### STRATEGIES FOR ELECTRIC MOBILITY FOR GURUGRAM WITH FOCUS ON MICRO MARKETS (IPT)



#### Group Members Sujata Savant, Priyanka Kataria and Namit Kumar

# **NEED OF THE STUDY**

- Gurugram, a millennium City and a IT hub attracts traffic from Delhi NCR.
- The intracity travel is predominantly by private modes.
- Skeletal bus system became functional in Gurugram only in 2019. Before that tempos and Auto rickshaws have been serving as the public transport in the city.
- Haphazardly developed route network.
- Some areas have over supply whereas some of the areas are unserved.
- The City also has the worst pollution levels in the whole of Delhi NCR
- To develop sustainable transport system in Indian cities, Govt. of India has come out with Policy of promoting Electric Vehicles.
- This project aims at leveraging the Government effort by promoting clean transportation through a road map for introduction of electric 3-wheelers/ tempos in Gurugram.

# **PROJECT OBJECTIVES**

- ✓ Identification of an eco system approach that is comprehensive as well as relevant to local context
- ✓ To study the existing IPT operation and suggest roadmap for shift to Electric Mobility in IPT operation in Gurugram.
- Suggest Strategies to help transition from conventional vehicles to electric vehicles in transport micro markets (IPT Vehicles)
- ✓ Develop sustainable and attractive Financial Model for all stakeholders to roll out the EV's

## **APPROACH & METHODOLOGY**

- Identification of stakeholders
- ✓ Market Needs
   Assessment
- ✓ Study of pros and cons of different options
- Identification of attractive financial and workable proposition for all stakeholders
- Present an eco system wide transition strategy, followed by a road map to operationalise the EV's in transport Micro markets in Gurugram



# **GURUGRAM- CITY CHARACTERISTICS**

- A major city of Haryana, an IT hub & known as Millennium City.
- Leading financial and industrial hub with the 3<sup>rd</sup> highest per capita income in India
- Satellite City of Delhi located about 30 km south west and very near to International Airport.
- Has large Influx of floating population from neighboring cities
- Gurugram Authority has developed Master Plan for Gurugram Manesar Urban Complex

YEAR	POPULATION (Lakh)	DECADAL GR(%)
1991	1.28	
2001	2.11	64.58
2011	8.77	315.47



 The Master Plan envisages population of 42 Lakh in 2031

## **GURUGRAM- VEHICULAR CHARACTERISTICS**

- City is growing rapidly so are the number of private vehicles.
- 99% of the vehicles registered in the city were personalised vehicles.
- City is in desperate need of good reliable public transport.



**COMPOSITION OF NEWLY REGISTERED VEHICLES IN CITY-2017** 

- City is well connected with neighboring cities with expressways and national highways.
- As a result, majority of the intercity travel is also private vehicles.



# PUBLIC TRANSPORT FOR GURUGRAM

#### **DELHI METRO SYSTEM – YELLOW LINE**

- Yellow Line 48.8 km, 37 metro stations
- In Gurugram: 6 stations with terminal station at HUDA city Centre.
- Average Daily Ridership(June'19): 5.5 M
- Average Daily Ridership within Gurugram:0.3 M

#### **GURUGRAM RAPID METRO**

- Total Length 11.7 km with 11 stations
- Daily Ridership 60,000 (2018)
- Interchange with Delhi Metro : at Sikanderpur

#### SHUTTLE (App based Bus Service)

- Started in 2015, allows customers to book bus service on app
- Connects Gurugram, Delhi, Noida, Faridabad etc
- Approx 35,000 use the service daily



## **BUS TRANSPORT IN GURUGRAM**

Started in 2018 by Gurugram Metropolitan City Bus Limited

- 9 Bus Routes covering 160 km with approx 120 buses
- Approx 100 private mini buses operated from Gurugram Bus stand to various towns/villages in the vicinity
- Approx 125 interstate buses operate on 16 bus routes by HSRTC



#### **INTERMEDIATE PUBLIC TRANSPORT (IPT) OF GURUGRAM**

- It is the primary mode of public transport in absence of Bus system
- IPT Modes:E-rickshaws,Tata Magic Vikram Tempo
- Total Registered shared tempos : About 37000.
- Fleet by Fuel : Approx 60% of total are CNG.
   About 10,700 Autos run on Diesel.
- Route Network: Permits given under employment scheme to rural youth to operate on fixed routes from village to CBD.
- Average Route Length: 8-10 km
- Fare Structure : Flat fare of Rs 10/ trip
- Imbalance in Tempos on routes. Some have
   Over-supply and some of the areas are uncovered.
- ✓ Share of IPT in Peak trips : 31% (Cvcle





The life line of Gurugram's city transport system



#### **Gurugram TODAY!**



Historical Data

Delhi-NCR Schools to remain closed until 15th Nov as air quality turns hazardous due to pollution

REGISTER FOR RESULT UPDATE



Delhi - NCR Schools Closed Due to Air Pollution: Supreme Court appointed EPCA has ordered Schools to be closed in Delhi and adjoining NCR towns of Noida, Gurugram, Ghasiabad, Briddabad tomorrow in the wake of deteriorating air quality in the region. EPCA's order to announce two-day School Holidays comes in the wake of Indian







**Status:** Health impact even on light physical work Serious impact on people with heart/lung disease.

due to air pollution 1 min read. Updated: 13 Nov 2019, 08:52 PM IST

 The SC-mandated EPCA ordered schools in Delhi-NCR to be closed for the next 2 days as pollution in the city hovered close to 'emergency' levels

 The EPCA also extended the ban on hot-mix plants and stone-crushers till 15 November

#### **OPERATION CHARACTERISTICS OF SHARED AUTO RICKSHAW**

#### **USER CHARACTERISTICS**

- ✓ ATL 3.7 KM
- Average Cost Rs 10
- Average Time of Travel 15 min
- Avg Waiting Time 2 min in peak hour
- Work and Business: About 60% of the trips
   ECONOMICS OF AUTO OPERATION



- Cost of Diesel Tempos 2.55 lakh & CNG Tempos 2.65 lakh
- Passengers/trip 10-12
- No of round trips 10-12
- ✓ With flat fare Earnings/day Rs 2000-2500/-
- ✓ O&M Cost of Diesel tempos is Rs. 3.76/Km as

compared to Rs. 2.17/ Km of CNG Auto

Parameters	Diesel	CNG
Capacity (ltr)	10	6
Price	64	59
Full tank	640	354
Average (km/lt)	18.5	30
Full tank mileage (km)	185	180
Per km running cost	3.46	1.97
Maintenance Cost per km	0.3	0.2
Total O&M cost/ Km	3.76	2.17

#### **INSTITUTIONAL ARRANGEMENTS OF SHARED AUTO RICKSHAW**

- Auto operation dominated by individual owners.
- Village Pradhan / Auto Union Head play major role in allocation of routes to individual operators.
- Most of the autos are driven by owners themselves.
- With Metro & Bus system and with GOI policy of promotion of electric vehicles in place, there is a need to relook in operations of IPT in Gurugram.
- The present study attempts to
  - To rationalize the auto route network and integrate it with Mass Transport in City.
  - Suggest measures to replace diesel operated autos by electric vehicles
  - Suggest implementation plan for smooth changeover from diesel to EV

#### **EXISTING TEMPO ROUTES GURUGRAM**





### **RATIONALISED ROUTE NETWORK FOR TEMPO**



- 7 states namely Karnataka, Maharashtra, Telangana, Kerala, Utter Pradesh, Andhra Pradesh, & Delhi have policy of promoting electric mobility with focus on IPT modes also.
- Major incentives given in policy to promote electric mobility include
  - Incentives of 25% of EV cost of 3W
  - Capital subsidy of 25% on equipment for Fast charging and Battery Swapping stations
  - EV Battery/ Cell manufacturing, assembling investment promotion subsidy of 25% of Value of Fixed Assets (VFA)
  - Tax exemption and Stamp duty & SGST reimbursement on all EV
  - Govt. Land to be offered on Lease basis
  - Use of CSR funds for electrification of Employee commuting fleets
  - Electricity duty exemption and Different tariff rates for EV service providers
  - EV Parks and Battery Recycling Plants o be developed incentives as per policy.

#### **CHALLENGES – Anticipated in Shift from Diesel Auto to EV**

- Comfort with the existing system and resistance to change
- Lack of awareness among auto owners about the benefits of changeover to EV
- High vehicle and Battery Costs
- ✓ No Electric Vehicle Policy in Haryana till date.
- Very limited options in EV with same capacity vehicle
- Limited driving range(95-100km) and availability of economical charging infrastructure
- Issues in setting up of Charging stations Location for set up, provision of Land, Battery charging areas, battery swapping infrastructure, fulfillment of Fire & Safety norms, etc
- Managing batteries post use in EVs

## **DEMAND DYNAMICS- EV'S OF SIMILAR CC**

- Alwar Vahini 8-10 seater
- Vikram EV 8 seater
- Mahindra Esupro







Alwar Vahini



Vikram EV

### **INPUT PARAMETERS TO FINANCIAL MODEL**

- Total Cost of the Battery Fitted OEM 8.75 lakh
- ARL 10 KM
- ✓ Average Fare/passenger ₹ 10
- Average Travel Time 25 mins
- Frequency Every 2-3 mins in peak hour
- Passengers/trip 8 (minimum)
- No of return trips 12
- Kms/Full Battery– 140 km
- ✓ Revenue/Day ₹ 2000/- (Average)
- Loan 80-90%
- Interest Rate 10%
- ✓ Total Cost per km in ₹ for BL 2.6

- ✓ Anticipated Fleet size 1000
- Batteries Requirement– 500-600
- Battery Size in KW 14
- Battery Cost 200\$/KW
- Battery Life Time in cycles 2000
- Battery Life 5 years
- No of Fast Chargers 100-150
- ✓ Charger Cost (₹) 30,000
- Time taken to charge 8.5 hrs
- ✓ Electricity cost/unit ₹ 6
- ✓ Swapper Cost (₹) 2.5 lakhs
- Total Cost of Ownership (10 years)
  - 1.57 (with battery)

### **OPTIONS OF FINANCIAL MODELS**

To make EV costs (capital and operational) similar to that for conventional vehicles

- Reduced capital cost investment for the government agencies to come up with Battery owned vehicle technology
- Due to higher ambient temperatures, charging under a controlled and conditioned environment will help improve battery life. Better in Battery Swapping Technology
- With separate battery leasing system would enable the EV to penetrate in the market



#### FINANCIAL ANALYSIS FOR BATTERY OWNED VEHICLES

- Total Cost of the Battery Fitted OEM 8.75 lakh (6L VEHICLE COST +2.0 L BATTERY COST)
- Insurance, Taxes and Other Miscellaneous Rs 73,400
- ✓ Life of Battery 5 years @ 40,000 km and 2000 cycles
- Maintenance plus charging cost 0.85 per Km
- Manpower Cost per Day 1000/-
- With 80:20 Debt Equity (DE) Ratio, 3 year Loan Repayment Option (LRO) with/without Fame subsidy and also in case of Battery Leasing Model is not viable.
- ✓ With 80:20 DE, 5 year LRP with/without Fame subsidy and Battery Leasing Model is not viable.
- With 90:10 Debt Equity (DE) Ratio, 3 year Loan Repayment Option (LRO) with/without Fame subsidy and also in case of Battery Leasing Model is not viable.
- With 90:10 DE, 5 year LRP with/without Fame subsidy is not viable+. However, in case of Battery Leasing Model positive cash flows start at about 57,000 km. In addition to Fame subsidy, subsidy to the tune of 20% of the vehicle cost (Approx 1.2 lakh) need to be provided by the State Government.

#### FINANCIAL ANALYSIS FOR BATTERY LEASER

Batteries number at each station	800
Number of vehicles served at each station	1,040.00
Battery size in kWh	14
Battery cost per kWh in thousand ₹	14
Battery investment in ₹ lakh per station	1,568.00
Battery lifetime in cycles	2,000.00
Battery life in years	4.21
Interest cost	10%
Battery depreciation + interest cost per day in ₹	162.31
vehicle efficiency (km/ kWh)	10
Battery cost per km in ₹	1.17
Charger infra cost in ₹	30,000.00
Number of chargers	208
Total charger cost in lakh ₹	62.4
Nos of swappers per station	7
Swapper cost per unit in ₹ lakhs	2.5
Total swapper cost in ₹ lakhs	17.5
Other infra cost factor	2
Infra cost per km in ₹	0.07
Battery + infra cost per km in ₹	1.24
Operational Cost	
Units of electricity used in a day for charging	11,138.40
Units of electricity used for air-conditioning	1,113.84
Electricity cost per unit in ₹	6
Total cost of electricity in ₹ in a day	73,513.44
Manpower costs per day in ₹	20,000.00
Total operation costs per day in₹	93,513.44
Operation cost per km in ₹	0.84
Total cost per km in ₹	2.08
With 25% margin cost	2.6

#### FINANCIAL ANALYSIS FOR BATTERY SWAPPING

- Total Cost of the vehicle 6.0 lakh
- No FAME Subsidy Considered
- ✓ Life of Battery 5 years @ 40,000 km and 2000 cycles
- ✓ Maintenance plus charging cost 2.6 per Km (Calculated from the Financial analysis of Battery Leaser)
- Manpower Cost per Day 1000/-
- ✓ With 80:20 Debt Equity (DE) Ratio, Both 3 year and 5 Year Loan Repayment Option (LRO) are not feasible
- With 90:10 Debt Equity (DE) Ratio, 5 year Loan Repayment Option (LRO) with subsidy to the tune of 10% (approx 60,000/-) need to be provided to the state Government. In other words if the cost of the vehicle comes around Rs 5.2- Rs 5.4 lakh, it will be feasible.
- In addition to the above, land for Battery Swapping needs to be provided
- Also State Government needs to subsidize the cost of Battery Leaser in case of Swapping Technology. The subsidy is to the tune of Rs 8 crores so that the Cost of Charging at the Battery Swapping Station is reduced.
- ✓ The model is viable if the battery charging cost is reduced from Rs 2.6/km to Rs 1.3/km

# **EXPECTED REDUCTION IN POLLUTION**

#### DIESEL AUTOS

- NO OF AUTOS: 10745
- KMS/YEAR/ AUTO: 51000
- TOTAL KMS BY ALL DIESEL AUTOS: 548 Mn
- EMISSION/ BY AUTO OPERATION('000 TONS)
  - CO:1.5
  - HC: 0.45
  - NOX:0.07
  - PM 0.05
  - CO2:47.06

#### ELECTRIC AUTO

- EMISSION NORM:
- CO2 0.096 Tonne / 16000 km
- EMISSION/ BY AUTO OPERATION('000 Tonne): 3.2897
- REDUCTION IN POLLUTION ('000 Tonne):
- CO2 43.77
- *CO:1.5*
- HC: 0.45
- NOX:0.07
- PM 0.05

# **ISSUES IN BATTERY LEASE MODEL**

- Heavy set-up cost to Battery Leaser
- Acquisition of land for setting up the facility.
- common battery and standardisation of swapping mechanism
- Operational & regulatory issues such as battery abuse, battery theft, monitoring of battery usage, insurance re-sale/ re-use
- Extensive use of IT to address operational and regulatory concerns

# **ISSUES IN BATTERY OWNED MODEL**

- High cost of ownership. It may deter small auto owners to come forward.
- EV available in market requires minimum 6-8 hours of charging.
   Night charge will play role in full battery charge.
- Autos operates 140-150 Km/day and 1 charge is sufficient only for 100-110 Km which suggests a need for opportunity charging.
- Opportunity charging facility need to be made available at public places.
- Lack of awareness among auto operators on benefits of changeover

# **ROLE OF STATE GOVERNMENT**

- To introduce its policy on Electric Mobility for the state with the vision of achieving full Electric mobility by the target year.
- To provide incentives to vehicle owners for shifting to EV
- To take innovative measures to facilitate the shift to EV. These may include:
  - Buy back of Old vehicles
  - Cheaper loans for purchase of EV
  - Subsidized rates of electricity
  - Tax/ Registration exemption
  - Allow CSR funds for setting up Charging stations
- To provide the charging facility with IT interventions for regulating and monitoring the use of charging facilities.
- To provide incentives to vehicle manufacturers and also for capital investments for battery leasing / charging infrastructure.
- Work force skill development

# **IMPLEMENTATION PLAN**

- Institution for Pilot operation of EV: setting up of Department in GMCBL for EV operations.
- Target about 2000 Auto's whose permit is expiring in 2020.
- Pilot Corridor with 30 Electric Autos on each route:
  - 1. Bus Stand to Sikanderpur (10 Km)
  - 2. Bus Stand to Kapashera (10 Km)
- Setting up of Night charging facilities
- Public awareness program
  - Awareness on benefits in shifting to EV
  - Financing schemes offered for replacement of existing Auto to EV
  - Awareness for Charging and maintenance
  - Awareness on Battery abuse and damage

### **PILOT CORRIDORS FOR EV AUTO RICKSHAWS**



### **HOTSPOTS IDENTIFIED FOR CHARGING OF EV**



# **INSTITUTIONAL ARRANGEMENTS**

- Gurugram Metropolitan City Bus Limited (GMCBL) to have a separate department for operation of IPT Electric Vehicles on fixed routes.
- The department to include Auto Union Heads as stakeholders to facilitate the change over from diesel tempos to EV.
- To take up with Banks for arranging cheaper loans to the Auto owners.
- To take up provision of Charging facility with Haryana Bijli Vitran Nigam(HBVN).
- To develop IT interface required for regulating and monitoring the use Charging infrastructure.
- To oversee the implementation of EV mobility on Pilot corridors.

S.No	Comments received During Midterm Review	Justification on incorporating comments
1	It seems the study is able to reduce the capital cost but it adds to operating cost? Need to look upon this issue.	<ul> <li>It is mainly due to absence of support infrastructure required for charging of the EV. Battery options are being explored which can reduce the dependence on the public infrastructure.</li> <li>Further, policy level initiatives are being explored to address the operating cost issues.</li> </ul>
2	There is an uncertainty (i.e guarantee) with battery lease model that it will lead to low cost operations.	Battery lease model will be successful when EV operation is large enough to sustain its operation. Moreover, the concept being new, lot of incentives would be required from government to attract private participation in the model. Present Study explores both the options of Battery owning/ leasing and suggests suitable model for pilot Study.
3	Analyse both the technology on distance usage per day. Does electronic vehicle reach breakeven point as of diesel vehicle?	Technology options available at present in 8 seater public EV vehicle need to charge twice in a day to match the performance of EV. Other costs being almost nil in case of EV, it does reach a break even point.

4	Daily earnings of user need to be taken into considerations, after obtaining that value, consult government to give subsidy.	Daily earnings of the driver/ owner has been obtained from the Primary surveys conducted at different identified locations in the Study area (Gurugram). Subsidy to be provided by the Government has been calculated/ analyzed based on the operations & maintenance costs and also on the battery charging model. Various alternative financing models have been developed for Battery owned and Battery leasing options to assess the subsidy required.
5	Can include hydraulic battery changing mechanism.	Shall be proposed at major IPT stands, as the EV vehicle selected for IPT operates in Gurugram is 8 seater Mahindra eSupro. It has a battery of 14.4KwH (weighing about 250 - 300 Kg) which requires hydraulic changing mechanism for charging enroute in case of Battery Lease model.

				_
6	What would be your replacement strategy of existing operating IPT vehicles? Supporting data is required.	а. b. c.	<ul><li>There are 36,712 Auto Rickshaws in Gurguram which includes 10,745 Diesel, 12,739 CNG, 456 Petrol and 12,772 other Auto Rickshaws.</li><li>Diesel auto rickshaws get a permit initially of 5 years from RTO, Gurugram to ply on the road. This permit is once renewed for another 5 years.</li><li>The strategy proposed for shift to EV in IPT modes is that of phased implementation. In Phase I, diesel autos should be asked to shift to EV. The autos whose permit is expiring in next 1 year should be taken on priority.</li></ul>	
7	In the current scenario as village Pradhan plays important role in deciding routes for IPT, What role will they play in the future?	а.	The introduction of EV on IPT operation will be an important step and need full support of Government to make it a success. It is proposed that for Institutional arrangements, a separate department Gurgaon Metropolitan City Bus Limited (GMCBL) be set up to look after EV operations on IPT. The village pradhan/ Auto Union heads should be made stakeholder to facilitate the changeover alongwith operation.	
		b.	They should be consulted in finalizing the final plan/ routes, making auto owners aware of the Government program of EV shifting and its advantage and facilitate the process of changeover, shifting of Auto to different routes, selection of routs for EV operation in phases, subsidy on vehicle, battery, battery charging electricity, vehicle Loan, etc.	
		c.	Route rationalization should be done by RTO/ Transport Department, Govt. Of	
			Haryana. 33	

8	Decision in policy is required to register a particular type fuel IPT mode and how you will intensify the change.	•	A Battery operated vehicle can be the change/ option for future PT modes. Government of Haryana needs to bring a policy for electric mobility with reference to IPT operation. Over a duration of 5-10 years, phasing out of the existing diesel/ petrol/ CNG run auto rickshaws can be carried out and no new renewal of permit to be given for plying existing autos on road. This may be enforced in a phased and a gradual manner for auto owners/ drivers to shift to electric vehicles.
9	Why bicycle share is not working?	•	Due to extreme variations in weather conditions in North India along with decreasing air quality people tend to use a more comfortable ride saving them from exposure to adverse weather conditions. Road safety & Road accidents is also a major concern for Non Motorized Transport (NMT) like Cycle and Cycle Rickshaws.
10	Actual phasing on ground? Transitioning from CNG/ Diesel to EV	•	RTA, in early 2019 has announced that it has stopped renewing licence of diesel autos which are more than 10 years old. It is proposed that about 60 Electric Autos will roll out on 2 Pilot corridors considered in this Study. These Electric Autos would gradually increase to about 2000 by the end of year 2020.

# References

- Documents from WRI, India
- Blogs of Dr. Ashok Jhunjhunwala, Professor, IIT Chennai
- Reports from TERI on Electric Mobility
- Electric Vehicle Policies and Electricity Tariff for EV Charging in India by India Smart Grid Forum (ISGF), July 2019
- Electric Rickshaws in Indian cities: Status & Scope for Improvement, 2015 by IUT
- Study to Improve and upgrade IPT vehicles and services by IUT
- Conversion of a conventional vehicle to a battery electric vehicle in the framework of an educational project, Paper by B. Van Hooreweder, F. De Coninck, P. Sas, 2015
- Merits and Challenges of E-Rickshaw as An Alternative form of Public Road Transport System: A Case Study in the State of West Bengal in India, Paper by Deepanjan Majumdar & Tushar Jash, 2015

# THANK YOU

\_\_\_\_\_

State	Targets	Incentives
	1.100% EV by 2030 in Private/ Shared PT	<ol> <li>Capital subsidy of 25% on equipment for Fast charging station, Battery Swapping stations</li> </ol>
	2.Fast charging/ Battery swapping to be	
Karnataka (25.09.2017)	provided at every 50 Km on highway	<ol> <li>EV Battery/ Cell manufacturing, assembling – investment promotion subsidy of 25% of Value of</li> </ol>
(,	3.Setting up of 5 GWh of EV Battery	Fixed Assets (VFA)
	Manufacturing unit	
		3. Tax exemption on all EV
	1.100% migration to EV by 2030	<ol> <li>Apartment association with 200+ families to be given 25% subsidy for Charging stn</li> </ol>
	2.Battery operated services at Metro stations	<ol><li>Tailor made benefits to be provided to investments beyond 200 Crore in EV industry</li></ol>
(27.09.2017)	3.Fast charging/ Battery swapping to be provided at every 50 Km on highway	3. Govt. Land to be offered on Lease basis
	provided de every so kin on highway	4. Road tax exemption till 2025
	4.Free Parking & charging Station for 2W at Metro Station	<ol><li>Allow use of CSR funds for electrification of Employee commuting fleets</li></ol>
	1. Generate investment of Rs. 25,000 Cr in	1. 25% subsidy for Commercial EV Charging station
Maharashtra (14.02.2018)	EV manufacturing, Battery & Assembly	2. Road tax & Registration Fee exemption
	2. Create 1 Lakh jobs in the State	<ol><li>Petrol Pumps to be allowed to set up charging stations freely</li></ol>

State	Targets	Incentives	<b>Other Features</b>
Uttar Pradesh (15.03.201 8)	<ol> <li>1.3w/4w EV vehicles to be encouraged in major cities</li> <li>2.Fast charging/ Battery swapping to be at every 50 Km on highway</li> <li>3.Promote EV battery &amp; charging manufacturing</li> <li>4.Setting up of 2000 MWh of EV Battery Manufacturing unit</li> </ol>	<ol> <li>100% exemption on Road Tax on EV purchase.</li> <li>30% subsidy on purchase of EV in form of reimbursement to family</li> <li>Private EV Parks of 100/150 Acre to be developed – incentives as per policy.</li> <li>Infrastructure interest subsidy to be given</li> <li>Electricity duty exemption</li> <li>Stamp duty &amp; SGST reimbursement</li> <li>Different tariff rates for EV service providers</li> </ol>	1
Andhra Pradesh (08.06.201 8)	<ol> <li>Conversion of commercial fleets to EV by 2030</li> <li>1 Lakh slow &amp; fast charging stations by 2024</li> </ol>	<ol> <li>Exemption of Road Tax &amp; Registration</li> <li>Capital subsidy of 25% for charging station</li> <li>25% of Fixed capital investments for Battery &amp; charging equipment etc.</li> <li>100% reimbursement of Stamp duty &amp; transfer duty on purchase/ lease of land</li> <li>Fixed power cost reimbursement @ Rs 1 per unit for period of 5 yrs</li> <li>100% SGST reimbursement</li> <li>EV Parks of 500 /1000 Acre to be developed – incentives as per policy.</li> <li>Battery Recycling Plants to be developed</li> </ol>	<ol> <li>Separate EV tariff to be created</li> <li>Time of day sale of power to Battery Vehicles will be considered – cheaper power during non peak hours</li> <li>Third party EV charging providers to be allowed to procure power from DISCOM at regulator determined tariff</li> <li>Cloud charging features to be encouraged</li> <li>Battery recycling plants to be set up.</li> </ol>

State	Targets	Incentives	Other Features
Kerala (29.09.2018)	<ol> <li>KSEBL to set up initial charging stations and swapping stations</li> <li>Fast charging and swapping stations to be established on highways to create infrastructure for EVs.</li> </ol>	<ol> <li>Subsidized rate of charging</li> <li>Incentives of 25% of EV cost of 3W</li> <li>Energy companies to invest in charging</li> <li>Subsidized electricity tariff between Rs 5-5.5 per unit for EV charging stations</li> <li>Road tax to be exempted for 3 yrs of new registration</li> </ol>	
Delhi (27.11.2018)	<ol> <li>25% of all new registrations to be Battery Electric Vehicle (BEV)</li> <li>Charging facilities at every 3 Km</li> <li>All RWAs, Market associations etc with parking of more than 10 ECS to be encouraged to install 1 Bharat EV AC charger for every 3 ECS</li> </ol>	<ol> <li>Purchase incentive of 5% for E- Autos</li> <li>E-rickshaws – drivers &amp; operators to get loans at 5% interest and purchase incentive of 10%</li> <li>E-Goods carriers, purchase incentive Of 50% of FAME incentive for first 5,000 registrations</li> <li>First 10,000 charging points to get 100% grant for purchase &amp; installation</li> <li>Tariff for Private charging: Rs. 5.50 per KWh with time of day rebates</li> <li>Exemption on Road tax, registration fees, MCD parking fee, permit fee</li> <li>Changes in Building bye- laws to include charging infrastructure</li> </ol>	<ol> <li>Recycling Battery &amp; EVs</li> <li>Re- use of EV Batteries by Swapping agencies</li> <li>Nodal agency to be appointed by GNCTD to act as aggregator to purchase EV batteries</li> </ol>