E-Rickshaw Trend in India

Dr. Vishwajeet V. Jituri

Abstract

Road transport is an important part of infrastructure development in a country. Traditionally; cycle-rickshaw, auto-rickshaw, tempo, van, small buses provide local and short route point-to-point connectivity. However, besides cycle-rickshaw, the other vehicles run on fuels like diesel, petrol, CNG. They burn the fuel and generate exhaust gases that contribute to the pollution. Nowadays, E-Rickshaw is emerging as an alternative local transport system in India. The reduction of air pollution and greenhouse gases are the main reasons for going for E-Rickshaws. Moreover, the E-Rickshaw reduces the manual labour involved in driving a cycle-rickshaw. However, there are challenges in implementation of E-Rickshaws on mass scale; such as vehicle charging infrastructure, governance structure, fare chart, financial plan, driving licence requirement, vehicle registration/permits, technology etc. Some cities have conducted successful trial runs of E-Rickshaws. The Government, in consultation with the stakeholders, can take a leading role in streamlining and standardizing the E-Rickshaw implementation in the country.

Keywords

E-Rickshaw, Auto-Rickshaw, pollution, transport, electric vehicle (EV), battery

Introduction

Road transport is an important part of infrastructure development in a country. The passengers need to reach their end destination, after travelling in major forms of transport systems like railways, planes, buses etc. Here, the local point-to-point transport systems come into picture. Traditionally; cycle-rickshaw, auto-rickshaw, tempo, van, small buses have been governing the local transport segment in India. These modes of transport are used as feeder service to public transport in metro cities, as public transport in small cities and in tourist places. Now, E-Rickshaw is emerging as an alternative local transport system in India. With growing awareness on pollution and the need to eco-friendly system, the battery operated E-Rickshaw is turning out to be a mass choice. However, there are many challenges in streamlining and regularizing the operation of E-Rickshaw. This paper does a study and journey of trends of E-Rickshaw in India.

Literature Review

Nimbkar Agricultural Research Institute (NARI) did a survey in the year 1997 on ‘feasibility of electric cycle rickshaw for rural and urban transport in India’. The survey was undertaken to find an upgrade to around 1 million cycle rickshaws plying on the Indian roads carrying about 3-4 billion passengers-km/year. Though cycle rickshaws are completely environment friendly, they were considered humanly degrading. However, the alternative petrol/diesel powered 3 wheelers are considered to be contributing to air and noise pollution. Therefore, a feasibility study was carried out with a prototype E-Rickshaw, considered to be eco-friendly, and important findings were listed in the report. (Rajvanshi, Anil K. ;, 1997)

The traditional auto-rickshaw, van, tempo, bus etc. run on fuels like diesel, petrol, CNG. They burn the fuel and generate exhaust gases that contribute to the pollution. A typical E-Rickshaw runs through a motor being powered from battery (mostly lead-acid type battery). The average specific energy consumption of the e-rickshaws is 53.76 kJoule per-passenger per-km, which is the most efficient among other forms of motorized local passenger vehicles like auto-rickshaw (362 kJoule), tempo, small buses etc. However, there are some disadvantages of E-Rickshaw as compared to auto-rickshaws; such as, the top speed of E-Rickshaw is 20-25 km/hour and travel range of 80-100 km. The auto-rickshaw can safely travel at a speed of 60 km/hour and have a travel range of more than 200 km.
Also, the E-Rickshaw is not completely pollution free, as the battery charging takes from a charging point powered from a thermal powerplant running on fossil fuel. (Majumdar & Jash, 2015)

The E-Rickshaw are mostly manufactured in China and India. The motor is brushless DC type, driven by a battery. There are some designs with solar panels mounted on the vehicle roof, which provides power to the motor or/and charging the battery. E-Rickshaws are popular in Asia; more in India, China, Bangladesh and Nepal. (Electric rickshaw, 2018)

Electric vehicles (EV) are predicted to increase the global electricity consumption by 30 percent and expected to reduce the harmful carbon emissions by 25 to 60 percent. There is emphasis on solar charging of batteries using photovoltaic (PV) technology; as there is continuous decrease in PV module prices, concerns over greenhouse gases, global energy policies and increase in procurement of EVs. In a solar powered/charged E-Rickshaw, the solar PV panels are fixed on the vehicle roof. The PV panels convert solar energy into electrical energy, which is then used to charge the battery and/or power the driving motor directly. However, during monsoon/rainy season, the solar power availability is diminished; making it necessary to use the conventional electricity to charge the battery. (Reddy, Aravindham, & Mallick, 2017)

Indian market conditions are ripe for large-scale introduction of electric vehicles. The cost of vehicles and the batteries continue to drop substantially every year. The national policy environment is also supportive in this direction, as the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) program, which offers purchase incentives for clean fuel technology cars, intends to boost the sales to 7 million electric vehicles by the year 2020. The reduction of air pollution and greenhouse gases are the main reasons for going for electric vehicles. A study in Visakhapatnam came out with following findings regarding willingness of cycle rickshaw pullers to go for E-Rickshaw:

a. E-Rickshaw with six passengers should be able to climb the hills.
b. Battery should be swappable or network of charging points should be available in the city.
c. The cost of buying and operating E-Rickshaw must be comparable to auto-rickshaw.

It was claimed that the replacement of diesel autos with electric autos would mean zero fuel consumption and zero greenhouse gas emissions. It was estimated that each diesel auto replaced would result in reduction of approximately 35 tons of carbon emissions over a period of five years. This was estimated up to a total 200,000 tons of carbon emissions by replacing more than 5,000 municipal disposal vehicles across the state with electric vehicles. It was claimed that the running cost would reduce from INR 3.50/km for a diesel auto-rickshaw to INR 0.50/km for the E-Rickshaw. However, as a challenge, business models based solely on direct revenues from vehicle charging services are currently financially infeasible. Hence, it is essential to put a financing program in place which would initially support the vehicle charging infrastructure. (Aecom, 2017)

The battery is an important part in E-Rickshaw, as it powers the motor driving the E-Rickshaw. After travelling 80-100 km distance, the battery gets discharged and requires recharging. The charging time for E-Rickshaw to its full battery capacity takes 8-10 hours and consumes 5-6 units (kWh) of electricity. The traditional charging point is powered by a thermal powerplant. A non-polluting and renewal option is solar power charging point/station. The average cost of charging E-Rickshaw through electricity is Rs. 10/kWh versus Rs. 1.3/kWh through solar power. (Saxena, Kumar, & Kesar, 2017)

A feasibility assessment project for E-Rickshaw was conducted in Kakinada city in Andhra Pradesh in the year 2016-17. The report highlighted the required institutional frameworks, policy
recommendations for e-rickshaw deployment and operational strategy. The major transport modes of last mile connectivity in Kakinada city are auto-rickshaws and cycle-rickshaws presently. The citizens’ preference to auto-rickshaws has increased, adversely impacting the livelihood of cycle-rickshaw pullers. Under the smart city proposal, the city authority had planned to launch E-rickshaws as an aid for improving the livelihood of cycle rickshaw pullers. The E-Rickshaw project was undertaken to understand the operational model, ownership, financial structure and the role of stakeholders. A trial run of E-Rickshaws was conducted for 3 days, to understand the performance of the vehicle in the city’s traffic. This was for understanding the vehicular speed, battery capacity/mileage, speed under the gradation and manoeuvrability of the vehicle in traffic, in specific routes (all of less than 5 km range). The trial run was considered successful and an action plan for implementation of E-Rickshaws was developed and submitted to the Municipal Corporation, detailing the institutional/governance structure, formation of E-Rickshaw associating, fare chart, financial plan linking with the incentive scheme etc. (ICLEI, 2017)

In Bangladesh, around 85 per cent of battery operated rickshaws make short trips (less than 5 km distance), around 11.46 per cent make medium distance trips (between 5 and 10 km) and the balance make more than 10 km distance trips. However, the average distance of trips made by E-Rickshaw is 3.29 km. Around 88 per cent of total population living in a town, where battery operated rickshaw is available, use this mode to meet their travel demand. Most of the users of E-Rickshaw are aged between 15 and 29 years, mostly students. However, the people having higher educational qualification, doing well paid private/government jobs or having medium or large scaled business do not use E-Rickshaw. (Rana, Hossain, Roy, & Mitra, 2013)

A Motor Vehicles Amendment Bill was put-up in Lok Sabha in the year 2015, to introduce a provision of driving licence requirement for E-Cart and E-Rickshaw, in the Motor Vehicles Act, 1988. (Transport Minister, 2015)

The E-Rickshaw brand and model needs to be registered with the Transport Authority. Looking into rapid increase in the demand, there are many E-Rickshaw manufacturers/suppliers. In Delhi alone, there are more than 500 approved E-Rickshaw / E-cart models. Due to this, there are inconsistencies in the design and models, leading to large variety of spare parts and support requirements. (ICAT, 2018)

The Transport Department of Delhi Government issued Circulars regarding registration approval of makes of battery operated E-Rickshaw. The Circular gave name of the manufacturer, model, seating capacity, weight, wheel base, speed, battery details, traction motor details, power controller details, tyre size, and conformance to Standards with respect to brakes, lamps, horn, tyre, signalling, battery, other safety components etc. (Maharaj Singh - MVI Operations, 2015)

Delhi Government came out with notification on E-Rickshaw Sewa Scheme, containing guidelines for the operation & regulation of E-Rickshaws in Delhi, with an emphasis to further augment the convenience, safety and security of the commuters. (Deputy Commissioner, 2014)

Delhi High Court issued directions to regulate E-Rickshaws plying in Delhi. BSES, as petitioner, had raised issue of inadequate infrastructure in Delhi for charging of E-Rickshaws. The important points in the judgement were:
a. Directive to State Transport Authority along with Delhi Police to frame a comprehensive policy with regard to E-Rickshaws.
b. Policy to ensure that only registered E-Rickshaws ply on the roads, after payment of registration and insurance policy charges.
c. Number of E-Rickshaws to be capped, keeping in view of the carrying capacity of the Delhi roads.
d. Out of approximately one lakh E-Rickshaws in Delhi, only about 15,000 have due registration. The rest are plying on the roads without registration.
e. The authorities not to release the impounded E-Rickshaws, until it is brought in the conformity with the Motor Vehicles Act, 1988. The seized E-Rickshaws to be released only after their owners obtain and produce a registration certificate.
f. Theft of electricity by E-Rickshaws to be properly investigated by the Delhi Police in accordance with law.
g. E-Rickshaws under the ambit of the Motor Vehicles Act, making it mandatory for the owners to fulfill all those conditions as required for the taxis and auto-rickshaws.
h. Prior to government’s decision, if someone met an accident due to rash or negligent driving of an E-Rickshaw, the victim was not entitled for any claim as it required registration of the vehicle under the laws. Without having registration under the Motor Vehicles Act, insurance of E-Rickshaws was not possible.
i. The E-Rickshaw drivers to have a driving licence.

(Bhattacharya, 2017)

The E-Rickshaw service has the following characteristics in India:

b. Regulatory Bodies: RTO for vehicle registration, Municipality for infrastructure and Traffic Police as enforcement agency
c. Route: Generally fixed by the drivers, mainly off-main roads into the localities
d. Fare structure: Flat fare on shared or individual basis
e. Vehicle technology: Motor power of 650-1000 watts, battery of 90-100 Ah, speed of 15-20 km/hour. Few recognized brands available in the market, otherwise mostly unorganized manufacturing sector.
f. Infrastructure facilities: No public charging points available, parking areas/ stands not defined
g. Permit issue: Delhi Government has started with the process of permit and registration.

(Institute of Urban Transport (India), 2015)

National Institute of Technology (NIT), Patna invited Tenders from reputed Original Equipment Manufacturers/ Authorised Dealers/ Bidders for procurement of E-Rickshaw for usage by the NIT. The Tender specified passenger carrying capacity, battery, charger, solar panel and on-site maintenance for 3 to 5 years.

(The Registrar, 2016)

Conclusions

The E-Rickshaw is emerging as popular means of local/ short distance transport. Besides the benefit of pollution free transport, the E-Rickshaw is an alternative to cycle-rickshaw; thereby reducing the manual labour. With the Government’s thrust on development of infrastructure and transport facilities, E-Rickshaw is providing last mile connectivity to the mass transport systems. To organize the E-Rickshaw facilities, the government has put some regulations in place and many more are expected to come. The charging stations for E-Rickshaw remains a challenge. Moreover, there are many-many manufacturers/ suppliers (mostly from unorganized sector) of E-Rickshaw, resulting in non-standardization, quality and after sales support issues. These need to be addressed appropriately. The following fishbone diagram gives the overall overview for the E-Rickshaw implementation.
Many cities have already conducted trials of E-Rickshaw and are in the process of removing the hurdles. The Government, in consultation with the stakeholders, can take a leading role in streamlining & standardizing the E-Rickshaw implementation in the country. This will result in effective implementation of E-Rickshaws in the country.

References