



The Shirpur Education Society's

R. C. Patel College of Engineering and Polytechnic, Shirpur

Department of Electrical Engineering

NOTES

Programme Code: Electrical Engineering

Year/Scheme: EE5K

Semester: 5th

Course Title: Electrical Vehicle Technology

Course Abbr.: EVT

Course Code: 315335

Subject Teacher :- Ms. H.A.Badgajar

UNIT-05 – (8 MARKS)

ELECTRIC VEHICLE (EV) POLICIES

CO Coverage: - Implement Indian and state EV policies for EV applications.

Content (Syllabus) :

5.1. Goal of EV30@30 campaign. Goals of electric vehicles initiative in India. National Electric Mobility Mission Plan 2020 (NEMMP): Objectives, Steps taken by Indian Government for faster adoption of electric vehicles, Barriers to adoption of electric mobility, E-mobility strategy, NEMMP 2020 Implementation structure.

5.2. Maharashtra Electric Vehicle Policy, 2021: Objectives, Basic demand incentives for electric vehicles, Vehicle segment-wise scrap page incentives, Incentives for charging infrastructure.

5.1 - Goal of EV30@30 :-

→ The EV30@30 Campaign, launched in 2017 at the 8th clean Energy ministerial, aimed to accelerate electric vehicles adoption globally, targeting a 30% of market share ~~30%~~ by 2030.

* Goals & Objectives :-

1) Focused on economic benefits, innovation, energy security, and reducing air pollution, the campaign covered a range of vehicle types and drivetrain technologies, emphasizing the need for adequate charging infrastructure.

1) International Co-operation :-

~~Focused on economic benefits, innovation, energy security~~

2) International Co-operation :-

Focused and supported by 13 countries and 23 organizations, it underscored the significance of global collaboration in combatting climate change through clean technology adoption.

* Significance & Core Principles :-

- 1) Promote information exchange among stakeholders.
- 2) Encourage fleet electrification in public & private sector
- 3) Establish 100 EV friendly cities via a global EV pilot city programme.
- 4) Support capacity building for workforce training in EV sector.
- 5) Support and expand electric charging infrastructure.

* Progress by 2021 :-

→ Participating countries achieved a 10% EV sales share, indicating progress but revealing that meeting 2050 net zero emissions targets requires higher EV market shares.

* Policy Evaluation :-

→ The campaign ~~was~~ phased out at CEM13, suggesting a shift towards more ambitious climate targets & indicating that global policy frameworks are adaptive to new findings & climate goals.

* Comprehensive approach :-

successful EV adoption demands an ecosystem approach, focusing on knowledge sharing, urban planning, workforce development, and infrastructure rather than solely on vehicle sales.

* Goals of Electric vehicle initiative in India :-

- Indian government has approved initiatives to enhance domestic manufacturing of passenger cars, emphasizing Electric Vehicles (EV)
- These scheme aligns with national goals of net-zero emissions by 2070, sustainable mobility, economic growth, and reduced environmental impact.
- The objective is to establish india as a global hub for automotive manufacturing and innovation, attracting investments from global EV manufacturers.
- A key policy is the scheme to promote manufacturing of electric passenger cars in india, launched on march 15, 2024 by the ministry of Heavy industries (MHI).
- Manufacturer's must meet a minimum investment requirement of 4150 Rs. Crore to participate in SPMEPCI.
- Approved manufacturers can import Completely Build-up (CBU) electric four wheelers at a reduced customs duty of 15% for five years, with a cap on total duty waivers.
- The policy marks a strategic shift from demand side incentives to developing a self-sufficient domestic manufacturing ecosystem.
- This approach aims to foster sustainable economic growth & reduce reliance on imports while facilitating market entry for global manufacturers.
- Lower custom duties on CBU imports are designed to attract Foreign Direct Investment (FDI) & support technology transfer, enhancing local manufacturing capabilities.

* National Electric Mobility mission Plan 2020 :- (NEMMP-2020)

* Objectives of NEMMP-2020 :-

NEMMP-2020 was launched in 2013 and has primary objectives as follows:-

- 1) National fuel security': Aims to increase energy independence by reducing fossile fuel dependency.
- 2) Affordable transportation': Promotes cleaner and economically viable transport options for the public.
- 3) Global manufacturing leadership': seeks to india as a leader in

electric vehicle manufacturing.

- 4) Environmental mitigation :- Aims to reduce air pollution & greenhouse gas emissions from conventional vehicles.
- 5) Target of 6-7 million annual sales of hybrid & electric vehicles starting 2020.
- 6) Projected benefits include savings of around 9,500 million litres of crude oil & a 1.3% to 1.5% reduction in CO₂ emissions by 2020.

* Steps taken by Indian Government for faster adoption of electric vehicles :-

* FAME India Phase-I (April 1, 2015 - March 2019)

- 1) Launched with 75 crore.
- 2) Focus areas :- Demand Creation, Technology platform, pilot projects, charging infrastructure.
- 3) Provided upfront purchase incentives across vehicle segments
- 4) Supported approximately 2.78 lakh xEV's with 343 crore in demand incentives.
- 5) Sanctioned 465 electric buses for deployment.

* FAME India Phase-II (effective from April-2019)

- 1) Notified with a budget of Rs. 10,000 crore over 3 years.
- 2) Aims to drive EV adoption through upfront purchase incentives and charging infrastructure development.

* Broader measures to Promote Electric mobility :-

- 1) GST Reduction :- EV taxes at 5% (No cess), compared to upto 28% for conventional vehicles.
- 2) Electricity as service :- Permitted sale of electricity for EV charging to attract investment.
- 3) Permit exemption :- Battery operated vehicles exempted from traditional permit requirement.
- 4) Public Transport electrification :- Initiatives to facilitate deployment of 5000 electric buses by state transport departments.

* Strategic insights :- Transition from phase I to II reflects a multipronged approach combining financial incentives, infrastructure & regulatory support. Emphasis on addressing barriers like high costs & range anxiety through comprehensive measures.

Focus areas include energy and automotive/road transportation, while also addressing public health, energy security, climate change and environmental sustainability.

→ Financial savings from reduced fossil fuel use due to electric mobility are expected to surpass government investment, indicating high economic viability.

* NEMMP 2020 implementation structure :-

- NEMMP 2020 was approved on August 29, 2012, with the department of heavy industry as the nodal body for its implementation.
- The FAME India scheme emerged as the central instrument for achieving NEMMP's goal.
- A review revealed that the target of 6-7 million EV units by 2020 was not met, only about 1.4 million electric vehicles were registered by August 3, 2022.
- There is exist a significant implementation gap between policy aspirations & market adoption, indicating challenges & potential underestimations of the required transformation scale.
- Although states have developed their own EV policies, a strong national policy framework is essential for cohesive implementation.
- Recommendations between state & central initiatives to avoid policy fragmentation & ensure sustained progress.
- Lessons learned from NEMMP 2020 should inform future policies to prevent silos & facilitate effective market transformation

* 5.2 Maharashtra EV Policy -2021 *

The maharashtra EV policy 2021 aims to significantly boost EV adoption in the state.

The policy outlines clear goals & targets :-

- 1) EV penetration target :-
Goal of 10% EV share in new vehicle registration by 2025.
- 2) The policy aims to enhance air quality, reduce noise pollution, improve energy security & decreases greenhouse gas emissions.
- 3) Aims to stimulate growth in the EV sector by creating employment & promoting innovation.

- 4) Establishes a network of charging stations throughout Maharashtra
- 5) Encourages technological advancements & research in EV technologies, including establishment of battery swapping stations.
- 6) Includes training programs to develop a skilled work force for the EV sector
- 7) Focuses exclusively on battery Electric Vehicles (BEV's), excluding mild-hybrid or plug in hybrid.
- 8) Features mechanism like "early bird discounts" to accelerate adoption & adapt to market trends.

* Basic Demand Incentives *

1) ~~Electric~~ Vehicle segment - Electric Two wheelers

- Basic demand incentives - upto Rs 10,000 (Some sources indicate Rs 5000)
- Early Bird discount - 5000/kwh of battery capacity (before Dec 21),
- 15000/- for 3kwh - 11 - (before March 2022)
- Tax exemptions - Yes.
- Special Conditions - Target - 10% of total 2w sales.

2) Vehicle segment - Electric 3 wheelers :-

- Basic demand incentives - upto 30,000 (Some sources indicate 12000)
- Early bird discount - Not specified.
- Tax Exemptions - Yes.
- Special Conditions - Target - 20% of total 3w sales.

3) vehicle segment; Electric Four wheelers.

- Basic demand incentives - upto 1.5 lakh (Some sources indicate Rs 1 lakh).
- Not specified (Early bird discount)
- Tax Exemption - Yes
- special conditions - max Rs 1.5 lakh for first 10,000 buyers,
Target - 5% of total 4w sales.

5) Vehicle segment: Public Transport / Buses

- Basic Demand Incentives - 10% of base price (for buses < Rs 20 lakh)
- Early bird discount - Not specified.
- Tax Exemptions - Yes.
- Special Conditions - mandate for new government vehicles to be electric from april 2022; first 1000 private/public bus purchasers eligible.

6) Vehicle segment - Vehicles without battery

- Basic demand Incentives: 50% of demand incentives.
- Early Bird discount: Not applicable
- Tax exemptions - Yes.
- Special Conditions: Remaining incentives goes to energy operator.

* Vehicle segmentwise scrapping incentives *

Vehicle Segment	Scrappage Incentive (Max Subsidy)	Notes
Electric Two-Wheelers (2W)	Up to ₹7,000	Generally eligible if also qualify for demand incentives
Electric Three-Wheelers (3W)	Not explicitly detailed in provided information	Generally eligible if also qualify for demand incentives
Electric Four-Wheelers (4W)	Up to ₹25,000	Generally eligible if also qualify for demand incentives
General Range	₹7,000 - ₹25,000	OEMs offering buyback programs (value reduction $\leq 7.5\%$ per year) eligible for additional incentives

- The maharashtra Ev Policy 2021 introduces scrapping incentives to promote the replacement of older, polluting vehicles with new electric vehicle.
- It combines demand incentives for purchasing new EVs with scrappage incentives for older (ICE) vehicles, enhancing adoption and fleet renewal.
- The policy aims to reduce tailpipe emissions from legacy vehicles, maximizing environmental benefits.
- Scrappage incentives are as shown in table above.

* Barriers to adoption of electric mobility :-

Electric vehicle adoption in India remains below 1% of the total vehicle market due to numerous challenges.

- 1) Overall Cost :- Higher purchase costs compared to internal combustion engine (ICE) vehicles deter buyers, fueled by expensive components like batteries & motors.
- 2) Expensive batteries :-
Battery prices contribute significantly to EV costs, limiting affordability.
- 3) charging infrastructure :-
A limited charging network in India increases inconvenience & 'range anxiety' for potential EV owners.
- 4) Range Anxiety :-
Concern about driving range & the distance between charging stations creates hesitance among consumers.
- 5) Lack of standardization :-
Varied technologies across manufacturers lead to complications in charging & hinder infrastructure development, creating consumer friction.
- 6) Facing extremities :-
Extreme weather conditions in India can negatively affect EV performance, emphasizing the need for robust technology development.
- 7) Strategic Imperative :-
Addressing these issues requires targeted investments in infrastructure & education to improve financial & psychological barriers.

* E-mobility Strategy :-

- The NEMMP 2020 e-mobility strategy is a data-driven document developed through collaboration between government & industry.
- It aims to support the EV sector by creating a favourable ecosystem & nurturing self-sustained business.
- Govt. support is projected at 13000-14000 crore over 5-6 years.
- Intended to facilitate demand & initial adoptions of electric vehicles.
- The strategy includes commitments to automotive R&D & essential charging infrastructure development.

QUESTION BANK/ASSIGNMENT -05

Course & Code: EE-5K

Semester: Fifth

Name of Subject: Electrical Vehicle Technology

Subject Code: 315335

Que. No.	Unit 5 Electric Vehicle (EV) Policies (08 Marks)
1	What was the primary sales target of the global campaign EV30@30 , and in which year was this campaign launched?
2	What is the full form of NEMMP , and what were its two core objectives when it was launched in 2013?
3	What is the GST (Goods and Services Tax) rate on electric vehicles in India, and how does it compare to that on conventional vehicles?
4	According to the Maharashtra Electric Vehicle Policy, 2021 , what is the key target for EV penetration among all new vehicle registrations, and by which year is it to be achieved?
5	Mention any four key barriers hindering the widespread adoption of electric vehicles in India.
6	What were the five fundamental principles suggested by the EV30@30 campaign for signatory countries to incorporate into their national strategies?
7	Provide information about the demand-side incentives/subsidies offered for electric two-wheelers and four-wheelers under the Maharashtra EV Policy 2021. Mention any special conditions if applicable.
8	How is the charging infrastructure planned to be developed under the Maharashtra EV Policy 2021? Specify the targets and financial incentives for slow and fast charging stations.
9	What is the strategic purpose behind combining scrappage incentives with demand incentives in the Maharashtra EV Policy? What are the scrappage incentive amounts for two-wheelers and four-wheelers?
10	What are the key features of the ' Scheme to Promote Manufacturing of Electric Passenger Cars in India (SPMEPCI) '? Include details about the minimum investment required and customs duty concessions.
11	What is the difference between Phase I and Phase II of the FAME India Scheme ? Which key areas did Phase I focus on, and what is the primary objective of Phase II?
12	The NEMMP 2020 plan could not achieve its ambitious sales target. What was that target, approximately how many EVs were on the road by August 2022, and what did the Committee on Estimates recommend for future national EV policies?


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