



NITI Aayog

MOBILISING FINANCE FOR EVs IN INDIA

A TOOLKIT OF SOLUTIONS TO MITIGATE RISKS AND ADDRESS MARKET BARRIERS

BY NITI AAYOG AND ROCKY MOUNTAIN INSTITUTE, JANUARY 2021





ABOUT THE AUTHORS

ABOUT NITI AAYOG

The National Institution for Transforming India (NITI Aayog) was formed via a resolution of the Union Cabinet on 1 January 2015. NITI Aayog is the premier policy ‘Think Tank’ of the Government of India, providing both directional and policy inputs. While designing strategic and long-term policies and programmes for the Government of India, NITI Aayog also provides relevant technical advice to the Centre and States. The Government of India, in keeping with its reform agenda, constituted the NITI Aayog to replace the Planning Commission instituted in 1950. This was done in order to better serve the needs and aspirations of the people of India. An important evolutionary change from the past, NITI Aayog acts as the quintessential platform of the Government of India to bring States to act together in national interest, and thereby fosters Cooperative Federalism.

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FOREWORD

On behalf of NITI Aayog and Rocky Mountain Institute, it is our pleasure to introduce this report, *Mobilising Finance for EVs in India: A Toolkit of Solutions to Mitigate Risks and Address Market Barriers*. The report identifies solutions to direct capital and financing to aid in India's EV transition.

India has signalled that the future of mobility is electric. The economics of vehicle electrification are improving, with battery pack prices decreasing from about INR75,000/kWh in 2010 to INR13,000/kWh in 2019. Despite a dip in EV sales in 2020, due to the economic effects of COVID-19, confidence in India's EV future will continue to grow as technology costs decline further, operators gain experience with EVs, and new business models prove their viability.

Yet, many well-documented barriers to EV adoption remain, ranging from technology cost to infrastructure buildout to consumer behaviour. The public and private sectors are diligently working together on solutions to each of these barriers. These solutions include:

- Production-Linked Incentive (PLI) Scheme, with an outlay of INR18,100 crore (USD2.4 billion) for the Advanced Chemistry Cell battery sector
- Faster Adoption and Manufacturing of Electric Vehicles (FAME) India Scheme, Phase II with an outlay of INR1,000 crore (USD135 million) for the deployment of charging infrastructure

The need of the hour, however, is the mobilisation of capital and finance towards EV assets and infrastructure. According to this report, the quantum of capital and finance required for India's EV future is considerable. Between 2020 and 2030, the estimated cumulative capital cost of the country's EV transition is INR19.7 lakh crore across vehicles, charging stations, and batteries. The projected size of the annual loan market for EVs is INR3.7 lakh crore in 2030.

Multistakeholder collaboration and innovative solutions are needed to access low-cost financing at this scale. Financial institutions, industry players, government bodies, and civil society must work together to ensure that the solutions outlined in the report are explored.

Innovations in finance and technology can accelerate the country's shift to shared, electric, and connected mobility. Two widely cited photos illustrate this point. In the first, dated 1900, it is very difficult to locate the first car on Fifth Avenue in New York City. In the second, dated 1913, it is more difficult to locate the horse carriage among a sea of cars on the same street.

What fuelled this rapid transition? Ford reduced the cost of a car by 62 percent in 13 years, and General Motors and DuPont invented auto loans. We are seeing similar technological and financial innovation at work today.

We would like to express our gratitude to those who generously contributed their time and expertise to this report. We look forward to working together to implement these solutions and others to support India's EV goals.

Sincerely,

**Shri Amitabh Kant (CEO, NITI Aayog)
and Mr. Clay Stranger (Senior Principal, RMI)**



Both photos are of New York City's Easter parade and were taken 10 years apart. Top (1900) by the National Archives and Records Administration. Bottom (1913) by the Library of Congress.

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EXECUTIVE SUMMARY

The Government of India (GoI) has made an ambitious commitment to the creation of demand for EVs through the Faster Adoption and Manufacturing of (Hybrid and) Electric Vehicles (FAME) India Scheme. Additionally, the promotion of domestic manufacturing through the National Mission on Transformative Mobility and Battery Storage has supplemented the scheme. As the economics of electric vehicles (EVs) continue to improve and new business models gain acceptance, India's EV market is poised for significant growth in the coming decade.

Key barriers related to EV adoption—including technology cost, infrastructure availability, and consumer behaviour—must be overcome. Incentives that reduce the upfront cost of EVs, such as the FAME II incentive in India or federal tax rebates in the US, are a critical first-order solution to address. Although less commonly discussed, financing—in terms of the cost and quantum of capital—is another hurdle for India's electric mobility transition. End-users currently face a range of challenges. High interest and insurance rates apply to retail loans, loan-to-value ratios are low, and specialised finance options are limited.

According to our analysis of future passenger and freight vehicle sales, India's weighted-average EV sales penetration has the potential to be about 70 percent in 2030. This value is based on forecasted cost competitiveness and expert interviews.

The quantum of finance required for this EV adoption scenario is considerable. Between 2020 and 2030, the estimated cumulative capital cost of the country's EV transition will be INR19.7 lakh crore (USD266 billion)—across vehicles, electric vehicle supply equipment (EVSE), and batteries (including replacements). The estimated size of the annual EV finance market will be INR3.7 lakh crore (USD50 billion) in 2030.¹

We have identified 10 solutions that financial institutions (FIs), the EV sector, and the government can adopt to help mobilise the capital and financing associated with India's EV transition. These include six targeted instruments and four ecosystem enablers:

TARGETED INSTRUMENTS

- 1. Priority sector lending (PSL):** The Reserve Bank of India (RBI) requires 40 percent of net bank credit to be deployed towards priority sectors. Inclusion of EVs in PSL guidelines would incentivise banks to increase lending towards the sector.
- 2. Interest rate subvention:** Subventions act as a subsidy on commercially offered interest rates, with the government bearing the balance through associated banks. Such schemes would substantially improve the affordability of loans. They have already been enacted in other sectors and at a state level for EVs in Delhi.
- 3. Product guarantees and warranties:** Reducing the uncertainty associated with EV models will improve their bankability. Original equipment manufacturers (OEMs) can provide assurances in the form of guarantees (to FIs) and warranties (to buyers) on the performance of their products.
- 4. Risk-sharing mechanism (government and multilateral-led):** Mechanisms and facilities that partly or entirely cover possible losses associated with financing EVs (due to their unclear resale value) can be capitalised at the national or multilateral level. These would distribute risk and provide FIs with an opportunity to build their trust in the sector.
- 5. Risk-sharing mechanism (fleet operator-led):** Fleet operators and final-mile delivery companies can leverage their existing FI relationships to provide partial credit guarantees and utilisation guarantees to driver-partners. They could share the risk between stakeholders in case of default and enhance loan availability for delivery drivers.

6. Secondary market development: Industry-led buyback programmes and battery-repurposing schemes will help OEMs and the central government catalyse a secondary market for EVs. This would improve the residual value of EVs, providing FIs with an avenue for resale in case of borrower default.

ECOSYSTEM ENABLERS

- **Digital lending:** Digital sourcing, underwriting, and sanctioning can streamline EV loans by helping overcome the operational and logistical challenges of vehicle financing.
- **Business model innovation:** Piloting and commercialising new business models, combined with the flow of patient capital, can demonstrate the potential of the sector. Additionally, they would help build trust in EVs and normalise them in the market.
- **Fleet and aggregator electrification targets:** The electrification of final-mile delivery, ride-hailing, and corporate transport fleets can act as a strong market signal for stakeholders across the ecosystem, especially OEMs and FIs.
- **Open data repository for EVs:** FIs need access to data on EV specifications, real-world drive cycles, actual charging costs, and operating expenditures. This will help such institutions accurately assess risk, determine appropriate interest rates, and design effective leasing programmes.

Together, these solutions aim to mitigate risks associated with technology, policy, manufacturers, resale, utilisation, maintenance, and customers. They aim to improve the confidence of FIs in financing EVs for end-users. These solutions will likely play important roles in India's economic recovery following COVID-19 by supporting EV sales, manufacturing, and business models—all of which can boost job creation and local value addition.

Engaging Indian FIs in the electric mobility dialogue will be critical to operationalising these solutions. Convening stakeholders from the financial industry, OEMs, fleet operators, government, and others can help prioritise EV financing. Identifying actionable steps is key to working towards implementation.

In addition, FIs need help to understand EV technology and business models, and stay up to date with the policy landscape. Educational materials can help lower risk and increase confidence. Finally, innovative procurement and leasing initiatives that lead to early deployments at scale can help prove the techno-economic viability of EVs and increase supply-chain investments.

Supporting the design of effective financing solutions can help unlock the capital needed for India's EV transition. We look forward to collaborating with partners across the EV ecosystem to elevate the role of finance.



INTRODUCTION

INDIA'S ELECTRIC MOBILITY OPPORTUNITY

India has made a strong commitment to electric mobility.¹ The country's EV transition is gaining traction due to: 1) demand creation, 2) state EV policies, and 3) domestic manufacturing. Simultaneously, the market for electric mobility in India is growing, enabled by policy, compelling and improving economics, and the emergence of new business models and investment opportunities.

1. DEMAND CREATION

In 2015, the Department of Heavy Industry, Government of India, launched its flagship incentive programme, the FAME India Scheme, to accelerate EV adoption.

- FAME I supported 2.8 lakh electric and hybrid vehicles, with demand incentives totalling about INR970 crore (USD130 million)—saving nearly 7 crore litres of fuel and abating over 17.2 crore kg of CO₂.²
- FAME II began in April 2019, with an outlay of INR10,000 crore (USD1.4 billion). It aims to drive large-scale adoption of EVs and charging infrastructure and develop a robust domestic EV ecosystem. EVs eligible under FAME II can cumulatively save 74 lakh tonnes of carbon dioxide (MtCO₂) emissions over their lifetime.³

EXHIBIT 1: CUMULATIVE LIFETIME OIL AND NET CO₂ SAVINGS OF VEHICLES ELIGIBLE UNDER FAME II

	2W 	3W 	4W 	BUS 	TOTAL
VEHICLES	1 MN	0.5 MN	55,000	7,000	1.56 MN
OIL SAVINGS (INR '000 CRORE)	3.0	7.2	2.5	4.5	17.2
NET CO₂ EMISSIONS SAVING (MILLION METRIC TONNES)	2.6	3.2	0.1	1.5	7.4



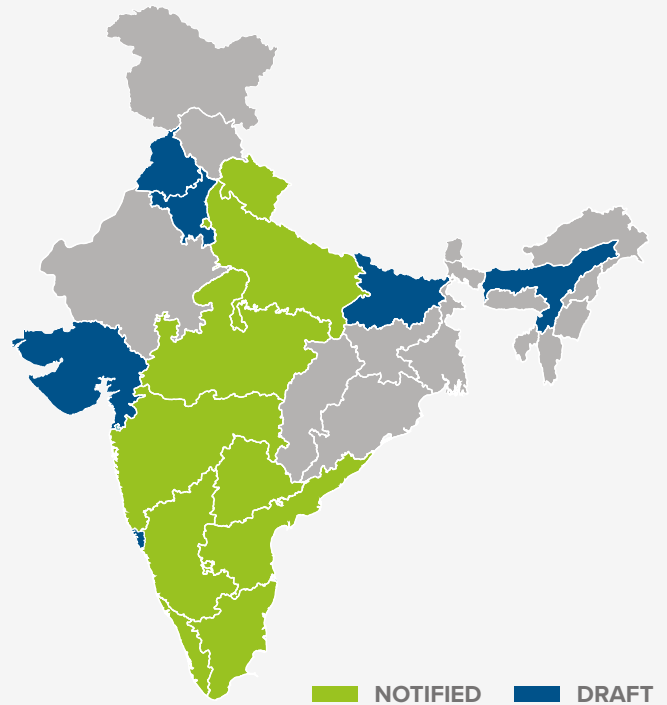
At the central level, multiple interventions are being implemented to support demand creation. For example, the Goods and Services Tax (GST) on EVs sold with batteries was reduced from 12 to 5 percent. The Ministry of Road Transport and Highways exempted EVs from permit requirements and recommended that states reduce or waive road taxes for EVs.⁴ Additionally, the Ministry of Housing and Urban Affairs amended the Model Building Bye-Laws, 2016, to establish charging stations in private and commercial buildings.⁵

2. STATE EV POLICIES

At the subnational level, 10 states have notified EV policies that are being implemented, while six others are drafting their EV policies.

EXHIBIT 2: STATUS OF STATE EV POLICIES AS OF JANUARY 2021

S. NO.	STATE	DAY	MONTH	YEAR	TIME SINCE (MONTHS)
NOTIFIED					
1	KARNATAKA	25 th	SEPTEMBER	2017	39
2	MAHARASHTRA	14 th	FEBRUARY	2018	34
3	ANDHRA PRADESH	8 th	JUNE	2018	31
4	KERALA	10 th	MARCH	2019	21
5	UTTAR PRADESH	7 th	AUGUST	2019	17
6	TAMIL NADU	16 th	SEPTEMBER	2019	15
7	MADHYA PRADESH	1 st	NOVEMBER	2019	14
8	UTTARAKHAND	2 nd	DECEMBER	2019	13
9	TELANGANA	6 th	AUGUST	2020	5
10	DELHI	7 th	AUGUST	2020	5
DRAFT					
1	ASSAM	8 th	SEPTEMBER	2018	28
2	BIHAR	14 th	JUNE	2019	16
3	GUJARAT	23 rd	SEPTEMBER	2019	15
4	PUNJAB	15 th	NOVEMBER	2019	14
5	GOA	16 th	MARCH	2020	10
6	HARYANA	11 th	DECEMBER	2020	1

**3. DOMESTIC MANUFACTURING**

Under the FAME II guidelines, incentives are available only for EVs with a predefined level of localisation. The goal is to promote domestic component manufacturing. The industry shows promise, with OEMs introducing a range of new EV products over the past year. Several states, such as Karnataka and Maharashtra, have also made manufacturing a focal point of their state EV policies, by offering fiscal benefits to create EV clusters.

In addition, the National Mission on Transformative Mobility and Battery Storage was approved in March 2019. Its goal is to increase domestic battery manufacturing and accelerate the adoption of e-mobility. Its focus areas include creating roadmaps for Advanced Chemistry Cell (ACC) battery manufacturing, formulating phased manufacturing programmes (PMP) for batteries, developing Corporate Average Fuel Economy (CAFE) norms, and leveraging Make in India. The Gol cabinet recently approved the PLI scheme to encourage ACC manufacturing with an outlay of INR18,100 crore.

ECONOMICS OF ELECTRIFICATION

The economics of EVs are improving yearly, driven by a reduction in battery prices and improvements in vehicle efficiency. Many segments and use cases are already showing competitiveness with internal combustion engine (ICE) vehicles based on a total cost of ownership (TCO).

- **Electric two-wheelers:** Final-mile delivery is a promising use case, as significant fuel-cost reductions are possible. There exist both national (i.e., INR20,000 under FAME II) and state subsidies (e.g., INR5,000/kWh under the Delhi EV policy, plus a top-up of INR7,500/kWh for the first one lakh EVs registered in Delhi).




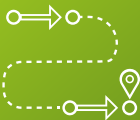
However, even without incentives, at the same interest rate ICE vehicles (ICEVs) receive, electric two-wheelers for goods delivery could reach TCO parity (at about INR 2/km) with equivalent petrol models by the end of 2020.⁶

- **Electric three-wheelers:** In the ride-hailing use case, electric auto-rickshaws are close to cost parity based on TCO, especially in Tier-2 and Tier-3 cities, where shorter trip distances require smaller batteries (i.e., less than 3 kWh).⁷ In the final-mile delivery use case, electric three-wheelers are already cheaper than their CNG counterparts on a TCO basis (at about INR2.5/km) in some geographies such as Delhi. This is primarily due to national and state incentives, including interest rate subvention.⁸
- **Electric four-wheelers:** It is generally not yet economical to electrify private cars. However, evidence from EV fleets, such as BluSmart, suggests that electric ride-hailing cars are already economical in cases where vehicle utilisation is between 150 and 220 km/day.⁹
- **Electric buses:** Analysis suggests that the TCO of an intra-city electric bus (e-bus) is lower than an equivalent diesel bus in a bus-to-bus comparison (at INR47/km for a 12-meter AC bus with a daily utilization of 200 km).¹⁰ However, for fleet conversion, this may vary depending on local costs and service requirements. Studies have indicated that more than one e-bus may be required to replace one conventional bus due to range limitations of early generation electric buses. However, proper planning and charging strategies can reduce this replacement ratio.^{11,12}

INVESTMENT OPPORTUNITIES

Significant venture capital has flown into the ecosystem. Indian EV start-ups have raised INR4,490 crore (USD601 million) between 2014 and 2019, highlighting the potential of EV business models.¹³

EXHIBIT 3: RECENT DEVELOPMENTS IN INDIA'S START-UP ELECTRIC MOBILITY ECOSYSTEM,^{14,15,16,17}

 <p>RIDESHARE</p>	<p>Industry analysts expect the shared mobility market to experience rising demand. Ride-hailing and rental applications could see up to 50 and 100 percent year-on-year growth through 2025, respectively.</p>
 <p>DELIVERIES</p>	<p>Electrification of freight use cases is on the rise. Flipkart became the first e-commerce marketplace to commit to 100 percent adoption of EVs by 2030, joining The Climate Group's EV100 coalition of companies.</p>
 <p>COMMUTER SERVICES</p>	<p>The International Finance Corporation (IFC) invested INR60 crore (USD8 million) in Bengaluru-based Lithium Urban Technologies, an electric commuter services provider, in April 2018.</p>
 <p>LAST-MILE CONNECTIVITY</p>	<p>Mitsui invested INR150 crore (USD20 million) in Delhi-based SmartE, an electric last-mile service provider, in July 2019.</p>