E-Scooter as an Alternative Non-motorized Transport NMT for Urban Area: A case study for Surat City in Gujarat state in western India

[1] Deepak S. Nishad, [2] Himanshu J. Padhya, [3] Zarana H. Gandhi
[1] Post Graduate Student, [2] Associate Professor, [3] Ad- Hoc Assistant Professor
[1] Town and Country Planning, [2]Faculty of Civil Engineering
[1] Sarvajanik College of Engineering and Technology (Surat, Gujarat), India

Abstract: Transportation is one of the basic needs of human. Mobility is required for to take advantage of life and its possibilities. However, mobility does have its drawbacks, particularly in urban environments, where many people utilize mobility options simultaneously. Poor air quality, traffic congestions, and lack of parking are a result of growing mobility need. In order to unravel these problems without imposing severe restrictions in personal mobility, alternatives to cars, powered by combustion engines, are necessary. One of these alternatives are electric-Powered Two- Wheelers. Unlike their conventionally powered counterparts, these vehicles utilize batteries and an electric powered drivetrain. the main objective of this paper is to study Existing Scenario, needs and issue identification of west zone, Surat city and to identify alternative means for NMT (Non-motorized transport) and ensure safety of people. About 15 percent of manmade CO2 comes from cars, trucks, airplanes, ships, and other vehicles. Environmentally friendly means of personal transportation such as electric cars, e-scooters, and electric bikes are among the solutions available and have become the subject of increasing attention as global warming has worsened.

Keywords— E- scooter, Air Pollution, Environment, NMT (Non-motorized transport), Traffic

I. INTRODUCTION

Transportation is important for providing mobility to the people, and for movement of products. Transportation facilitates a broad spectrum of opportunities for a private for desired activities. Though transport isn't an end in itself, it's the means to several ends. Efficient transportation leads to economic, social and political advantages. The economic advantages are; expanded marketplace for goods; stabilization of costs in several markets; and economy of scale by concentration of activities in definite localities and subsequent distribution. The social benefits include opportunities of travel for intellectual pursuits and pleasure access to medical facilities; and selection of location for home and work. The political effects result from promotion of national integration, uniform extension of state services to varied communities, and strengthening of the security and security of the country.
Since the introduction of the interior combustion engine (ICE), modern mobility has fundamentally changed. Today, it's impossible to imagine modern transportation without motor vehicles. Powered Two-Wheelers (PTWs) represent a relevant section of such vehicles. In recent years, electric low-powered PTWs, also called e-scooters, became a notable trend. Without excessive emissions and noise, also as convenient dimensions, e-scooters can help European cities ease their increasing problems with traffic, emissions, and parking. during this paper, we present the results of a real-life field trial, performed within the City of Munich, Germany. By providing six vehicles, 38 subjects were ready to incorporate an e-scooter into their everyday lives. Recorded with travel diaries and a pre-post-survey, usage and attitudes were evaluated. Results show that a majority of daily trips is suitable for e-scooters and charging infrastructure is sufficient for this type of auto, while subjective safety, weather, and baggage capacity are restricting attributes.

Poor air quality, traffic congestions, and lack of parking are a result of growing mobility need. so as to unravel these problems without imposing severe restrictions in personal mobility, alternatives to cars, powered by combustion engines, are necessary. one among these alternatives are electric-Powered Two- Wheelers (ePTWs). Scooters, or gasoline powered two-wheelers, are getting increasingly popular within the Netherlands. they supply fast, independent and affordable transportation, especially in urban congested areas. Unfortunately, they even have considerable adverse impacts on the environment and human health. The three most prominent impacts are related to pollution, sound pollution and traffic accidents.

II. E SCOOTER

Electric low-powered PTWs, also called e-scooters, became a notable trend in the recent years. Traffic environment encourages the acquisition and usage of ePTWs and eBikes. While low-powered two-wheelers represent a footnote within the daily traffic of most European cities, recent development in electrification redefine the face of this vehicle class from loud and smelly two-stroke vehicles to modern, electric-powered, easy to handle vehicles without tailpipe emissions. Incorporating such vehicles could help to ease problems in inner cities like traffic congestions, pollution, noise, and lack of parking. Trip diary entries revealed the vehicles were used particularly for commuting and leisure trips, even for business trips within the town. These trip purposes represent an opportunity to determine e-scooters as alternative to cars, since these purposes are yet dominated by car usage. Trip analysis combined with answers from the pre-post survey reveal that commuting trips as well as business trips can be covered with e-scooters, while leisure trips can be covered partly due to the number of travelers. While easy parking is that the most distinct benefit, weather dependency, baggage restrictions, and subjective safety are drawbacks of the vehicle class. After all, e-scooters are easy to handle and range also as charging was confirmed to not be an exclusion criterion.

An electric scooter is one sort of light motorcycle driven by an electrical motor and used with small wheels, a coffee seat, and a fixed shield protecting the driver's legs. it is now making an effort to apply new technology to develop electric scooters, not only for environmental protection but for industrial advancement as well. Electric scooters are considered as a new green technology of transportation for replacing traditional fuel

scooters, and also regarded as a viable niche market and a potential industry for many countries. An electric scooter is a light motorcycle driven by an electric motor, which can be considered a constrained workstation in which there is very limited available adjustment to suit different sizes of riders.

III. ZERO-EMISSION ELECTRIC SCOOTERS IN TAIWAN AS A SUSTAINABLE TRANSPORT STRATEGY

In Taiwan, the govt considers the zero-emission scooters to be a sustainable sort of transport like walking, cycling and conveyance, which play an important role to support sustainable urban mobility. Therefore, the event of zero-emission scooters is a crucial strategy in constructing the sustainable transport network of Taiwan. It is also the government's priorities about the policy of emission-reduction and energy-conservation within the transportation sector. Moreover, the contribution of replacing petrol scooters by zero-emission scooters like battery-powered electric scooters and cell scooters to reduction in greenhouse emission (GHG) emission and improvement in energy efficiency is evaluated. Zero-emission scooters are regarded as a sustainable form of transport in Taiwan. The government launched its first promo- national program in 1998, which aimed to reduce the air pollution by using lead-acid battery based electric scooters to replace petroleum-powered scooters. Recently, a new incentive program by implementing a subsidy policy for purchasing electric scooters lug with Li-ion batteries together with smart infrastructures is proposed for combating the climate change. Recently, electric vehicles have received a great attention worldwide again since they have much lower CO2 emissions than gasoline-fueled ones and thus can make a big contribution to reduction in CO2 emissions in the transportation sector. Taiwan government therefore started its third phase of promotional program of electric vehicle in order to reduce the GHG emission, which proposed a new incentive program to subsidize the purchase of electric scooters. It is also a part of the national policy in energy-conservation and emissions-reduction. A shift from petroleum-powered scooters to zero-emission scooters such as battery-powered electric scooters and fuel cell scooters has benefits of enhancing the energy efficiency and reducing the GHG emission.

IV. STUDY AREA PROFILE

The city of Surat is situated at latitude 21º 12´ N and 72º 52´ E on the bank of river Tapi bordered Arabian Sea coastline on its west at a distance of about 19.4 KM by boat along the Tapi stream about 16 KM by road, along Dumas. It is 13 M above the mean sea level. Surat city is located in the most developed region of Gujarat state. The region extends from Kalol towns in north down south to Vapi, in Bulsar district. Its western boundary is defined by the seacoast and the eastern by hills. The major transportation spine provides north south linkages, linking Gujarat with the rest of the country. Surat city is the business capital of the state and is of significant importance to the country. Surat occupies a crucial position on the Ahmedabad-Mumbai regional corridor centrally situated at a distance of 260 KM North of Bombay and 224 KM South of Ahmedabad on the 225 KM long industrial belt, having straight linkages with the industrial urban centre of Vadodara, Ankleshwar and Vapi.

The National Highway No. 8 passes within 16 KM of the SMC boundary and is one of the busiest expressway trunk routes in the country. The city is connected by road and rail with the main cities and towns of the state also as states of Maharashtra and Madhya Pradesh.

V. CONCLUSION

National Urban Transport Policy 2006 emphasize on use of non-motorized mode of transport and improving streets by proper inclusive and visionary approach in city planning. This leads to decreased speed of travel and increased chaotic traffic jam on roads. Present paper is focused on E-scooter as a sustainable transport strategy to reduce traffic congestion. An electric scooter is one sort of light motorcycle driven by an electrical motor and used with small wheels, a coffee seat, and a fixed shield protecting the driver's legs. it is now making an attempt to use new technology to develop electric scooters, not just for environmental protection except for industrial advancement also. Electric scooters are considered as a new green technology of transportation for replacing traditional fuel scooters, and also regarded as a viable niche market and a potential industry for many countries. e-scooter transportation could reduce emissions, and automobile congestion in local areas, powered two-wheeler drivers are extremely susceptible to road risks. Surat is highly developing city and migrants from different states and cities is higher in the surat because of industrial hub. So, it is required to planning for an alternative of motorized vehicle. E scooter is the best option which is recommended for Surat city as a Sustainable transport Strategy.

REFERENCES

[1] A. Abubakirova, A. S. (2016). Place of tourism in the economy of Kazakhstan republic . Procedia economic and finance.

[2] Abdullah, A. A. (2006). The creation of an eco-tourism site: a case study of Palau Singa Besar. Ecology and the environment.

[3] Ayazlar, R. A. (2015). Flow phenomenon as a tourist experience in paragliding: A qualitative research. Procedia economics and finance.

[4] Cavallaro, F. (2019). A tool to support transport decision making in tourist coastal area. Case studies on transport mobility.

[5] Chang, Y. (2017). Sustainable Coastal zone planning based on historical coastline changes: A model case study in Tainan, Taiwan. Landscape and urban planning.

[6] Chen, C.-L. (2017). A Transition beyond traditional fisheries: Taiwan's experience with developing fishing tourism. Marine Policy.

[7] Darren Man-Wai Cheung, B. s. (2015). Social order, leisure, or tourist attraction? The changing planning missions for waterfront space in Hong Kong. Habitat international.

[8] A.E. Kattan, F. A. (2017). A Case Series of Pediatric Seymour Fractures Related To Hoverboards: Increasing Trend With Changing Lifestyle. *Surgery Case Report*.

[9] Hwang, J. J. (2012). Review on development and demonstration of hydrogen fuel cell scooters. *Renewable and Sustainable Energy Reviews* .

[10] J. Garche1, P. M. (2017). Lead-acid batteries for E-bicycles and E-scooters. *Fuel Cell and Battery Consulting*.

[11] Jon-Patrick Allem, A. M. (2017). Are electric scooters promoted on social media with safety in mind? A case study on Bird's Instagram. *Preventive Medicine Reports*.

[12] Jyh-Rong Chou, S.-W. H. (2005). An anthropometric measurement for developing an electric scooter. *Transportation Procedia*.

[13] Jyh-Rong Chou, S.-W. H. (2005). An anthropometric measurement for developing an electric scooter. *Transportation Procedia*.

[14] Lihon Zhang, z. z. (2014). Sustainable bike-sharing system: characteristics and commonalities across cases in urban china. *Cleaner Production*.

[15] Marco Paviotti, K. V. (2012). On the out-door annoyance from scooter and motorbike noise in the urban environment. *Science of the Total Environment*.

[16] Maria Vittoria Prati, M. A. (2014). Road grade influence on the exhaust emissions of a scooter fuelled with bioethanol/gasoline blends. *Transportation Research Procedia* .

[17] McKenzie, G. (2019). Spatiotemporal comparative analysis of scooter-share and bike-share usage patterns in Washington, D.C. *Transport Geography*.

[18] Michael A. Regan, G. L. (2017). Use of Cognitive Work Analysis for exploration of safety management in the operation of motorcycles and scooters. *Accident Analysis and Prevention*.

[19] Nikolaos-Fivos Galatoulas, K. N. (2018). Analysis of potential demand and costs for the business development of an electric vehicle sharing service. *Sustainable Cities and Society*.