BARRIERS TO EV ADOPTION

Despite improving economics and growth across the ecosystem, many well-documented barriers to EV adoption in India remain, including:

1. **Technology cost:** In a few segments, the high upfront cost of EVs is slowing adoption despite the potential for lower TCO. There is an ongoing need to further reduce the upfront cost and TCO in many use cases through various instruments.
2. **Policy implementation:** National-level policy can be complemented with added fiscal incentives at the state level. Non-fiscal incentives will also be important in developing a favourable operating environment and customer confidence for EVs.
3. **Manufacturing and supply:** Despite growing product diversity, there is still a need for greater customized product and model availability, and more fit-for-purpose models. Further, more domestic manufacturing of advanced batteries and cells, battery management systems, electric motors, motor controllers, and other components is needed. OEM capital has recently focused on the migration of ICEVs to Bharat Stage VI (BSVI) standards, while the industry is experiencing lower sales due to COVID-19. This is hampering supply-side investment in EVs.
4. **Infrastructure buildout:** The introduction of advanced batteries and longer-range vehicle modes can address customer concerns about range. Alongside these developments, electricity distribution companies (discoms), charging service providers, and other actors can focus on building robust charging infrastructure networks. Using smart technology that communicates with the electric grid will unlock additional value from demand-side management.
5. **Consumer behaviour:** Demand for more affordable EV products is expected, as consumers reduce spending in the short term due to COVID-19. This potential shift in consumer preferences may affect manufacturers' investment and production decisions.

EV FINANCE

In addition to these commonly discussed barriers, access to low-cost finance is still a formidable barrier that warrants multistakeholder attention and innovative solutions. EV sales are expected to slow in the short term due to: 1) the economic impact of COVID-19 and 2) the recent investment flow by OEMs towards BSVI standards (April 2020). Improving access to attractive financing products can be key to drive EV demand.[19]

High financing cost and uncertainty around long-term economics—including resale value—remain both real and perceived issues for FIs. There are risks associated with the nascency of the electric mobility ecosystem. They have given rise to problems such as high interest and insurance rates, low loan-to-value ratio, and limited financing options for retail customers. This may lead to unsecured borrowing from the unorganized sector at even higher rates.

Further, both the vehicle finance and EV sectors are diverse. Levels of TCO parity and incentive structures available for each segment, use case, and stakeholder are different. Private electric two-wheelers, for example, would have vastly different parameters to consider in financing compared to e-buses used for public transport. This creates the need for government, industry, and FIs to collaborate on a set of customised EV financing solutions. It also creates a role for OEM-owned financial companies to help define the market.

PURPOSE OF THIS REPORT

Mobilising Finance for EVs in India: A Toolkit of Solutions to Mitigate Risks and Address Market Barriers aims to serve the following purposes:

- **Landscape assessment:** Take stock of the structure, stakeholders, and practices in India's conventional vehicle finance ecosystem and its emerging EV finance ecosystem.
- **Barrier assessment:** Understand current barriers and risks associated with lending to EVs, and scaling up the size of the financing market and diversity of products for EVs.
- **Solution identification:** Create a toolkit of short-, medium-, and long-term solutions to help FIs, government, and other stakeholders enable low-cost EV financing.

INDIA'S VEHICLE FINANCE INDUSTRY

CONTEXT AND OVERVIEW

India's retail vehicle finance industry has evolved since the 1990s to be worth an estimated INR4.5 lakh crore (USD60 billion) today.[20,21,22] This is primarily a result of economic liberalisation and growth in the automotive market.

As of 2020, the flow of finance from the organised sector (i.e., banks and non-banking financial companies (NBFCs)) is about:

- 50 percent to four-wheeler passenger vehicles (PVs)
- 40 percent to commercial vehicles (CVs)
- 10 percent to tractors and two-wheelers

Financing penetration—i.e., the share of vehicles financed through loans by the organised sector—varies by segment and is expected to be:

- 35 to 50 percent for all two-wheelers
- 80 percent for all four-wheeler PVs
- 95 percent for new light-, medium-, and heavy-duty CVs

Financing penetration seems to be associated with economics and use cases of vehicles. Less expensive segments and use cases are seeing lower levels of financing and vice-versa. The unregulated autorickshaw segment is unique. Here, the penetration of financing by the organised sector is very low due to the high-risk nature of borrowers.

Preowned CVs are more affordable for driver-owners, who may also not be seen as bankable. This could be one of the reasons for lower penetration of financing. For all new CVs, penetration is high. Fleet operators' prefer to have loans linked to the vehicles instead of their balance sheets.

Loan tenures for different segments are generally similar (about three to four years, except for two-wheelers, which are shorter). Loan-to-value (LTV) ratios, i.e., the portion of asset value financed, vary—from 70 to 75 percent of the vehicle for two-wheelers to 80 to 90 percent for CVs. Interest rates are usually floating, rather than fixed, and vary by lender.

KEY STAKEHOLDERS

EXHIBIT 4: KEY STAKEHOLDERS IN INDIA'S VEHICLE FINANCE INDUSTRY

CATEGORY	STAKEHOLDER	DESCRIPTION	EXAMPLES
FINANCING			
BANKS	Public sector undertaking (PSU) banks	State-owned commercial FIs that provide longer tenure, lower interest loans	Bank of India, Canara Bank, State Bank of India (SBI)
	Private sector banks	Privately owned FIs that specialise in larger transactions for institutions, fleets, and vehicles in urban areas	Axis Bank, HDFC Bank, ICICI Bank, IndusInd Bank
NBFCs	Captive vehicle financiers	OEM-owned NBFCs that provide specialised and subvention-linked products to customers	Bajaj Finance, Mahindra & Mahindra Financial Services, Tata Motors Financial Services
	Non-captive vehicle financiers	Other privately owned NBFCs that provide smaller pools of finance at higher interest rates in non-metro areas	Cholamandalam Finance, IndoStar Capital, Manappuram Finance, Shriram Transport Finance
	Fintech companies	Privately owned companies that lend through technology and digital platforms	RevFin, Three Wheels United (TWU)
INSURANCE			
MOTOR INSURANCE	Insurance companies	State- or privately-owned insurance providers often allied with banks or non-captive financiers	Bharti AXA, HDFC Ergo, ICICI Lombard
	Insurance agents or brokers	Privately owned companies that aggregate and negotiate insurance offerings, often allied with captive financiers to provide specialised products at dealerships	Global-India Insurance Brokers, Hero Insurance Broking, Mahindra Insurance Brokers
OTHER DEBT/EQUITY CAPITAL			
LONG-TERM INVESTORS	Venture capital funds	Private investors that provide equity to mobility startups, early-stage ventures and fintech	Micelio Fund, Sequoia Capital
	National development banks	State-owned Indian FIs that provide equity and/or debt to mobility startups, large fleet owners, and businesses for sustainable economic development	Indian Renewable Energy Development Agency (IREDA), Small Industries Development Bank of India (SIDBI)
	Multilateral/ bilateral development banks	Publicly owned international FIs that provide equity and/or debt to banks, NBFCs, and businesses for transitioning fleets for sustainable economic development	Asian Development Bank (ADB), CDC Group, World Bank Group

BANKS AND NBFCs

Initially, NBFCs had the largest market share in the vehicle finance industry. Later, private and public banks and OEM-owned captive vehicle financiers emerged as key players. Recently established fintech companies have also found a niche in digital lending for vehicles.

Banks made up 56 percent of the market share in India in FY19, the rest being NBFCs. Both these categories specialise in lending to different customers.[23] Broadly, banks dominate the four-wheeler passenger vehicles market. Captive NBFCs are particularly active in lending for two-wheelers, while non-captive NBFCs are prominent in the commercial vehicle market.

MOTOR INSURANCE AND LONG-TERM INVESTORS

The vehicle ('motor') insurance industry is diverse and spurred by investment and support from banks, NBFCs, and OEMs. It comprises companies and brokers or agencies that act as aggregators and negotiators.

Long-term investors, such as development banks, facilitate infrastructure loans to governments, and business-level debt or equity for FIs and logistics companies. Venture capital spurs the mobility ecosystem through early-stage investment.

THE CURRENT LANDSCAPE OF EV FINANCE

VEHICLE FINANCING

Only recently have specialised EV loans been introduced. Most segments, other than e-rickshaws, lack specialised products.

E-RICKSHAW LOANS

With the rapid growth of the e-rickshaw market, FIs are offering dedicated, collateral-free loans:

- IndusInd Bank partnered with OEM Lohia Auto Industries (in March 2017). The bank offers retail vehicle finance for three-wheeler electric models across 11 Indian states. While interest rates are floating, loans are offered directly through the dealer, making the process hassle free.
- Ujjivan Small Finance Bank signed a memorandum of understanding (MoU) with OEM Green Shuttle Technology (in July 2019). It offers passenger and cargo three-wheeler loans at attractive interest rates.
- Bank of India and Punjab National Bank offer e-rickshaw financing with LTV ratios of up to 85 percent. The maximum tenure is 48 months.
- Micro Units Development and Refinance Agency (MUDRA) loans were designed to support microenterprises in India. MUDRA provides refinance support to banks, NBFCs and microfinance institutions in lending up to INR10 lakh (USD13,500). E-rickshaws are eligible for MUDRA loans.[24]

These recent initiatives require income tax returns and credit scores, which are often difficult for e-rickshaw drivers to provide. As a result, financing penetration remains low.

ELECTRIC FOUR-WHEELER LOANS

The economics of shared mobility services like ride hailing are compelling. Such services can benefit significantly from specialised financing solutions for electric cars.

SBI started the Green Car Loan, the only specialised product for electric cars, in April 2019. Highlights include:

- A discount of 20 basis points on existing car loan interest rates. As of September 23, 2020, SBI's mean interest rate for all cars was 9.52 percent, indicating that on average the SBI Green Loan would charge an interest rate closer to 9 percent.
- To reduce costs, the processing fees for the first six months of the scheme was waived.
- The maximum repayment period was increased to eight years.
- An LTV ratio as high as 90 percent is offered.

BUSINESS MODEL INNOVATION

Innovative business models and procurement schemes aim to make up for low financing penetration. Their focus is on reducing upfront costs and technological risk by leveraging leasing, battery separation, and economies of scale.

EXHIBIT 5: BENEFITS AND DRAWBACKS FOR BUSINESS MODELS USED FOR ELECTRIC VEHICLES

BUSINESS MODEL	FINANCING MECHANISM	DESCRIPTION	KEY BENEFITS	KEY DRAWBACKS	EXAMPLES	PRESENT IN INDIA (Y/N)
PURCHASE	Equity/personal funds	Fleet operators or owners buy vehicles through equity or personal funds.	• Provides greater control over assets • No dependency on other stakeholders	• High upfront cost for the owner	• Bangalore-based Lightning Logistics purchased its final-mile delivery fleet entirely through equity.	Y
	Debt/corporate loans	Fleet operators or owners buy vehicles through company-level debt or other loans.		• Reduces capacity to raise debt for operations or expansions	• In 2017, Energy Efficiency Services Ltd. (EESL) issued green bonds worth INR640 crore (USD100 million) to support its environmentally focused initiatives.[25]	Y
	Retail loans/ vehicle financing	Fleet operators or owners buy vehicles using specific vehicle loans.	• Loans are linked to vehicles rather than the balance sheet • Room to raise debt for other functions	• Subject to high interest • Low LTV ratios	• The SBI Green Car Loan programme offers financing for e-4Ws.[26]	Y
	Demand aggregation/ bulk procurement *(in between purchase and lease-all)*	A third party purchases vehicles in bulk, to leverage economies of scale. The vehicles are sold or subleased to fleet operators or drivers.	• Higher volume reduces transaction and unit costs • Diversified risk exposure is across the customer pool if the technology is underutilised	• Success is dependent on procurement volume • Requires interagency coordination	• EESL leased electric cars to ride-hailing company BluSmart. So far 300 EVs, procured in bulk from Mahindra & Mahindra and Tata Motors, have been leased.	Y
LEASE-ALL	Dry and end-to-end leases	Fleet operators or owners lease vehicles from OEMs. End-to-end contract options include repair and maintenance services.	• Spreads payments over time • Longer lease term payments comparable to ICE segments	• Require OEMs to develop financial and after-sale service capacities	• Areon Mobility is a logistics company leasing 30–40 e-2Ws to final-mile delivery companies. They aim to grow to hundreds of units. • EESL offers a dry lease model on electric sedans to State governments at INR22,500 a month for six years.[27]	Y
	Wet lease/ operating expense (OPEX)	The transit authority or fleet owner procures the EV from fleet operators and pays for service on a per-kilometre basis. The authority or owner keeps the fare revenue, handles scheduling, routing, service standards. The operator oversees operations and maintenance.	• The transit authority or owners assume revenue risk • Operators assume financial, technology, and operational risks	• Relies on institutional capacity and interagency coordination • Requires greater technical assistance	• The Department of Heavy Industry (DHI) and NITI Aayog have recommended the wet-lease model to India's State Transport Undertakings (STUs). They propose deploying 5,595 e-buses under FAME II via a Gross Cost Contract (GCC).	Y

(CONTINUED)

BUSINESS MODEL	FINANCING MECHANISM	DESCRIPTION	KEY BENEFITS	KEY DRAWBACKS	EXAMPLES	PRESENT IN INDIA (Y/N)
BATTERY SEPARATION	Battery swapping	Fleet operators give access to (owned, leased, or shared) battery swapping stations. Affiliated drivers can purchase vehicles without batteries.	• Separating the battery cost to make EVs less capital intensive for the vehicle owners • Better battery management by involving a battery provider • Improves the potential to monetise grid services such as demand response	• High upfront cost for the infrastructure provider	• Ola Electric has set up battery-swapping stations for two- and three-wheelers in Delhi in partnership with discoms BSES Yamuna and BSES Rajdhani.	Y
	Battery leasing	A utility, OEM, or third-party buys batteries and leases them to a fleet owner or operator. The vehicle is financed separately.		• Limited OEM battery offerings • Nascent legislative environment • Policies are still being formulated	• Proterra, a US e-bus manufacturer, offers a battery-leasing programme. A city procures the bus without the battery and leases the battery from Proterra through fixed-service payments. • Bengaluru-based, Autovert is an IoT-enabled leasing firm for personal mobility e-2Ws. In addition to full vehicle subscriptions, it is setting up a battery subscription facility.	Y (early stages)
	Pay-as-you-save® (PAYS®)[28]	Utilities purchase batteries and provide charging infrastructure. Bus operators repay them over time at a PAYS tariff.	• Procure the battery at minimum cost • Leveraging the utility's balance sheet, rate-basing, and cost-recovery mechanisms • Reduce cost for bus operators	• Heavily dependent on the financial health of the utility • Relies on utility's ability to pass on increased rates to offset battery costs	• Clean Energy Works has designed PAYS schemes for e-buses in the US and South America. • India can achieve the electrification of public transport with this model. • PAYS for segments such as two-wheelers can be piloted through private discoms.	N (however, it is common in efficiency financing)

GOVERNMENT INTERVENTIONS

To lower the TCO of EVs, most government initiatives have provided capital expenditure (CAPEX) and annual operating expenditure (OPEX) incentives. Prominent interventions aimed specifically at financing include:

- DHI has recommended an OPEX-based model by NITI Aayog to STUs. The model will deploy a total of 5595 e-buses under FAME II.
- The Delhi EV Policy provides an interest rate subvention of 5 percent on loans for buying e-autos and e-carriers. Delhi Finance Corporation (DFC) and its empanelled Scheduled Banks and NBFCs are developing a scheme on interest rate subvention. The Policy aims to bring more traction to this price-sensitive and financially challenging segment.
- The Kerala Finance Corporation (KFC) has created a programme to provide low-cost loans for EVs in the state.[29] Buyers pay a 20 percent down payment and avail a 3 percent point interest rate subsidy, resulting in an interest rate of 7 percent. Loans are capped at INR50 lakh and have a tenure of up to 5 years. All registered vehicle forms and both private and commercial use-cases are eligible. A credit score of 680 or higher is required, with salary slips to verify that total deductions from their salary (including the equated monthly installment of the loan) do not exceed 80 percent of their gross salary.

BARRIERS TO SCALING UP FINANCE

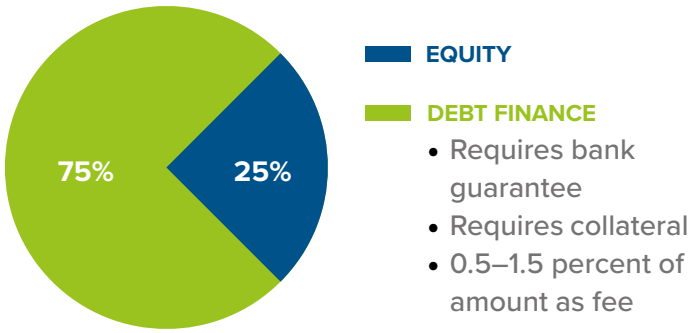
Innovations are transforming the amount and scale of financing needed, reducing costs and risks associated with EVs. However, the following examples illustrate that regardless of business model and stakeholders involved, finance remains a bottleneck:

- **E-2WS FOR FINAL-MILE DELIVERY**
  Demonstrating business model viability is a challenge for fleet operators. Many find it difficult to access equity or debt to purchase vehicles that they lease to drivers for deliveries. High daily utilisation and robust charging networks are needed for economical electrification.

- **E-3WS FOR INTERMEDIATE PUBLIC TRANSPORT**
  Due to higher capital costs, drivers require financing to purchase e-rickshaws or e-autos. However, they lack a credit history to prove their loan repayment ability. Unavailability of collateral further limits their financing options.

- **ELECTRIC BUSES FOR CITY SERVICES VIA GCC**
  Debt finance requirements and fees (see Exhibit 6) make it difficult for operators to purchase e-bus fleets. Typically operators are required to finance about 25 percent of the total capital cost as equity, representing a significant down payment for a fleet of e-buses.[30]

EXHIBIT 6: BARRIERS TO FINANCING ELECTRIC BUSES FOR CITY SERVICES VIA GCC



KEY CHALLENGES

HIGH INTEREST RATES

Interest rates for EV loans tend to be higher than ICE vehicles. For a privately operated electric car in Delhi, banks charge a marginally higher interest rate than a conventional vehicle.[31] However, a commercially operated electric car could be charged up to 14 to 15 percent, compared to 12 percent for a diesel car.[32]

The difference is more significant for e-2Ws, with interest rates as high as 20 percent or more.[33] This increases the equated monthly instalment (EMI) paid by vehicle owners, adding to ownership costs.

LOW LOAN-TO-VALUE RATIOS

Banks offer loans for EVs with only partial financing and a low LTV ratio to mitigate risk.[34] The low LTV ratio ensures that the financier can recover substantial costs in case of borrower default despite a potentially low resale value.

Small operators or drivers may not possess the equity to accommodate the low LTV ratio. They will be forced to seek unsecured high-interest supplementary loans from the unorganised sector. COVID-associated fear of borrower default has further lowered LTV ratios, worsening the problem.

LIMITED FINANCING OPTIONS

Most FIs in India do not offer specialised products for EVs, except for the SBI Green Car Loan scheme. In Norway, China, the UK, Australia, and other countries, most leading banks offer such products, contributing to high EV adoption rates. Operators in India are forced to choose loans with high interest rates, low LTV ratios, and shorter repayment periods.

Banks and NBFCs need collateral for EV loans in addition to the vehicle, in cases where the credit history of the borrower is unavailable or unreliable. This increases the challenges faced by aspiring EV operators and owners.

HIGH INSURANCE COSTS

EV owners also pay higher insurance than conventional models. Since a vehicle's insurance cost is based on its CAPEX, the higher the upfront cost, the higher the insurance premiums. For example, the cost of insurance for a privately-owned, commercially registered, self-driven car in Delhi is INR0.29/km for an EV. However, for an equivalent diesel ICE vehicle, it is INR0.18/km.[35]

In some cases, insurance companies may perceive higher risks of technology failure and high costs of repair. As a result, they may ascribe higher rates due to a lack of historical performance data on EV products and business models.