India Smart Grid Forum

# A Policy Framework for Electric Rickshaws in Delhi

**An ISGF study Paper**


## Abstract

*The objective of this paper is to recommend a draft policy framework for development of charging infrastructure and registration of E-Ricks in Delhi. Although these vehicles are eco-friendly, more efficient and generate employment, there are no rules and regulations in place to govern this market. E-Ricks have no registration numbers, no insurance and its drivers do not have driving licences! Charging of E-Ricks are taking place at the residences of the drivers with domestic connection at domestic tariff. Due to this Delhi DISCOMs are losing about Rs. 1.5 million per day. Also these vehicles run on lead acid batteries, recycling and disposal of which cause many environmental and health hazards.*



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## About India Smart Grid Forum

India Smart Grid Forum (ISGF) is a public private initiative of the Ministry of Power (MoP), Government of India for accelerated development of smart grid technologies in the Indian power sector. ISGF was set up in 2010 to provide a mechanism through which academia, industry; utilities and other stakeholders could participate in the development of Indian smart grid systems and provide relevant inputs to the government's decision making.

# 1. Introduction

When Electric Rickshaws (E-Ricks) first appeared in Delhi about 3 years ago, no one expected that they would become a rage so fast. It is reported that more than 1,00,000 E-Ricks are already plying on Delhi roads (some reports put this number at 2 lakhs).

These E-Ricks are economical and an eco-friendly mode of transport, which provide last mile connectivity from metro stations to residential colonies and markets which are within a radius of 2 to 3 km. These vehicles use completely knocked down (CKD) parts mostly manufactured in China and assembled in local workshops which are located in and around Delhi. Further, these vehicles do not have number plates and the drivers do not need licenses since they are said to be running on 250 W of power (under the previous Motor Vehicle Act, vehicle with motor power less than 250W and speed less than 25kmph were regarded as non-motorized). However, our study suggests that the capacity of motors in most of the E-Ricks is well above 650 W and thus it doesn't fall under non-motorized vehicle category. Moreover, the revised Motor Vehicle Act mandates all motorized vehicles to be registered. It takes around 6 to 8 hours to fully charge these vehicles and travels around 60 to 70 km after full charging. These vehicles carry around 5 people with 4 commuters in the rear cabin and 1 beside the driver and charge Rs.10/- per head per trip. The average number of trips that the E-Ricks run is around 13 to 15 trips in a day, which helps them to earn around Rs.600 to 700 on an average day which is comparable with daily earnings of auto rickshaws.

A study conducted by WHO found Delhi to be one of the worlds' most polluted cities[1]. The city thus has a huge opportunity to reduce emission levels by adopting E-Ricks and other types of Electric Vehicles. ISGF study established Delhi's potential to reduce $CO_2$ emission by around 0.164 million tonnes annually through successful conversion of 1,00,000 CNG auto rickshaws to E-Ricks. By 2020 around 5,00,000 or more E-Ricks are expected to ply on roads of Delhi, resulting in probable $CO_2$ emission reduction potential of around 0.8 million tonnes annually. Additionally conversion of 1,00,000 auto rickshaw to E-Ricks would reduce our oil/gas import bills by more than Rs 2.78 billion annually.

However, there are few concerns which need to be addressed urgently through appropriate policy framework. Currently there are no laws and regulations to govern E-Ricks. They have no registration number and number plates. They are not insured for third party damages. Also some E-Ricks carry more passengers than capacity thus putting safety of passengers as well as bystanders at risk. The passengers cannot claim insurance or file a complaint in case of an accident. Another concern area is the impact of charging of large number of E-Rick batteries on the quality of power and economic health of DISCOMS. These vehicles mostly use owner's domestic connection to charge the batteries and are billed at residential tariff

[1] http://www.nytimes.com/2014/05/09/world/asia/cities-in-india-among-the-most-polluted-who-says.html

due to which Delhi DISCOMS are potentially losing revenue around 1.5 million rupees a day. In addition to it, large numbers of batteries are expected to be scrapped annually. This may generate hazardous waste and create environmental and health problems.

If the current trend continues, the numbers of E-Ricks are expected to go up to 5,00,000 by 2020 in Delhi alone and are also expected to proliferate in other cities across India. In view of above, there is urgent need to regulate E-Ricks. The policies need to be designed such that the concerns of all stakeholders are addressed and encouragement should be provided to the growth of these zero-emission E-Ricks. Following policy initiatives are recommended for regulating and promoting the E-Ricks.

## 2. POLICY INITIATIVES

- *Registration of E-Ricks under a new category in the Motor Vehicle Act*

In view of safety issues, the Road Transport Authority of Delhi may draft a policy for registering E-Ricks under Motor Vehicle Act and requiring mandatory driving license and third-party insurance for driving E-Ricks. Some time line of say 6 months may be provided in the policy to complete the registrations of already existing E-Ricks. The national government can also look at forming a new vehicles segment for registering these E-Ricks, along with norms on speed limit, maximum number of passengers, standards for components and safety standards. In the interest of promoting these eco-friendly vehicles, they may be exempted from type tests.

- *Encourage setting up of facilities to charge E-Ricks at public locations like metro stations, shopping malls and other feasible places*

The present generation E-Ricks in Delhi use 4 lead acid batteries (12V/80Ah-100 Ah) connected in series. As there are no public charging facilities available, these are presently being charged at the residence of the E-Rick drivers usually during night which is harmful for the residents. E-Rick operators are thus paying domestic tariff for charging these batteries.

A policy guideline may be issued to encourage setting up of battery charging stations at various public places preferably near E-Rick concentrated zones. Delhi Electricity Regulatory Commission approval may be obtained for charging commercial tariff to public battery charging stations. Also Distribution Companies will need to augment Network/Infrastructure in the areas where public fast charging infrastructure can be created. ISGF can provide guidance to Delhi Transport Department for creating smart battery charging infrastructure at public places and to recommend appropriate type of chargers to be used.

- *Policy to promote usage of Lithium Ion Batteries in E-Ricks*

Lead Acid batteries are environmentally hazardous and cannot be fast charged. Use of Lithium ion batteries (LiBs) in E-Ricks may be encouraged as they do not contain any heavy metals and they are relatively more environment friendly. Also, LiBs support fast charging stations.

Although LiBs have a better life cycle cost as compared to that of lead acid batteries, the initial capital cost is high i.e. Rs.90,000 for LiBs against Rs.21,000 for Lead acid battery. The life of lead acid battery is 400 to 500 cycles (6 to 8 months) whereas LiBs last for 2000 to 4000 cycles (> 5 years). The additional advantage that can be achieved is the weight of the batteries can be reduced by almost 33% and size by 3.2 times. The policy may therefore offer subsidies for LiBs and encourage reuse of LiBs in second-use applications such as solar street lighting, home invertors etc. This could significantly increase the total lifetime value of the battery, and thus reduce its cost to the automotive user. Stake holder consultations can be held to brainstorm the viable business models for promoting usage of LiBs in E-Ricks.

- *Standards for chargers*

Use of sub-standard battery chargers for E-Ricks charging can inject harmonics into the distribution grid. The policy need to ensure that chargers with proper specification and standard should be used. ISGF and BIS can collaborate in finalizing suitable fast charging standards for EVs in India.

- *Policy for addressing environmental issues related to large scale dumping / scrapping of lead acid batteries.*

There is a risk of lead acid batteries used in E-Ricks getting abandoned in public places or recycled through unorganized smelters, creating a big environmental hazard. If lead gets into the environment, serious problems such as birth defects and other physical, behavioural and learning difficulties may occur. Lead can be fatal to children who inhale or ingest it. The US Environmental Protection Agency considers lead to be one of the most dangerous chemicals that threaten human beings and the environment

Although a Deposit Refund System (DRS) is available for lead acid batteries in India along with Batteries Management and Handling Rules (BMHR 2001), still a large percentage of batteries are recycled by the informal sector in ways that are harmful to health and the environment. This problem may further aggravate due to expected large scale recycling of E-Rick Batteries. Suitable policy infrastructure needs to be created to prevent handling of lead acid batteries by unorganized sector.