

An Electrifying Highway towards India Vision 2035

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ABSTRACT: - This project focuses on two main problems related to Environment i.e. CO2 emission and dependency on fossil fuel, which are non-renewable sources. Electric Vehicles are the solution for these problems. Unfortunately, most environmentally friendly energy storage systems, such as batteries, have less energy density compared to fossil fuel, which will have a negative impact on the vehicle range, cost, efficiency, etc. So, this project has an infrastructure that gives possible solution that is transferring power to vehicles from roadway itself. The roadside units stores the energy which is generated by different resources like solar panel, wind power, pressure, etc. Because of this EV does not need the larger and heavy batteries for long distance transportation. This will reduce cost and weight of the Electric Vehicles.

KEYWORDS: - E-Highway, EV, Technology Vision 2035, Overhead lines, Pantograph, Battery Vehicle.

INTRODUCTION

TECHNOLOGY VISION 2035 (TV 2035) is not the first intonation of a Technology Vision for India. In 1996, Technology Vision 2020 document prepared by TIFAC (Technology Information, Forecasting and Assessment council), under the leadership of Dr. A.P.J. Abdul Kalam, then Chairman, TIFAC, was released by the Honorable Prime Minister. An Endeavour was undertaken by TIFAC in 1996 with a view to sketch the scenario as of the year 2020. Decade and a half down the line, it is important to repeat such an exercise to review the actual state of play and take into account new possibilities and challenges that would take the country to the year 2035. Hopefully, such rolling excises would enable a more calibrated approach to evolution of technology related national planning process. I believe this to be essential as new discoveries, innovations in techno-socioeconomic space and international dynamics in a highly competitive environment could significantly alter the evolution of technology [5].

MOTIVATION: - The battery is a major part of the total cost and weight of the EV, which reduces the container load capacity, and thereby also the economically gain for the otherwise less energy demanding vehicle. To make the EV less dependent on the battery, especially for long distance heavy transport, and at the same time reduce the vehicle cost, a possible solution could be to transfer power to the vehicle from the roadway.

METHODOLOGY: -This system consists of two units, one is the Vehicle unit and another is the roadside unit. Vehicle unit is place in the vehicle, which has a battery to store the charge

through pantograph, which will connect to the overhead transmission lines. And Roadside unit is place on side of the road.

BLOCK DIAGRAM

Vehicle Unit

One mode selection switch used for select the mode i.e. Normal mode or Auto mode. The vehicle operates on Diesel mode called normal mode, and Auto mode is for electric mode. When Driver select Auto mode, the sonar sensor sense the height of overhead lines, According to that pantograph will operated and connect with overhead transmission lines. From this transmission lines, supply is given to battery of the vehicle.

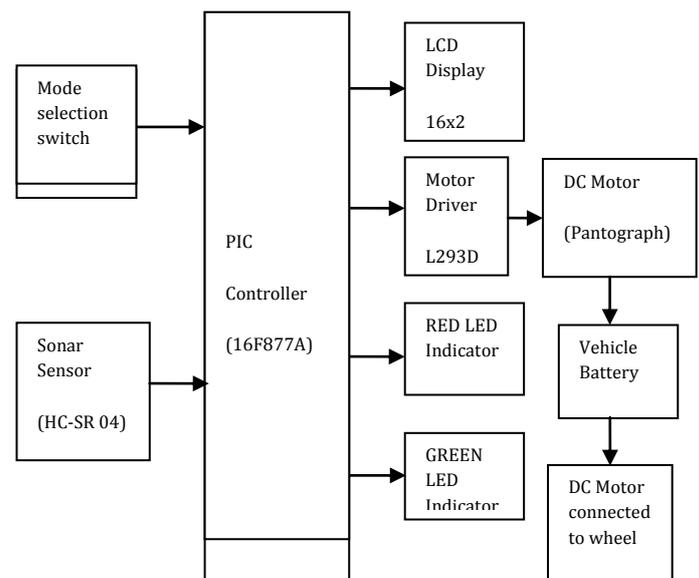


Fig.1: Block Diagram (vehicle unit)

Road side unit:-

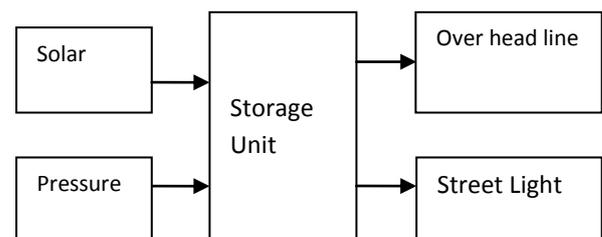


Fig.2: Block Diagram (Road side unit)

Road side unit consist of a Storage unit (battery), which is charge by the solar panel and pressure. This electricity is given to overhead transmission lines of the road. Also this electricity is given to the street lights.

FLOW CHART: -

Vehicle unit:-

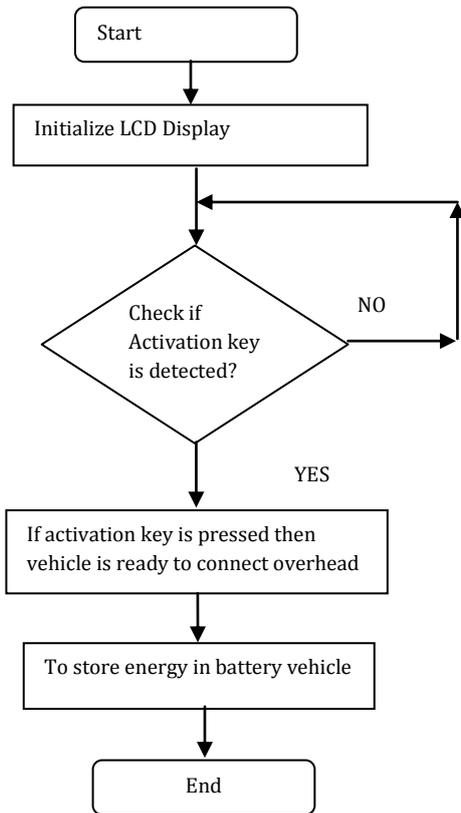
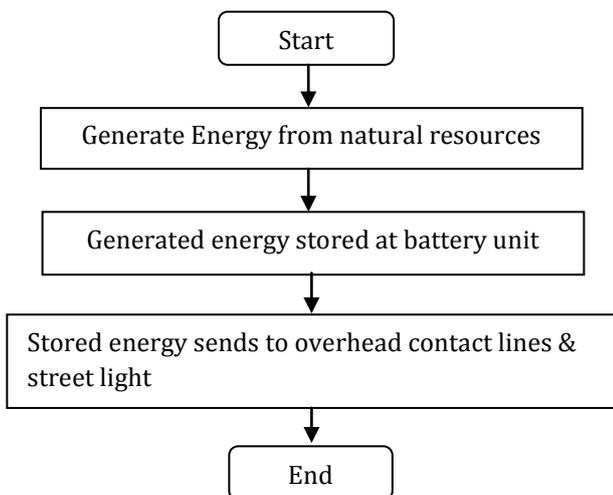


Fig.3: Flow chart of vehicle unit

Road side unit:-



SIMULATION:-

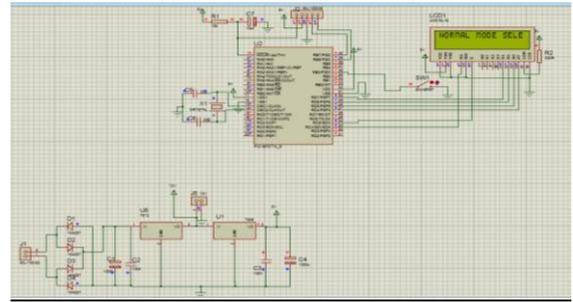


Fig.5: Selection of normal mode

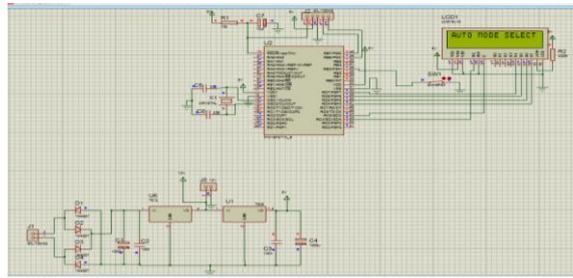


Fig.6: Selection of Auto mode

HARDWARE RESULTS

Table No. 1:- Output of Ultrasonic Sensor

Sr. No.	Mode	Sensor O/P	Comment
1)	Normal	NA	Vehicle runs on Normal Mode i.e. without using overhead lines.
2)	Auto	183.69 cm	Bottom Level
		110.36 cm	Mid Level
		5.54 cm	Top Level (Pantograph connected to over headlines)



Fig.7:- Vehicle on Auto Mode

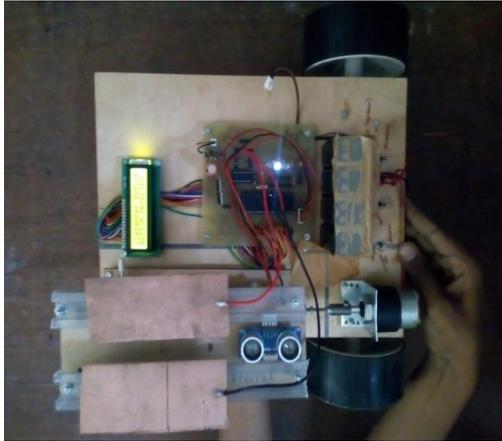


Fig.8:- Vehicle on Normal Mode

ADVANTAGES

Can be easily modified for improving the setup and adding new features. The system both accurate and reliable. The technology can easily be integrated into existing road infrastructure. Economic alternative to fossil fuels in road transport. Lower CO₂ emissions with electrified road traffic.

CONCLUSION

In our proposed system e-Highway technology includes a catenaries wire supporting the overhead contact wire, thus required power transfer from roadway to vehicle effectively. In this we uses the renewable sources i.e. solar panel for generating electricity that reduces the dependency on fuel. Hence it reduces the CO₂ emission which cause to environmental pollution. As this is one time investment system it reduces the cost of implementation.

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