International Journal of Engineering Research
Volume No.7, Issue Special 4, pp : 560-562
ISSN:2319-6890 (online),2347-5013(print)
9,10 March 2018

Plug In Hybrid Electric Vehicle- India

Chandrapal Singh Rajpurohit[1] Jeeya Ram[2], Ravinder Charan[3]
[1,3]Department of Electrical Engineering GEC, Banswara
[2]Department of Civil Engineering, GEC, Banswara
Email: chandrapalraj87@gmail.com, ravindercharan35@gmail.com, jeeyaram1996@gmail.com

Abstract : The major downside facing the Indian transportation and power sector is that the increasing costs of the fossil fuels. The increasing fuel costs have an instantaneous impact upon the Indian economy. As fossil fuels costs climbs higher, the look for different modes of transportation is required. Pluggable hybrids square measure proving to be an entire new thanks to store and consume mass amounts of energy from the Indian installation. This paper focuses on the importance of use of pluggable hybrids in Republic of India and infrastructure necessities for a similar. This paper shall additionally discuss the challenges for implementation of pluggable hybrids in Republic of India. The paper shall facilitate to supply Associate in Nursing insight upon a good launch within the Indian landmass.

Index Terms—PHEV's (Plug In Hybrid Electric Vehicle), Fossil fuels, Green fuel, Economic impact

Introduction

India's efforts to develop Associate in Nursing economical good grid will possess the subsequent few pre-requisites these embrace the ability system ought to absolutely meet user's demand for electricity, optimize the allocation of power resources, make sure the security, reliableness and economy of electricity provide, meet environmental constraints, and meet the electricity market development. good Grid ought to settle for the range of fresh energy generation, optimize the structure power capability, promote certainty and intermittent characteristics of the distributed diversification of the ability provide structure, and improve the proportion of low-carbon energy in energy structure, whereas improve the consistency and reliableness of the grid. because the unrenewable energy power generation, good Grid cannot develop while not the support of energy storage. Distributed energy storage units of PHEVs will function a complement of the ability grid to alleviate tension of the ability provide and improve network reliableness. With development of technology, their production to take advantage of the growing electrical vehicle market [3]. Following fig shows block diagram of Plug In Hybrid Electric vehicle.

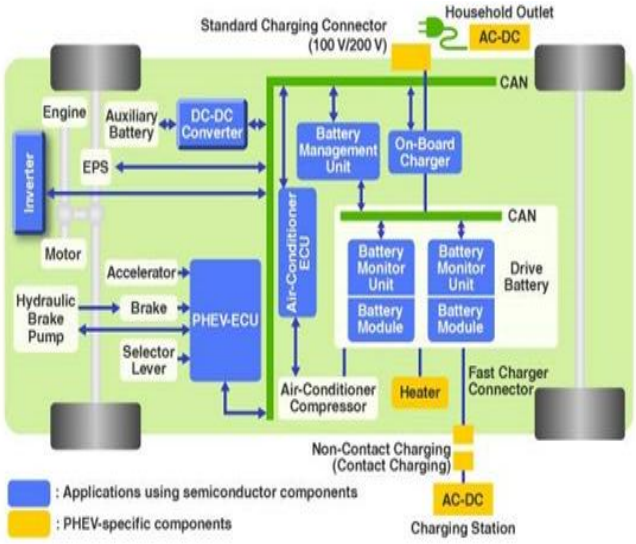

Fig 1: Block Diagram of Plug In Hybrid Electric Vehicle

PHEV's will any scale back investment and in operation prices of power grid. Statistics showthat rider vehicles square measure, on average, place and idle for concerning twenty three hours each day. throughout this point, the battery within the rider vehicles will act as distributed mobile storage unit of power grid. and also the battery power will feed back to the grid once the ability provide is scarce in grid. With the event of electrical vehicles, V2G and its functions in good grid attracts additional and additional attention.

Plug in Hybrid Electric Vehicles

Plug-in electric vehicles are growing in popularity due to increasing governmental regulations on industries and public opinion to reduce greenhouse gas emissions and move toward more sustainable technologies. Therefore, many automotive companies have already started to expand PEVs offer numerous advantages over conventional fuel based vehicles such as; more efficient motors, low emissions, less reliance on fossil fuels, energy storage for grid surplus and vehicle-to-grid (V2G) capability for supporting grid during peak times. PEVs can come in many variants such as all-Battery Electric Vehicles (BEVs) and Plug- In/Hybrid Electric Vehicles (HEVs/PHEVs) which combine battery powered electric motor propulsion (for short intercity driving) with conventional fuel based internal combustion engines (for long range cruising). The latter hybrid PEV type is currently the most popular. PEVs are anticipated to be charged in public or corporate car parks, electric charging stations, or at a customer's premises. Therefore, in order to support PEVs in the near future, an electric vehicle network complete with charging stations and infrastructure to support residential PEV charging is necessary. This will be an important function of

ISSN:2319-6890 (online),2347-5013(print)
9,10 March 2018

newly developing smart grids proposed to modernize century old distribution system design for future energy requirements [3] . Typical PEV battery capacities presently range from a few kWhs to over 50 kWh. In order to charge these batteries in a time period similar to filling the tank of a fuel based car, it is expected that most PEVs will have multiple charging modes allowing slow to rapid charging. Lithium-ion titanate batteries are showing promise with their lightweight, energy dense and rapid recharge capability [3].With a suitable battery charger, it may be possible to recharge these batteries in approximately 10 minutes with 95% of full charge. For example, the newly released Mitsubishi iMiev PEV offers home charging from 15A 240 V (Australia) power supply. The battery charger itself is built into the PEV. The iMiev offers the quick charge facility using a special socket supplied from a rapid charge unit such as those to be installed in charging [3].

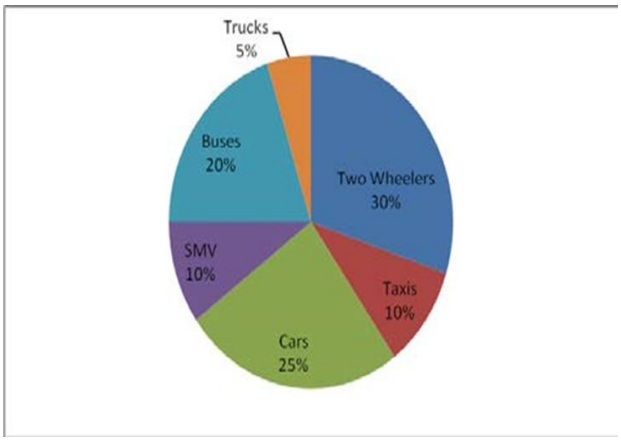

Fig 2: Vehicle sale growth in India

The PHEVs can be further split up into the following categories:

➢ On-Road Highway Speed Vehicles An On-Road Highway Speed Vehicle is an EV capable of driving on all public roads and highways. Performance of these On-Road vehi- From the above representation it may be seen that the cles is similar to Internal Combustion Engine vehicles. Indian transport sector does have an extremely high potential

➢ City Electric Vehicles Traditionally, City Vehicles have when it comes to an implementation of Hybrid electric vehicle been BEVs that are capable of driving on most public and its smart grid application in India. roads, butgenerally are not driven on highways.

➢ Top speed is typically limited to 55 mph. Neighborhood Electric Vehicles (NEVs) Neighborhood.

Fossil Fuel Consumption Pattern In The Indian Vehicles

➢ posted at thirty five mph or less. The fuel consumption additionally has gone up exponentially contemplate electrical vehicles (NEVs), additionally called Low Speed Vehicles (LSVs) square measure BEVs that square measure restricted to twenty five mph and square measure al- The Indian transport sector showed an incredible lowed in sure jurisdictions to work on public streets growth considering the traffic within the past ten years.

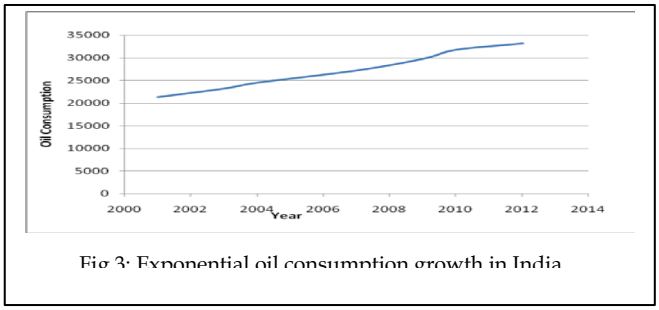

Fig 3: Exponential oil consumption growth in India

 Commercial On-Road Highway Speed Vehicles There are ering this growth. The oil consumption went up from 2130000 variety of business electrical vehicles, as well as com- (bbl/day) in 2001 to 33000 (bbl/day) in 2012 mercial trucks and buses. These vehicles are found as both BEVs and PHEVs.

Indian Transport Sector Scenario

Roads ar the foremost necessary mode of transportation in Republic of India nowadays. They carry nearly ninety % of the country's traveler traffic and sixty five % of its freight. The density of India's road network -- at zero.66 metric linear unit of road per sq. metric linear unit of land [1].The urban population in Republic of India has big from {ten %|one-tenth|tenth|tenth part|common fraction|simple fraction} in 1901 to forty percent in 2013. Nearly seventy % of the urban population is found in Metropolitan cities .This serious concentration of population in an exceedingly few centers has resulted within the enlargement of cities in density yet as space. With the rise in population and economic activities the travel demand has augmented several folds. The inadequate conveyance and therefore the straightforward availableness of finance facilities for personal vehicles have resulted in augmented vehicle possession levels and their usage. Further, the changes in urban type and therefore the oil consumption increase pattern that is accompany structure in terms of lad use, density of population and connied by the value rise of the fuels has result in the planners to centration of activities have modified the travel pattern[5]. get hold of for numerous alternate means that to scale back the fuel will .The following Pi chart illustration shows the yearly sumption and therefore the promotion to the employment of Hybrid electrical vehicles category-wise growth in vehicle sales in Republic of India vehicles within the Indian landmass. but the implementation of this technology will associate with several challenges to be long-faced by the facility sector and transport sector in Republic of India.

Challenges For Phev Implementation In India

The PHEV technology since Its beginning sets a serious disadvantage of augmented

price as a results of that it finds lower acceptance within the majority of class financial gain cluster of Indian population.The increase in charging station demand is sure to be very high that comes with its own drawbacks.

The battery charging times or all vehicles ar appx. 1 hour, therefore this results in a lower acceptance as compared to the standard fuelled vehicles.

ISSN:2319-6890 (online),2347-5013(print)
9,10 March 2018

The increase in demand-generation gap that is already quite high within the Indian power sector is sure to worsen if there's a rise within the use of PHEVs.

Considering the Indian population the number of load of power grid are going to be very high throughout the height load periods.

Infrasturcture Requirement For Phev Implementation

- Overnight charging facilty in unit garages
- Overnight charging facility in flat complexes.
- Opportunity charging at industrial facilities
- Dedicated charging stations setup just like fuel stations
- Charging facility at industries and IT parks.

The Infrastructure demand for PHEV implementation those involves an oversized quantity of capital investment this is often quite balanced out by future edges to the facility system.

Conclusion

Due to increasing costs of fossil fuels want for various supply of energy for transportation arises. The PHEVs do hold an honest scope for development within the Republic of Indian landmass considering its edges and ar because of get enforced in India considering the challenges mentioned during this paper.

Reference

i. Electric Vehicle technology explained, James Larminie, John Lowry, John Wiley & sons ltd

ii. Electric vehicle battery systems, Sandeep Dhameja, Newnas, Boston Oxford Johannesburg Melbourne New Delhi.K

iii. Pohlink, E Mikes, P. Ponchon, "New aspects of reliability in gas insulated substations", IEEE paper no.1-4244-0493-2/06.

iv. Murat Yilmaz Philip T. Krein ,"Review of Charging Power Levels and Infrastructure for Plug-In Electric and HybridVehicles and Commentary on Unidirectional Charging", 2012 IEEE International Electrical Vehicle Conference (IEVC'12) .IEC 62271-203 International standard.

v. Electric Vehicle Charging Infrastructure Deployment Guidelines for the Oregon I-5 Metro Areas of Portland, Salem, Corvallis and Eugene.Shigemitsu Okabe,Tokio Yamagiwa IEC 62271-203 .

vi. F. Musavi, M. Edington, W. Eberle, and W. G. Dunford, "Evaluation and Efficiency Comparison of Front End AC-DC Plug-in Hy-