

Interfacing of Solar and Wind Energy

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Abstract:

In parallel to developing, demand for more energy makes we seek new energy sources. The most important application field of this search is renewable energy resources. Wind and solar energy have being popular ones owning to abundant, ease of availability and convertibility to the electric energy this work covers realization of a hybrid renewable energy system for a domestic application, which runs under a microcontroller to utilize the solar and wind power. This project is implemented in accordance with available line-electricity. Batteries in the system are charged by either wind power via a small alternator or solar power via an MPPT Module. System control relies mainly on microcontroller. Power resources and loads in the system are monitored and controlled in real time.

Keywords: Solar panel, permanent magnet DC motor or stepper motor, 7 A chargeable battery, DC voltage combiner, wind turbine etc.

Introduction:

One of the driving forces for social and economic development and a basic demand of nations is energy. Most of the energy production methods are one-way, which requires change of form for the energy.

In parallel to developing technology, demand for more energy makes us seek new energy sources. Researches for renewable energies have been initiated first for wind power and then for solar power. Efficiency of solar power conversion system is ca. 18%, whilst that of wind power is ca.55%. These efficiencies could increase by 50% with beam tracking, beam focusing and wind direction adaptive motion method.

The aim of this work is design and implementation of a domestic solar-wind hybrid energy system under microcontroller. This work is expected to sustain some part of the daily domestic electricity consumption with an efficient utilization o solar and wind power.

Literature Review:

- For the installation of project set required apparatus is collected.
- As per the block diagram interfacing of solar and wind energy set is performed.
- DC voltage combiner is used for interfacing of energy from solar panel and wind turbine.
- Interfaced energy is fed to battery for energy storage.
- This stored energy is used only for DC load and when we needed AC supply inverter circuit is installed.
- Hence AC as well as DC load is start up

Methodology:

- For the installation of project set required apparatus is collected.
- As per the block diagram interfacing of solar and wind energy set is performed.

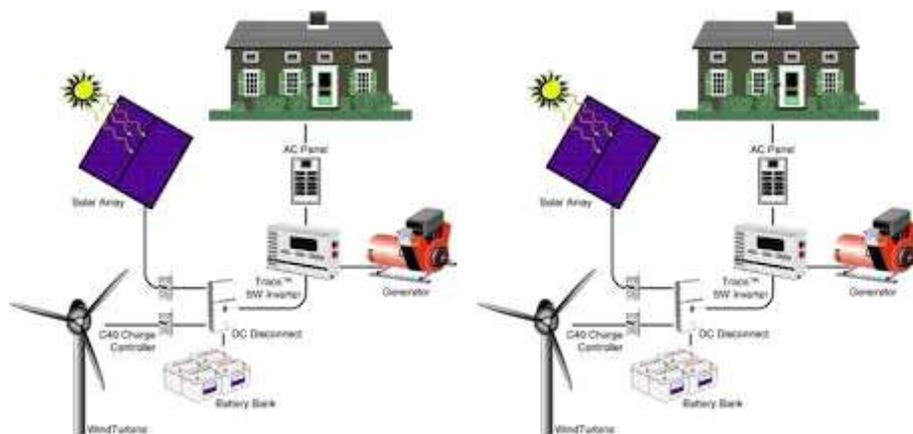
- Equipment required is as follows :
- 20 watt solar panel.
- Permanent magnet DC motor.
- 7 A chargeable battery.
- DC voltage combiner.

Project development:

While doing interfacing of solar wind energy we use single DC voltage combiner, it collects energy from solar panel and alternator and interface this two energy as one output.

We use such type of panel for both AC as well as DC load. This type of installation is suitable for remote area and where transmission of electricity is not possible through transmission line.

It reduce use of non renewable energy sources and it supports to use of renewable energy sources, which are available free of cost in nature.



Observations:

- Analyze power variation under various combinations of air temperature and flow rate entering the expander, in order to quantify the seasonal variation in power output capability
- Select the most suitable thermal storage media.
- Design the solar collector that is optimal for the inlet temperature.
- Perform cost estimates and conduct cost analyses.
- Compare sliding pressure versus constant pressure design for the expander.

Conclusion:

- Due to interfacing the system becomes more reliable.
- Such interfacing can be providing where continuous energy supply is required such as hospital, government offices, train, hostels, etc.