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Hybrid Charging Station

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ABSTRACT: A hybrid micro grid-powered charging station reduces transmission losses with superior power flow control within the contemporary power grid. However, the ungraceful charging of battery electric vehicles (BEVs) with the hybrid micro grid ends up in unsuccessful consumption of the renewable energy sources connected to the charging station. Furthermore, planned development of upcoming charging stations includes a multiport charging facility, which is able to cause overloading of the utility grid. The project works on (1) the energy management approach and converter control of multiport BEV charging from a photovoltaic (PV) source and its efficient utilization; (2) maintenance of the DC bus voltage no matter the utility grid overloading, which is caused by either local load or the meagreness of PV power through its energy storage unit (ESU). Additionally, the charge supervisor provides control system charging through stable current and voltage, and this reduces the charging time. The aim of an energy management strategy is to reduce the usage of utility grid power and store PV power when the vehicle is not connected for charging. To balance the load demand, the proposed system is connected to the grid through a 3 phase bidirectional DC-AC (alternating current) inverter. The obtained results show that the projected renewable charging mechanism is appropriate for EV charging thus help creating pollution free environment.

KEYWORDS: Electric Vehicles, Synchronous Generator, Recharging Mechanism, Alternative Energy, Wind Energy hybrid microgrid, battery electric vehicle, energy management.

I.INTRODUCTION

India doesn't have satisfactory petroleum reserves. Therefore, it's heavily enthusiastic about crude oil and fossil fuel imports. Presently, India is that the third biggest oil importer after US and China. The entire crude basket of India includes 82.8% import of rock oil and 45. 3% trade in for natural gas. As, the petroleum products consumption contributes to the pollution, there has been a large demand to contain the consumption of petroleum products to deal with the pollution problem. Further, it also causes huge economic burden on the Indian citizens because of large size of petroleum import. Therefore, to cut back the dependence on petroleum products and save the environment, it's required to change over to alternate clean fuel and clean technology. A significant portion of the petroleum products is being consumed by the automobiles. Hence, running these vehicles is causing major damage to our surrounding by adding pollution. Because the Indian transport sector is heavily dependent on petroleum products.

Electric vehicles (EVs) are increasingly used everywhere the world because of heating problem and thus the price of fuel for an inside combustion engine. EVs were used for various purposes type of presently public car and a transport vehicle. Increasing in power demand is cannot avoidable. In India, electric vehicles are growing leading to demand for wattage because of necessary to hunt out other energy sources for generating electricity to scale back the worth fuel effluence. For energy sources, Solar and low-speed wind turbines are good options. Many researchers fascinated hybrid renewable energy to generating electricity for reduce energy costs and develop the power distribution systems become more stable. Also, currently, there are many researchers study on the charging station with exciting power production from hybrid renewable energy sources. They have purposed a techno-economic analysis of hybrid system comprising of solar and wind energy for powering a overseas mobile transceiver station and investigation to hunt out the result to determinecon sequences of probable variation in radiation, wind speed, and diesel price within the optimal system

configurations. Particle swarm optimization algorithm is employed to work out optimal position of the charging station within the distribution system. The strategy for optimal allocation and sizing of renewable energy sources (RES) and electric vehicles (EV) charging stations. during This project we developed optimal design of electrical vehicle charging station integrated with Grid including solar PV and wind generation generators to help to help generates the electricalsfor the electric vehicle charging station system .

II. WORKING

Firstly we implement small solar, wind plants with a supply from the grid at a place of plant and at that place power measured by using voltage sensor. For solar plant we developed charging controller for the constant voltage and the supply send to dc to dc converter. Converter sends a power to the charging station continually from wind and solar plant to the charging station to charge the vehicle. And unmitigated power is used for charging of the battery. If in case any abnormal condition occur due to atmosphere at that condition the power of solar and wind is drop so at that condition charging station run on the power through grid to maintain continuity of supply. All the process is control by the Arduino atmega controller, current voltage sensor and relay as a controlling and sensing unit.

III. METHODOLOGY

Technically, the hybrid charging station system refers to 2 generation sources like renewable energy (wind and solar) and main grid system. However, the amount “hybrid solar panels” refers to solar and battery storage which unlike off-grid systems is connected to the grid source.

This Plant is divided into the 4 parts

1. Solar powerplant
2. wind power plant
3. AC Grid system
- 4.ControlCircuit

1.Solar power plant

Aenergyplant is relies on the conversion of sunlight into electricity, either directly using photovoltaic's (PV),or indirectly using concentrated alternative energy (CSP). Concentrated alternative energy systems use lenses, mirrors, and tracking systems to focus an oversized area of sunlight into alittle beam. Photovoltaic converts light into current using the photoelectric effect and energy store in batteries and use for supply to station. Silicon is a also way recognized semiconductor having properties of both metals and non-metals. To create a solar array, this silicon is doped by a pentavalent dirtiness converting silicon into positive type silicon also remarked to as p-type silicon. And similarly other part is transformed into negative or n-type silicon. As name suggest p-type have much more than holes (positive charge) in it and n- type has excessive electrons. Then these two are mutual together one over other up to the atomic level. their contact and having opposite charge electrons ensue n-type to p-type and holes travel from p-type to n-type thus creating a thinpotential barrier between them. The current so generated from this association of charges is named as diffusion current.

2.Wind power plant

Wind power or **wind energy** is that the use of wind to produce mechanical power through wind turbines to show turn electric generators for electrical power. Alternative energy could be a popular sustainable, renewable source of power that features a much smaller impact on the environment compared to burning fossil fuels.Wind energy may be a renewable source of energy and available all round the globe in abundance. So to tie together this l resource within the

very best way wind turbines are designed. The turbine can operate from 15km/hr to 90km/hr of wind speed and are being vastly used all round the world. The wind generation plant are used for the creation of electricity in air current area with the backing of wind turbines.

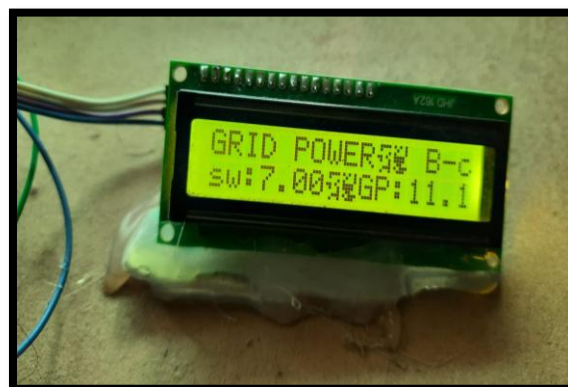
3. AC Grid System

Electrical Grid or grid is defined because the network which interconnects the generation, transmission and distribution unit. It supplies the electric power from generating unit to the allotment unit. Electrical grid installation is defined because the network which interconnects the generation, transmission and distribution unit. It supplies the electric power from generating unit to the allotment unit. An outsized amount of power is transmitted from the generating station to load centre at 220kV or higher. The network form by these high voltage lines in termed the super grid. The super network feeds the sub-transmission network operating at 132Kv or reduce.

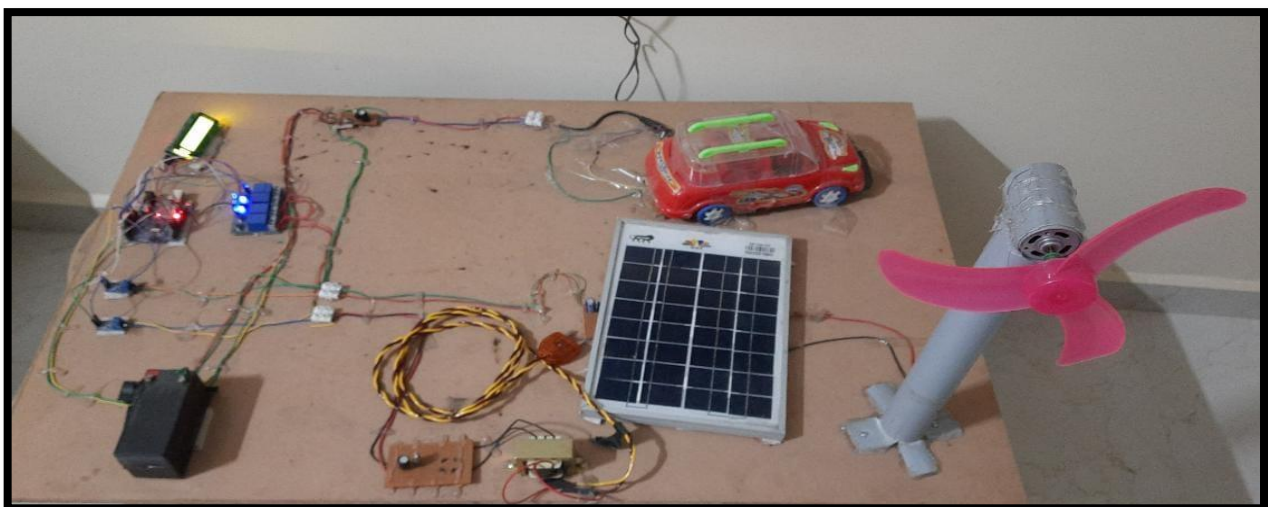
4. Control circuit

Hybrid power systems (HPS) are any autonomous electricity generating systems, incorporating over one form of power sources, operated along with associated supporting equipment (including storage) to produce power to the grid or on site. Hybridization through combining different energy sources in one supply system offers the simplest possibility to use the system.

IV. RESULT



Grid Power





V.CONCLUSION

The optimal design of charging station, electric vehicles integrated with Grid include wind generation, and solar energy we developed during this project. The results show a possible of hybrid renewable energy sources. Using renewable energy integrated with electricity allotment systems can supply the system more consistent and suitable electrical vehicles charging areas. The developed idea will be applied to optimize the charging stations for electric vehicles in rural areas, and it'd would be a decent topic for future studies and also for the industrial purpose I future.

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