INNOVATIVE HYBRID POWER GENERATION ON HIGHWAYS

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Introduction:
A single turbine can easily provide the average daily electricity needs of households. The safety and comfort of the city are also ensured. The turbine can be installed in parks, near seashores, rooftops, households but the roads are the ideal locations for the device. The big vehicles like buses can provide a lot of wind energy. The speeding the turbine is designed vertically with long blades. It covers less area on the ground and is easy to handle. It can easily be assembled and disassembled which makes it durable. Solar panels are fixed at the top of the turbine to generate extra electricity. The device is capable of producing vehicles on the highway can provide enough wind for these turbines to work all day and night without stopping. The energy generated can be transported to places or it can be used for maintenance of roadways.

This technology can revolutionize the road. Electricity is most needed for our day to day life. There are two ways of electricity generation either by conventional energy resources or by non-conventional energy resources. Electrical energy demand increases in word so to fulfill demand we have to generate electrical energy. Now a day’s electrical energy is generated by the conventional energy resources like coal, diesel, and nuclear etc. The main drawback of these sources is that it produces waste like ash in coal power plant, nuclear waste in nuclear power plant and taking care of this wastage is very costly. And it also damages he nature. The nuclear waste is very harmful to human being also. The conventional energy resources are depleting day by day. Soon it will be completely vanishes from the earth so we have to find another way to generate electricity. The new source should be reliable, pollution free and economical. The non-conventional energy resources should be good alternative energy resources for the conventional energy resources. There are many non-conventional energy resources like geothermal, tidal, wind, solar etc. the tidal energy has drawbacks like it can only implemented on sea shores. While geothermal energy needs very lager step to extract heat from earth. Solar and wind are easily available in all condition. The non-conventional energy resources like solar, wind can be good alternative source. Solar energy has drawback that it could not produce electrical energy in rainy and cloudy season so we need to overcome this drawback we can use two energy resources so that any one of source fails other source will keep generating the electricity and in good weather condition we can use both sources combine.

Hybrid Energy System:
Hybrid energy system is the combination of two energy sources for giving power to the load. In other word it can defined as “Energy system which is fabricated or designed to extract power by using two energy sources is called as the hybrid energy system.” Hybrid energy system has good reliability, efficiency, less emission, and lower cost. In this proposed system solar and wind power is used for generating power. Solar
and wind has good advantages than other than any other non-conventional energy sources. Both the energy sources have greater availability in all areas. It needs lower cost. There is no need to find special location to install this system.

**SOLAR ENERGY:**
Solar energy is that energy which is gets by the radiation of the sun. Solar energy is present on the earth continuously and in abundant manner. Solar energy is freely available. It doesn’t produce any gases that mean it is pollution free. It is affordable in cost. It has low maintenance cost. Only problem with solar system it cannot produce energy in bad weather condition. But it has greater efficiency than other energy sources. It only need initial investment. It has long life span and has lower emission.

**WIND ENERGY:**
Wind energy is the energy which is extracted from wind. For extraction we use wind turbine. It is renewable energy sources. The wind energy needs less cost for generation of electricity. Maintenance cost is also less for wind energy system. Wind energy is present almost 24 hours of the day. It has less emission. Initial cost is also less of the system. Generation of electricity from wind is depend upon the speed of wind flowing.

**Objectives :**
Taking safety as prime consideration: This device is safer in all aspects. To make a device which can be used without any power supply and obtain power from waste. To utilization the force or the energy which is useless. To reduce the human effort for generation of power. To develop a device this can make work simple. To develop a device which can run cost efficient.

**Methodology :**

```
Wind Turbine
   ↓
  Dynamo

Solar Panel
   ↓
  Charge controller

Arduino UNO
   ↓
  Display

Battery
   ↓
  Load
```
**Working Wind Turbine:**

1. The vertical axis wind turbine is used to convert the kinetic energy into Mechanical energy, this turbine blades are made up of light weight material, the turbine input is given to the dynamo.
2. Dynamo’s work using the wild complex phenomena of electromagnetism. The electricity produced by dynamo is stored in MPPT kit.

**SOLAR PANEL:**

1. Solar panel is placed at the top of the wind turbine it is also produce Electricity.
2. **MPPT Kit:** It checks output of PV module and dynamo, compares it to battery voltage then fixes what is the best power that PV module can produce to charge the battery and converts it to the best voltage to get maximum current into battery. It can also supply power to a DC load which is connected directly to the battery.
3. **Arduino UNO:** The Arduino UNO is an open source microcontroller board. The board is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits.
4. **Display:** It is used as Multipurpose
5. It display the current Time, Date, Temperature, and carbon contents present in atmosphere.

**Result:**

The wind turbine produce maximum 30v, and solar panel will produce 17v.

**Conclusion:**

We have taken up this project as real challenge, as we were not experience in the field. We started our work on this project facing new hurdles initially. After the completion of the project work we tried its working in our college. The maneuverability of the device is quite good and the handling is quite simple. For commercial purpose one can improve the efficiency of the device effectively by increasing the size of the device.

**Future Scope of the Project:**

The proposed hybrid system model can also be erected in the path of rail road where high pressure of wind is developed by the motion of the train. When manufactured on large scale, power generation cost of this system will reduce. We feel the project that we have done has good future scope in the global sector.