

# To What Extent Has the Avoid-Shift-Improve Framework Been Incorporated into Indian Electric Vehicle Policy

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**Abstract:** Today, India has some of the worst global levels of pollution – a result of the country’s rapid development and drive towards urbanization. The majority of greenhouse gases that contribute to this pollution come from vehicles in urban areas (1), creating an urgent need for viable and sustainable alternatives. Over the past few years, different states in India have implemented various electric vehicle (EV) policies in the hopes of reducing pollution. In this paper, we make two contributions. First, we consider common vehicle types and driver behavior in India to propose that the Avoid-Shift-Improve (ASI) framework be used to optimize transport and infrastructure planning. The ASI framework is a sustainable EV policy approach that focuses on the mobility needs of people as the main factor of EV adoption rather than car infrastructure (2). Second, we analyze 20 EV policies globally to evaluate how successful the ASI framework has been in encouraging the use of electric vehicles. Our results show that the Avoid and Shift components of the ASI framework lead to better EV policies than the Improve component. This will require a combination of government regulations, financial incentives, and a change in the attitudes of Indian consumers and vehicle manufacturers. We find the three-pronged strategy of the ASI framework is a successful and sustainable growth model, since it expands rather than curtails consumer choice.

**Keywords:** ASI Model, Avoid, Shift, Improve, GHG

## 1. INTRODUCTION

Pollution levels in many populated metropolitan cities are an increasingly significant cause of concern, with mobile sources such as vehicles being the main cause of GHG emission and air quality deterioration. As a result, there has been a recent push from local authorities and governments to use policy as a tool for encouraging the use of public transport and electric vehicles. With the transport sector rapidly growing in India, the number of privately owned vehicles is on the rise and this trend is expected to accentuate the problem of both pollution and traffic jams. What is therefore required is a rethink of how transport mobility and city planning are regulated and guided. By taking an Avoid-Shift-Improve (ASI) approach to electric vehicle policy, we focus more improving transport mobility of

people rather than the mode of transport and transport infrastructure. Many solutions have been looked at to alleviate the problems of air pollution and traffic congestion in India but most have been met with limited success. The Avoid-Shift-Improve (ASI) approach of transport and urban planning aims to reduce greenhouse gas emissions (GHG), achieve fuel energy efficiency, and reduce congestion by promoting alternative mobility solutions with the final objective of creating more livable cities.

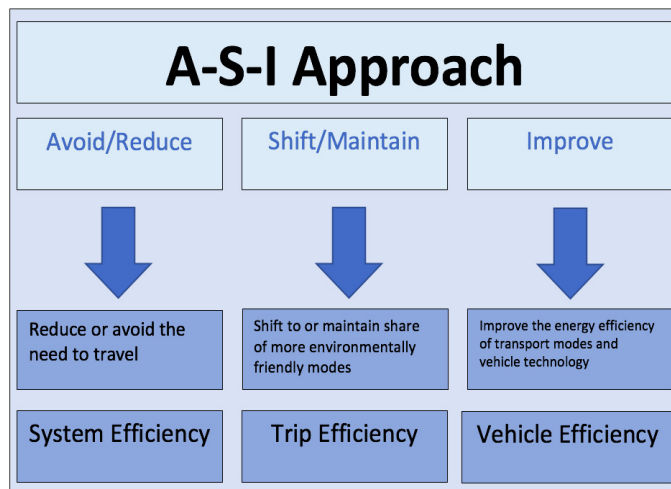


Fig. 1. The ASI concept of sustainable mobility (SUTP, 2020)

## 2. THE ASI FRAMEWORK

The ASI framework involves three components (11):

The **Avoid/Reduce** component of the framework focuses on ways to avoid or reduce travel by improving the efficiency of the transport system. It aims to reduce energy use and emissions in the transportation sector by reducing the need to travel and reducing trip lengths by managing travel demands and integrating land-use planning. Initiatives such as parking

reforms and road toll pricing, smart traffic signal control, real-time travel information, etc. enable better planning and avoid unnecessary travel.

The **Shift** component encourages movement towards environment-friendly and energy-efficient modes of transport. Promoting non-motorized modes such as walking and cycling, and increased usage of public transport can help reduce emissions and congestion while improving travel time. Affordable and easily accessible public transport system plays an important role in encouraging people to shift away from private ownership.

The **Improve** component focuses on achieving higher vehicle and fuel efficiency through technology improvements. It promotes setting up stringent standards for fuel economy and the adaptation of advanced vehicle technology such as clean diesel freight vehicles and plug-in hybrid electric vehicles. It also aims at optimizing the transport infrastructure.

The ASI framework encourages transport strategies that improve the efficiency of the transport system while being sensitive towards climate change. In other words, it allows for synergies in improving technology and infrastructure while shifting the focus from cars to humans to better address the GHG emissions leading to global warming.

### 3. ELECTRIC VEHICLES IN INDIA

Prime Minister Narendra Modi's administration has set an ambitious target of electric vehicles' (EV) contributing up to 30% of new car sales by 2030 (currently 1% of car sales are EV) (6). While a number of initiatives are underway to meet these goals, most have required modifications or have faced serious roadblocks along the way. Some notable initiatives are listed below. (8)

- Faster Adoption and Manufacturing of Electric Vehicles (FAME) is the flagship scheme of the Department of Heavy Industry. It provides cash incentives for the purchase of EVs. The scheme was promulgated after deliberation of over two years but has been slow to demonstrate tangible results.
- The National Mission on Transformative Mobility and Battery Storage (formed in March 2019) to promote the domestic supply chain for EV including battery and cell manufacturing, is yet to outline a concrete program. The proposal to transition all light vehicles to electric by 2025 was shot down, and despite incentives, EV adoption is clearly lagging (8).
- In June 2019, NITI Aayog proposed a 2025 deadline for transitioning all ICE two-wheelers to electric power; however, after strong pushback from the industry, the proposal was put on hold. Now in the wake of the pandemic, when the entire world is investing heavily in

environment and climate change, India too needs to reframe its EV regulations.

- In May 2017, India's top economic policy think tank (NITI Aayog) began discussions around a new EV policy encouraging the electrification of all new vehicles by 2030. They proposed that subsidies should be offered to buyers as incentive. The proposal faced resistance from car-makers and auto parts companies that considered the shift too sudden and ambitious, and the target was rolled back to 30%.
- India is now working on a new EV policy which aims to incentivize investments in electric vehicle manufacturing, batteries and smart charging technology.
- The government also aims to push the use of electric vehicles for public use, a revolution already led by three-wheeled autorickshaws.

EV policy implementation has been hindered by bureaucracy, economic challenges, slow change in consumer attitudes and constant changes to financial incentives. This has resulted in lack of open, transparent and long term EV policy. More specifically, challenges including the limited financial incentives offered for the 4 wheel private segment (currently limited to shared EV mobility only), high import duties that reduce the price parity between EV and Internal Combustion Engine (ICE) vehicles, and the no pan India policy on Road Tolls and State Road Tax waivers are particularly to blame.

Automobile industry experts are of the view that the four critical factors that will drive EV adoption in India over the next decade are Government policy, battery cost, charging infrastructure and supply chain localization. These are essential to support a large-scale adoption.

### 4. EV ADOPTION IN VARIOUS MARKET SEGMENTS

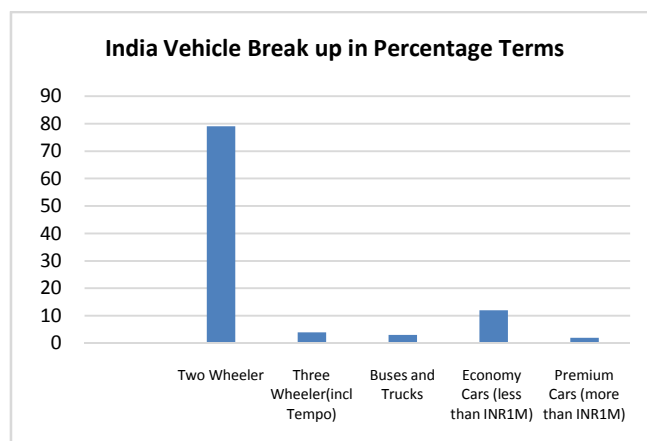


Fig. 2. Sales data from the past five years reveals the % break up of total vehicles in India (3)

In addition to its population and the number of mobile vehicles, India is unique in the type of vehicles being used.

This vehicle mix poses its own share of challenges for the ASI approach to transport planning in India.

Two and three-wheelers will lead the electrification movement in India in the medium term. E-rickshaws have emerged as a large electric vehicle market segment in India. A large part of this utilitarian segment is based on lead-acid batteries and are not in the organized sector. In the medium to long term, we can only expect the EV adoption in the four-wheeler category to stay limited to commercial/ fleet applications. On the commercial vehicle side, E-buses are expected to lead the way. Regulatory push will drive this category, rather than the total operating costs. In India, premium four wheelers (cars) are only 2% of the total sales. However, most advanced technologies are available in this category in global markets. (4)

However, policymakers' efforts to convince domestic car manufacturers to produce electric vehicles have suffered. This is mainly because of the lack of clear long term policy to incentivize EV manufacturing and sales, un-robust infrastructure and a high cost of batteries. Experts in the auto sector share the view that a policy that provides financial incentives to help the domestic manufacturers of EV cars and two wheelers may have a better impact on making EVs more affordable and widely used, rather than providing subsidies to individual buyers.

The State Government of Delhi (7) has taken the lead by announcing its Delhi Electric Vehicles policy. This policy plans to cover a comprehensive mix of financial incentives including rebates/waivers on road tax and registration fees. Furthermore, the policy aims to establish a wide network of public charging stations and to develop skilled jobs related to the EV ecosystem. This serves as a model that other states facing similar challenges of carbon emissions and traffic congestion can follow. While India may be operating in the same global context as other countries who have adopted sophisticated EV policy, it has a unique mobility pattern which other countries do not face. EV policy in India must be tailor made to India's particular demographic needs and available infrastructure.

## 5. INCORPORATING ASI INTO EV POLICY

Within the existing EV policy in India, there are elements of the ASI framework (10) that have already been incorporated both directly and as a corollary to the change in mobility patterns and attitudes that the EV policy hopes to bring about. While there may be several different paths to providing sustainable transport solutions, the three-pronged strategy of Avoid-Shift-Improve (ASI) is probably the best sustainable

growth model, mainly because it does not depend on curtailing people's choices but instead offers additional choices to the consumer. These are discussed below:

**Avoid** – this component is designed for policy measures that take time to take effect but address the root cause of the problem in the long run. The main goal of this strategy is to reduce or eliminate the need to drive to work (primarily an unproductive task given the traffic during peak hours). While the search for less polluting mobility technology continues, the long term solution would be to plan smart cities in order to drastically cut down on driving/parking. This strategy promotes living clusters with offices, housing, commercial space, and other amenities are located together. Moreover, the lack of parking lots also free up land space for further development. In India this is feasible in upcoming mixed-use communities, IT parks and dedicated hubs. Examples can be seen in parts of Gurgaon, Chandigarh, Hyderabad, Bangalore, Pune and Noida.

**Shift** – the second component involves the mindset of the population shifting from desiring personal vehicles to preferring more efficient modes of mobility such as walking, cycling, public transport, car pool, metro etc. This has seen mixed success in crowded metro cities where there is more reliance on car sharing and public transportation. However, influencing personal vehicle users is not easy given the costs and long timeline involved. Building out public transportation is an expensive endeavor and well-maintained footpaths are not the norm in Indian cities. In fact, most car owners in India choose to drive instead of walk even during short trips.

**Improve** – the last component promotes research and development aimed at reducing emissions, improving fuel efficiency, and lowering the cost of operating EV. This component benefits the most from EV policy and regulations in India.

A fourth very important requirement is the need for clear, transparent and long term monitoring of key parameters and data around performance indicators.

## 6. CONCLUSION

The Avoid-Shift-Improve approach to transport planning and infrastructure holds great promise for the Indian transport sector and the future of Indian cities. However, to achieve a major reduction in GHG emissions and the growing need for bigger roads and flyovers, the focus will have to be more on the Avoid and Shift components in the long run. Most of the improvements in the medium term will come from innovations in EV technology and improved financial incentives for manufacturers and buyers. By investing in the ASI framework, India sets itself up for a sustainable and achievable way to

slow the impact of climate change while reducing traffic congestion.

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