

Power generation through renewable energies – An application in passenger trains

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This paper mainly focuses on an Innovative method to generate current by using renewable energy resources mainly solar and wind energy for railways. The railway is one of the biggest goods and passenger transport system. It uses current for lighting, fans, air conditioning for passenger trains. At present railway system use diesel or current which is supplied by grid to run the train. The fuel (diesel) may end up at particular time period. The Innovative method to generate current within the train for lights, fans, AC and to some amount to grid by using renewable energy resource. The Design of top surface of the train must be changed to place solar panels which will generate current and another Innovative method is to use of wind blowing in opposite direction to the train moment to generate current. These Innovative methods will reduce cost spent on current consumption by Indian railways.

Key words: Solar energy, wing energy, alternator, motor.

1. Introduction

The conversion of solar energy into electrical energy is done by solar panels. ²Solar panels are arrays of photovoltaic cells, specially designed modules that convert solar energy into electrical energy. This conversion is made possible by the basic properties of matter. Solar panels harvest sunlight and actively convert it to electricity. Solar cells, or photovoltaic cells, are arranged in a grid-like pattern on the surface of the solar panel. It will convert solar energy into electrical energy.

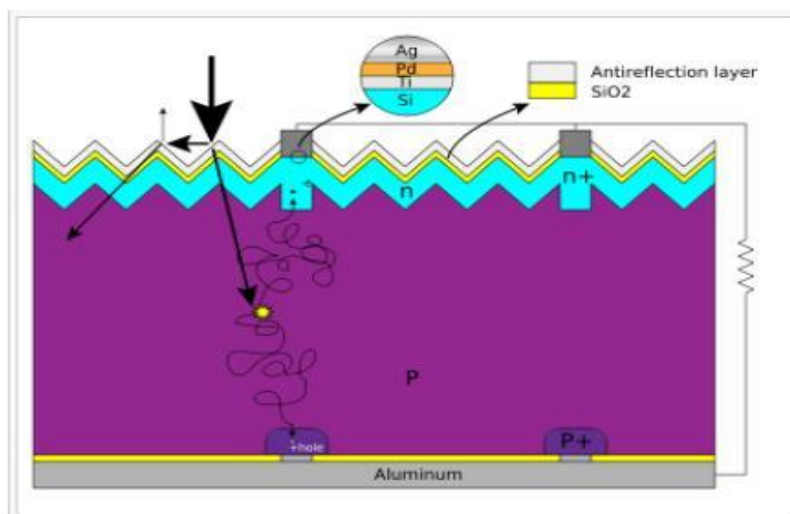


Fig.1. Converting solar energy to electrical energy

2. Methodology

The method of flow process of electricity through solar energy system is shown in Fig.2. Solar panels are placed on the top surface of the train; these panels will convert solar energy into electricity. The generated current is stored in a battery. The current stored in battery is used for various applications like lights, fans, and air conditioning system of passenger trains.

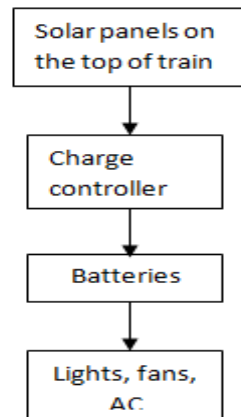


Fig.2. Flow chart for solar energy

The method of flow process of current by wind energy system is shown in Fig.3 with the help of a flow chart. The train body must be redesigned such a way that wind turbine are placed in front of train body frame and at the window areas with an angle to wind direction. These wind turbines are connected to ¹alternators which convert mechanical energy into electrical energy. The generated current by alternators is stored in batteries. The current stored in battery is used for various applications like lights, fans, AC.

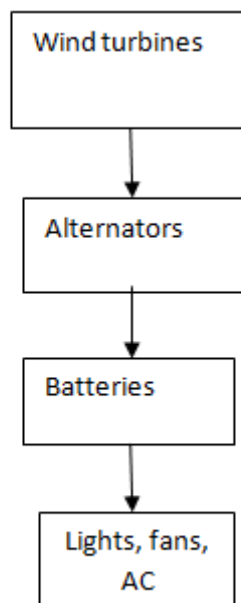


Fig.3. Flow chart for wind energy

3. Design of Model

The Innovative design model of train outer surface is shown in Fig.4. Top surface of the train is used for mounting of solar panels. At each window side a wind turbine can be installed in such a way that the wind flows on the blades of the turbine. The similar arrangement is followed for the entire train.

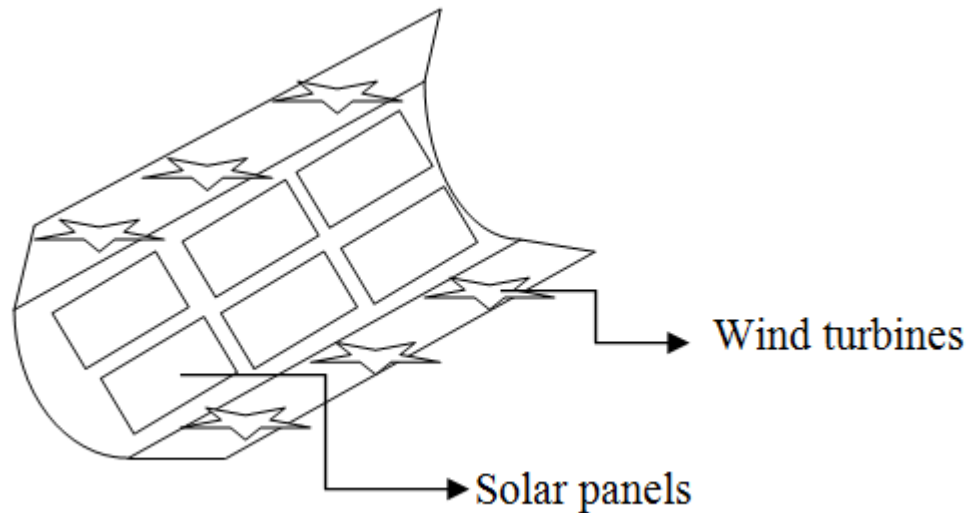


Fig.4. Model design of Innovative method

4. Conclusion

The Innovative method which is described above will reduce the maintenance cost of railways in comparison with existing practice. The current generated by natural resources will save up to 80% of current used from the grid for lights, fans and AC. The only drawback is initial Investment is high.

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