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Study and Analysis of Renewable Charged EVS

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Abstract: With the boom of industrialization and urbanization from the early 20th century, the dependence upon conventional energy sources such as fossil fuels have increased tremendously. Currently, fossil fuels are depleted at an alarming rate and are also causing a hazardous impact on our environment due to the emissions of harmful gases such as carbon monoxide, oxides of Sulphur, oxides of nitrogen, etc. To mitigate such conditions, EVs are introduced where they overtake the traditional IC engines in the field of reducing environmental pollution. Integration of renewable energy sources such as solar, wind energy, hydropower, etc., can play a crucial role when it comes to the sources of charging the EVs. The promising efficiency and abundance of renewables provide an upper hand in the charging of EVs. In this paper, a survey on different charging methods of EV with renewable energy sources has been done. Charging of EV with the integration of renewable sources is advantageous due to its increased benefits.

Nowadays fossil fuels produce highly toxic and colorful exhaust gases which is very harmful to all living beings and also in future the engines which are using these fuels become obsolete due to these aspects. Hence this project is developed for the purpose of using wind energy to power and run a hybrid (electric) vehicle. A windmill generates power from wind energy and this electric power is stored in a battery, meanwhile another battery powers the vehicle alternatively. In the both the ways, the vehicle gets the power from a battery. This project could be stated as there is a compulsory need for an alternative source of fuel to power the vehicle; we can use this system as a beginning for a futuristic alternative for fossil fuels and harness the wind energy in vehicles around the world.

Keywords: wind system, Electrical vehicles, fossil fuels, renewable energy sources, conventional energy sources, efficiency, IC engines

I. INTRODUCTION

Power is essential to the success of any country. It is an important part of the country's economic growth. Coal, oil, and natural gas are our main sources of energy. They are vital power sources in industry, agriculture, trade, and domestic purposes, as we all know. The global need for energy is gradually increasing. Coal, fossil fuels, oil, and other gases are some of the energy sources available. All of these sources, however, are deteriorating the environment. We need a clean source of energy because of global warming and pollution. In today's society, everyone is focused on eco-friendly energy, which refers to the production of energy that does not harm the environment. In that case, renewable energy sources such as solar, wind, hydro, biomass, biofuel, and others are available. Renewable energy yields promising effects in the reduction of pollutants. However, there are some challenges to use these energy sources, and more research is being done to increase the efficiency of renewable energy sources. It will be more expensive for the country to generate electricity from coal or mineral energy instead of renewable sources. It is thought that using this renewable energy source to generate energy would reduce CO2 emissions.

As mentioned earlier, there are many sources of renewable energy, but wind energy is the most common as it is widely distributed. But wind speed is extremely unstable due to climate change and change in wind speed due to the geographical conditions. Generally, wind energy is used separately to produce electricity, and the wind turbine system extracts energy from the air. This system utilizes wind energy to produce electricity. Hybrid systems are more profitable than systems that rely entirely on a single energy source. Researchers face a difficult challenge in increasing the capacity of the system while keeping costs and reliability low. Wind turbines convert wind energy into mechanical energy, eventually converting it into electricity. Any electrical power generated by this system is variable and unpredictable. To make it run and save on battery, several control units called inverters are used. This power can be used for sitting or for other purposes. The system has great potential for daily electricity generation, low production costs, and low maintenance costs, among other benefits. The renewable hybrid wind power system includes wind turbines, inverters, batteries, and a variety of additional components. In order to obtain the maximum output from each component, one component must be modeled first, and then the components must be tested to meet the required reliability. Integration systems will provide continuous power if power generation by this type of model is sufficient.

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Here the hybrid car is specially designed so that the energy limitation can be easily overcome by using hybrid technology. As the battery running is beneficial for the society and more often this type of technology is fruitful for the environment. So, to overcome the energy limitation we have installed wind energy and that is called the regeneration of energy. Wind power is the use of air flow through wind turbines to mechanically power generators for electricity. Wind power, as an alternative to burning fossil fuels, is plentiful, renewable, widely distributed, clean, produces no greenhouse gas emissions during operation, and uses little land.

II. LITERATURE SURVEY

A. A Novel Based Wind/Solar Electric Vehicles for Green and Clean Environment

The electric vehicle is an optimal choice for automobiles than conventional systems to keep the environment green and healthy and as well as it is very economical. Wind/Solar electric vehicle has much more benefits as compared to conventional electric vehicles, solar energy cars and as well the combustion engine cars. It is seen clearly that how much energy can be harvested by the combination of micro wind turbines and the solar cell. This useful energy which produced by the combination of these two renewable energy resources helps to increase the mileage of the electric vehicles. The sharing of recharged batteries for the electric vehicles will be the future recommendation for this research. The standard size of rechargeable batteries will be introduced in the market with an android application which is adopted by all the electric vehicles and the sellers. It is much safer for the environment because it doesn't produce any devastating emission and a harmful waste product like conventional cars do

B. Emerging supply chain of utilizing electrical vehicle retired batteries in distributed energy systems

Increasing electric vehicles (EV) penetration leads to significant challenges in EV battery disposal. Reusing retired batteries in distributed energy systems (DES) offers resource-circular solutions. This paper proposes an optimization framework to model the emerging supply chains and design strategies for reusing the retired EV batteries in DES. Coupling a supply chain profit-allocation model with a DES design optimization model, the framework maximisers the whole chain profit and enables fair profit distribution between three interactive sectors, i.e., EV, DES, dismantling and recycle (D&R) sectors

C. A Battery Thermal Management in Electrical Vehicle

The automotive industry is moving towards electric vehicles due to fossil fuel dependency to control, CO2 control and pollution abatement. Lithium-ion batteries power most of the electric vehicles due to high energy density and long life. These batteries are manufactured in cylindrical type, prismatic and pouch type shapes. The electric vehicle operates at different loads and hence the temperature of the battery changes with time. Batteries operating temperature range is 15-35˚C for better performance and life. Operating outside of this temperature range may degrade the performance and may start the initiation of thermal runaway. Therefore, battery temperature is maintained as per the requirement using direct cooling, indirect cooling, and heating method (during cold temperature operation). Most of the EV manufacturers use indirect cooling plus silicone-based materials to maintain the required temperature. Air cooling is an in-efficient method as compared to the liquid cooling method due to lower heat capacity. Phase change material (PCM) cooling has a limitation in maintaining the battery temperature during cold operating temperature. During the cold operating condition, battery capacity drops to 60% at -40˚C as compared to 100 % capacity at 20˚C. So, heating during cold operating temperature is essential to avoid catastrophic failures of batteries. Effective battery thermal management system is essential to dissipate the heat generated inside the batteries. For low-temperature operating conditions, heating is required to ensure the best performance. In this paper, the details of different cooling and heating methods for battery thermal management in electrical vehicles are reviewed.

D. Analysis and modelling of failure states in electric vehicle charging infrastructure

This paper presents modeling methodology and simulation results of failure states and transients in electric vehicle (EV) charging infrastructure for investigation a potentially dangerous phenomenon that might appear during a typical operation. Transients can occur during normal work and during faults in EV Chargers. The trend in the electric cars suggests that in the future ultra-fast chargers would be the dominant one, therefore the focus is put-on high-power chargers (> 50 kW). During failure states of EV chargers' transients occurred in network can impact on other chargers or can propagate along power lines and affect other electrical power equipment. Studies and simulations have been carried out using EMTP-ATP software package on the test model circuit especially prepared for this paper purpose.

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E. Fuel Cell Electric Vehicles as Alternative to Battery Powered Electric Vehicles

Direct combustion of fuel for transportation accounts for over half of greenhouse gas emissions and a significant fraction of air pollutant emissions. Because of growing demand, especially in developing countries, emissions of greenhouse and air pollutants from fuels will grow over the next century even with improving of technology efficiency. Most issues are associated with the conventional engines, ICEs (internal-combustion engines), which primarily depend on hydrocarbon fuels. In this contest, different low-polluting vehicles and fuels have been proposed to improve the environmental situation. Some vehicle technologies include advanced internal combustion engine (ICE), spark-ignition (SI) or compression ignition (CI) engines, hybrid electric vehicles (ICE/HEVs), battery powered electric vehicles and fuel cell vehicles (FCVs). Fuel cell vehicles, using hydrogen, can potentially offer lower emissions than other alternative and possibility to use different primary fuel option.

III. EXSISTING SYSTEM

Electric fueling stations are still in the development stages. Not a lot of places you go to daily will have electric fueling stations for your vehicle. So, for longer distance travelling it is difficult to find a charging station While it takes a couple of minutes to fuel electric vehicles, an electric car takes about 4-6 hours and sometimes even a day to get fully charged.so it is time consuming process.

IV. PROPOSED SYSTEM

Here we are using wind power which is a renewable energy source produces electric energy in this proposed technology, when electric vehicles are running charging will happen automatically

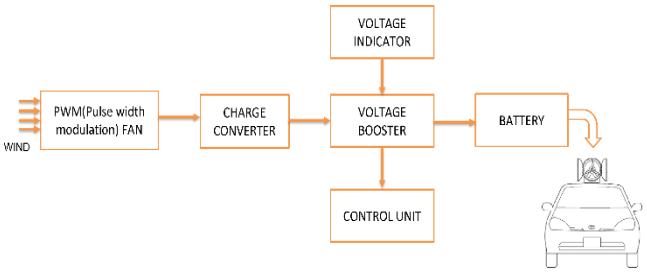

Fig. 1. EV charging using solar panel block diagram

V. WHY DO WE NEED RENEWABLE SOURCES ELECTRICITY TO CHARGE ELECTRIC VEHICLES?

In this graph, we can see the equivalent carbon dioxide emissions from a lifecycle assessment which includes the emissions due to-Vehicle production -The well-to-wheel emissions for the fuel -Vehicle maintenance and,-End-of-life recycling of the vehicle The graph has three parts:- The emissions for different combustion engine cars are shown on the right side- The middle part shows the emissions for battery-electric cars charged from different emitting electricity generation sources- The left part shows the emissions for battery-electric cars charged from different non-emitting (maybe renewable) electricity generation sources We can see that electric vehicles have very little emissions from a life cycle point of view even when charged from a fossil fuel-dominated electricity grid. However, if the electricity itself is generated from non-emitting sources such as wind, hydro or nuclear, the net life cycle emissions of the electric vehicle are further reduced, and well tank emissions to zero. Hence it is necessary to use renewable sources of electricity to charge electric cars in the future.

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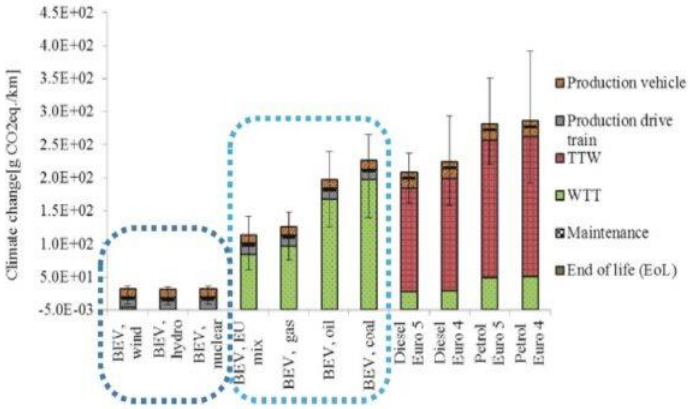

Fig. 1. Graph of carbon dioxide emission from vehicle

VI. CONCLUSION

This project gives a clear idea that electric vehicle powered with the help of wind energy is more effective than fuel vehicle. It is found that prototype captured wind energy through fan induced on it. There is huge potential for producing electricity from renewable sources. This project gives a clear idea that vehicle powered with the help of wind energy is more effective than fuel vehicle at present it has been seen that wind vitality is one of the quickest creating sustainable power source innovations because of the vitality request, natural issues, and an acceleration in petroleum derivative expenses. Wind energy could avoid the emissions of many hazardous gases and it will also reduce pollution. while we are charging e vehicles in fuel stations it will take many hours but in this proposed project there is no time wastage Vehicle will charge automatically using wind energy

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