

# India is Gradually Moving towards Alternative Fuel Vehicles

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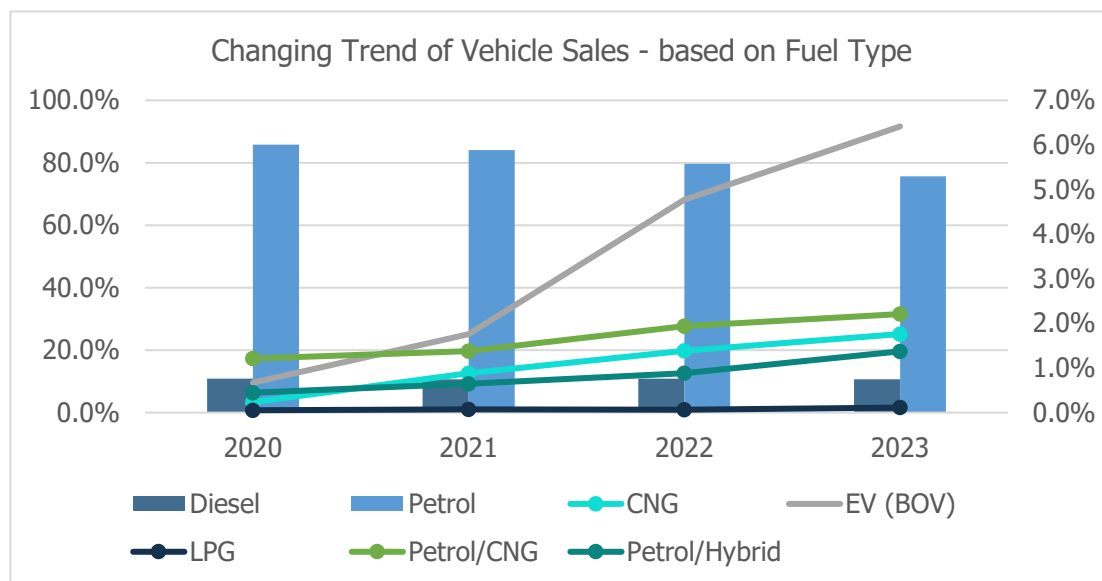
## Synopsis

- Demand for vehicles powered by traditional fuels such as petrol and diesel is progressively shifting towards those that utilise alternative fuels. The share of petrol vehicle sales, as a percentage of total vehicle sales (includes Passenger Vehicles, Commercial Vehicles, two and three-wheelers), has recorded a significant decline, decreasing from 86% in 2020 to 76% in 2023 while for diesel vehicles it has slightly decreased from 12% in 2020 to 11% in 2023.
- EVs, CNG, LPG, and hybrids are gaining popularity; however, the inadequacy of charging/fuelling infrastructure remains a significant barrier, despite some advancements.
- At present, EVs offer the lowest lifetime cost, followed by CNG.
- The future of India's mixed-fuel automotive market will be determined by government policies, infrastructure development, and consumer preferences.

## India's Auto Revolution Underway

The Indian automotive market, based on fuel type, is undergoing a fascinating revolution as India grapples with rising air pollution and its commitment to reducing greenhouse gas emissions, the need for cleaner and more sustainable transportation solutions has become increasingly crucial. While petrol and diesel have dominated the Indian automotive scene for decades, a wave of alternative fuel options is emerging, offering both environmental and economic benefits.

In recent years, there has been a notable shift towards exploring alternative fuel options that are both eco-friendly and economically viable as seen from the chart below where the share of traditional fuel-based vehicle sales volume is changing.



Source: Vahan and CareEdge Ratings

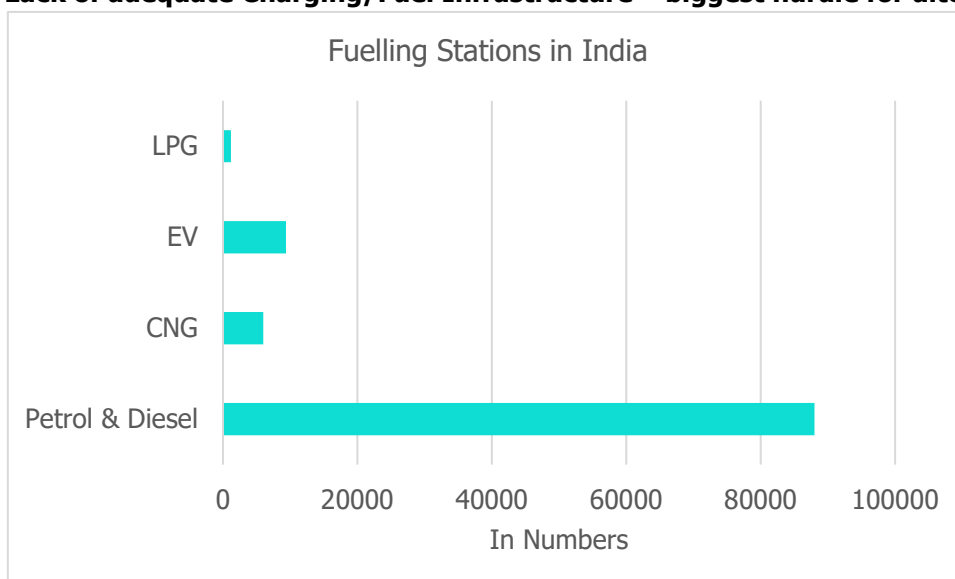
The share of petrol vehicles sold in overall vehicle sales witnessed a substantial dip of around 10% during CY2023 compared to just three years back in CY2020. Diesel vehicles, however, experienced a gradual shift, with their market share decreasing marginally from 12% in CY2020 to 11% in CY2023. The shift has been towards CNG, LPG, EV and Hybrids (including Petrol/Diesel with CNG/LPG/Hybrids) with the major driver being EV. The sales volume of these alternative fuel-driven vehicles recorded a growth of more than 400% in CY2023 as compared to CY2020, albeit on a much smaller base.

The decision to choose amongst various alternatives such as electric vehicles (EV), compressed natural gas (CNG), liquified petroleum gas (LPG), petrol, diesel, or flex fuel depends on various factors, driving habits, and development of fuelling infrastructure.

**Navigating the Choice: Driving Factors**

- Petrol-powered vehicles have traditionally led the passenger car segment in India, favoured for their lower initial costs and the extensive availability of petrol. Diesel-powered vehicles are popular for their fuel efficiency, especially in SUVs and commercial vehicles. However, they incur higher overall maintenance costs due to the significant upkeep required for engines, including frequent oil changes and part maintenance.
- Over the years, CNG has gained popularity, particularly in urban areas, for its relatively lower cost compared to petrol and diesel. CNG is commonly used in public transport, taxis, and some private vehicles.
- LPG was used in some passenger vehicles as an alternative fuel, but its adoption was not as widespread as petrol and diesel because of inadequate fuelling stations.
- Demand for EVs is booming, driven by government incentives, reducing battery costs, and rising fuel costs, especially petrol and diesel. India aims for 30% of all vehicle sales to be electric by 2030.
- Flex fuel vehicles, capable of running on ethanol blends, are not as common in India as in some other regions.

**Lack of adequate Charging/Fuel Infrastructure – biggest hurdle for alternative fuel vehicles**



Source: data.gov.in and CareEdge Ratings (approx.)

The number of EV charging stations is growing, but it's nowhere near enough to meet the potential demand. Range anxiety remains a major concern for EV buyers. Similarly, while India has a decent network of CNG stations

compared to LPG or other flex fuels, it's still far less extensive than petrol and diesel pumps. This limits the range and convenience of using CNG vehicles. To encourage the growth of charging/fuel stations/pumps, the Indian government has launched several schemes to incentivize the development of alternative fuel infrastructure, such as subsidies and grants.

Overall, while there's progress in building infrastructure for eco-friendly fuels, significant challenges remain. Overcoming these hurdles will be crucial for accelerating the adoption of these cleaner alternatives and achieving India's sustainability goals.

### Total Vehicle Cost Analysis

When assessing the total cost of ownership (TCO) for vehicles powered by various fuels, including petrol, diesel, CNG/LPG, and EVs, it is crucial to consider not only the initial purchase price but also fuel expenses, maintenance costs, insurance premiums, and any applicable government incentives or subsidies. According to the analysis below, EVs currently present the lowest TCO, with CNG vehicles following closely behind.

Analysis Metrics	Petrol	Diesel	CNG	EV (Range 250-300 km)
Fuel Cost (Rs)	104 per litre	92 per litre	76 per kg	200 per charge
Mileage (per km)	11	12	15	NA
Fuel Cost (Rs/Km)	9.45	7.67	5.07	0.7
Lifetime Distance Covered (KM)	200000	200000	200000	200000
Total Lifetime Fuel Cost (Rs in lakh)	18.91	15.33	10.13	1.40
Average Car Price (Rs in lakh)	8	11	9	15
Road Tax (Rs in lakh)	0.88	1.44	0.63	Waived Majorly
Lifetime Maintenance Cost (Rs in lakh)	0.60	0.70	0.70	0.30
Net Cost of Ownership (Rs in lakh)	28.38	27.43	20.46	16.70

Source: CareEdge Ratings (Assumptions based on same vehicle type, average cost and range)

While EVs have a higher upfront cost, their lower fuel and maintenance expenses, coupled with government incentives, make them relatively more cost-competitive compared with petrol and diesel vehicles in the long run, especially for high-mileage drivers. CNG offers lower fuel costs but is limited by station availability. The availability of charging stations for EVs and refuelling stations for CNG can affect convenience and operational costs. Performance-wise, CNG and EVs offer instant torque and smooth acceleration, but petrol and diesel vehicles might offer more power and range in certain situations.

While upfront costs are important, a comprehensive TCO analysis is also crucial for vehicle purchase, especially in the context of shifting focus towards eco-friendly alternatives. Additionally, evolving government policies and infrastructure developments will play a significant role in shaping the TCO dynamics for different fuel types over the long term. The recent announcement of enhanced allocation of FAME-II by Rs 1,500 crore is a positive step towards encouraging EV adoption in India. The enhanced allocation and strategic focus of FAME-II are expected to accelerate EV adoption in India by March 2024 to encourage potential buyers to take advantage before it exhausts.

### **CareEdge Ratings View**

“Overall, the Indian automobile market is at a crossroads, with EVs and CNG emerging as strong contenders to challenge the traditional dominance of petrol and diesel fuel-driven vehicles. The future will depend on factors like government policies, technological advancements, and consumer preferences”, said Arti Roy, Associate Director, CareEdge Ratings.

Further, it's important to note that the demand for each fuel type can vary depending on several factors, including the specific vehicle segment, geographical location, and individual needs. With evolving fuel preferences and government initiatives aimed at fostering green mobility, CareEdge Ratings expects the automotive landscape to see a significant transformation by 2030.

Approximately 30% of total auto sales are expected to be electric vehicles, while hybrids and vehicles running on compressed natural gas (CNG) are anticipated to capture 20-25% of the market share. The remaining portion will be divided among traditional fuels such as petrol and diesel, alongside the adoption of flexi-fuels. A mixed fuel market offers more options for consumers based on needs and budgets. Policy and technological developments will continue to shape the future of the Indian automobile market.

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