

# Solar E-rickshaws Vs. Conventional E-rickshaws: A Study on Awareness

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## Abstract

Solar e-rickshaw is a new means of transport and advanced technology that blends solar energy with mechanics. In simple words, a solar e-rickshaw is a three-wheeler powered by solar energy, suitable for short distances (Mulhall et al., 2010). Solar-powered e-rickshaws can support the daily operations of the drivers, helping them overcome range restrictions and make more money as they can avoid charge-wait periods during work hours. These solar e-rickshaws are also clean, environment friendly, sustainable energy. This study aimed to identify the lack of knowledge due to communication gaps in spreading awareness regarding advantages of solar e-rickshaw, which has led to less usage of e-solar rickshaws that has the potential to enhance the performance and energy efficiency for achieving environmentally sustainable transportation. This study is with special reference to Gurugram city in India. The methodology used for this study is in-depth interviews using semi-structured questionnaire and purposive sampling. The outcome of the study indicates that measures are needed to communicate and educate the e-rickshaw drivers and owners on its solar version and its benefits, for the solar e-rickshaw to come to mass use and acceptance.

## INTRODUCTION

Solar e-rickshaws are different from conventional e-rickshaws in that they are powered by solar energy, while conventional e-rickshaws have to charge their batteries and use them after charging. Solar e-rickshaws have several benefits over conventional e-rickshaws (Mulhall et al., 2010). They consume 40% less energy (Warree, 2021), come with high-efficiency solar panels, are noise-free, have very low maintenance and running costs, and are pollution-free (Kokate et al., 2020). The popularity of solar-rickshaws is not seen much in a city like Gurugram where e-rickshaws are in use in large numbers, specially visible around metro stations, though the popularity of solar e-rickshaws is trying to catch up in India due to its low running and initial cost with other economic and environmental benefits.

## Objective

- To find out the awareness level of solar e-rickshaws amongst the e-rickshaw drivers

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- To investigate the satisfaction levels in terms of convenience of c-rickshaw users with solar e-rickshaws versus battery e-rickshaws.
- To examine the economic preferences of e-rickshaw users regarding solar e-rickshaws versus battery e-rickshaws in terms of cost, maintenance, and operational expenses.
- To explore the perceptions of e-rickshaw users on the environmental impact of solar e-rickshaws versus battery e-rickshaws.

## **METHOD**

The research method used for the study is in-depth interviews. A sample size of 25 was considered in the study. The sampling was purposive sampling. It was conducted on the e-rickshaw users on solar e-rickshaws versus battery e-rickshaws at HUDA City Centre, Gurugram, since it is one of the hubs of e-rickshaw walas (drivers/ owners). Questions asked were semi-structured interviews with e-rickshaw drivers at the location. The questions designed were to understand the satisfaction levels, perceptions, and economic preferences of the users regarding solar e-rickshaws versus battery e-rickshaws and also regarding knowledge and awareness of e-rickshaws.

The questions were in a discussion format, allowing the participants to express their views freely. The data collected from the interviews were analyzed using qualitative methods such as thematic analysis to identify common themes and patterns in the responses. The findings provide insights into the user perspectives on the two types of e-rickshaws concerning their convenience, economic and environmental impact.

## **Review of Literature**

According to a study on retrofitting auto rickshaws to e-rickshaws, the proposed model of e-rickshaw has improved vehicle performance as compared to existing conventional e-rickshaw in terms of mileage, starting current, battery life, and security feature of the vehicle (Kokate et al., 2020). Another study on the commercial and technological feasibility of using solar e-rickshaw for semi-urban areas found that solar e-rickshaws have low maintenance, low

running cost, are eco-friendly and non-polluting products and can be used for public mobility solutions in semi-urban areas.

In terms of driving experience, comfort and convenience, the E-Ashwa E Rickshaw is indeed a great buy for Indian transporters. The operating costs are very low and the interior experience is pretty impressive both for the driver and passengers. The three-wheeler is perfectly optimized for Indian conditions (Kumar, 2017).

## **Difference between Solar E-rickshaw and Battery E-rickshaw**

E-rickshaws and auto-rickshaws differ primarily in the design and specifications of the electric powertrain, performance (in terms of torque and maximum speed) and passenger capacity. E-rickshaws are a low-cost variant of e-3 Ws without an exact ICE counterpart (Kumar & George, 2020). The comfort level in an e-rickshaw is much better than in an auto-rickshaw. Auto rickshaws can cause major distress to the riders. E-rickshaws are lower than the traditional pedal rickshaw and with their gravity being nearer to the land, they ascertain a more stable turning and ride experience. In comparison, auto-rickshaws are a much safer option as they seat only a maximum of three passengers and can be fined for violations.

According to the provided search results, the main difference between solar e-rickshaws and battery e-rickshaws is the source of power. Battery e-rickshaws are powered by an electric motor and a battery ranging from 650 to 1400 Watts (Saera, 2022). On the other hand, solar e-rickshaws are powered by a battery that stores electricity generated by solar panels attached to the vehicle. Solar e-rickshaws can be directly solar-powered, which means they are driven solely by one or more electric motors powered by solar panels mounted on the vehicle. However, in practice, solar panels are not frequently used in e-rickshaws.

The main difference between solar e-rickshaws and battery e-rickshaws is the source of power. Solar e-rickshaws are powered by solar panels that convert the sun's energy into electricity, which is stored in a battery and used to turn the motor (Sameeullah & Chandel, 2016). On the other hand,

battery e-rickshaws are powered by a battery that is charged by plugging it into an electrical outlet. Solar e-rickshaws are a new means of transport that blend solar energy with mechanics, while battery e-rickshaws have been in use for some time. Solar e-rickshaws are designed to provide the maximum possible benefits to their users and are suitable for short distances.

Solar e-rickshaws are more environmentally friendly than battery e-rickshaws because they use renewable energy, while battery e-rickshaws rely on electricity from the grid, which may be generated from non-renewable sources. However, solar e-rickshaws are not frequently used because solar panels are not effective in e-rickshaws and are not frequently used.

### **Price Feasibility**

According to the provided search results, solar e-rickshaws are considered to have a low running and initial cost compared to battery e-rickshaws. Solar e-rickshaws are designed to provide the maximum possible benefits to their users and come with many great features (Chauhan, 2021). However, the exact price comparison between solar e-rickshaws and battery e-rickshaws is not provided in the search results. The cost of battery e-rickshaws in India (Harding et al., 2016) ranges from Rs 9500 to Rs 13500 for Lead-Acid tubular plate-based batteries (Paul, 2022). The price of the best e-rickshaw in India is approximately Rs 1.12 lakh (ex-showroom price) (Kokate et al., 2020). In conclusion, while solar e-rickshaws are considered to have a low running and initial cost, the exact price comparison between solar e-rickshaws and battery e-rickshaws is not clear from the provided search results.

### **Advantages and Disadvantages of Solar E-Rickshaws Compared to Battery E-Rickshaws**

According to the provided search results, solar e-rickshaws have some advantages and disadvantages compared to battery e-rickshaws. One advantage of solar e-rickshaws is that they use renewable energy, which is environmentally friendly and reduces pollution (Chauhan, 2021). Additionally,

solar e-rickshaws can save on fuel costs compared to battery e-rickshaws. However, solar panels are not frequently used in e-rickshaws and are ineffective. Moreover, solar e-rickshaws have a limited range and are suitable for short distances. Battery e-rickshaws, on the other hand, have a longer range and can be charged using grid electricity. However, charging and replacing the battery can be inconvenient and costly. In conclusion, both solar e-rickshaws and battery e-rickshaws have their advantages and disadvantages, and the choice between them depends on various factors such as cost, range, and environmental impact.

## **FINDINGS**

In this paper, we have interviewed about the awareness and the use of all-electric auto rickshaws for transportation at Huda City Centre, Gurugram. The majority of findings interviewing the E-Rickshaw walas indicated that there is less knowledge and awareness about solar e-rickshaws. Not much publicity or advertisements are visible about e-rickshaws. Those with some information on solar-assisted e-rickshaws agreed that the solar variant could be economically beneficial compared to conventional ones. They stated that e-rickshaws have lower running costs and are a cost-effective mode of transportation and the development of solar-powered e-rickshaws has the potential to replace petrol-consuming public transport vehicles. The economic and environmental benefits of using solar charging stations for e-rickshaws, make local driving largely carbon-free for the users. The main factors for adapting solar E-Rickshaws were the economic benefits such as lower operating costs, reduced fuel consumption, and potential for renewable energy.

## **CONCLUSION**

According to the study, solar-powered e-rickshaws can certainly be a viable source of livelihood for auto drivers around the country and contribute to a reduction in pollution as the electric auto rickshaw fitted with solar panel result less in pollution. The solar panels on the e-rickshaw can support the daily



operations of the drivers, helping them overcome range restrictions and make more money as they can avoid charge-wait periods during work hours.

Dissemination of more information and knowledge about solar powered e-rickshaws is required in order for it to gain acceptance and popularity. This can be done through outdoor campaigns at prime locations where the e-rickshaw walas assemble. Also, more advertisements need to be put up to bring about awareness and information about solar e-rickshaws.

A solar-powered rickshaw can be a good alternative to simply battery powered or CNG. Solar-powered e-rickshaws use 40% less power than traditional auto rickshaws and are therefore more sustainable and e-rickshaws bring in a decent amount of revenue for their owners (Warree, 2021).

The environmental benefits of electric rickshaws include solar-powered ones. As a clean mode of transport, solar e-rickshaws are a feasible and sustainable mode of transportation.

The study highlights the economic benefits of using solar e-rickshaws, including low running and initial costs.

Electric locomotion in the solar e-rickshaw affords traversing longer distances compared to its manual counterpart, which translates into increased earnings for the rickshaw pullers & fewer health hazards. Due to the commercial and technological feasibility of using solar e-rickshaws for semi-urban areas are highly recommended. This concludes that there is a need to grow awareness on using solar e-rickshaws as a sustainable and cost-effective mode of transportation.

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