
EFFECT OF SOLAR POWER IN SMART GRIDS

Krushna Chandra Sahoo*, Satyaprakash Rout

Corresponding author: krushna.sahoo@driems.ac.in

Abstract: The renewable energy is vital for today's world as in near future the non-renewable sources that we are using are going to get exhausted. The solar power is a step in saving these non-renewable sources of energy. The basic principle of solar power is to use energy that is stored in a battery during and after charging it from a solar panel. The charged batteries are used for further purposes.. This idea, in future, may help protect our fuels from getting extinguished.

Keywords: D.C. Motor, , smart grid, Solar panel

1.Introduction

Today's grid is outmoded (Most of the grids are designed and installed before the era of microprocessors) and suffering from reliability issues. The Grid control and optimization is modernized in a slow pace all around when compared to the pace of technology advancement. This is mainly due to the huge infrastructure investment involved. The main concept of smart grid is lying on integrating the Information Technology and Electrical usefulness for the development and benefit of consumers as well as industry. A smart grid is defined as a system which is secured, adaptive, interactive and supports the energy flow and has no significant topographical or organizational restrictions.

2. Important features of Smart Grid:

- Smart Metering and improved Reliability
- Improved Interoperability of appliances and equipments connected along with the infrastructure serving the Grid.
- Enhancement in demand and response control organization.
- Distributed power generation and grid interface from every sources of energy like Wind turbines, Solar panels and so on.
- Ecologically friendly by continuing the ratio of renewable generation to total generation and emission control.

3. Solar and Smart Grid:

The benefits of smart grid can be improved through the integration of non-conventional energy sources like Wind, Solar, and Biomass power plants. Solar power takes the important position among all other sources due to its continuous accessibility and cost effectiveness. Solar energy is available in abundance. The light energy radiation from sun in a day is sufficient to power the energy needs of whole world for 365 days. It is assessed that by 2015, the total installed capacity of solar energy will be 33.4 GW.

In addition to this, the Smart Grid technology will open up more opportunities for solar energy by providing a new energy value chain, linking renewable and conventional power generation to reduce carbon dioxide emission, and increasing the utilization through reliable operation. The existence of Smart Grid will support the streamline the distributed solar energy production using rooftop solar arrays to feed electricity into the grid during daylight in order to meet the peak demand. This will result in individual house owners and commercial units investing in solar power generation and will find it comfortable to sell the power which they generate feedback to the local energy utilities and pay their energy bill, or even make a profit out of it. The evaluation of smart grid technology will inspiration a significant demand of solar power system and rooftop solar PV arrays that are Smart Grid well-matched. The development of Smart Grid will allow seamless integration of energy generation from distributed sources, such as rooftop solar PV arrays, along with traditional power generation

plants of various capacity and size. The whole Electricity distribution network will be through an intelligent transmission and circulation topology.

Solar power is gaining more prominence with the introduction of micro grid and de-centralized power plants. The addition of Solar power generation in to Smart Grid will allow advanced flexibility to have localized and right sized power plant with reduced transmission loss, less complexity, zero environmental concerns, and difficult efficiency. During 2012 summer in Germany, the peak solar energy generation touched 20 GW. The presence of micro grid is very much required in the wake of recent northern grid failure in India (largest energy outage in history). It is the time for all power sector manufacturers, utility service providers and individuals to start aligning towards smart thinking for the smarter grid.

4. Challenges and the Way Ahead:

Some of the challenges related to solar energy Generation are:

- High initial cost
- More dependent on sunny weather
- Occupies more space for PV panel installation
- Less efficiency in energy conversion Continuous research and development are ongoing to tackle the challenges pertaining to solar power generation.

5. Conclusion:

The cost benefit of smart grid along with renewable energy sources through environmental impact is huge and hence the environmental benefits will generate billions of revenue every year. Every unit of energy saved by efficient performance of the smart grid will result in reduced expenditure on pollution controls at power plants. It has been found that benefits of the smart grids mainly depend upon System optimization and integration of renewable, whereas end-user energy management will contribute a least percentage.

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Biographical Notes



Prof. Krushna Chandra Sahoo is an Asst. Prof. &HOD of EE&EEE Department at DRIEMS, Cuttack, Odisha. He has 11 years teaching experience. He has research interest in Power System Protection, Control System, Renewable Energy, Distributed Generation etc.



Prof. Satyprakash Rout is an Asst. Prof. of EE&EEE Department at DRIEMS, Cuttack, Odisha. He has 7 years teaching experience. He has research interest in Power System operation, Power electronics, Renewable Energy etc.