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REVIEW ON: DISTRIBUTED PV SYSTEM AN EFFECTIVE SOLUTION FOR ELECTRICAL POWER GENERATION

Vinita Mehto*

* Under the supervision of Prof. B.N. Phadke Department of Electrical & Electronics Engg. IES IPS Academy Indore (M.P.)

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ABSTRACT

Renewable energy is important for replacing the energy generated by natural resource like petroleum, coal etc. Energy consumption from resource like oil and coal must be reduced because of the limited petroleum resources and contribute of pollution to the environment .Renewable energy having more importance due to increase in the cost of petroleum product and other product and the pollution caused by the use of these fossil fuels.Solar power has become a source of renewable energy and solar energy applications should be enhanced. Solar water heating system was a practical application to replace the using of electrical water heater. More research is needed to increase capability and reduce production costs of solar water heating system and make the solar water heating system more efficient and practical. Conversion of solar irradiance to Electrical Energy by PV Cells is the most promising future renewable energy. This energy is freely available and hence its distributed generation and use is a promising feature.

KEYWORDS: PV, Distributed Generator, Renewable Energy Sources (RES), etc.

INTRODUCTION

Energy Play an important role in our life. As the rapidly growth of population and shortage of energy resources use of such type of natural resource is very important significant in modern life.With the rapidly industrialization energy demand is increasing in drastic manner in such situation efficient generation of energy is challenging task. As we know that we have limited natural resource so to overcome from this challenging situation only one solution to start use of renewable energy more and more. Among renewable energy solar energy is unlimited and available everywhere is friendly to environment and it has no health hazard issues.

Solar energy conversion can be done either by using thermal or photovoltaic effect. Many application use solar energy such as: Military and space vehicle and light source electrical vehicle, refrigeration system water pumping, solar pumps offer a clean and simple alternative to fuel-burning engines and generators for domestic water, livestock and irrigation. Solar based system are most effective during dry and sunny seasons, and require no fuel deliveries, minor maintenance, easy to install, naturally matched with solar radiation as usually water demand increases during summer when solar radiation is a maximum, and less expensive than other alternative sources of energy such as windmills.

The consumption of fossil fuels also has a negative environmental impact, in particular the release of carbon dioxide (CO2) into the atmosphere. CO2 emissions can be greatly reduced through the application of renewable energy technologies, which are already cost competitive with fossil fuels in many situations.
The main drawbacks of solar Photo Voltaic cells system is its high cost of installation for producing desired power level of electricity which is due to the high manufacturing cost of solar modules compounded with its low conversion efficiency.

Most of the times, the power conversion system associated with the solar PV generating unit can cost up to 40% of the total cost. Photo Voltaic system, in general, is designed to deliver a specific amount of energy as per the requirement of the applications. Therefore, purchase and installation of all PV system will eventually be based on predicted or guaranteed energy production.

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LITERATURE REVIEW

This segment of this paper reviews a variety of techniques proposed earlier in literature.

James Cust [1] Propose a solution for distributed power system using Photo voltaic cells in India. The Indian climatic conditions are highly suited to solar photovoltaic (PV) technology; India enjoys between 250-300 sunny days per year, translating to between 4-7kwh/m2 (compared to an average of 2.7kwh/m2 in UK and Germany). With capital costs of between $3,000/kw and$6,000/kw (Hansen and Bower 2003)9, solar PV and thermal technologies are very expensive, making them only suitable for small highly dispersed loads or for remote locations. Solar Home Systems (SHS) and small solar panel systems have been used in such niche applications especially in projects that requiring small loads of 20-100W. SHS do not have sufficient capacity to serve small rural industries and groups of villages with 50-100kw demand profiles. However, SHS and solar lanterns have been successful in southern India and are becoming more widely available in northern parts.

The Ministry of New and Renewable Energy (MNRE) under its PV program me has distributed around 610,000 systems, totaling around 20MW of capacity. This includes solar lanterns, home lighting systems, street lighting systems, water pumping systems, and an aggregate capacity of about 1.2 MW of stand-alone power plants.

Nidhiverma et.al, [2], propose a review on the power distribution using photo voltaic cell. Renewable energy is being utilised now in many parts of the country as it is better for the environment and so to us. It is the only reliable source in present and future. Solar energy is abundant and easily accessible. With the help of government the technology can be provided at low cost. Besides the advantage of solar energy it is difficult to execute its implementation as at present it has high installation cost. The people in rural areas do not have knowledge of the presence of such renewable sources and have no idea how to harvest them. These resources are now getting due importance since the non renewable sources are getting depleted at a high rate due to the increase in energy demand. With proper knowledge and technology we can harvest these resources to the maximum extent and the problem of lack of electricity in the Indian rural areas can be solved with ease. Programmes providing subsidy and other benefits can be initiated but with proper research of the area. Care should be taken before the application of program as to whether the inhabitants can carry on the utilisation of the resource or else distributed decentralized generation may be set up.

Rural electrification plays an important role in the growth of economy of the country so its necessary for the government to take proper and effective initiative for its application in India.

Gowtham D[3],propose a technique for the development of distributed power generation system based on solar Photo Voltaic cells. Propose technique develop system employing permanent magnet synchronous generator(PMSG) driven by a variable speed wind turbine and PV array connected to a load and the grid. These PMSG wind turbine connected to a dc-dc converter via three phase diode rectifier and Photo Voltaic cells array along with a dc-dc converter connected to the DC link which operates under a centralized three phase inverter. For the achievement of maximum power the optimum tor Renewable energy is being utilized now in many parts of the country as it is better for the environment and so to us. It is the only reliable source in present and future. Solar energy is abundant and easily accessible. With the help of government the technology can be provided at low cost. Besides the advantage of solar energy it is difficult to execute its implementation as at present it has high installation cost. The people in rural areas do not have knowledge of the presence of such renewable sources and have no idea how to harvest them. These resources are now getting due importance since the non renewable sources are getting depleted at a high rate due to the increase in energy demand. With proper knowledge and technology we can harvest these resources to the maximum extent and the problem of lack of electricity in the Indian rural areas can be solved with ease. Programmes providing subsidy and other benefits can be initiated but with proper research of the area. Care should be taken before the application of program as to whether the inhabitants can carry on the utilisation of the resource or else distributed decentralized generation may be set up. Rural electrification plays an important role in the growth of economy of the country so its necessary for the government to take proper and effective initiative for its application in India.

Mr. Prince A Basheer[4], propose the method for the distributed power based on photo voltaic cells. Generated sinusoidal active power to the grid at unity power factor This thesis has presented an advanced control of an existing grid interfacing inverter to improve the power quality at PCC for a 3-phase 4-wire DG system. It is clear that the grid-interfacing inverter can be effectively used for power conditioning without affecting its normal operation of real power transfer. Distributed power generation systems used for power transmission are PV panel,

Fuel stack and Wind energy system. They are connected to inverter by means of a dc link capacitor. The grid-interfacing inverter with the proposed technique can be used to inject real power generated from RES to the grid, and can operate as a shunt Active Power Filter (APF). This approach thus eliminates the need for additional power conditioning equipment to improve the quality of power at PCC. It should be possible to develop the power-electronic interface to optimize the energy conversion, transmission and reactive power, to minimize harmonic distortion, to achieve at a high efficiency over a wide power range, and to have a high reliability and security. The new power-electronic technology plays a very important role in the integration of renewable energy sources into the grid. Here the control is done by the grid interfacing inverter using PI controller and PWM technique. Extensive MATLAB/Simulink simulation results have validated the proposed approach It is further demonstrated that the PQ enhancement can be achieved under different scenarios. The current unbalance, current harmonics and load reactive power, due to linear, unbalanced and non-linear load, connected to the PCC, are compensated effectively such that the grid side currents are always maintained as balanced and sinusoidal at unity power factor. Using the power generated from RES, the grid-interfacing inverter with the proposed control approach can fulfill the total load active and reactive power demand but can also delivers the excess power factor.

T.Thillainayaki[5],proposes method for distributed power system using photo voltaic cells. The current unbalance, current harmonics and load reactive power demand are compensated effectively such that the grid currents are always maintained as balanced and sinusoidal at unity power factor. When power generated from RES is more than the load power demand, the grid interfacing inverter delivers power to the grid at unity power factor.

[6] Propose a review for the distributed power system based on photo voltaic cell. Transmission is currently the responsibility of each state and each state has its own energy pricing. Also sometimes the load center (demand) and the solar resource (large areas in desert) can be separated by state borders, which leads to the complication of which state has to build the line and which price has to be used to buy the energy. Also, building lines passing through tribal areas requires special permission from the tribes that could lead to further complication. From the standpoint of Independent System Operators (ISOs), they do not want to invest billions in building a transmission lines for a project which may fail to take off leading to a vicious cycle where in the solar company finds it difficult to get financing without transmission lines and the ISOs are unwilling to commit to building transmission lines without assured financing for the companies.
{Problem of intermittent resource, mitigation through communication, scheduling}

CONCLUSION

A review of major solar photovoltaic cell technologies comprising of photovoltaic power generation technique, Hybrid photovoltaic (PV) generation, different light absorbing materials, performance and reliability of PV system, distribution and control is presented. The various applications of solar photovoltaic such as building integrated system, desalination plant, space, solar home systems and pumps are also presented. From these papers we conclude that distributed generation will have to overcome-

- High peak load shortage.
- High T & D losses.
- Problem of rural electrification.
- Extension of the grid in remote and inaccessible areas.
- Faster response to new power demand
- Problem of grid failure.

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