



Sustainable Transportation for India's Future Based on Electric Vehicles

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ABSTRACT

Sustainable Transport is also known as Green Transport and it is any form of transport that does not use or rely on deteriorating natural resources. Instead it relies on renewable or regenerated energy rather than fossil fuels that have a finite life expectancy. This paper deals with the need of an alternate transportation, India's mission of sustainable transportation, its hurdles and some recommendations that can foster electric vehicle implementation.

Keywords--- Sustainable Transport, Grid Connected Charging Stations, Electric Vehicle, Solar Charging Stations, Renewable Energy

I. INTRODUCTION

Transport is fundamental to development in a large scale, global sense. The transport options available in a country reflect its level of development. Effective transport systems enable people to access vital services, such as healthcare and education, to travel for employment, to transport and sell goods, to access social networks, and to make their voices heard in the political arena. An effective transport system leads to improved social development and economic growth. India is among the leading manufacturers and users of automobiles in the world. It is estimated that 21 million new vehicles were registered during 2016-17. [1] All major global automobile companies have already started their production in India, as the automobile market in central Asia is booming. New living conditions in a fast moving society have made Indians more dependent on vehicles.

II. TRANSPORTATION: POLLUTION & FOSSIL FUELS

India is undergoing massive urbanization, which brings with it social, economic and environmental challenges. The environmental effects that are caused by the burning of fossil fuels have created various worse effects in India. The emissions from the combustion of fossil fuels result in the formation of carbon monoxide, carbon dioxide etc., which are harmful for human health. Recent surveys suggest that Indian cities like Delhi and Agra are among the worlds most polluted cities. The contribution from diesel-powered trucks, Buses and other vehicles are to be considered as a major contributing factor towards pollution. The intensity of pollution in Indian cities was clearly witnessed during the winter months of December. Adding further, fuel efficiency is now considered by users as the cost of fossil fuels is increasing day by day. The availability of fossil fuels in the future is another question that also has to be answered. These factors have paved way for a sustainable transportation system.

III. INDIA'S SUSTAINABLE TRANSPORTATION PLAN 2030

India is about to embark on the most ambitious electric-car transformation in the world. [2] The government has launched a National Electric Mobility Mission Plan to switch India to 100% electric vehicle mobility by 2030. This would reduce Green House Gas (GHG) emissions to a significant level.

IV. CHALLENGES OF INDIA'S SUSTAINABLE TRANSPORTATION PLAN

Presently more than 65% of country's electricity comes from coal. By pushing electric vehicles in a big way, India's electricity needs are going to skyrocket. Along with this Mobility mission plan, initiatives to harness the solar energy for charging these vehicles have to be initiated as early as possible to tackle this increment in electricity usage that may arise in the near future. India needs to develop services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today's and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient.

The issues of implementing charging stations will be a major obstacle in the Electric Mobility Mission Plan. However, there are few initiatives that can be elaborated to full swing to combat this issue. One among them is the draft initiative put forward by Kerala State Government and Kerala State Electricity Board (KSEB). According to their plan, KSEB will be providing charged batteries, which can be swapped with the used batteries. Along with this the government primary focus is on providing subsidies for EV purchase and to target on giving permits only to E- auto rickshaws.

V. RECOMMENDATION

The possible solution for combating the charging issue is to utilize the solar energy by installing a network of charging stations powered by grid-connected solar photovoltaic systems. These solar panels can be installed in roof tops, fields, vacant spaces etc. [3] The electricity produced from these solar power panels can be used for home appliances and the extra electricity can be supplied to the grid. During night, when there is no sunlight the energy needed is supplied from the grid. The extra energy supplied to the grid is paid by the utility company who sells this energy to electric vehicle charging stations. Thus, this system will provide an income to the family.

The main question arises on how to implement this charging network? This can be done by provides training to women self-help groups and local entrepreneurs in the installation of solar charging stations for electric vehicles. In collaboration with women self-help groups, residence associations, companies and institutions we can create a network of charging stations powered by grid-connected solar photovoltaic systems. The focus is to reduce the energy demand on the grid due to electric vehicles by locally producing the charging power in a 'green' manner through solar panels. It will foster an ecosystem for sustainable transport in India and create

significant employment opportunities for women and youth.

VI. CONCLUSION

India being the 7th largest country and located in the equatorial sun belt of the earth, receives huge amount of solar energy which remains unharnessed. Through the National Rural Employment Generation Scheme the government can provide training to women groups and unskilled youth to participate in building a suitable transport system, electric vehicles and charging stations. Thus it can also generate a large number of employment opportunities. In the 21st century, we have woken up to the fact that there is a need for us to care for the world around us. Technology advancing sustainable transport is a high priority, and when considering the scale of the health and climate challenges, it is an imperative. [4]

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