

REPORT NO.
324



**PARLIAMENT OF INDIA
RAJYA SABHA**

**DEPARTMENT-RELATED PARLIAMENTARY STANDING COMMITTEE
ON INDUSTRY**

THREE HUNDRED AND TWENTY FOURTH REPORT

ON

Promotion of Electric Vehicles in the Country

*(Presented to the Rajya Sabha on 20th December, 2023)
(Laid on the Table of Lok Sabha on 20th December, 2023)*



**Rajya Sabha Secretariat, New Delhi
December, 2023 / Agrahayana, 1945 (Saka)**

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COMPOSITION OF THE COMMITTEE

(Constituted w.e.f. 13th September, 2023)

RAJYA SABHA

1. **Shri Tiruchi Siva** - **Chairman**
2. Shri Birendra Prasad Baishya
3. Shrimati Sulata Deo
4. Shri Mithlesh Kumar
5. Dr. Sikander Kumar
6. Shri Hishey Lachungpa
7. Shri Sandosh Kumar P
8. Shri Rajeev Shukla
9. Dr. Ameer Yajnik
10. *Shri Nagendra Ray

LOK SABHA

11. Ms. Mimi Chakraborty
12. Shri Bharatsinhji Shankarji Dabhi
13. Shri Hemant Tukaram Godse
14. Dr. S. T. Hasan
15. Shri Mohanbhai Kalyanji Kundariya
16. Shri Ravindra Kushwaha
17. Shrimati Poonamben Hematbhai Maadam
18. Shri Bidyut Baran Mahato
19. Shri Rampriti Mandal
20. Shri Vincent H. Pala
21. Shri Chirag Paswan
22. Shri T. R. V. S. Ramesh
23. Shri Y. S. Avinash Reddy
24. Shri Ravi Kishan Shukla
25. Shri Sunil Soren
26. Shri Kumbakudi Sudhakaran
27. Shri Sunil Dattatray Tatkare
28. Shri Su. Thirunavukkarasar
29. Shri Vijaykumar (alias) Vijay Vasanth
30. ^Vacant
31. #Vacant

SECRETARIAT

1. Dr. Vandana Kumar, Additional Secretary
2. Shri Swarabji B., Joint Secretary
3. Shri Jayanta Kumar Mallick, Director
4. Ms. Niangkhanem Guite, Deputy Secretary
5. Shri. Pratap Shenoy, Deputy Secretary
6. Shri Abhimanyu Vishnoi, Assistant Committee Officer

* Nominated to the Committee w.e.f. 26.09.2023

^Vacancy caused due to resignation of Smt. Gomati Sai w.e.f. 06.12.2023

#Vacancy caused due to resignation of Shri Hanuman Beniwal w.e.f. 15.12.2023

INTRODUCTION

I, the Chairman of the Department-related Parliamentary Standing Committee on Industry, having been authorised by the Committee, hereby present this Three Hundred Twenty-Fourth Report on the subject *Promotion of Electric Vehicles in the Country*.

2. The Committee took up the subject for detailed examination. As part of examination of the subject, the Committee deliberated in detail in its meetings held on 10th January & 23rd June, 2023, wherein it heard the views of the Ministry of Heavy Industries, Ministry of Power, Ministry of Road, Transport & Highway, Ministry of Petroleum & Natural Gas, Ministry of Environment, Forest and Climate Change, Ministry of New & Renewable Energy, Ministry of Finance (Department of Revenue), NITI Aayog, SMEV and during its study visit to various leading EV Manufacturers of the Country.

3. The Report is based on the submissions made by the Secretaries & Officers of various Ministries; representatives of SMEV and EV Manufacturers; and other materials such as Background Notes, Power-Point Presentations and replies to the questionnaires submitted to the Department-related Parliamentary Standing Committee on Industry in connection with the examination of the subject.

4. The Committee express its sincere gratitude to the Ministry of Heavy Industries Ministry of Power, Ministry of Road, Transport & Highway, Ministry of Petroleum & Natural Gas, Ministry of Environment, Forest and Climate Change, Ministry of New & Renewable Energy, Ministry of Finance (Department of Revenue), NITI Aayog, SMEV and EV Manufacturers for placing their valuable suggestions in connection with examination of the subject before the Department-related Parliamentary Standing Committee on Industry.

5. The Committee considered and adopted the report in its meeting held on 19th December, 2023.

NEW DELHI;
19th December, 2023
Agrahayana 28, 1945 (Saka),

TIRUCHI SIVA
Chairman,
Department-related Parliamentary
Standing Committee on Industry,
Rajya Sabha

ACRONYMS

2W	-	Two Wheeler
3W	-	Three Wheeler
4W	-	Four Wheeler
AAT	-	Advanced Automotive Technology
AC	-	Alternating Current
ACC	-	Advanced Chemistry Cell
ADB	-	Asian Development Bank
AIS	-	Automotive Industry Standards
BE	-	Budget Estimates
BEV	-	Battery Electric Vehicle
BSS	-	Battery Swapping Station
CCS	-	Combined Charging System
CESL	-	Convergence Energy Services Limited
CFA	-	Central Financial Assistance
CMVR	-	Central Motor Vehicle Rules
CNG	-	Compressed Natural Gas
CO ₂	-	Carbon Dioxide
COP	-	Conference of Parties
CRISIL	-	Credit Rating Information Services of India Limited
DC	-	Direct Current
DD	-	Daman and Diu
DISCOM	-	Distribution Company
DNH	-	Dadra & Nagar Haveli
DVA	-	Domestic Value Addition
EESL	-	Energy Efficiency Services Limited
EPR	-	Extended Producer Responsibility
EU	-	European Union
ER & D	-	Engineering Research & Development
EV	-	Electric Vehicle
EVCS	-	Electric Vehicle Charging Station
EVSE	-	Electric Vehicle Supply Equipments

FAME	-	Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles
FY	-	Financial Year
GCC	-	General Conditions of Contract
GDP	-	Gross Domestic Product
GHG	-	Green House Gas
GSR		General Statutory Rules
GST	-	Goods and Services Tax
GWH	-	Giga Watt Hour
HEV	-	Hybrid Electric Vehicle
ICE	-	Internal Combustion Engine
IEC	-	Information, Education and Communication
IIT	-	Indian Institute of Technology
IPR	-	Intellectual Property Rights
KW	-	Kilo Watt
KWH	-	Kilo Watt Hour
LFP	-	Lithium Iron Phosphate
LiB	-	Lithium ion batteries
LNG	-	Liquefied Natural Gas
LDV	-	Light Duty Vehicle
MHI	-	Ministry of Heavy Industries
MNRE	-	Ministry of New & Renewable Energy
MoRTH	-	Ministry of Road, Transport and Highways
MOU	-	Memorandum of Understanding
MW	-	Mega Watt
NCR	-	National Capital Region
NE	-	North East
NGO	-	Non Governmental Organization
OEM	-	Original Equipment Manufacturer
OMC	-	Oil Marketing Company

PCS	-	Public Charging Station
PHEV	-	Plug-in Hybrid Electric Vehicle
PIB	-	Press Information Bureau
PLI	-	Production Linked Incentive
PPP	-	Public-Private Partnership
PSU	-	Public Sector Undertaking
R&D	-	Research and Development
RE	-	Revised Estimates
ROV	-	Remotely Operated Vehicle
SMEV	-	Society of Manufacturers of Electric Vehicles
SO	-	Statutory Orders
STC	-	State Transport Corporation
STU	-	State Transport Undertaking
UAV	-	Unmanned Aerial Vehicle
USD	-	United States Dollar
UT	-	Union Territory
YoY	-	Year Over Year

REPORT

Electric vehicles are gaining popularity across the globe. Due to fast depletion of fossil fuels, the automotive industry is also shifting from traditional fuel based technology to eco-friendly technologies. The automotive sector has emerged as one of the most dynamic and rapidly growing sector in the world. The sector has witnessed remarkable progress and is now considered a key contributor to economic growth of the nations. The growth of this sector in India has been fuelled by several factors, including rising income levels, increasing urbanization, improved road infrastructure, and the expansion of the middle-class population. The sector encompasses a wide range of vehicles, catering to various segments and consumer preferences. Two-wheelers, such as motorcycles and scooters, and Three Wheelers dominate the automotive market of developing nations such as India, owing to their affordability and convenience in navigating congested urban areas. Passenger cars have also witnessed significant growth, with a rising demand for compact and mid-size vehicles. Furthermore, the commercial vehicle segment, including trucks and buses, plays a pivotal role in supporting robust transportation and logistics network.

2. The automotive sector also faces its share of challenges. These include the need for continuous technological advancements, stringent emission norms, infrastructure development, and skilled labour availability etc. Nonetheless, industry stakeholders, including manufacturers, policymakers, and consumers are actively working towards overcoming these obstacles and fostering a sustainable and competitive automotive ecosystem. Pollution is a significant concern in the automotive sector, primarily due to the rapid growth of vehicles on the roads and the associated emissions. However, efforts are made within the auto sector to mitigate its environmental impact and promote sustainability.

Indian Automotive Sector:

3. The Automotive Industry in India has come a long way from its nascent state at the time of India's independence in 1947 to its present day dynamic form. Today, the industry produces a wide range of automobiles and auto-components catering to both the domestic as well as foreign markets. The development of the industry has been shaped by the demand on the one hand and the government interventions on the other.

4. India represents the third largest automobile market of Passenger vehicles and Commercial vehicles in the world. India is the world's largest manufacturer of Three Wheelers, second largest manufacturer of Two-

Wheelers, and fourth largest manufacturer of Passenger Vehicles. Indian Automotive Industry has the presence of all Global automobile manufacturers from Europe and Asia such as Suzuki, Honda, Toyota, Isuzu, Yamaha, Nissan, Hyundai, Kia, Renault, Volkswagen, Skoda, BMW, Mercedes, PSA, JLR, Fiat, Cummins, MG Motor, etc.

5. The turnover of Indian Automobile Industry is USD 151 Billion (Rs 12.4 lac crore), that translates into a large contribution to country's economy and manufacturing sector. At present, 30.7 million jobs (Direct: 4.2million and Indirect: 26.5 million) are supported by the Indian Automotive Industry. Indian Automotive Industry exported vehicles and auto components amounting to about **USD 35.7** billion. The production and sales statistics of automotive motors in the country for the year 2022-23 as informed by the Ministry of Heavy Industries is as under:

Category-wise production & sales statistics for 2022-23

(No. of Units in Lakh)

Category of Vehicles	Total Production	Total Sales	Total Export	Worldwide ranking in Manufacturing
2 Wheelers	194.6	158.6 2	36.5	Among Top 2 in the World
3 Wheelers	8.55	4.89	3.66	No.1 in the World
Passenger Vehicles*	45.78	38.90	6.63	Among Top 4 in the World
Commercial Vehicles**	10.35	9.62	0.79	Among Top 6 in the World

6. India is massively dependent on oil imports and pollution in many Indian cities has reached alarming levels. The Indian Government has implemented several policies and initiatives to address this issue and promote cleaner and more sustainable transportation. In recent years, the Indian automotive sector has embraced the global shift towards sustainable mobility. Electric vehicles (EVs) have gained traction, driven by Government initiatives, favourable policies, and growing environmental awareness. Several automakers are investing in EV technology and infrastructure development, leading to an increasing number of electric vehicles on Indian roads.

Electric Vehicles (EVs):

7. Electric Vehicles (EVs) includes road and rail vehicles, surface and underwater vessels, electric aircraft and electric spacecraft. Electric road vehicles include electric passenger cars, electric buses, electric

trucks and personal transporters such as electric buggy, electric tricycles, electric bicycles and electric motorcycles/scooters. Though the concept of electric vehicles has been around for a long time, it has drawn a considerable amount of interest in the past decade amid a rising carbon footprint and other environmental impacts of fuel-based vehicles.

8. An electric vehicle (EV) is propelled by an electric motor, powered by rechargeable battery packs, instead of an internal-combustion engine (ICE) that generates power by burning a mix of fuel and gases. The electric motor gets its power from a controller which in turn is powered by a rechargeable battery that is recharged by plugging the vehicle into an electric power source, or may be self-contained with a battery, solar panels, fuel cells or an electric generator to convert fuel to electricity. Thus the electric vehicles operate on the principle of converting electricity to kinetic energy to drive motor(s) which in turn rotates the wheels of the vehicle.

9. Unlike conventional technologies, there are no tail-pipe emissions from electric vehicles. Compared to traditional gasoline-powered vehicles, EVs produce fewer emissions and are more energy-efficient & cost-effective. While EVs were once seen as a product suitable for a particular group of people, they are now becoming increasingly popular as battery technology improves and availability of charging infrastructure gradually improving to facilitate the users of electric vehicles.

10. Based on the input used to power the vehicle, electric vehicles (power trains) are categorized into four distinct types:

Battery Electric Vehicle (BEV)

BEVs are also known as All-Electric Vehicles (AEV). Electric Vehicles using BEV technology run entirely on a battery-powered electric drive train. The electricity used to drive the vehicle is stored in a large battery pack which can be charged by plugging into the electricity grid. The charged battery pack then provides power to one or more electric motors to run the electric vehicle.

Hybrid Electric Vehicle (HEV)

HEVs are also known as series hybrid or parallel hybrid. HEVs have both engine and electric motor. The engine gets energy from fuel, and the motor gets electricity from batteries. The transmission is rotated simultaneously by both engine and electric motor. This then drives the wheels.

Plug-in Hybrid Electric Vehicle (PHEV)

The PHEVs are also known as series hybrids. They have both engine and a motor. One can choose among the fuels, conventional fuel (such as petrol) or

alternative fuel (such as bio-diesel). It can also be powered by a rechargeable battery pack. The battery can be charged up with electricity by plugging into an electrical outlet or electric vehicle charging station (EVCS). PHEVs have much larger battery packs when compared to other HEVs and therefore can run larger distances on battery energy.

Fuel Cell Electric Vehicle (FCEV):

FCEVs are also known as Zero-Emission Vehicles. They employ ‘fuel cell technology’ to generate the electricity required to run the vehicle. The chemical energy of the fuel is converted directly into electric energy. FCEVs are also known as Zero-Emission Vehicles. They employ ‘fuel cell technology’ to generate the electricity required to run the vehicle. The chemical energy of the fuel is converted directly into electric energy.

11. Transport is a fundamental requirement of modern life, but the traditional combustion engine is quickly becoming outdated. Petrol or diesel vehicles are highly polluting and are being quickly replaced by fully electric vehicles. Among the most notable advantages of EVs is their contribution in reducing air pollution. Electric Vehicles produce zero tailpipe emissions. If coupled with the use of renewable energy sources, EVs become a crucial tool in achieving India's targets under the Paris Agreement.

12. The availability of fossil fuels is limited, and the Toxic emissions from petrol and diesel vehicles lead to long-term, adverse effects on public health. In comparison, the emissions impact of electric vehicles is much lower than the petrol or diesel vehicles. Fully electric vehicles have zero tailpipe emissions, but even when electricity production is taken into account, petrol or diesel vehicles emit almost 3 times more carbon dioxide than the average EV. To reduce the impact of charging electric vehicles, India is ambitious to achieve about 40 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by the year 2030. Therefore, electric vehicles are the way forward for Indian transport sector.

13. There are two major concerns why there is a need to switch over to electric energy in the automotive sector and promote electric vehicles, which are briefly enumerated below:

(i) **Air pollution**, especially particulate matter, is a serious challenge in India, and transport is a significant factor in the nation’s air-quality problems. The transport sector of the country is also expanding rapidly and the number of vehicles on the roads is expected to rise very

sharply in the future. However, the transport sector is an important sector that facilitates the overall development of industries and commercial activities in any economy. In India, therefore, development of the transport sector is a priority area for the Government. Emissions from the transport sector are mainly driven by fossil fuel consumption in the road sector, even as vehicle ownership in India is far below the world average and much below the levels of other developed and emerging economies. Overall, transportation sector contributes to about 9.7 per cent of the country's total Greenhouse Gas emissions. Moreover, increasing sales of internal combustion engine (ICE) vehicles have more than doubled the fuel consumption and related GHG emissions from the transport sector. The road transport sector accounts for about 87 per cent of passenger traffic and 60 per cent of freight traffic movement and sustainable development of this sector is a critical element in the long-term development strategy of the country.

(ii) Energy consumption of the transport sector accounts for 18 per cent of the total energy consumption in India. This translates to an estimated 94 million tonnes of oil equivalent (MTOE) energy. Indian transport sector accounts for 13.5 per cent of India's energy-related CO₂ emissions, with road transport accounting for 90 per cent of the sector's total energy consumption.

14. India has committed to Net-Zero carbon emissions by 2070 and to reduce the total projected carbon emissions by one billion tones by 2030. India also submitted its Long-Term Low Emission Development Strategy to the United Nations Framework Convention on Climate Change (UNFCCC), during the 27th Conference of Parties (COP27) held at *Sharm-el-Sheikh*, Egypt in November, 2022. One of its strategies is to develop an Integrated, Efficient, and Inclusive Low-Carbon Transport System.

15. Technological breakthroughs and innovations have periodically come up to cater to these issues sustainably. Electric Mobility is one such alternative that has started finding acceptability globally to restrain emission of greenhouse gases and diminish air and noise pollution thus, providing both environmental and socio-economic benefits to countries. It is believed that faster adoption and promotion of electric vehicles will not only reduce dependence on fossil fuels but also bring down the oil import bill and the pollution arising from the use of ICE vehicles in the country.

Initiatives by Government to promote EVs in the Country:

16. **National Electric Mobility Mission Plan (NEMMP) 2020:** The Ministry of Heavy Industries, being the nodal Ministry for the automotive sector, has been funding research, design, development and demonstration projects and also spearheading the electric mobility initiative in the country. In this direction, the Government of India approved the National Mission on Electric Mobility (NMEM) in 2011. Subsequently, the National Mission on Electric Mobility Plan 2020 (NEMMP 2020), which was unveiled in 2013, was one of the most important initiatives initiated by the Central Government to bring in a significant change in the Automobile and Transportation Sector. This is the culmination of a comprehensive collaborative planning for promotion of hybrid and electric mobility in India through a combination of policies aimed at gradually increasing Electric vehicle population in India along with a certain level of indigenization of technology, thereby ensuring India's global leadership in some vehicle segments.

The Vision Statement of this plan is -

“To encourage reliable, affordable and efficient xEVs that meet consumer performance and price expectations through Government – Industry collaboration for promotion and development of indigenous manufacturing capabilities, required infrastructure, consumer awareness and technology; thereby helping India to emerge as a leader in the xEV Two Wheeler and Four Wheeler market in the world by 2020, with total xEV sales of 6-7 million units thus enabling Indian automotive Industry to achieve global xEV manufacturing leadership and contributing towards National Fuel Security”

17. The National Electric Mobility Mission Plan 2020 (NEMMP 2020) was intended to provide the future roadmap, establish common set of priorities, broad principles and framework for promoting the adoption of the full range of electric mobility solutions for India, which can enhance national fuel security, provide affordable and environment friendly transportation and enable the Indian automotive industry to achieve global manufacturing leadership. The main policy to achieve targets set out in the NEMMP is the "Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles" (FAME) scheme.

18. It was expected that by achieving the targeted sale penetration levels for xEVs by 2020, the electric mobility initiative is likely to not only result in significant savings in liquid fuel consumption thereby lowering the

petroleum import bill but will also result in mitigation of impact of mobility on the environment with significant reductions in emissions and also net decrease in CO2 emissions on a “well to wheel” basis.

19. **Ministry of Heavy Industries:** Electric vehicles have been making headlines for decades. But it is only in recent years that EVs have been attracting seminal interest, innovation, and investments. Significantly, India has the world’s third highest CO2 emissions and embracing EVs will help in reducing CO2 and curbing air pollution. In this regard, during the examination of the subject *Promotion of Electric Vehicles in the Country*, the representatives from the Ministry of Heavy Industries apprised the Committee of the initiatives taken by the Government towards promoting electric mobility in the country, as follows:

“On efforts to promote electric mobility, the Government schemes can be divided into two parts-on the demand side and on the supply side. On the demand side, we have FAME scheme which has an outlay of Rs.10,000 crore launched on 1.4.2019. It will go on till 31.3.2024. The main objective is to reduce upfront cost of the electric vehicles to the buyer as generally they are costlier. On the supply side, there are two schemes which help in reducing the manufacturing cost of electric vehicles, and advanced automotive technology component scheme. One is the PLI Auto Scheme. It has an outlay of Rs.26, 000 crore launched in September, 2021. The other is the PLI ACC which is for batteries with an outlay of Rs.18, 100 crore launched in June, 2021.”

Faster Adoption and Manufacturing of Electric (&Hybrid) Vehicles in India (FAME India):

20. The Ministry informed the Committee that the Government approved the scheme titled *Faster Adoption and Manufacturing of Electric (&Hybrid) Vehicles in India' (FAME India)* in March, 2015 for a period of 2 years *w.e.f* 1st April, 2015 with an aim to reduce dependency on fossil fuel and to address issues of vehicular emissions. The Phase-I of FAME India Scheme has been extended from time to time till 31st March, 2019 with enhancement of total outlay to Rs. 895 crore. The scheme had four focus areas *i.e.* Technology Development, Demand Creation, Pilot Project and Charging Infrastructure.

21. In the First Phase of the FAME Scheme about 2.8 lakh hybrid and electric vehicles were supported by way of demand incentive amounting to Rs. 359 crore (approx). Projects worth Rs. 158 crore (approx) were sanctioned for the technology development like establishment of Testing

Infrastructure, setting up of Centre of Excellence for Advanced Research in electrified transportation, Battery Engineering etc. to various organisations/institutions like Automotive Research Association of India (ARAI), IIT Madras, IIT Kanpur, Non Ferrous Material Technology Development Centre (NFTDC), Aligarh Muslim University (AMU) etc. In Phase-I, the Government has also supported for deployment of 425 Electric buses in about 9 cities by way of incentive amounting to Rs. 280 crore (approx), and sanctioned Projects for setting up of 520 EV Charging Stations for Rs. 43 crore (approx) in cities like Bangalore, Chandigarh, Jaipur and NCR of Delhi and major highways such as Delhi-Chandigarh, Mumbai-Pune, Delhi-Jaipur, Delhi-Agra etc. Out of these 520 Charging Stations, 461 Charging Stations have been installed as on 21st January, 2022.

22. The Ministry apprised the Committee that based on the experience gained during Phase I of FAME Scheme and suggestions of various stakeholders, the Ministry of Heavy Industries notified Phase-II of the Scheme *vide* S.O. 1300 dated 8th March 2019, with the approval of Cabinet. Phase-II of the scheme is for a period of 5 years, commencing from 1st April 2019, with an outlay of Rs. 10,000 crore. The main objective of the scheme is to encourage faster adoption of Electric and Hybrid vehicles by way of offering upfront incentive on purchase of Electric vehicles and also by establishing the necessary charging Infrastructure for electric vehicles. **The FAME-II Scheme was allocated an outlay as per details given below:**

FAME-II Scheme Outlay

	Components	Previous outlay (₹ crore)	Revised outlay (₹ crore)
1	Demand Incentives	8,596	8,757
2	Charging Infrastructure	1,000	839
3	Admin. Exp. including Publicity, IEC activities	38	38
4	Committed Expenditure of Phase-I	366	366
Total		10,000	10,000

23. In this Phase II of the scheme, more emphasis is given on affordable & environment friendly public transportation options for the masses that include shared transport. Demand Incentives on operational expenditure model for electric buses will be delivered through State/City Transport

Corporation (STUs). In 3W and 4W segments, incentives will be applicable mainly to vehicles used for public transport or registered for commercial purposes. In the e-2Ws segment, focus will be on private vehicles. The Scheme initially aims to create demand by way of supporting 7210 e-Buses, 5 lakh e-3 Wheelers, 55000 e-4 Wheeler Passenger Cars and 10 lakh e-2 Wheelers. Creation of charging infrastructure will be supported in selected cities and along major highways to address range anxiety among users of electric vehicles under the Scheme.

24. The Physical and Financial Progress of FAME-II Scheme (including claims under process) as on 19.06.2023 with revised targets as appraised to the Committee is given below:

Category	Number of Vehicles			Amount (in Rs. Crores)		
	Revised Targets	Achievement	%	Revised Targets	Achievement	%
e-2W	9,68,000	6,89,016	71%	3,500	3,160	90%
e-3W	1,26,000	80,341	64%	700	456	65%
e-4W	11,000	8,115	74%	250	189	76%
e-Buses	7,090	2,838 – supplied 6,862 – committed	97%	4,307	1,181 – paid 3,151 – committed	73%
Total	11,12,090	7,80,310	70%	8,757	4,986	57%

25. The Committee notes that the initial targets were revised by bringing down the number of vehicles to be supported under the FAME-II Scheme. The Committee is of the opinion that in order to facilitate the transition momentum to Electric Mobility, more number of electric vehicles need to be supported and, therefore recommends that the Ministry should broaden the scope and extend the FAME-II Scheme for at least 3 more years in consultation with the Industry stakeholders to make the Scheme more inclusive.

26. The Committee notes that initially the Government had the target of supporting 55,000 e-4 Wheelers under the FAME II Scheme, but the revised targets have reduced the number of vehicles to the committed funds only *i.e.* for 11,000 e-4 Wheelers. Though 2 Wheelers is a dominant category, share of 4 Wheelers is also significant in the automotive sector of the country. The Committee recommends that the Ministry should increase the number of electric vehicles to be supported in the 4 Wheelers category and also include private e-4 Wheelers in the domain of FAME II Scheme with a cap based on the cost and battery capacity of the vehicle.

27. The Committee was informed by the Ministry of Heavy Industries that in Phase-II of the FAME Scheme, the demand incentive was initially linked to battery capacity *i.e.* Rs. 10,000/kWh for all eligible electric vehicles, except e-Buses (for which the incentive is Rs. 20,000/kWh), subject to capping at certain percentage of cost of eligible vehicles (*i.e.* 40 per cent for e-Bus and at 20 per cent for all other categories of eligible vehicles) restricted to vehicles with prices less than the threshold value. Further *w.e.f.* 11th June 2021, Demand Incentive for e-2 Wheelers has been increased to Rs.15,000/KWh from Rs.10,000/KWh subject to increase in capping to 40 per cent from 20 per cent cost of eligible e-2 Wheelers which has been revised further to Rs.10,000/kWh (maximum 15 per cent of ex-factory price) *w.e.f.* 1st June, 2023. The number of vehicles proposed to be supported in different category of vehicles is as under:

Category of vehicle	E-Buses	e-2W	e-3W	e-4W Cars
EV Technology	Electric	Electric	Electric	Strong Hybrid, Plug in Hybrid and Electric
Used for	Public Transport	Private Use, Commercial Use Shared Transport	Commercial Use Shared transport	Commercial Use Shared Transport
Incentives	Rs. 20000/- per KWh	Rs. 10000/- Per KWh	Rs. 10000/- Per KWh	Rs. 10000/- Per KWh
Mode of Reimbursement	Through STU	Through online Portal of FAME II	Through online Portal of FAME II	Through online Portal of FAME II
No of Vehicles to be supported	About 7090	About 1 million	About 5 lakh	About 55000

28. In its replies to the queries of the Committee regarding rationale behind the reduction in subsidy, the Ministry informed that, it was necessary as with the prevailing rate for demand incentive (*i.e.* ₹15,000 per kWh battery capacity with a maximum cap of 40 per cent of the ex-showroom price), the funds envisaged under the Scheme (Rs. 2,000 crore) had already been exhausted and to reach the Scheme target of 10 lakh e-2Wheelers, either the demand incentive outlay had to be enhanced or the incentive per vehicle had to be reduced or a combination of both. In this regard, the Ministry had a stakeholder's consultation with the Original Equipment Manufacturers of e-2Whleers wherein various options for re-allocation of funds between different segments within the overall budget of FAME II Scheme and incentive per vehicle were considered. After detailed

deliberations, it came out that the continuity of the subsidy for a longer duration was more important and accordingly, the following decisions were taken:

- The scheme outlay of e-2Wheelers was revised from Rs. 2,000 crore to Rs. 3,500 crore.
- The formula for calculation of subsidy payable on e-2Wheelers was revised as: Rs. 10,000 per KWh of battery capacity, or 15 per cent of the ex-factory price (revised from ex-showroom price), whichever is lower.

29. The Ministry deduced that this would enable the Scheme to support about 9.68 lakh electric vehicles at the current sales and battery capacity estimates. This estimate of 9.68 lakh electric vehicles has been calculated at average price of Rs.1.42 lakh per vehicle.

30. The sales statistics of Electric Vehicle-2W for the year 2023-24 (excluding Telangana) as follows:

Month/Year	April,23	May,23	June,23	July,23	Aug,23	Sep,23
E-2W	66873	105556	46067	54591	62744	64027

(Source: SMEV)

31. **The Committee notes that reduction of subsidy *w.e.f.* 1st June, 2023 in case of e-2Wheelers has negatively impacted their sales. It also notes that the budget constraint was the major reason behind the reallocation of funds and for the revision of targets under the FAME-II Scheme. As there is an instant need to decarbonise the transport sector, the Committee recommends that the Ministry should restore the subsidy on e-2Wheelers and, if required, project enhanced budget allocations in order to maintain the momentum and pace of electric vehicles penetration, so that the desired target could be achieved by 2030.**

32. **During the deposition before the Committee, the issue of e-Quadricycle was discussed and the Committee was informed by a stakeholder that e-Quadricycle will give a big fillip to last-mile connectivity and, based on a study, CRISIL had indicated that India could be one of the largest manufacturers of e-Quadricycles, which would help in reducing two lakh tones of CO2 emissions. The Committee recommends that the Ministry should develop an ecosystem to include e-Quadricycle in the FAME-II Scheme as the e-Quadricycle**

would not only help reduce CO2 emissions but would be an employment generation initiative for the youth of the country.

33. In order to boost EV penetration as well as to promote electric mobility in public transport systems especially in the State Transport Corporations, the Ministry informed the Committee that proposals were invited from cities and State Transport Corporations through an Expression of Interest (EoI) for deployment of Electric Buses under Operational cost model basis. After examining the proposals, Ministry of Heavy Industries sanctioned 6315 electric buses to 65 cities/STUs/State Government entities for intra-city operations. Out of these 6315 electric buses, Supply Order for about 3738 electric buses for intra-city, inter-city operation and last mile connectivity have been issued. Out of these 3738 buses, 2838 electric buses have been deployed: 720 in Maharashtra, 450 in Gujarat, 600 in Uttar Pradesh, 400 in Delhi, 292 in Karnataka, 50 in Goa, 100 in Andhra Pradesh, 80 in Chandigarh, 50 in Odisha, 16 in West Bengal, 30 in Uttarakhand, 25 in Bihar, 25 in Dadra and Nagar Haveli.

34. In addition to above, Ministry of Heavy Industries *vide* Gazette Notification dated 11th June 2021, nominated **EESL** to aggregate demand for E-Buses under FAME-II Scheme in 9 major cities having population of over 4 million (Mumbai, Delhi, Bangalore, Hyderabad, Ahmedabad, Chennai, Kolkata, Surat and Pune). **CESL** (wholly owned subsidiary of EESL) issued Grand Challenge Document on 30th September, 2021 regarding the demand for 5450 e-Buses which was received from 5 of the 9 nominated cities out of which 3472 e-Buses were allocated under FAME-II Scheme. Total demand allocation of e-Buses city-wise under General Conditions of Contract tender is as under:

City	Allocation under FAME-II (pro-rata basis)
Delhi	921
Bangalore	921
Hyderabad	300
Surat	150
Kolkata	1180
TOTAL	3472

Thus, under FAME-II scheme, a total of $3738+3472=7210$ e-Buses will be eventually deployed in various States.

35. A safe, reliable and cost-effective public transport system would definitely have a positive impact on improving the air quality in urban areas as well as reducing the number of private vehicles on road. The Committee recommends that the Ministry should allocate more funds for developing a decarbonised mass public transport system and also project for enhancement of the budgetary allocation for e-Buses under FAME Scheme so that it does not suffer due to shortage of funds.

36. The Committee is of the opinion that frequent changes in the policies relating to Electric Vehicles create uncertainties in the market as well as in the EV Industry. This will also creates doubt in the minds of people and the end users about the Government actions which may negatively impact the growth of the EV industry. The Committee recommends that the Government should strive towards formulation of a consistent and stable national policy on Electric Mobility so that a propitious environment is created for the EV industry in order to promote sustainable and clean transportation system in the country.

Charging Infrastructure:

37. During the examination of the subject, the Ministry informed the Committee that the Government of India's incentive on EV Charging Stations is Rs. 1,000 crores. It is given only on the electric vehicle supply equipment, that is, the electrical part. There are three categories. One hundred per cent of the cost is reimbursed if it is in hospitals or educational institutions. Seventy per cent cost is reimbursed if it is in markets, malls, metro stations, bus stands, etc. And, fifty per cent cost is reimbursed if it is in cooperative societies and private taxi services. This is the categorisation of the incentives. The same has been reflected in table below:

Within Cities		
Category	Subsidy on EVSE Cost	Locations
A	70 per cent of the cost of EVSE	Markets, Malls, Metro Stations, Bus Stops & Railways Stations etc.
B	100 per cent of the cost of EVSE	Hospitals, Educational Institutions & all Government office complexes for official purposes etc.
C	50 per cent of the cost of EVSE	Co-operative/Housing Societies & Private Taxi Services etc.

38. The Ministry also informed that for highways and expressways, the target is to have one EV charger on every hundred kilometers on both sides and fast chargers, which are 50 KW, one charger every 25 kilometers on both sides of the highways.

39. Further, regarding chargers, the Ministry of Heavy Industries informed the Committee that they were not able to install most of the chargers and therefore, a decision was taken that Ministry of Petroleum will install the chargers in their retail outlets. It was also informed that there were a number of issues regarding the charging infrastructure. One issue was the requirement of ten number of guns for slow chargers and six for fast chargers. However, the Programme Implementation and Steering Committee (PISC) reduced this number from ten to five so that initial capital expenses could be kept less. For fast charging stations, it was reduced from six to three. Earlier, for upstream infrastructure, no funds were provided. Now, subsidy is given for upstream infrastructure also, which will make the installation of charging stations easier. There was also the issue of obsolete technology. CHAdeMO charger was one requirement earlier. But then, the requirement of CHAdeMO was removed. Only CCS and Bharat Stage-I was kept.

Support for Upstream Infrastructure is as given below:

#	Particulars	Tentative Cost (Rs.)	Maximum subsidy (Rs.)
1	Up to 50 Kw PCS	6,04,000	4,00,000
2	Up to 100 Kw PCS	14,80,000	8,00,000
3	Up to 150 Kw PCS	19,00,000	12,00,000
4	Above 150 Kw PCS	24,00,000	15,00,000

40. During deliberations of the Committee with the stakeholders, the issue of Incentivisation of charging stations figured to a large extent. Stakeholders were of the view that currently incentives under FAME-II are given to PSUs or Ministries for charging station installation, whereas in EV segment, the subsidies are given to the end users as well. The stakeholders informed that adoption of charging stations by individual investors or small entrepreneurs have been seen in some cases. Therefore, the stakeholders were of the view that the Ministry may consider incentivizing the installation of charging stations to individual investors also. **The Committee is of the view that the proposal of stakeholders hold merit and recommends that the Ministry of Heavy Industries in consultation with Industry partners should expand the scope of FAME-II or any future Scheme to incentivize installation of charging stations to individual investors in order to achieve the goal of setting up of charging stations throughout the length and breadth of the country as well as to eliminate road anxiety among potential customers. The Committee also recommends that Women Self Help Groups and Cooperative Societies may be given assistance to open and operate Charging Stations. They may be provided an assured return by the Government from its own funds.**

41. The Committee was informed by the Ministry that Bharat Heavy Electricals Limited (BHEL) was providing Engineering, Procurement and Construction (EPC) solution for Electric Vehicle charging stations including solar based charging stations and also for Battery Energy Storage Systems (BESS). **The Committee recommends that keeping in view the importance of EV Mobility as a key ingredient of reducing the pollution level in the country, the Ministry of Heavy Industries should play a proactive role through BHEL in providing EPC solutions to support electric vehicle (EV) charging stations, including solar based EV charging stations and, if required, more funds may be allocated to BHEL to facilitate popularizing the EV Mobility. Every Public Sector Undertaking and Government institutions may be asked to participate in the installation of Charging Stations in their own premises for the use of the vehicles coming to their premises.**

Production Linked Incentive (PLI) Scheme for Automobile and Auto Components:

42. The Committee was informed by the Ministry that the Government has approved the Production Linked Incentive Scheme for Automobile and Auto Components on 15th September, 2021 for enhancing India's manufacturing capabilities for Advanced Automotive Products with the budgetary outlay of ₹25,938 crore for a period of 5 years (FY 2022-23 to FY 2026-27). Incentives of 13-18 per cent will be provided on Electric Vehicle and Hydrogen Fuel Cell vehicles and their components. Besides, incentives of 8-13 per cent will be given on AAT components.

43. Further, the Committee was informed that the objective of the Scheme is to boost manufacturing of Advanced Automotive Technology (AAT) Products, Promote deep localization and attract investments and build large-scale manufacturing capacities. The Scheme is focused on Zero Emission Vehicles (ZEVs) *i.e.* Battery Electric Vehicle and Hydrogen Fuel Cell Vehicle. The scheme also incentivizes auto components related to Safety, Connected Vehicles, Emission Control, Passenger Convenience, Flex Fuel Vehicles (an internal combustion engine capable of operating on gasoline and any blend of gasoline and ethanol up to 83 per cent), CNG & LNG and Sensors, etc. The scheme incentivizes only those eligible AAT products for which minimum 50 per cent Domestic Value Addition (DVA) is achieved and has been certified by Testing Agencies (TAs) of the Ministry of Heavy Industries. This criterion is aimed to reduce imports, facilitate deep localization for AAT products and enable creation of domestic as well as global supply chain.

44. As per the submission made by the Ministry of Heavy Industries, this Scheme will act as a catalyst for Indian Automobile Industry, enabling it to move up the value chain into higher value-added products and attract fresh investments in indigenous supply chain of AAT products. AAT products include 19 categories of vehicles and 103 AAT Components. The Scheme has also attracted commitment of investment of ₹67,690 crore (against the target estimate of ₹42,500 crore) over a period of five years.

45. In its replies, Ministry of Heavy Industries informed the Committee that PLI-AUTO requires applicants to meet threshold of cumulative minimum new domestic investment for each year of the scheme to be eligible for incentive. Threshold for minimum investment and minimum Domestic Value Addition (DVA) has been kept so as to encourage advancement of technology and R&D for AAT components. The Capital expenditure on Engineering Research & Development (ER&D) and product design & development at all stages in the entire value chain of the goods proposed to be manufactured, including software integral to the functioning of the same to the eligible AAT products, shall be allowed for the purpose of investment under the PLI-Auto Scheme. Such expenditure shall include test and measuring instruments, prototypes used for testing, purchase of design tools, software cost (directly used for ER&D) & license fees, expenditure on technology & transfer of technology (ToT) Agreements including the purchase of technology, Intellectual Property Rights (IPR), Patents and copyrights for ER&D. Thus, these allowed investment expenditures are thereby creating an ecosystem to manufacture components of EVs locally.

46. As regards the Minimum cumulative new domestic investment and Minimum Determined Sales of AAT Products to be achieved by the applicant in each financial year, the Ministry informed the Committee as per details given below:

Cumulative new domestic investment to be achieved	(₹ in crore)				
	Champion OEM (Except 2W & 3W)	Champion OEM (2W & 3W)	Component Champion	New Non-Automotive investor (OEM)	New Non-Automotive investor (Component)
Up to or before March 31, 2023	300	150	40	300	80
Up to or before March 31, 2024	800	400	100	800	200
Up to or before March 31, 2025	1400	700	175	1400	350
Up to or before March 31, 2026	1750	875	220	1750	440
Up to or before March 31, 2027	2000	1000	250	2000	500

(₹ in crore)

Scheme Year	Minimum Threshold Determined Sales Value for Champion OEMs	Minimum Threshold Determined Sales Value for Component Champions
FY 2022-23	125.00	25.00
FY 2023-24	137.50	27.50
FY 2024-25	151.25	30.25
FY 2025-26	166.38	33.28
FY 2026-27	183.01	36.60

47. **Ensuring Domestic Value Addition (DVA) is an important aspect of the PLI Scheme for Automobile and Auto Components. The Committee recommends that the Ministry should take necessary steps for achieving better scheme output, including policy changes and financial outlay, for enhancement of manufacturing capabilities for Advanced Automotive Technology products thus creating an ecosystem to manufacture components of electric vehicles locally and promoting manufacturers as global *Automotive Champions*.**

PLI Scheme: *National Programme on Advanced Chemistry Cell (ACC) Battery Storage:*

48. The Ministry informed the Committee that the PLI scheme - *National Programme on Advanced Chemistry Cell (ACC) Battery storage* - has been approved by the Union Cabinet on 12th May 2021 with budgetary outlay of ₹ 18,100 crore. The scheme envisages enhancing manufacturing capabilities of Advanced Chemistry Cell (ACC) by setting up of Giga scale ACC and battery manufacturing facilities in India with emphasis on maximum domestic value addition.

49. The Committee was also informed by the Ministry that the likely demand of ACC in India on a conservative basis is estimated 106 GWh while on an accelerated basis it is likely to be 260 GWh by the year 2030. In the absence of the scheme, the cumulative import bill of ACC cells in India during the scheme period (2 years plus 5 years) could be up to ₹ 2.7 lakh crore. The average YoY potential of Advanced Chemistry Cell and its components import savings is expected to be around Rs. 20,000 crore. Moreover, the scheme is expected to create ~9000 direct jobs and the demand side for Advanced Chemistry Cells is expected to generate in excess of 30 lakh jobs considering fresh investments being made in manufacturing electric vehicles and the support infrastructure.

50. The Committee was informed that the beneficiary firm has to ensure domestic value addition of at-least 25 per cent and raise it to 60 per cent domestic value addition within 5 Years while also making the mandatory investment of ₹225 crore/GWh within 2 Years. The investment here captures the expenditure spent on R&D and product development related to Advance Chemistry Cell. Such expenditure shall include test and measuring instruments, prototypes used for testing, purchase of design tools, software cost (directly used for R&D) and license fee, expenditure on technology, Intellectual Property Rights, Patents and Copyrights for R&D/ all non-creditable taxes and duties would be included in such expenditure thereby creating an ecosystem to manufacture batteries of electric vehicles locally.

51. During the examination of the subject, the representatives from the Ministry of Heavy Industries apprised the Committee that - *According to the estimates by the NITI Aayog, at present, 21 per cent of the requirements of the battery are going into EVs, and by 2030, the expected demand to be 250 GWh for cells. Out of that 250 GWh, 70 per cent will be consumed by electric vehicles and nearly 30 per cent or 28 per cent will be consumed in the grid storage, the stationary storage, used for power systems. And, the other 2-3 per cent is for home electronics and consumer electronics. So, the major part of the cells will be in the EVs.*

52. The Ministry of Heavy Industries also informed the Committee that bids were received from 10 companies for a total capacity of ~128 GWh. After evaluation of the bids based on Quality and Cost Based Selection (QCBS) mechanism, 9 companies met the conditions of eligibility and were ranked on the basis of their combined technical and financial score. Accordingly, letter of award was issued to 4 successful beneficiary firms on 28th March 2022, out of which 1 firm has been disqualified.

53. All the beneficiary firms have to start setting up the plants from 1st January, 2023 and commence manufacturing of Advanced Chemistry Cells within 2 years from the appointed date *i.e.* latest by 31st December 2024. The details of the phase wise committed capacity and Domestic Value Addition of beneficiary firms is as follows:

Timeline	Ola Cell Technologies Pvt. Ltd.		Reliance New Energy Battery storage Pvt. Ltd.		ACC Energy Storage Pvt. Ltd.	
	DVA	Capacity (GWh)	DVA	Capacity (GWh)	DVA	Capacity (GWh)
Dec 2023	25%	1	0%	0	70%	1
Dec 2024	30%	5	25%	5	75%	2

Dec 2025	40%	10	40%	5	80%	3
Dec 2026	55%	20	60%	5	85%	4
Dec 2027	60%	20	70%	5	90%	5

54. According to report of NITI Aayog, Battery manufacturing presently represents one of the largest economic opportunities. For India to achieve its ambitious targets of 500 GW of non fossil fuel energy by 2030 and also to have Electric Vehicles make up 30 per cent of its new vehicle sales by 2030, a robust domestic battery ecosystem is required for domestic value addition. Thus development of a domestic battery ecosystem will boost the demand for Advanced Chemistry Cell battery technologies and create significant growth from some of the largest sectors, such as transport and power. Moreover, India's contribution towards creating advanced battery manufacturing hubs has not been encouraging so far, due to lukewarm domestic demand and lack of the rare metal reserves that are key ingredients for Lithium-ion Battery chemistries. But due to advancement in battery technologies with higher performance and improved affordability, the requirement of rare metals is losing its importance, which gives India an opportunity to establish a battery manufacturing ecosystem on the basis of new-age technologies that exploit abundantly available indigenous materials such as sodium and aluminium.

55. Further, promoting the domestic manufacturing of ACC batteries also provides India with the opportunity to reduce its dependence on imports to meet the future demands of the energy requirements. In view thereof, the ACC manufacturing PLI scheme can encourage investments for creating domestic battery manufacturing hubs and new job opportunities which can contribute in advancing battery technologies across various sectors and influence the adoption of Electric Vehicles in the country.

56. Although the Ministry of Heavy Industries is striving hard towards *Make in India* and *Atmanirbhar Bharat* with the Schemes like PLI-Auto, PLI-ACC and Phased Manufacturing Programme under FAME-II Scheme, the Committee is of the view that to make India a Global EV Hub, the Ministry should have supportive, transparent, and consistent government frameworks at national, state, and local levels and also focus towards establishing dedicated Manufacturing Hubs and Industrial Parks for manufacturing of batteries, cells and Electric Vehicle auto components. The Committee believes that this would encourage and strengthen economic development of the country.

Ministry of Road, Transport & Highways (MoRTH):

57. Ministry of Road, Transport & Highways is responsible for formulation of broad policies relating to road transport and automotive norms. For the promotion of electric vehicles, various initiatives have been taken by the. Some of the initiatives as apprised to the Committee by the MoRTH are as under:

- (i) **E-Rickshaw:** MoRTH has amended the Motor Vehicles Act and the Rules to include specifications regarding manufacture, operation, registration and issue of driving license to E-Rickshaw drivers under the ambit of CMVRs. Further, the Ministry *vide* S.O. Notification 2812(E) dated 30.08.2016 has exempted transport vehicle of the category e-cart and E-Rickshaw from the requirement of permit.
- (ii) **Unique Number Plate:** To distinguish registration mark for zero emission vehicles, from all other motor vehicles on road, it was decided that the background colour of the registration plate shall be *Green*. Accordingly, MoRTH *vide* GSR 749(E) dated 07.08.2018 has prescribed specification of registration mark for Battery Operated Vehicles to Yellow colour on Green background for transport vehicles and, for all other cases, in White colour on Green background.
- (iii) **Battery Operated Transport Vehicles exempted from the requirements of permit:** In order to create an ecosystem of Electric Mobility in the country through non-fiscal Incentivisation and to promote electrification in Public Transport and last mile connectivity, the MoRTH *vide* S.O. 5333(E) dated 18.10.2018 has exempted Battery Operated Transport Vehicles from the requirements of permit.
- (iv) **Hybrid Electric Vehicles (HEV):** MoRTH has Notified GSR 167(E) dated 01.03.2019 for retro-fitment of hybrid electric system or electric kit to motor vehicles or conversion of motor vehicles for pure electric operation with fitment of pure electric system kit.
- (v) **Exemption from payment of registration/renewal fee:** In order to incentivize Electric Vehicles *vis-a-vis* ICE vehicles, MoRTH *vide* GSR 525(E) dated 02.08.2021 has exempted Battery Operated Vehicles from the payment of fees for the purpose of issue or renewal of registration certificate and assignment of new registration mark. As per *Vahan Portal*, 18 States/UTs namely Gujarat, Andhra Pradesh, Ladakh, Union Territory of DNH and DD, Chhattisgarh, Punjab, Odisha, Tamil Nadu, Karnataka, Goa,

Delhi, Maharashtra, Manipur, West Bengal, Assam, Jammu and Kashmir, Madhya Pradesh and Meghalaya have exempted the Registration fees for Electric Vehicles.

- (vi) **Zero cost All India Tourist Permit for electric vehicles:** MoRTH has issued a Notification *vide* GSR 302(E) dated 18.04.2023 to issue All India Tourist Permit for battery operated vehicles without payment of any permit fee.
- (vii) **Automotive Industry Standards (AIS):** MoRTH has also notified the various Automotive Industry Standards (AIS) for aspects related to safety, range, power, Central Motor Vehicle Rules type approval etc. for electric vehicles to enable their development as per the *Annexure-I*.

58. Further, the Committee was informed by the Ministry of MoRTH on the recommendation of NITI Aayog for the promotion of electrical 2 and 3 Wheelers that they have advised the States and UTs to delink the cost of battery (which accounts for 30-40 per cent of the total cost) from the vehicle cost. As a result, the vehicles can be sold in the market without the battery and it will reduce the upfront cost of the electrical 2 and 3 Wheelers and make them comparable *vis-a-vis* ICE 2 and 3 Wheelers. In the present registration process (Form 22A of CMVR), the details of engine number and motor number are only required and the details of battery is not captured. The Ministry *vide* its letter dated 12.08.2020 had advised all States and Union Territories that vehicles without batteries can be sold and registered based on the type approval certificate issued by the Test Agency. It was further clarified that there is no need to specify the Make/Type or any other details of the Battery for the purpose of Registration.

59. The Committee was also informed by the MoRTH that it has issued an advisory dated 17.07.2019 to all States and Union Territories regarding Incentivisation of electric vehicles and induction of electric vehicles in shared mobility and public transport operations. The States/UTs were requested to consider waiving the road tax to the maximum possible extent on the electric vehicles so as to reduce the initial cost of the vehicle for the users. As per details available on the *Vahan Portal*, 19 States/UTs *viz.* Chhattisgarh, Chandigarh, Delhi, Goa, Himachal Pradesh, Maharashtra, Meghalaya, Odisha, Punjab, Rajasthan, Uttarakhand, Jammu and Kashmir, Karnataka, Ladakh, Puducherry, Tamil Nadu, Uttar Pradesh, Kerala and West Bengal have provided exemption/rebate from road tax on electric vehicles.

60. The Committee notes that MoRTH has issued various guidelines and advisories to States and Union Territories so as to incentivize and

bring down the initial cost of electric vehicles. Many States have complied with these guidelines and included the measures in their respective EV policy but, to increase the targeted penetration of electric vehicles by 2030, more needs to be done. Since 19 States/Union Territories are only providing exemptions and rebate in road tax, the Committee recommends that the MoRTH should take up the issue with the remaining States/Union Territories in order to bring in all the States and Union Territories such as Uttar Pradesh, Bihar, Haryana etc. on a common platform as well as make efforts to slash down the road tax further and provide other possible exemptions in respect of electric vehicles. MoRTH, in order to decarbonise the Automotive Sector, should also make electric vehicles mandatory for public transport in cities with high rate of air pollution.

Ministry of Power:

61. In order to expedite the rollout of public EV charging infrastructure across the country, the Committee was informed by the Ministry of Power that *Charging Infrastructure for Electric Vehicles - Guidelines and Standards* has been issued on 14.12.2018 with amendments issued on 01.10.2019, 08.06.2020, 14.01.2022, 07.11.2022 and 27.04.2023, giving details of the roles and responsibilities of various stakeholders at the Central & State level. The salient features of the Guidelines issued are:

- Supporting creation of Electric Vehicles Charging Infrastructure in order & provide affordable tariff chargeable from Public EV Charging Station Operators/Owners and Electric Vehicle users.
- Enabling owners of Electric Vehicles to charge their EVs at their residence/offices using their existing electricity connections.
- Introducing revenue sharing model for provision of land at promotional rates for public charging stations.
- Providing electricity connection to Public Charging Station (PCS) within stipulated timelines.
- Permitting DISCOMs to leverage funding from Revamped Distribution Sector Scheme for general upstream infrastructure augmentation.
- Prescribing single part EV tariff for Public Charging Stations and shall not exceed Average Cost of Supply (ACoS) till 31.03.2025.
- Specifying ceiling limits on service charges being levied by public charge point operators on the EV customers to recover the cost of servicing the capital investments (including GST) made by it in setting up the Public Charging Station. The amendment specifies a ceiling of Rs 2.50 per unit and Rs 3.50 per unit of electricity used for

slow AC charging of EVs at PCS during the solar and non-solar hours respectively. Additionally, a ceiling limit of Rs. 10 per unit and Rs. 12 per unit of electricity used for DC Fast charging of EVs at PCS during the solar and non-solar hours respectively.

62. In its replies, the Ministry of Power informed the Committee that Central Electrical Authority (CEA) has carried out generation expansion studies and prepared National Electricity Plan with the projected All India peak electricity demand and electrical energy requirement (as per 20th Electric Power Survey Projections) which includes electricity demand due to charging of Electric Vehicles. The likely installed electricity capacity of the country for the year 2031-32 is to be around 900,422 MW and, the projected installed capacity for the said year is capable to meet the demand at all instances of time including the demand due to electric vehicles.

63. Ministry of Power informed that Public Electric Vehicle Charging Stations are expected to have Fast Chargers with power capacities in excess of at least 50 kW to allow topping up of vehicle batteries within short durations. The heavy duty chargers are expected to deliver high power to the vehicle in short durations from the Grid, thus require equivalent upstream capacities in the distribution network to cater to such high power demand. The existing distribution network in the country may not have the required capacity to cater to such high power requirements especially when such chargers are located towards the end of the distribution feeders or otherwise at the feeder nodes with frequent low voltage profiles. Therefore, to integrate such high power charging stations with the Grid, upstream infrastructure including transformers of appropriate capacity, isolation and other safety equipment is required. Such upstream infrastructure entails additional cost, which may be as high as 60 per cent of the total cost of setting up a Public Charging Station and acts as a deterrent in widespread setting up of public charging stations. In view of this, the Ministry of Power *vide* its Guidelines and Standards for Public Charging Stations dated 14.01.2022 has made a provision enabling the Public Charging Station developers to leverage the funds available under the Revamped Distribution Sector Scheme (RDSS) for augmenting the upstream distribution network to integrate such high power capacity charger in the grid without any financial implication to EV customer.

64. In response to the query of the Committee regarding electricity tariff structure, the Ministry of Power informed the Committee that currently, there is no provision to have a single tariff system for Public Charging Stations across the country due to differences in the cost of power generation

and power purchase by Electricity Distribution Companies (DISCOMs) from the power generating companies. Moreover, in terms of the guidelines and standards, Ministry of Power has introduced a single part supply tariff for public charging stations not exceeding ACoS (Average cost of electricity supply) till 31st March 2025.

65. The Committee notes the efforts of the Ministry of Power towards augmentation of distribution network through Revamped Distribution Sector Scheme (RDSS). The Committee is of the view that with more penetration of electric vehicles, EV owners may prefer to charge their vehicles at home during non-solar hours which may lead to surge in electricity demand ultimately overloading the electrical systems. The Committee recommends that Ministry of Power should encourage solar hours charging of electric vehicles through advertisements, including regional languages, to minimize the load on electrical systems during non-solar hours and promote establishing charging stations/points at work locations/office buildings/premises with minimum parking facility to increase charging network as well as solar hours charging to minimize load on electric system. Ministry of Power should also encourage Solarization of EV Charging Stations, in coordination with the Ministry of Heavy Industries, by providing subsidy for installation of EV Charging Stations both under public as well as private sector.

66. In its deposition before the Committee, Ministry of Power informed that *EV Yatra Portal* was launched by the Hon'ble President on 14th December, 2022, in which all the charging stations have been mapped and connected in the country. The *EV Yatra App* is user-friendly for the EV users and helps dispel range anxiety by locating the charging station and slot, which is available nearby. **The Committee is of the view that the Ministry of Power should popularize such Apps and recommends that the scope of the *EV Yatra App* should be enlarged to help even the potential electric vehicle buyers to know about the cost of the vehicle, cost of battery, insurance and comparison between EV and ICE vehicles as a single stop solution for all issues related to electric vehicles.**

67. Further, the Ministry of Power informed that a Portal has been launched by Bureau of Energy Efficiency through which anybody applying for electric connection from the respective State DISCOMS can utilise the facilities available in this Portal. Electric connection through this Portal is time bound and action is taken against DISCOM through State Government for not providing connection within the timeframe. In this regard, Guidelines have also been issued for setting up of EV Charging Stations in public place.

The Committee appreciates such a move of the Ministry of Power and recommends that the benefits of the aforesaid *Portal* and Guidelines should be given wide publicity vigorously in all prominent languages through various modes of media, including social media.

Ministry of Petroleum & Natural Gas:

68. The Ministry of Petroleum & Natural Gas informed the Committee that Oil Marketing Companies have taken a target of installing 22,000 EV Charging Stations across the country by December, 2024. As on 1st June, 2023, 8440 EV Charging Stations have already been installed across the country. Furthermore, OMCs have plans to reach 11,748 EV Chargers by December, 2023 and 22,000 by December, 2024.

69. Oil Marketing Companies have developed a phase-wise roadmap to achieve the above target as enumerated below:

Phase 1: High priority 9 cities & Major Highways/Expressways - The 9 cities viz., Mumbai, Delhi, Bangalore, Hyderabad, Ahmedabad, Chennai, Kolkata, Surat & Pune and Major Highways/Expressways are being taken up in Phase 1 for installation of EV Charging Stations.

Phase 2: State Capitals & Major cities (>1 million populations) - In the next 2-3 years, electric vehicles will gain popularity amongst the urban consumers of these markets.

Phase 3: Smart Cities -The 100 Smart Cities are planned to be covered considering the consumer shift to electric vehicles and expansion of the EV network by the Automobile Original Equipment Manufacturers in these cities.

Phase 4: Cities with more than 2 lakh population (not covered under Phase 1-3) - There are 234 cities with more than 2 lakh populations. Oil Marketing Companies are preparing a roadmap to cover these cities and keeping pace with the expansion of the EV network by the Automobile OEMs.

70. The Committee was informed by the Ministry of Petroleum & Natural Gas that Oil Marketing Companies have recently been sanctioned a subsidy of ₹800 crore under FAME Scheme (Phase-II) for setting up 7,432 Charging Stations (as part of the targeted 22,000 Chargers) based on techno-commercial and safety viability. The 7,432 EV fast Chargers of CCS-2 type

of capacity 50/60 KW and 100/120 KW will be set up in the following regions:

S. No.	Regions Covered	No. of Chargers
1	4 Million plus cities (9 cities viz. Delhi, Mumbai, Chennai, Kolkata, Bangalore, Hyderabad, Ahmedabad, Pune & Surat)	681
2	Rest Million plus cities (44 cities)	563
3	Smart cities, cities in Hilly States not covered under the above	324
4	Highways connecting adjoining major cities/Expressway	79
5	Major Expressways	5785
	Others	-
	Total	7,432

71. Range anxiety is the concern/worry of an individual driving a vehicle that the battery may drain out of power before the arrival of the destination or next charging station. Cost is also another important factor in choosing a vehicle and, there is a huge price gap between the Electric Vehicle and ICE Vehicle. Lack of Visible Charging Infrastructure along with range anxieties in the minds of the people are posing hindrance to the adoption of Electric Vehicles. Although the Government is working to increase the Charging Network in the country, long distance travel with Electric Vehicles is still a concern and EV owners are compelled to travel intra-city or short-distance journeys.

72. A common thread arising out of deliberations with the stakeholders/Ministry concerned was that in order to make Electric mobility a 'way of life' throughout the length and breadth of the country 'adoption of small cities' with respect to provision of Charging Infrastructure and providing employment to the local youth there is necessary.

73. Electric Vehicles have range constraints as its range depends on battery capacity and therefore, the vehicles need charging at frequent intervals, whereas ICE Vehicles have a fuel tank which gives them range advantage vis-a-vis electric vehicles. The Committee recommends that Ministry of Petroleum & Natural Gas should also consider including the sub-urban and rural areas under the target areas for establishing Charging Stations, as installations of charging stations only at retail outlets of Oil Marketing Companies would not be adequate due to range anxiety in case of electric vehicles. Further, in view of the targeted Electric Charging Stations of 22,000, the sanctioned Charging

Stations of 7,432 for installation under FAME-II is way below the target and, therefore the Committee recommends that sincere efforts should be made for setting up of more Charging Stations to address the issue of range anxiety and boost the EV penetration in the automotive sector in the country.

74. The Committee was informed by the Ministry of Heavy Industries that 520 Charging Stations had been sanctioned under the Phase-I of FAME India Scheme. Further, 2,877 charging stations in 68 cities across 25 States/UTs and 1576 charging stations across 9 Expressways and 16 Highways have been sanctioned under *FAME-II* India Scheme. The Committee recommends that other Ministries should be roped in along with charging infrastructure operators to put in place a comprehensive plan for establishment of a Charging Network in the country to address the issue of road anxiety of electric vehicle owners.

75. The Committee was informed that Battery swapping provides a method of decoupling of batteries from electric vehicles and reducing their upfront costs. It also ensures reduced waiting/charging time for vehicles and offers a promising alternative to increase the adoption of electric vehicles in commercial segment. The rate of adoption of battery swapping in India has remained low because of multiple pitfalls associated with it *viz.* lack of standardization, unsuitable battery pack design, higher costs over the electric vehicle life, shorter commercial life of battery packs etc. However, it provides several advantages to the electric vehicle owners, battery swapping system owners, and electricity distribution companies. Some of the benefits of battery swapping stations are as under:

- The benefits to electric vehicle owners include reduced cost of ownership, reduced downtime/charge time and reduced range anxiety in presence of wide network of Battery Swapping Stations (BSS).
- The benefits to battery system operators include reduced cost of real estate (no need for large parking space), minimization of electricity cost (in ToU scenario) and option of having another revenue stream by participating in electricity market.
- The benefits to the distribution companies include planned development of infrastructure, treatment of battery swapping systems as flexible loads and the increased predictability of load, which otherwise would be difficult to have in high EV penetration scenario.

76. In its reply to the query of the Committee, the Ministry of Petroleum & Natural Gas informed that currently there is no standardization & interoperability for batteries used in battery swapping. Due to lack of

standardization, the proposition of battery swapping is not expanding in a way it can. Battery Swapping Station can serve only few vehicles of specific make. OMCs are setting up battery swapping stations on pilot basis in alliance with battery swapping players.

77. The Committee is of the view that one of the biggest barriers to the widespread adoption of Electric Vehicles remains the lack of charging infrastructure and the overall time required to charge such batteries. With a Battery Swapping System, EV owners will save on the high cost of buying a new set of battery at periodic intervals as they can simply replace the exhausted batteries for fully charged ones at Battery Swapping Stations. The Committee recommends that the Ministry of Heavy Industries should conduct a study regarding the feasibility of battery standardisation and formulate a stable Battery Swapping Policy with the highest levels of safety standards that can infuse confidence in consumer's decision making thereby boosting demand whilst inducing infrastructure build-out by swapping operators, which has a huge potential to invite FDI into the battery swapping network creation in the country.

Ministry of Finance:

78. During the examination of the subject, the Committee was apprised by the Department of Revenue, Ministry of Finance that: *“The present GST rate on electric vehicles is 5 per cent. It is the lowest GST slab. EV Chargers also attract the same rate of duty i.e., 5 per cent. These were fixed in 2019-post 36th meeting of the GST Council. Further, regarding the direct tax provisions in relation to electric vehicles, a provision was brought in 2019 under the Income Tax Act to provide for deduction to person i.e., buyer of the vehicle of Rs. 1.5 lakh interest on loan to promote electric vehicles. It was in the context of too much of pollution in the country at that point of time. Now, the stated policy of the Government is that we are phasing out exemptions, deduction and going towards rationalization of tax rate.”*

79. In response to a query of the Committee, Department of Revenue informed that at the time of introduction of GST, electric vehicles attracted GST at a rate of 12 per cent based on the recommendation of the GST Council in its 14th Meeting held on 18.05.2017. However, in order to promote the faster penetration and adoption of electric vehicles, the GST Council in its 36th Meeting held on 25.07.2019 recommended a GST rate reduction from 12 per cent to 5 per cent. During the said meeting the GST Council had also recommended a GST rate reduction on EV Chargers from

18 per cent to 5 per cent. These rate changes were effective from 01.08.2019. In addition, based on the recommendation of the GST Council in its 28th Meeting held on 21.07.2018, the GST rate on Li-ion batteries was reduced from 28 per cent to 18 per cent. Li-ion batteries are extensively used in electric vehicles, hence aforementioned reduction in the GST rate on such batteries would contribute to lower the costs associated with EV manufacturing.

80. In response to a query of the Committee regarding the tax incentives provided by the Ministry of Finance to promote the adoption of electric vehicles and whether there are any plans to introduce tax breaks or exemptions for electric vehicle manufacturers or importers to encourage the growth of the electric vehicle industry in India, the Ministry informed that it is the stated policy of the Government to remove exemptions and deductions available in the Income-Tax Act 1961 while simultaneously reducing the rates of tax. Existing domestic companies can opt to pay tax at reduced rates of 22 per cent plus applicable surcharge and cess given that they do not avail any specified exemption or incentive. In addition, new domestic manufacturing companies, including companies manufacturing electric vehicles, (registered on or after 1st October, 2019 and starting manufacturing on or before 31st March, 2024) can opt to pay tax at the rate of 15 per cent plus applicable surcharge and cess given the condition that these companies do not avail any specified exemption and incentive. Furthermore, such companies shall not be required to pay any Minimum Alternate Tax (MAT).

81. The Committee was also informed that the Income-Tax Act 1961 also contains specific provisions relating to promotion of electric vehicles in India such as, under section 80EEB of the Act, deduction up to an amount of Rs. 1.5 lakh is allowed on interest payable by an individual on loan taken from any financial institution for the purpose of purchase of an electric vehicle. The deduction under this section shall be allowed only if the loan has been sanctioned by the financial institution beginning on 01.04.2019 and ending on 31.03.2023. Besides, the depreciation allowance as percentage of written down value in the case of renewable energy devices (which includes electrically operated vehicles) is 40 per cent.

82. In response to a query of the Committee that whether the Ministry is planning to extend the duration of the loan sanctioned beyond 31st March 2023 for claiming additional tax deduction of Rs 1.5 lakh on the interest paid on loan for purchase of electric vehicles, the Ministry informed that the end date for taking loan for the purpose of purchase of electric vehicles for claiming additional tax deduction of Rs. 1.5 lakh on the interest paid for

such loan under Section 80EEB of the Income Tax Act 1961 has not been extended beyond 31.3.2023 and there is no proposal to extend it. Furthermore, there is no proposal to make the same/similar clause/exemption available under the new tax regime. This is in line with the stated policy of the Government to remove exemptions and deductions available in the Income-Tax Act 1961 while simultaneously reducing the rates of tax.

83. The Committee is of the view that one of the major challenges to make electric vehicles more affordable and economical to operate is their high ownership cost *vis-a-vis* ICE vehicles, as the electric vehicles include a battery pack that forms about 40-45 per cent of their ownership cost. Since the Lithium-ions Batteries (LIBs) for electric vehicles has a greater durability with relatively high energy and power density, the Committee recommends that Government should explore the possibility of shrinking further the GST on Lithium-ion batteries to bring down the ownership cost of electric vehicles. Further, there is a need to address the issue of GST for manufacturers as well in order to reduce the high cost of electric vehicles and consequently its affordability for the potential buyers to promote faster adoption of electric vehicles.

84. Section 80EEB of the Income Tax Act 1961 allows an individual to claim tax savings of up to Rs. 1.5 lakh on interest paid on a loan made specifically to purchase an electric vehicle. Section 80EEB specifically states that the deduction benefits in case of purchase of electric vehicles are available only if the loan is approved by the Financial Institutions during the period 1st January 2019 to 31st March, 2023. The Committee is of the view that pollution is still a major concern and therefore, there is a need to work towards Green Grow. In order to facilitate faster adoption of electric vehicles, the Committee recommends that the provision under Section 80EEB may be considered for extension at least up to 31st March, 2025.

Ministry of Environment, Forest and Climate Change

85. Ministry of Environment, Forest & Climate Change apprised the Committee that switching to Electric Vehicles would replace use of fossil fuels such as petrol & diesel and consequently Electric vehicles will have significant environmental benefits such as drastic reduction in air and noise pollution. However, there are certain challenges associated with the increased use of Electric Vehicles. As Electric Vehicles uses onboard electricity storage systems (battery packs) for the storage of energy, the

increase in use of electric vehicles will lead to increase in production of batteries, and certainly the need for effective disposal of batteries to safeguard the environment . (*Replies to questionnaire MoEFCC*)

86. In its replies to the questionnaire about the impact of increased Battery production on environment due to increase in demand for Electric Vehicles, the Ministry of Environment, Forests & Climate Change informed the Committee that Government of India notified the Battery Waste Management Rules, 2022 on 22nd August, 2022 to ensure environmentally sound management of waste batteries replacing the Batteries (Management and Handling) Rules, 2001. The rules cover all types of batteries viz. Electric Vehicle batteries, portable batteries, automotive batteries and industrial batteries and provide an enabling framework for environmentally sound management of waste batteries generated from all Electric Vehicles. Stakeholders in the rules are producers (including importers), recyclers and refurbishers. Regulatory bodies are Central Pollution Control Board and State Pollution Control Boards.

87. The rules function based on the concept of Extended Producer Responsibility (EPR) where the producers (including importers) of batteries are responsible for collection and recycling/refurbishment of waste batteries and use of recovered materials from wastes into new batteries. EPR mandates that all waste batteries to be collected and sent for recycling/refurbishment, and it prohibits disposal in landfills and incineration. To meet the EPR obligations, producers may engage themselves or authorize any other entity for collection, recycling or refurbishment of waste batteries. Producers (including importers) has mandated targets for collection and recycling/refurbishment of waste batteries in the range of 30-90 per cent depending on the type of batteries. However, the remaining batteries are also to be collected in 7-14 years compliance cycle. Recyclers are mandated to recover minimum percentage of battery materials from the waste batteries in the range of 55-90 per cent depending on the type of batteries starting from the FY 2024-25. Producers are mandated to use minimum percentage of recycled materials out of the total dry weight of a battery in the range of 5-40 per cent depending on the type of batteries starting from the FY 2024-25.

88. The rules enable setting up a mechanism and centralized online portal for exchange of EPR certificates between producers and recyclers/refurbishers to fulfill the obligations of producers. Online registration & reporting, auditing, and Committee for monitoring the

implementation of rules and to take measures required for removal of difficulties are salient features of rules for ensuring effective implementation and compliance.

89. The Committee was also informed that on the principle of Polluter Pays Principle, environmental compensation will be imposed for non-fulfillment of Extended Producer Responsibility (EPR) targets, responsibilities and obligations set out in the rules. The funds collected under environmental compensation shall be utilised in collection and refurbishing or recycling of uncollected and non-recycled waste batteries.

90. Lithium-ion batteries, which are the most common type of battery used in electric vehicles, are made up of various materials such as cobalt, nickel, and lithium. While these materials are recyclable, the recycling process is expensive and requires a significant amount of energy. Moreover, the current recycling rate for Lithium-ion batteries is not up to the mark, which means the majority of these batteries are being discarded as e-waste, leading to environmental concerns as well as health hazardous. **The Committee is of the view that proper disposal and recycling of Lithium-ion Batteries (LIBs) are crucial to minimize the threat they pose to the environment as well as to the public health and therefore, there is a need for advanced battery recycling technologies and increased awareness of the importance of proper disposal of e-wastes. The Committee recommends that initiatives should be taken to encourage advanced R&D efforts for development of sustainable e-waste recycling technologies and to develop Sodium-ion as an alternative to Lithium-ion in battery manufacturing in coordination with the OEMs and Channel Partners for a more sustainable future. Besides, training modules should be designed for proper training and skilling of recyclers and labourers engaged in the business for effective management and disposal of LIBs and e-wastes.**

Ministry of New & Renewable Energy

91. The Ministry of New and Renewable Energy (MNRE) informed the Committee that it is the Nodal Ministry for promotion of renewable energy (RE) including wind, solar, small hydro, bio energy, *etc.*, and also new technologies like ocean energy, geo-thermal energy, *etc.* in the country. The Ministry also informed that the major schemes and programmes are targeted towards generation of electricity from RE resources.

92. The renewable energy sources such as wind and solar are intermittent in nature, thus the Electric Vehicle (EV) charging stations with stand-alone wind and/or solar power cannot provide reliable power for charging EVs. Therefore, the charging stations have to be connected to the grid in which the electricity is mainly supplied by local power distribution company (DISCOM). However, the power supply to the charging station through the grid can be from any sources of electricity generation, including renewable energy. With notification of Green Energy Open Access Rules, the EV charging stations can demand green power from the concerned DISCOM. With this mechanism, the EVs can be charged through green power.

93. In response to a query of the Committee regarding the steps being taken by the Ministry for providing renewable energy solutions for EV charging infrastructures at home and in residential societies, the Ministry replied that under Rooftop Solar Programme, Ministry is providing Central Financial Assistance (CFA) up to 40 per cent for installation of rooftop solar at homes. With net-metering arrangement, the solar power generated can also be used to negate the electricity consumption of the house, including the electricity consumption for charging electric vehicles. Similarly, CFA up to 20 per cent is being provided for installation of rooftop solar in residential societies to utilise the generated solar power for common utilities, including for charging Electric Vehicles.

94. The Ministry of New and Renewable Energy informed the Committee that concerted efforts are being made for increasing the share of renewable energy in electricity mix and in line with the announcement made by the Hon'ble Prime Minister at COP26, they are working towards achieving 500 GW of installed electricity capacity from non-fossil sources by 2030.

95. The Committee notes the efforts made by the Ministry of New and Renewable Energy for harnessing of renewable sources of energy such as wind and solar energy to supplement the generation of electricity. It is of the considered view that a pragmatic and earnest focus on generating renewable and non-fossil energy will go a long way in meeting the electricity demands of the society. Moreover, players in the automotive sector are moving the needle on renewable energy transition by leveraging cutting-edge auto electrification technologies. The Committee recommends that the Ministry should make all out efforts to tap the maximum energy that can be harnessed from such renewable energy sources to supplement the current electricity demand arising from households and industries, including EV Charging Stations, to support the Electric Mobility in the country. *EV-Ready India Dashboard*

should also be given wide publicity, especially in regional languages, to encourage electric vehicles as a cleaner and more efficient alternative to ICE vehicles.

NITI Aayog

96. NITI Aayog is involved in taking various initiatives and formulating policies for faster adoption of electric mobility in the country. It has been informed that Electric Mobility is one of the greatest technology advancement of recent times and India is strongly committed to take it forward. A host of policy measures, regulations, and interventions have already been made in that direction which broadly fall into regulatory norms (e.g., State EV policies), incentives for demand creation & charging infrastructure set up (purchase subsidy under FAME-2, lower GST) and promotion of local manufacturing (ACC PLI, Auto & Auto Components PLI). While these measures will help in accelerating the adoption of EVs, the absence of advanced research and technology base hurts the global competitiveness of Indian electric vehicles industry.

97. In this connection, the Committee was informed by the Ministry of Heavy Industries that in order to address the challenge on future of workforce and to develop world class ecosystem for R&D and Innovation in Transformative Mobility, NITI Aayog created an R&D Platform with IITs. The platform is to build indigenous technologies and conduct India specific studies. Consultations with IITs were organised to introduce New M.Tech Programmes to promote research on energy storage & battery chemistry. Various R&D initiatives have been taken up by 16 out of 23 IITs.

98. In addition to the above, several promotional campaigns and initiatives have been taken up by the NITI Aayog to encourage the adoption of electric vehicles. Some of them, as apprised to the Committee by the NITI Aayog, are:

❖ **e-AMRIT (Accelerated e Mobility Revolution for India's Transportation):**

E-AMRIT Portal, which was launched on 10.11.2021, has been designed to serve as a 'one-stop site' to provide all the information related to the adoption of electric vehicles in India. E-AMRIT Portal is instrumental to raise EV awareness to consumers, enhance EV uptake and attract investment. E-AMRIT complements the initiatives of the government on raising awareness on electric vehicles and sensitizing consumers on the benefits of switching to electric vehicles. As an accelerator of change, e-AMRIT will influence various stakeholders, including millions of users, to

adopt electric vehicles, drawing more investments into the sector. It has inspired Karnataka, Telangana and Gujarat to develop State EV Awareness Portals.

❖ **Shoonya-Zero Pollution Mobility:**

Shoonya-Zero Pollution Mobility is a consumer awareness campaign administered by NITI Aayog in partnership with leading companies working in the electric vehicle ecosystem in India. *Shoonya* aims to set the ride-hailing and delivery segment on a pathway to 100% electrification. Major

components of the campaign are as under:

- i. Corporate Branding Program: To recognise the efforts made by industry partners towards electric vehicles; parcels, vehicles, and driver uniforms for electric deliveries and rides are branded with the *Shoonya* logo.
- ii. Consumer Awareness Drive: To highlight the health and environmental benefits of EVs and solidify *Shoonya* as a slogan in every household in India, NITI Aayog uses both traditional and digital media channels.
- iii. Resource Toolkit: To allow EV users to understand the cost and emission benefits of switching to EVs, financing options, and existing policies, the toolkits are hosted on the *Shoonya* website (<https://shoonya.info/Toolkit>).

Shoonya has kick-started a widespread transition to a sustainable and clean mobility future. Within 18 months of the campaign launch, *Shoonya* has achieved the following milestones under each component:

a) **Corporate Branding:**

- The industry partner cohort of the *Shoonya* campaign grew from 35 to 149 corporate. The companies include two, three and four-wheeler manufacturers, charging infrastructure providers, fleet aggregators, financing institutions, and e-commerce and ride-hailing companies.
- In the first year of the Campaign, the estimated number of electric deliveries and rides completed by corporate partners *via* the *Shoonya* campaign was close to 70 million and 40 million, respectively, mitigating 13,000 tonnes of carbon dioxide.

b) **Consumer awareness drive:**

- *Shoonya* launched an engaging brand film, created an infomercial video, produced monthly newsletters and blogs, installed over 300 *Shoonya*-branded billboards/hoardings across key metro cities, and undertook social media promotions to enhance consumer awareness in India.

- The brand film and infomercial video received 65 million+ views across social media channels of *Shoonya*. Additionally, the infomercial has received over 60,000 views.
 - Additionally, NITI Aayog partnered with *MyGov* to take the *Shoonya* campaign to the masses and increase awareness around electric vehicles in India. Together, NITI Aayog and *MyGov* hosted several contests such as quizzes, doodle, and photography competitions. The *Shoonya* podcast series launched in partnership with *MyGov* served as a platform to share the stories of India's sustainable mobility champions.
- c) **Resource Toolkits:** NITI Aayog launched two toolkits on the *Shoonya* website:
- **EV Calculator** informs consumer choices by highlighting the cost and environmental benefits of switching to Electric Vehicles
 - **Financing Resources** allow users to understand the lending process and choose the right financing option to save money when buying an Electric Vehicle.

99. The Committee notes the initiatives undertaken by NITI Aayog such as e-AMRIT Portal and *Shoonya* Campaign and hopes that launching comprehensive nationwide awareness campaigns to educate the general public about the environmental and financial advantages of electric vehicles would help dispel the misconceptions and increase acceptance of the electric vehicles among the populace. The Committee is of the view that help of NGOs, social media and popular celebrities may also be considered for creating awareness and popularising electric vehicles (EVs). Further, the Ministry of Heavy Industries, in coordination with the NITI Aayog, should take initiatives to encourage the Governments of States/UTs to develop their respective EV Portals, in line with the e-AMRIT Portal, to generate public awareness regarding the advantages of electric vehicles.

100. Further, the Committee was apprised that State EV policies play a crucial role in fostering electric vehicle manufacturing and accelerating EV uptake in India. State Governments along with Central Government are also working in the same direction to step up the faster adoption of Hybrid and Electric Vehicles. To promote EV ecosystem and to take stock of EV initiatives in the country, the EV Mission in NITI Aayog has organised workshops with States/UTs. To identify mobility challenges in North Eastern states and exchange learning on best practices, Regional Workshops have been organised. Through this platform the EV Mission is able to inspire

about 33 States/ UTs to come up with EV policies. Of the 33 States/UTs so far 26 States/UTs have notified their EV policies and 7 States/UTs EV policies are in draft stage.

101. The Committee is of the view that the States are drivers of electric mobility movement in the country and they need to be equipped with efficient tools and policies to make electric vehicle revolution a success and contribute towards net zero emission. The Committee recommends that a comparative analysis of the notified EV policies of States/UTs should be conducted and based on the analysis outcome, a comprehensive stable EV policy may be adopted to address the misconceptions regarding electric vehicles among the people and to boost EV revolution in the country. Further, States/UTs, which are yet to notify their EV Policy, should be provided expert guidance and scientific assistance by NITI Aayog and other related organisations in formulation of their EV policy.

102. The Committee was informed that various State/UT Governments have set targets to upgrade their fleet of buses in respective STUs/STCs to Electric, such as Haryana Government has set a deadline of 100 per cent of bus fleet owned by State Transport Undertakings in the state into electric buses by 2029, similarly Delhi Government has also plans to make 80 per cent of their fleet to electric by the end of 2025. **The Committee notes the efforts made by some of the State/UT Governments in decarbonising their respective bus fleet and is of the view that, along with buses, the logistics sector also needs to be decarbonised as it is a major contributor to air pollution. Therefore, in order to decarbonise the Transport Sector, efforts should be made to set a deadline for making Transport Sector in the country mandatorily electric.**

103. Although India has seen the rise in sales and production of Electric Vehicles in the recent years, still there are certain challenges which are hampering the widespread adoption of electric mobility in the country. Some of the major challenges are:

Lack of Financing

104. In response to a query of the Committee, the Ministry of Heavy Industries informed that one of the significant barriers to scaling up EV adoption is the limited access to affordable commercial finance. While EVs offer lower operating costs compared to internal combustion engine (ICE) vehicles and have achieved total cost of ownership (TCO) parity in some

segments, their high upfront costs and limited financing options hinder widespread affordability and adoption.

105. Besides, the nascent nature of the Electric Vehicle sector leads commercial lenders to perceive significant risks, resulting in a low level of commercial financing. Only a limited number of financial institutions operate in this space, and they often provide financing with dissuasive terms, such as high interest rates, short maturity, or low loan-to-value (LTV) ratios. Access to financing through commercial banks and Non-Banking Financial Corporation (NBFCs) is restricted, especially for low and middle income individuals who constitute the majority of e-2/3W (electric two-wheelers and three-wheelers) purchasers. They face challenges such as high interest rates (ranging from 20-25 per cent), lower LTV compared to conventional vehicles, and shorter loan tenures. Additionally, concerns regarding the long-term performance of EVs and supply-side constraints deter commercial lenders from providing financing. While NBFCs are more active in EV lending, they face their own challenges, including high cost of financing, limited access to long-term funds, market fragmentation, and high underwriting and collection costs, leading to higher interest rates compared to commercial banks.

106. Further, the Committee was informed that in order to accelerate the transition to e-2/3Ws in India, it is crucial to de-risk and provide affordable financing options. In response to this need, the GoI is formulating a catalytic policy response and has requested the World Bank (WB) to design and offer financial interventions to overcome these barriers and stimulate the growth of the e-2/3Wheeler market.

107. Based on the detailed studies and extensive market consultations, the World Bank and Small Industries Development Bank of India (SIDBI), in consultation with NITI Aayog, are recommending a combination of credit enhancement and concessional loans. It aims to develop a more sustainable ecosystem for e-2/3Whealers. The proposed initiative, named Electric Vehicles Operations and Lending for a Vibrant Ecosystem (EVOLVE) to address the major issues in EV Financing and to unlock the market. EVOLVE RSP seeks to establish a pan-India program with a budget of US\$250 million. Under EVOLVE RSP, SIDBI to unlock affordable commercial financing for e-2/3Whealers and the associated charging infrastructure.

108. Despite many positive developments within the electric vehicle industry, the EV financing market is marred with several fundamental

challenges such as higher interest rates for non-premium vehicle categories to a general lack of understanding about EVs and apprehensions about their battery life. Therefore, purchasing an Electric Vehicle currently has higher financing costs than traditional ICE vehicles. **The Committee notes the challenges associated with financing the Electric Vehicles and is hopeful that the efforts of NITI Aayog, World Bank and SIDBI will be helpful in addressing the issue of finance availability for the potential EV buyers. Taking into consideration the efforts of the Government for promoting Electric Vehicles and green asset creation, the Committee recommends that Electric Vehicles should be brought under the Priority Sector Lending (PSL) category until the 30 per cent penetration target fixed for 2030 is achieved, for accelerating India's commitment towards net-zero emissions. Further, cooperation between EV Original Equipment Manufacturers (OEMs) and lenders may be encouraged to improve EV buyers accessibility to finance. Ministry of Heavy Industries may also consider including private EV Four Wheelers in FAME-II so as to improve their share in the Electric Mobility Mission.**

Supply of Raw Materials/Components

109. According to a report titled “Critical Minerals of India” by Ministry of Mines, India imports 100 per cent of its Lithium requirement and the major import sources are Chile, Russia, China, Ireland and Belgium. In this regard, in response to the query of the Committee about the lithium resources and dependence on import of Lithium, NITI Aayog apprised the Committee that NITI Aayog, in collaboration with ADB and EY, has undertaken a comprehensive study to analyze the entire value chain of critical minerals and active materials involved in the production of Lithium-ion Batteries (LIBs). Outcome of this study provides insights into the policy approach NITI Aayog which aimed at reducing India's dependence on lithium and lithium-ion battery imports, taking into account recent discoveries of lithium resources within the country.

110. The policy roadmap will also focus on scaling up LIB recycling infrastructure to complement above efforts and support the domestic critical mineral requirements including Lithium. It will also aid in promoting environmentally sustainable battery disposal and waste management practices. Further, the policy roadmap will promote R&D for earth abundant alternatives to critical minerals used in LIBs, support commercialization of lab to market for such products, provide start-up incubators and technology industrialization centres, and facilitate demonstration projects.

111. Recently, through amendments to the Mines and Minerals (Development and Regulation) Act, 6 minerals (including Lithium minerals) have been omitted from the list of 12 atomic minerals. Upon removal of these minerals from the list of atomic minerals, exploration and mining of these minerals will be open to private sector. As a result, exploration and mining of these minerals is expected to increase in the country.

112. Lithium is very critical for the development of EV industry. Consequently rise in demand for raw materials for batteries is expected with the progress of PLI-ACC scheme. Over two-third of World's known lithium reserves are in the Lithium Triangle of Argentina, Bolivia and Chile. With the recent findings of reserves of Lithium in Jammu & Kashmir and Rajasthan, India could also become a game changer in the EV industry by boosting its domestic battery manufacturing industry. The Committee recommends that the Government should take initiatives such as framing of rules and guidelines to accelerate the process of lithium extraction so that India become *Atmanirbhar* in the field of Lithium-ion Battery manufacturing to facilitate transition to Electric Mobility.

113. In its replies to the questionnaire, Ministry of Heavy Industries informed the Committee that India is importing various components/parts such as motor, controller compressor, etc mainly from China and Europe. Though China, USA, Europe and South Korea have made good progress in setting up manufacturing plants of ACC, India has to catch up. Presently India, is also importing its requirement of ACC, however battery assembly has started in India. In order to cut down imports and produce the components locally, the government has launched National Programme on Advanced Chemistry Cell (ACC) Battery Storage and PLI Auto.

114. The Committee notes the achievements of Schemes such as PLI-Auto and National Programme on ACC, but until the benefits of these schemes spread across the country and self-sufficiency in manufacturing of batteries and auto components is achieved, the Government should ensure adequate supply of components, cells and batteries for growth of Electric Vehicles *vis-à-vis* ICE Vehicles. The Committee recommends the Ministry to foster international cooperation/partnership with global suppliers/countries to ensure and maintain the supply chain requirements of the domestic Electric Vehicle industry. Ministry of Heavy Industries should also work in coordination with the Ministry of Micro, Small and Medium Enterprises to help develop a Manufacturing Network for manufacture of Battery and EV

components and progress in this regard may be shared with the Committee.

Consumer perception/Awareness:

115. Consumer's perception influences their decisions on whether they should go for the newer technologies like EV or stick with the technology already in place. Although, many people especially those concerned with the environment are already opting for EVs but still lot many are reluctant. Therefore, awareness among the masses is crucial for accelerating the adoption of electric mobility in the country. In this direction, the Bureau of Energy Efficiency under the guidance of the Ministry of Power, GoI launched "GO ELECTRIC" campaign in year 2021, to spread awareness on e-mobility in the country. The "GO ELECTRIC" campaign has been designed to educate the masses about the Central/State Government policy initiatives pertaining to the promotion of e-mobility in the country & benefits of EVs over conventional vehicles. The campaign has been designed and developed in consultation with the industry like the OEMs, State Nodal Agencies, Oil marketing companies (OMCs) and Public Sector Units of Government of India.

116. Ministry of Heavy Industries informed the Committee that as per *Vahan Portal*, EV sales in FY 2022-23 were 11.8 lakh units, which are 2.5 times of EV sold during FY 2021-22. In FY 22-23, 7.2 lakh e-2Wheelers, 4 lakh e-3Whleers, 47,479 Passenger Cars and 2973 Commercial Vehicles were registered, which is about 6 per cent of total internal combustion engine vehicle sales in FY 2022-23.

117. For the promotion and penetration of Electric Vehicles, creating awareness regarding the environmental and economic benefits of adoption/migration to Electric Vehicles among the people is necessary. It's equally important to convey the initiatives taken by the Central & State governments to promote e-mobility in the country. The Committee recommends that awareness campaigns, events, etc. at the local level in coordination with urban local bodies/municipalities, etc. should be organised in the regional languages in the States to promote Electric Vehicles and their wide acceptance by general public. Print, Audio Video, Radio, and Social Media modes should also be utilised to enhance the outreach.

118. According to a report of NITI Aayog, Indian Gig force is expected to rise to 23.5 million by 2029-30, from the current workforce of 7.7

million. Most of the delivery start-ups especially in food & grocery delivery employ gig force on a large scale, which could be a potential driving agent for increasing the Electric Vehicles penetration in the country, particularly in 2-Wheeler segment. The Committee recommends that the Ministry should take steps in coordination with the stakeholders to make the vehicle fleet of 2-Wheelers in these start-ups/companies mandatorily to be Electric Vehicles in order to achieve the 30 per cent target of EV penetration by the year 2030.

PM e-Bus Sewa:

119. According to a release of Press Information Bureau, the Union Cabinet has approved the *PM e-Bus Sewa* for augmenting the city bus operations by e-Buses on Public-Private Partnership (PPP) Model. The Scheme would have an estimated cost of ₹57,613 crore, out of which support of ₹20,000 crore will be provided by the Central Government. The Scheme will support bus operations for 10 years. The scheme will cover cities with a population of 3 lakh and above and priority will be given to cities not having organised bus services. Through this scheme, e-Buses will be deployed on PPP Model in 169 cities and Infrastructure will be upgraded in 181 cities under the Green Urban Mobility Initiatives. Cities will also be supported for development of charging infrastructure under Green Urban Mobility Initiatives.120. The Committee is of the view that support to bus priority infrastructure shall not only accelerate the proliferation of state-of-the-art, energy efficient electric buses but also foster the innovation in the e-mobility sector as well as development of resilient supply chain for electric vehicles. It will also bring in economies of scale for procurement of electric buses through aggregation for e-buses. Adoption to Electric mobility will reduce noise and air pollution and curb carbon emissions.

121. The Committee observes that in phase-2 of FAME Scheme, only 9 major cities having population of over 4 million were targeted in aggregation model for e-buses and very few States have earlier participated in operational cost model. With the announcement of PM e-Bus Sewa, the Committee is hopeful that the Scheme will help transform urban mobility landscape in smaller cities also. The Committee recommends that the concerned Ministry(ies) should strive for the early implementation of the scheme so that the benefits of the scheme will proliferate in an efficient manner and timely.

Recommendations/Observations at a Glance

1. The Committee notes that the initial targets were revised by bringing down the number of vehicles to be supported under the FAME-II Scheme. The Committee is of the opinion that in order to facilitate the transition momentum to Electric Mobility, more number of electric vehicles need to be supported and, therefore recommends that the Ministry should broaden the scope and extend the FAME-II Scheme for at least 3 more years in consultation with the Industry stakeholders to make the Scheme more inclusive.

(Para 25)

2. The Committee notes that initially the Government had the target of supporting 55,000 e-4 Wheelers under the FAME II Scheme, but the revised targets have reduced the number of vehicles to the committed funds only *i.e.* for 11,000 e-4 Wheelers. Though 2 Wheelers is a dominant category, share of 4 Wheelers is also significant in the automotive sector of the country. The Committee recommends that the Ministry should increase the number of electric vehicles to be supported in the 4 Wheelers category and also include private e-4 Wheelers in the domain of FAME II Scheme with a cap based on the cost and battery capacity of the vehicle.

(Para 26)

3. The Committee notes that reduction of subsidy *w.e.f.* 1st June, 2023 in case of e-2Wheelers has negatively impacted their sales. It also notes that the budget constraint was the major reason behind the reallocation of funds and for the revision of targets under the FAME-II Scheme. As there is an instant need to decarbonise the transport sector, the Committee recommends that the Ministry should restore the subsidy on e-2Wheelers and, if required, project enhanced budget allocations in order to maintain the momentum and pace of electric vehicles penetration, so that the desired target could be achieved by 2030.

(Para 31)

4. During the deposition before the Committee, the issue of e-Quadricycle was discussed and the Committee was informed by a stakeholder that e-Quadricycle will give a big fillip to last-mile connectivity and, based on a study, CRISIL had indicated that India

could be one of the largest manufacturers of e-Quadricycles, which would help in reducing two lakh tones of CO2 emissions. The Committee recommends that the Ministry should develop an ecosystem to include e-Quadricycle in the FAME-II Scheme as the e-Quadricycle would not only help reduce CO2 emissions but would be an employment generation initiative for the youth of the country.

(Para 32)

5. A safe, reliable and cost-effective public transport system would definitely have a positive impact on improving the air quality in urban areas as well as reducing the number of private vehicles on road. The Committee recommends that the Ministry should allocate more funds for developing a decarbonised mass public transport system and also project for enhancement of the budgetary allocation for e-Buses under FAME Scheme so that it does not suffer due to shortage of funds.

(Para 35)

6. The Committee is of the opinion that frequent changes in the policies relating to Electric Vehicles create uncertainties in the market as well as in the EV Industry. This will also creates doubt in the minds of people and the end users about the Government actions which may negatively impact the growth of the EV industry. The Committee recommends that the Government should strive towards formulation of a consistent and stable national policy on Electric Mobility so that a propitious environment is created for the EV industry in order to promote sustainable and clean transportation system in the country.

(Para 36)

7. The Committee is of the view that the proposal of stakeholders hold merit and recommends that the Ministry of Heavy Industries in consultation with Industry partners should expand the scope of FAME-II or any future Scheme to incentivize installation of charging stations to individual investors in order to achieve the goal of setting up of charging stations throughout the length and breadth of the country as well as to eliminate road anxiety among potential customers. The Committee also recommends that Women Self Help Groups and Cooperative Societies may be given assistance to open and operate Charging Stations. They may be provided an assured return by the Government from its own funds.

(Para 40)

8. The Committee recommends that keeping in view the importance of EV Mobility as a key ingredient of reducing the pollution level in the country, the Ministry of Heavy Industries should play a proactive role through BHEL in providing EPC solutions to support electric vehicle (EV) charging stations, including solar based EV charging stations and, if required, more funds may be allocated to BHEL to facilitate popularizing the EV Mobility. Every Public Sector Undertaking and Government institutions may be asked to participate in the installation of Charging Stations in their own premises for the use of the vehicles coming to their premises.

(Para 41)

9. Ensuring Domestic Value Addition (DVA) is an important aspect of the PLI Scheme for Automobile and Auto Components. The Committee recommends that the Ministry should take necessary steps for achieving better scheme output, including policy changes and financial outlay, for enhancement of manufacturing capabilities for Advanced Automotive Technology products thus creating an ecosystem to manufacture components of electric vehicles locally and promoting manufacturers as global *Automotive Champions*.

(Para 47)

10. Although the Ministry of Heavy Industries is striving hard towards *Make in India* and *Atmanirbhar Bharat* with the Schemes like PLI-Auto, PLI-ACC and Phased Manufacturing Programme under FAME-II Scheme, the Committee is of the view that to make India a Global EV Hub, the Ministry should have supportive, transparent, and consistent government frameworks at national, state, and local levels and also focus towards establishing dedicated Manufacturing Hubs and Industrial Parks for manufacturing of batteries, cells and Electric Vehicle auto components. The Committee believes that this would encourage and strengthen economic development of the country.

(Para 56)

11. The Committee notes that MoRTH has issued various guidelines and advisories to States and Union Territories so as to incentivize and bring down the initial cost of electric vehicles. Many States have complied with these guidelines and included the measures in their respective EV policy but, to increase the targeted penetration of electric vehicles by 2030, more needs to be done. Since 19 States/Union Territories are only providing exemptions and rebate in road tax, the Committee recommends that the MoRTH should take up the issue with

the remaining States/Union Territories in order to bring in all the States and Union Territories such as Uttar Pradesh, Bihar, Haryana etc. on a common platform as well as make efforts to slash down the road tax further and provide other possible exemptions in respect of electric vehicles. MoRTH, in order to decarbonise the Automotive Sector, should also make electric vehicles mandatory for public transport in cities with high rate of air pollution.

(Para 60)

12. The Committee notes the efforts of the Ministry of Power towards augmentation of distribution network through Revamped Distribution Sector Scheme (RDSS). The Committee is of the view that with more penetration of electric vehicles, EV owners may prefer to charge their vehicles at home during non-solar hours which may lead to surge in electricity demand ultimately overloading the electrical systems. The Committee recommends that Ministry of Power should encourage solar hours charging of electric vehicles through advertisements, including regional languages, to minimize the load on electrical systems during non-solar hours and promote establishing charging stations/points at work locations/office buildings/premises with minimum parking facility to increase charging network as well as solar hours charging to minimize load on electric system. Ministry of Power should also encourage Solarization of EV Charging Stations, in coordination with the Ministry of Heavy Industries, by providing subsidy for installation of EV Charging Stations both under public as well as private sector.

(Para 65)

13. The Committee is of the view that the Ministry of Power should popularize such Apps and recommends that the scope of the *EV Yatra* App should be enlarged to help even the potential electric vehicle buyers to know about the cost of the vehicle, cost of battery, insurance and comparison between EV and ICE vehicles as a single stop solution for all issues related to electric vehicles.

(Para 66)

14. The Committee appreciates such a move of the Ministry of Power and recommends that the benefits of the aforesaid *Portal* and Guidelines should be given wide publicity vigorously in all prominent languages through various modes of media, including social media.

(Para 67)

15. Electric Vehicles have range constraints as its range depends on battery capacity and therefore, the vehicles need charging at frequent intervals, whereas ICE Vehicles have a fuel tank which gives them range advantage *vis-a-vis* electric vehicles. The Committee recommends that Ministry of Petroleum & Natural Gas should also consider including the sub-urban and rural areas under the target areas for establishing Charging Stations, as installations of charging stations only at retail outlets of Oil Marketing Companies would not be adequate due to range anxiety in case of electric vehicles. Further, in view of the targeted Electric Charging Stations of 22,000, the sanctioned Charging Stations of 7,432 for installation under FAME-II is way below the target and, therefore the Committee recommends that sincere efforts should be made for setting up of more Charging Stations to address the issue of range anxiety and boost the EV penetration in the automotive sector in the country.

(Para 73)

16. The Committee was informed by the Ministry of Heavy Industries that 520 Charging Stations had been sanctioned under the Phase-I of FAME India Scheme. Further, 2,877 charging stations in 68 cities across 25 States/UTs and 1576 charging stations across 9 Expressways and 16 Highways have been sanctioned under *FAME-II* India Scheme. The Committee recommends that other Ministries should be roped in along with charging infrastructure operators to put in place a comprehensive plan for establishment of a Charging Network in the country to address the issue of road anxiety of electric vehicle owners.

(Para 74)

17. The Committee is of the view that one of the biggest barriers to the widespread adoption of Electric Vehicles remains the lack of charging infrastructure and the overall time required to charge such batteries. With a Battery Swapping System, EV owners will save on the high cost of buying a new set of battery at periodic intervals as they can simply replace the exhausted batteries for fully charged ones at Battery Swapping Stations. The Committee recommends that the Ministry of Heavy Industries should conduct a study regarding the feasibility of battery standardisation and formulate a stable Battery Swapping Policy with the highest levels of safety standards that can infuse confidence in consumer's decision making thereby boosting demand whilst inducing infrastructure build-out by swapping operators, which has a huge potential to invite FDI into the battery swapping network creation in the country.

(Para 77)

18. The Committee is of the view that one of the major challenges to make electric vehicles more affordable and economical to operate is their high ownership cost *vis-a-vis* ICE vehicles, as the electric vehicles include a battery pack that forms about 40-45 per cent of their ownership cost. Since the Lithium-ions Batteries (LIBs) for electric vehicles has a greater durability with relatively high energy and power density, the Committee recommends that Government should explore the possibility of shrinking further the GST on Lithium-ion batteries to bring down the ownership cost of electric vehicles. Further, there is a need to address the issue of GST for manufacturers as well in order to reduce the high cost of electric vehicles and consequently its affordability for the potential buyers to promote faster adoption of electric vehicles.

(Para 83)

19. Section 80EEB of the Income Tax Act 1961 allows an individual to claim tax savings of up to Rs. 1.5 lakh on interest paid on a loan made specifically to purchase an electric vehicle. Section 80EEB specifically states that the deduction benefits in case of purchase of electric vehicles are available only if the loan is approved by the Financial Institutions during the period 1st January 2019 to 31st March, 2023. The Committee is of the view that pollution is still a major concern and therefore, there is a need to work towards Green Grow. In order to facilitate faster adoption of electric vehicles, the Committee recommends that the provision under Section 80EEB may be considered for extension at least up to 31st March, 2025.

(Para 84)

20. The Committee is of the view that proper disposal and recycling of Lithium-ion Batteries (LIBs) are crucial to minimize the threat they pose to the environment as well as to the public health and therefore, there is a need for advanced battery recycling technologies and increased awareness of the importance of proper disposal of e-wastes. The Committee recommends that initiatives should be taken to encourage advanced R&D efforts for development of sustainable e-waste recycling technologies and to develop Sodium-ion as an alternative to Lithium-ion in battery manufacturing in coordination with the OEMs and Channel Partners for a more sustainable future. Besides, training modules should be designed for proper training and skilling of recyclers and labourers engaged in the business for effective management and disposal of LIBs and e-wastes.

(Para 90)

21. The Committee notes the efforts made by the Ministry of New and Renewable Energy for harnessing of renewable sources of energy such as wind and solar energy to supplement the generation of electricity. It is of the considered view that a pragmatic and earnest focus on generating renewable and non-fossil energy will go a long way in meeting the electricity demands of the society. Moreover, players in the automotive sector are moving the needle on renewable energy transition by leveraging cutting-edge auto electrification technologies. The Committee recommends that the Ministry should make all out efforts to tap the maximum energy that can be harnessed from such renewable energy sources to supplement the current electricity demand arising from households and industries, including EV Charging Stations, to support the Electric Mobility in the country. *EV-Ready India Dashboard* should also be given wide publicity, especially in regional languages, to encourage electric vehicles as a cleaner and more efficient alternative to ICE vehicles.

(Para 95)

22. The Committee notes the initiatives undertaken by NITI Aayog such as e-AMRIT Portal and *Shoonya* Campaign and hopes that launching comprehensive nationwide awareness campaigns to educate the general public about the environmental and financial advantages of electric vehicles would help dispel the misconceptions and increase acceptance of the electric vehicles among the populace. The Committee is of the view that help of NGOs, social media and popular celebrities may also be considered for creating awareness and popularising electric vehicles (EVs). Further, the Ministry of Heavy Industries, in coordination with the NITI Aayog, should take initiatives to encourage the Governments of States/UTs to develop their respective EV Portals, in line with the e-AMRIT Portal, to generate public awareness regarding the advantages of electric vehicles.

(Para 99)

23. The Committee is of the view that the States are drivers of electric mobility movement in the country and they need to be equipped with efficient tools and policies to make electric vehicle revolution a success and contribute towards net zero emission. The Committee recommends that a comparative analysis of the notified EV policies of States/UTs should be conducted and based on the analysis outcome, a comprehensive stable EV policy may be adopted to address the misconceptions regarding electric vehicles among the people and to

boost EV revolution in the country. Further, States/UTs, which are yet to notify their EV Policy, should be provided expert guidance and scientific assistance by NITI Aayog and other related organisations in formulation of their EV policy.

(Para 101)

24. The Committee notes the efforts made by some of the State/UT Governments in decarbonising their respective bus fleet and is of the view that, along with buses, the logistics sector also needs to be decarbonised as it is a major contributor to air pollution. Therefore, in order to decarbonise the Transport Sector, efforts should be made to set a deadline for making Transport Sector in the country mandatorily electric.

(Para 102)

25. The Committee notes the challenges associated with financing the Electric Vehicles and is hopeful that the efforts of NITI Aayog, World Bank and SIDBI will be helpful in addressing the issue of finance availability for the potential EV buyers. Taking into consideration the efforts of the Government for promoting Electric Vehicles and green asset creation, the Committee recommends that Electric Vehicles should be brought under the Priority Sector Lending (PSL) category until the 30 per cent penetration target fixed for 2030 is achieved, for accelerating India's commitment towards net-zero emissions. Further, cooperation between EV Original Equipment Manufacturers (OEMs) and lenders may be encouraged to improve EV buyers accessibility to finance. Ministry of Heavy Industries may also consider including private EV Four Wheelers in FAME-II so as to improve their share in the Electric Mobility Mission.

(Para 108)

26. Lithium is very critical for the development of EV industry. Consequently rise in demand for raw materials for batteries is expected with the progress of PLI-ACC scheme. Over two-third of World's known lithium reserves are in the Lithium Triangle of Argentina, Bolivia and Chile. With the recent findings of reserves of Lithium in Jammu & Kashmir and Rajasthan, India could also become a game changer in the EV industry by boosting its domestic battery manufacturing industry. The Committee recommends that the Government should take initiatives such as framing of rules and guidelines to accelerate the process of lithium extraction so that India become *Atmanirbhar* in the field of Lithium-ion Battery manufacturing to facilitate transition to Electric Mobility.

(Para 112)

27. The Committee notes the achievements of Schemes such as PLI-Auto and National Programme on ACC, but until the benefits of these schemes spread across the country and self-sufficiency in manufacturing of batteries and auto components is achieved, the Government should ensure adequate supply of components, cells and batteries for growth of Electric Vehicles *vis-à-vis* ICE Vehicles. The Committee recommends the Ministry to foster international cooperation/partnership with global suppliers/countries to ensure and maintain the supply chain requirements of the domestic Electric Vehicle industry. Ministry of Heavy Industries should also work in coordination with the Ministry of Micro, Small and Medium Enterprises to help develop a Manufacturing Network for manufacture of Battery and EV components and progress in this regard may be shared with the Committee.

(Para 114)

28. For the promotion and penetration of Electric Vehicles, creating awareness regarding the environmental and economic benefits of adoption/migration to Electric Vehicles among the people is necessary. It's equally important to convey the initiatives taken by the Central & State governments to promote e-mobility in the country. The Committee recommends that awareness campaigns, events, *etc.* at the local level in coordination with urban local bodies/municipalities, *etc.* should be organised in the regional languages in the States to promote Electric Vehicles and their wide acceptance by general public. Print, Audio Video, Radio, and Social Media modes should also be utilised to enhance the outreach.

(Para 117)

29. According to a report of NITI Aayog, Indian Gig force is expected to rise to 23.5 million by 2029-30, from the current workforce of 7.7 million. Most of the delivery start-ups especially in food & grocery delivery employ gig force on a large scale, which could be a potential driving agent for increasing the Electric Vehicles penetration in the country, particularly in 2-Wheeler segment. The Committee recommends that the Ministry should take steps in coordination with the stakeholders to make the vehicle fleet of 2-Wheelers in these start-ups/companies mandatorily to be Electric Vehicles in order to achieve the 30 per cent target of EV penetration by the year 2030.

(Para 118)

30. The Committee observes that in phase-2 of FAME Scheme, only 9 major cities having population of over 4 million were targeted in aggregation model for e-buses and very few States have earlier participated in operational cost model. With the announcement of PM e-Bus Sewa, the Committee is hopeful that the Scheme will help transform urban mobility landscape in smaller cities also. The Committee recommends that the concerned Ministry(ies) should strive for the early implementation of the scheme so that the benefits of the scheme will proliferate in an efficient manner and timely.

(Para 121)

Annexure-I

Automotive Industry Standards (AIS) for aspects related to safety, range, power, Central Motor Vehicle Rules (CMVR) type approval, etc. for electric vehicles:

- (1) Requirements for Construction and Functional Safety (AIS-038 Rev 1)

- (2) Safety Requirements for Electric power trains of Passenger and goods vehicles (M& N Category) and Rechargeable Electrical Energy Storage System (REESS) (AIS-038 (rev 2))

- (3) Measurement of Electrical Energy Consumption (Wh/km) (AIS-039 Rev 1)

- (4) Method of Measuring the Range (km) (AIS-040 Rev 1)

- (5) Measurement of Net Power & Maximum 30-minute power (AIS-041 Rev 1)

- (6) CMVR Type Approval for Electric Vehicles (AIS-049 Rev 1)

- (7) Safety Requirements for Traction Batteries (AIS-048)

- (8) Safety Requirements for Electric power trains of 2 Wheelers, 3 Wheelers and Quadricycles and Rechargeable Electrical Energy Storage System (REESS) (AIS-156)