mexico City.
- The government has allocated 25 million pesos for the installation.

Bogota, Columbia

1,776

Area
(Km^2)

8.181

Population
(Lakhs)

82.73

GDP per Capita
(Billion USD)

FOCUSED MODES: **Buses and taxis**

FISCAL INCENTIVES

- VAT exemption for hybrid EVs
- Lower Import tariffs for EVS
- Other mandates and tax breaks

REGULATORY STRATEGIES

- Exemption from time of day vehicle restriction measures like “Peak and Plate” used for traffic regulation.

GOAL

National Strategy for Electric and Sustainable Mobility: 6,00,000 EVs by 2030, 100% EV bus fleet, 45% population using PT

Achieving net zero emissions by 2050

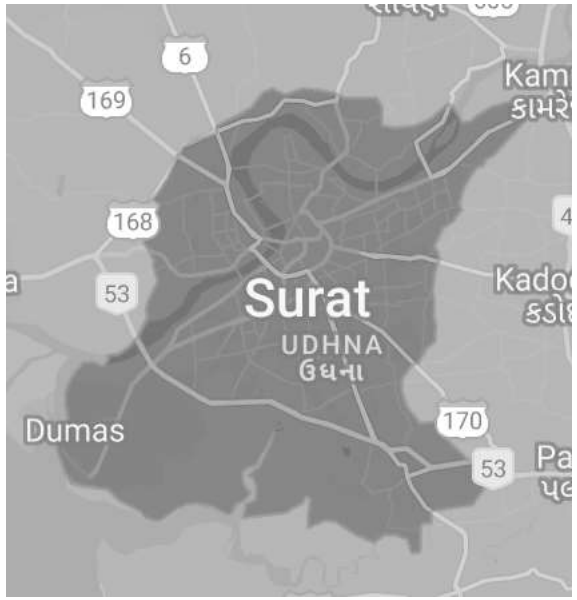
PUBLIC TRANSPORT

- 2020 tenders favour 100% electric buses, with contracts that last for 15 years (rather than 10 years) and lower bus productivity requirements (260 km per day per bus instead of 300 km)

CHARGING INFRASTRUCTURE

- Under The Bogota EV Charging Infrastructure Project, Enel X is installing charging points and terminals and shall use smart grid technology.

Surat, India



474.2

Area
(Km²)

7.78

Population
(Million)

7.69

GDP per Capita
(USD)

GOAL

Target of min. 20% EVs of State EV Policy Target of 0.2 m EV by 2025 (40,000 EVs)

Promote charging infrastructure and mandate adoption of EV in City Corporation and its agencies such as Surat Smart City Development Ltd., Surat Sitilink etc.

FOCUSED MODES: 2W, 3W, 3W and Buses

FISCAL INCENTIVES

- Central Govt. price subsidy for Buses, 3W, 2W and Taxies (FAME 2)
- Lower Vehicle Registration Charges
- State Govt price subsidy on cars and 2&3W
- Vehicle Tax exemption – 100% on 1st year, 75% on 2nd year, 50% on 3rd year and 25% on 4th year.
- 100% Rebate in Environment Improvement Charge
- Rs. 5000 per Pink Auto (3W)

PUBLIC TRANSPORT

- 40% subsidy on price for E Buses under FAME II and Rs 25 per km VGF
- 450 E Buses ordered through gross cost tender : 50 E Buses already on the Road

REGULATORY STRATEGIES

- Free parking for EVs on Parking lots operated by the city.
- City Municipal Corporation Employee vehicles and Garbage Collection vehicles to shift to EV in a phased manner.

CHARGING INFRASTRUCTURE

- Targeting to install 500 Public / Private Charging Stations or points
- Municipal Corporation shall provide land on rental basis for first 2 years and revenue sharing basis from 3rd year.

National Level Incentives

FISCAL INCENTIVES

	2W	3W	Cars	Trucks	Buses
Subsidy @ National Level under FAME II Scheme	15,000/ kWh	10,000/ kWh	10,000/ kWh	20,000/ kWh	20,000/ kWh

- *National subsidies are provided based on the battery size of vehicles.*
- *Demand Incentives for e-buses - provided only on operational expenditure model (GCC Model).*

NON-FISCAL INCENTIVES

- *FAME II encourages the States to provide waiver / concessional road tax, exemption from permit, waiver / concessional toll tax, waiver / concessional parking fees, concessional registration charges etc.*

State Level Incentives

Source: *A Review Of State Government Policies For Electric Mobility, 2020 by Chaitanya Kanuri, Rohan Rao, Pawan Mulukutla*

State Level Incentives

FISCAL INCENTIVES

Note: Maximum cap is set for all subsidies

State	2W	3W	Cars	Light Carriers	Buses
Delhi	INR 5,000/ kWh	INR 30,000	INR 10,000/ kWh	INR 30,000	
Bihar	INR 10,000/ kWh	INR 10,000/ kWh	INR 10,000/ kWh		INR 10,000/ kWh
	Additional INR.7,000/ kWh for using Li-ion instead of lead-acid batteries (only for 2W and 3W)				
Maharashtra	15% on BP*	15% on BP	15% on BP	Not Defined	10% on BP
Kerala		INR 30,000			
Gujarat	INR 10,000/ kWh	INR 10,000/ kWh	INR 10,000/ kWh		**OPEX Subsidy under CMUBS (INR.25/km)**

** Base Price of the vehicle*

Maharashtra and Kerala - subsidies are based on the vehicle's purchase price.

Delhi, Bihar and Gujarat- subsidies are provided on the battery size of vehicles.

NON-FISCAL INCENTIVES

Road Tax Exemption

100% exemption :Delhi, Maharashtra, Karnataka, Kerala, Bihar, Uttarakhand, Tamil Nadu, Andhra Pradesh and Punjab

Road tax exemption for early procurement of Evs

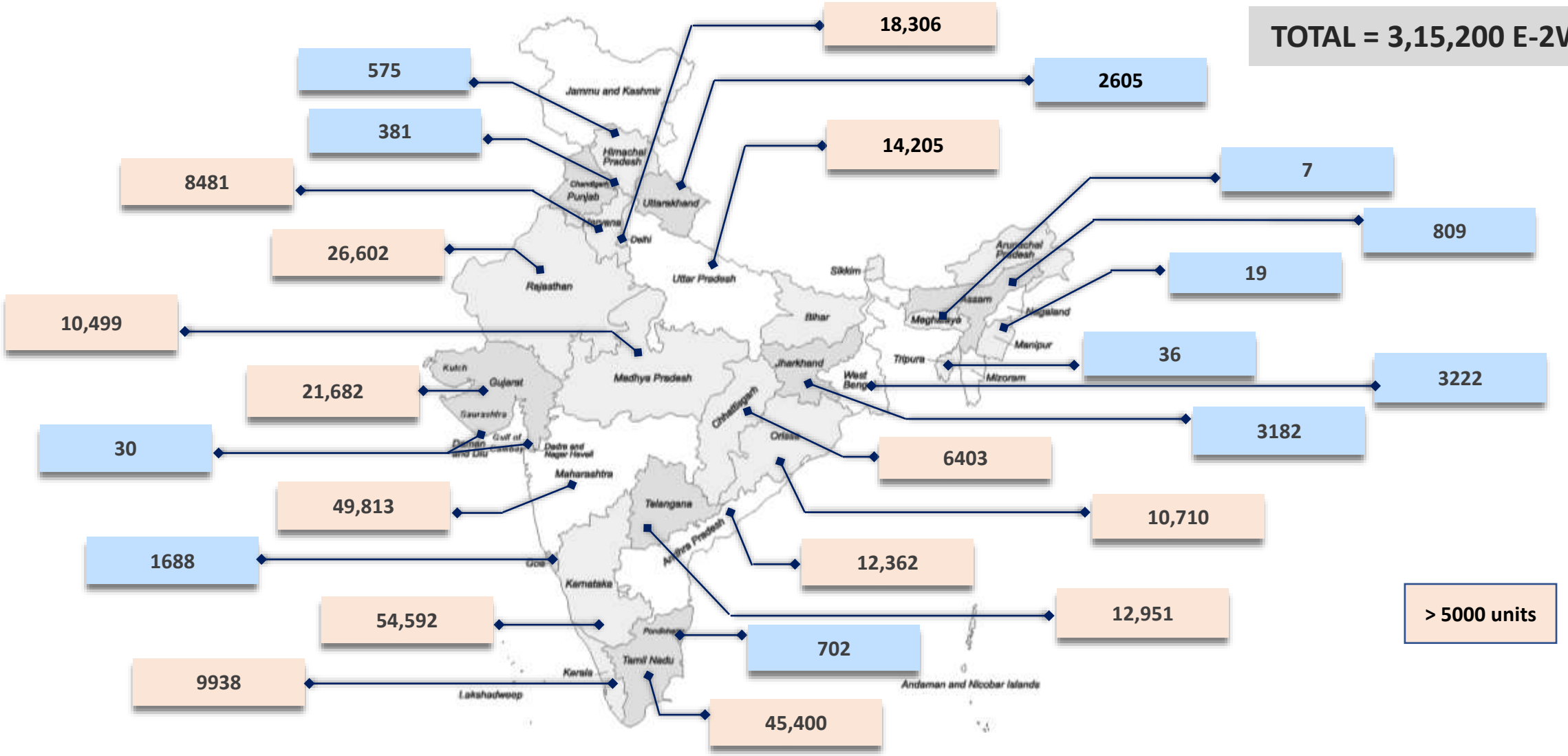
Telangana and Madhya Pradesh

100% exemption on Registration Fees

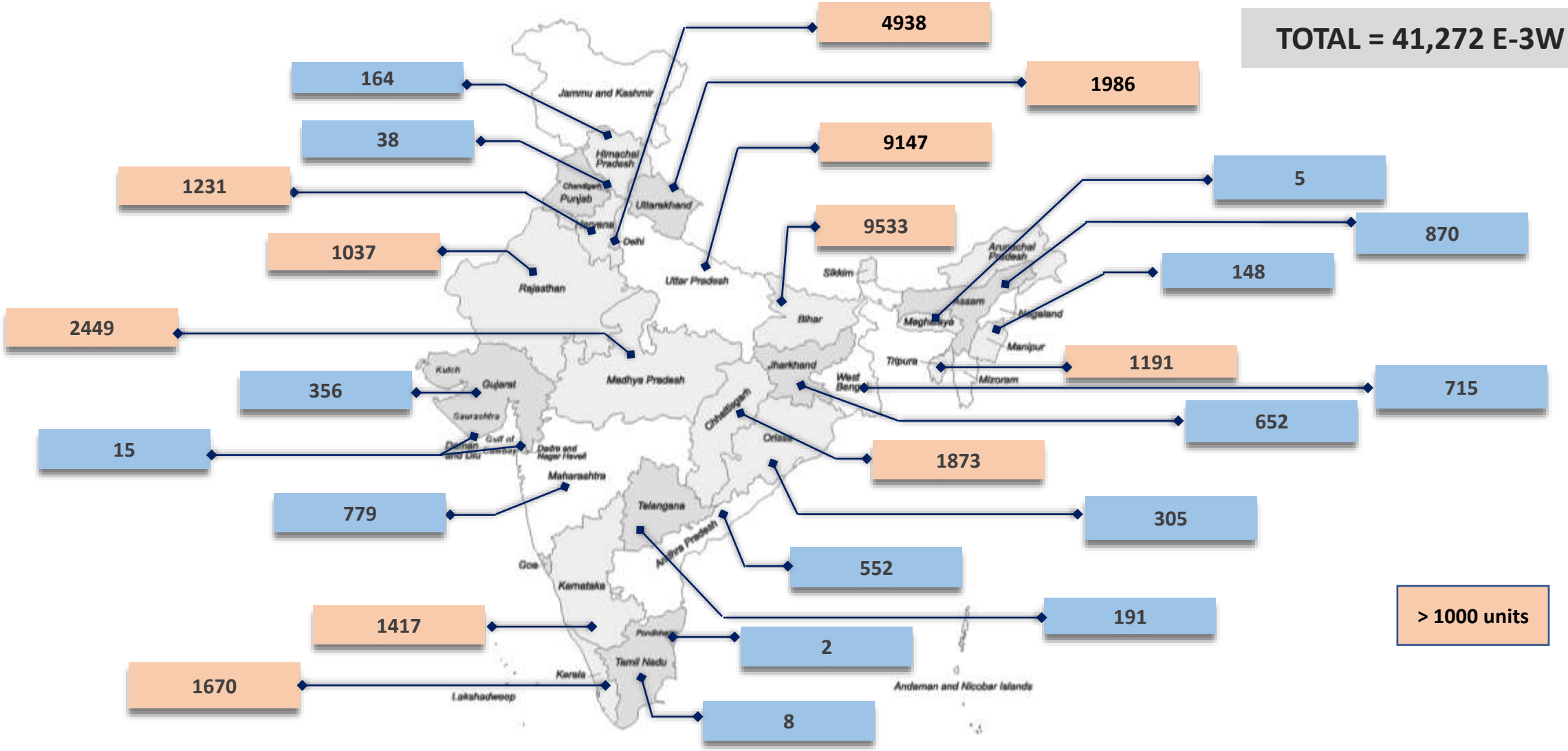
All states except Punjab and Gujarat

Source: *State EV Policies*

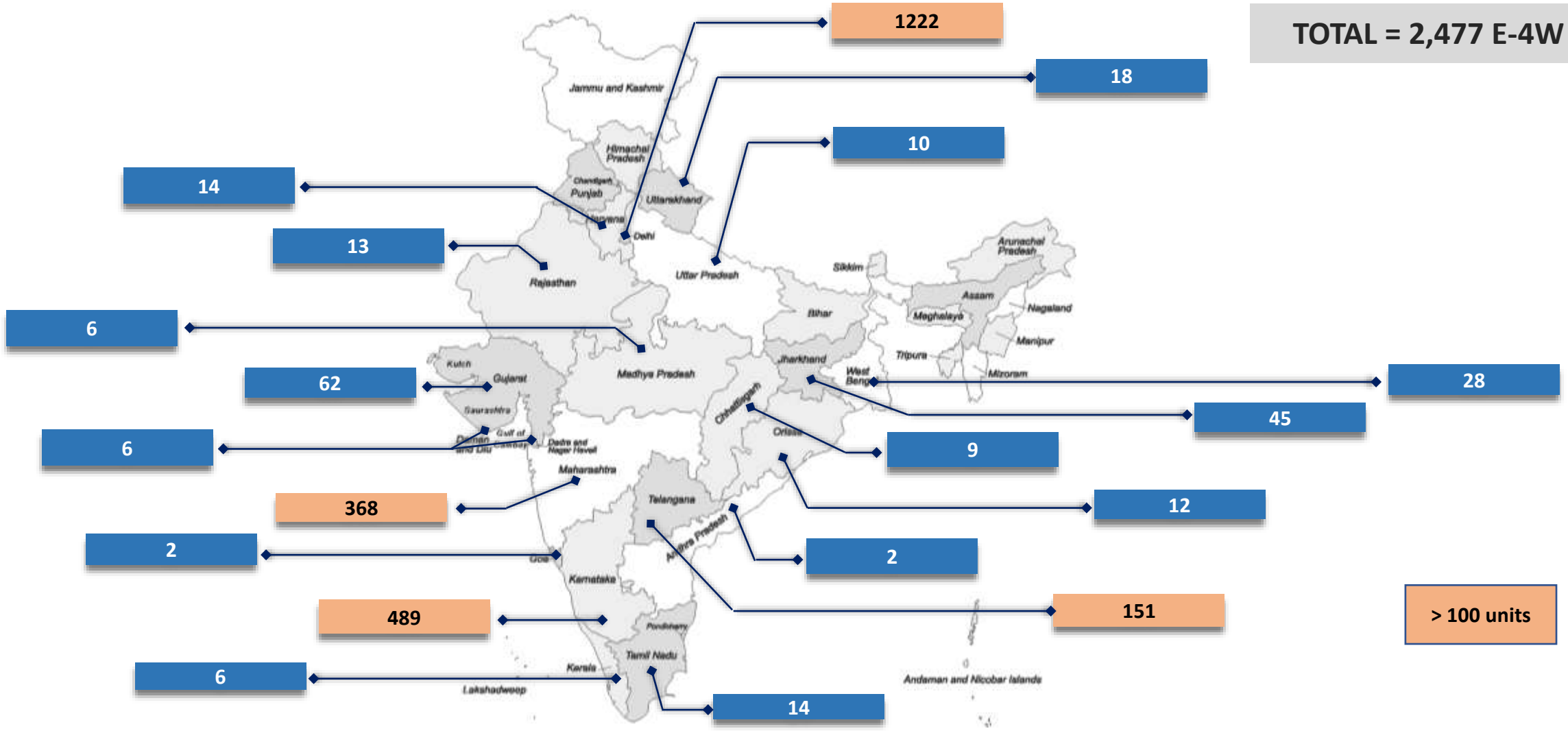
Two-Wheeler Deployment in India



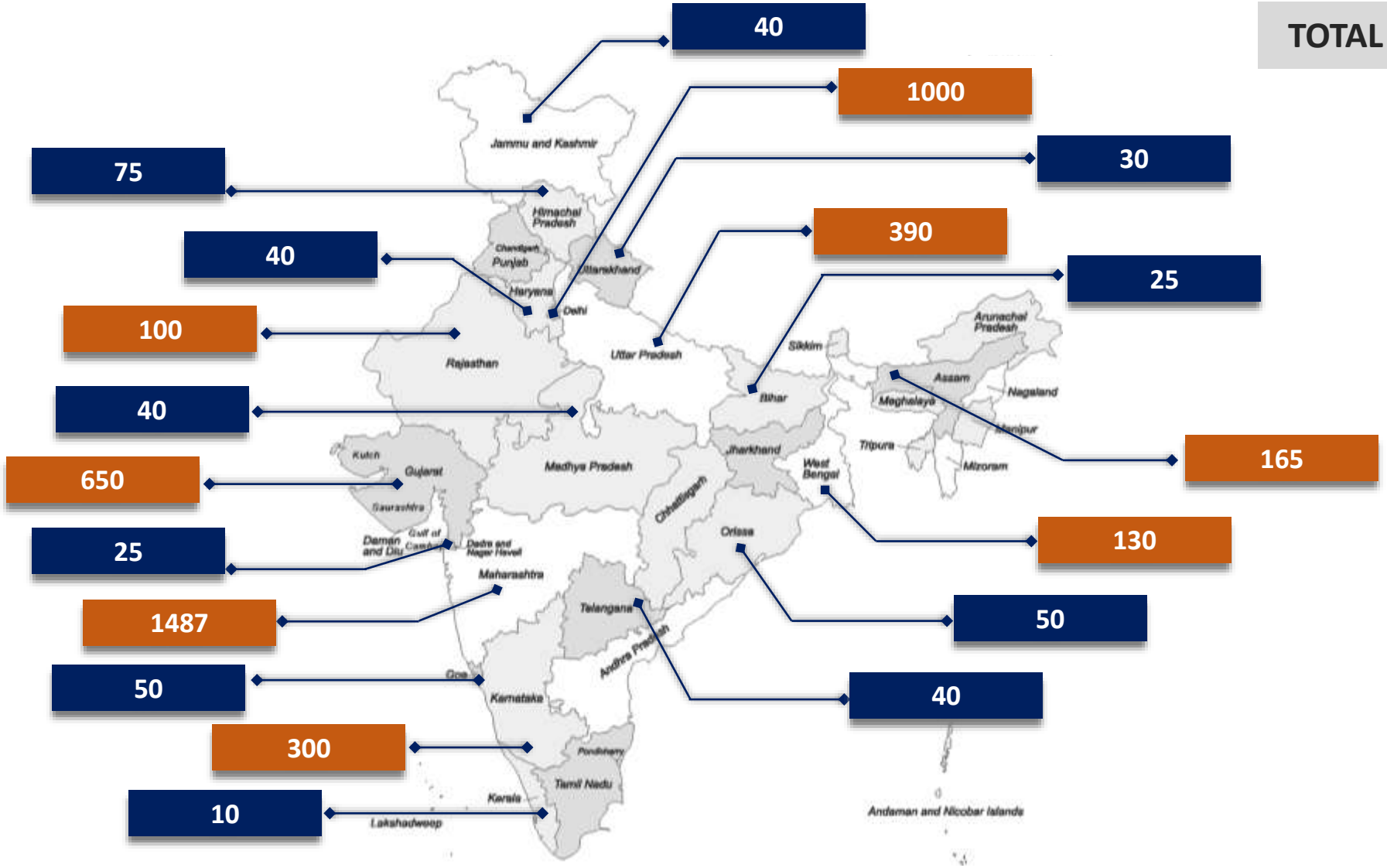
Three-Wheeler Deployment in India



Four-Wheeler Deployment in India



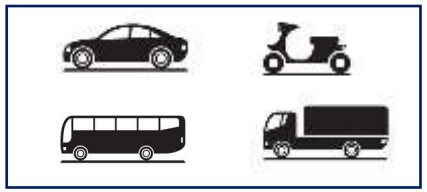
Bus Deployment in India



Key Takeaways – Targets and Modes

How are the Goals framed?

Setting emission reduction targets



Select specific modes for converting to EV.

Estimating % or no. of vehicles to be converted to EV within the target period

Which Modes are predominantly the focus?

Private Vehicles

Buses

EV30@30 campaign aims to reach a goal of 30% sales share across 4W categories by 2030 in IEA EV Initiative countries

ELECTRIC VEHICLES INITIATIVE

AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

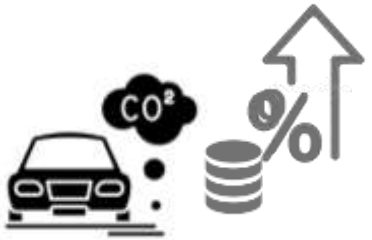
EVI co-lead EVI co-lead

Key Takeaways – Vehicle related Strategies

What kind of strategies are being followed for E-Vehicle promotion?

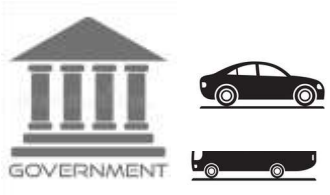
Fiscal Incentives : Direct subsidy, Emission based Tax rebates (Registration/VAT), Credits

Soft Measures : Creating Low Emission Zones, Preferential Parking and exemptions from restricted zones



Increased vehicle tax, toll rates and parking cost for ICE Vehicles

Promoting local manufacturing to reduce vehicle cost



E-Vehicle

Converting Government owned vehicles to EV is the preferred first step to transition

Electric Power Train Vehicles- Construction and Functional Safety Requirements

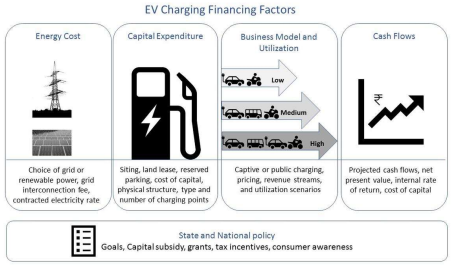
Promoting Electrification : Grid, Vehicle and Charging Standards

Key Takeaways – Charging related Strategies

What kind of strategies are being followed for promotion charging infrastructure ?

Direct subsidies and tax rebates for charging equipment

Permits for setting up Charging Stations at parking stations and city assets



Business models to encourage charging station operators

Building Regulations and power tariff to support Charging Points at homes and offices and Encourage charging during off peak hours

Thank You

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Summarising Priority Areas to Address in Policy

- Prioritising low carbon modes: Public Transport, Vans and Electric IPT, Cycling and walking
- Integrate goals into National Policies eg.
  - Public Transport and sustainable transport policies ,
  - Environmental policies
  - Tax and Registration incentives
  - Power Systems and Vehicle Standards
- Involve stakeholders in policy making Develop- local governments, manufacturers, energy management vendors, transport operators
- Localisation of policies – public transport, building regulations, parking, charging stations, integration into town plans
- Support Grid and Charging Infra development
- Support sustainable battery production and recycling

EV Charging Station Business Model

EV Charging Financing Factors

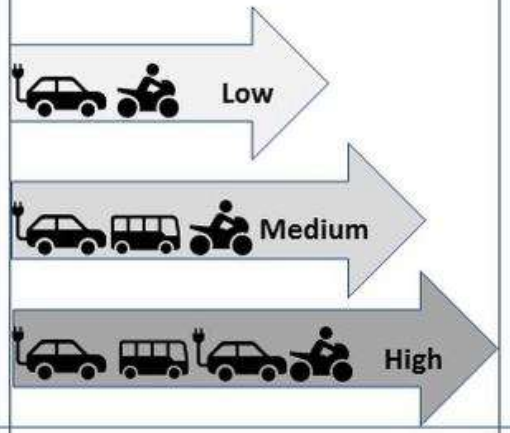
Energy Cost

Choice of grid or renewable power, grid interconnection fee, contracted electricity rate

Capital Expenditure

Siting, land lease, reserved parking, cost of capital, physical structure, type and number of charging points

Business Model and Utilization



Captive or public charging, pricing, revenue streams, and utilization scenarios

Cash Flows

Projected cash flows, net present value, internal rate of return, cost of capital

State and National policy

Goals, Capital subsidy, grants, tax incentives, consumer awareness