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Literature Review on Solar Wiring System

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ABSTRACT: This project include the making of reliablewiring for grid tied solar system. It develop to solve the problems about the transmission of electricity problems in institutional area. It's all about the related to the reliable connection of solar system, safe transmission in the grid tied solar system, also the management of power in the institution, houses and industries. Basically this system is made for the engineering college .the features of this system is it is battery less system which reduce the cost of system. It not only include about the wiring but also about the installation of grid tied solar system. This system is made up with the terms and rule of the manufacturer of system component and wiring. Design of this system is based on the all system which made in the country.it is also for the all people who want to install solar system. This system is not related about the replacing the current system but it including the better connection which make current system better with minor replacement. And finally it is natural source of energy which is not limited and also about the reducing the light bills.

KEYWORDS: grid wiring, grid tied, solar power, connection of solar wiring, battery less.

I.INTRODUCTION

This project is being made with the aim of developing a standard procedure for the design of large-scale institutional grid-connected solar with PV systems using the slab of building with proper. The standard procedure developed will be acceptable for the designing of a 5KW grid tied solar PV system for GCOE (Godavari College of engineering)-Jalgaon. The performance of the 5KW grid-connected solar PV system will also be explanation about the guaranteed life of the system using solar PV system.

Grid-connected solar Photovoltaic (PV) systems employ the direct conversion of sunlight into electricity which is fed directly into the electricity grid without storage in batteries. This will be a very good way to boost the existing electricity production capacity in the country, which is mainly from hydro and thermal sources. This will contribute positively to the worsening energy situation in the country. Solar energy, being a renewable source, will also provide energy without pollutants and greenhouse gas emissions. This can go a long way to help mitigate the adverse effect of global warming as well as contribute to sustainable energy development. It will also set the pace for similar projects to be developed in other institutions thereby helping attain the target of 10% renewable energy in the electricity generation mix set by the government**.**

The main objective of the project is to design a 5KW grid-connected solar photovoltaic system GCOE-Jalgaon using the roofs of buildings and to analyze the technical and financial performances based on the results of simulation software packages.

II. LITERATURE SURVEY

In recent year solar system is most popular things for the homes and also for the business in India. Believe it or not, this desire to use the sun to power people's electricity needs is anything but new. Ever since scientists discovered materials that can produce electrical current by simply being exposed to light, people have been excited about this energy source. Get ready to dive into the exciting and ever-expanding world of solar power with the overview we provide in this report.

The operating principles for modern PV cells were first discovered in 1839 by a French physicist named A.E. Becquerel. After that, a number of scientists played with and improved on Becquerel's original discovery. In the 1950s, Bell Labs created the first piece of PV technology designed for use in space. This technology soon found its way back down to earth for use in telecommunications applications in remote areas. In the 1970s and 1980s, people began using PV modules to charge batteries and then used those batteries to run various lights and appliances in their remote homes. These early PV pioneers helped set the stage for today's PV industry.

The first PV cells weren't very efficient or widely used outside of space programs. They were also quite costly. Yet over the years, researchers and manufacturing companies increased efficiencies and reliability and managed to drive down costs drastically. All of these contributions have led to the widespread use of solar modules and their availability

to you and me. In the following sections, I describe some common PV applications, a few brief pros and cons of PV systems, and the future of the PV industry.

Modern PV systems can be found in a wide variety of applications. The power calculators, pump water, help offset the energy used by floodlights along highways, and, of course, power homes and businesses.

For you and me, electricity is available nearly everywhere we go, and PV systems are able to integrate with the existing utility grid. In remote, developing areas, PV systems provide valuable energy for powering lighting systems, running refrigerators, and helping deliver clean drinking water

III. METHODOLOGY AND DISCUSSION

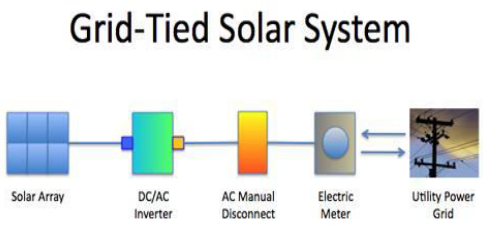

Fig. 1 simple grid tied solar system

In this we used the grid tied system. Very Simple architecture of this system shown in figure by which we can easily guess the logic and also the idea about its implementation and method of installation of solar system.

Grid tied solar system has connection for this system .it include the some component and wiring for this system. The component are PV plates, dc/ac inverter, ac manual disconnect and dc manual disconnect, electric meter, and grid.

Simple operation of this system simple as per the diagram .the solar array absorbs the energy from the sun rays then this energy provided to the dc to ac converter .as per name it perform the dc to ac power conversion. This ac power is applied to the ac disconnect .this circuit is mainly placed for the safety and switching purpose. Then it is ready for institutional or residential uses.

The connection between this is play main role for the whole system which depend on the wiring of system. The good quality of wiring is necessary for the system performance. Wiring should be colored as per the standard.

The wiring standard means thecolor of wired is used for the connection. It help to understand the connection of the system. Electrical wire insulation is color coded to designate its function and use. For troubleshooting and repair, understanding the coding is essential. The wiring label differs according to AC or DC current.

There are several type of wire. The two common conductor materials used in residential and commercial solar installations are copper and aluminum. Copper has a greater conductivity than aluminum, thus it carries more current than aluminum at the same size. Aluminum may be weakened during installation especially during bending, however it is less expensive than copper wires. It is not used (not permitted) for interior home wiring, as they are used in larger gauges for underground or overhead service entrances and for commercial operations.

A.SELECTION OF CABLE AND CABLE SIZE FOR A SOLAR PV PLANT

In the solar system selection of wire is much more important as well as selection of PV module, inverter and other component of system. Cables are the medium to transfer electricity from PV array toinverter. Even scientist take science to another level but they also still not discovered the way by which they can transfer power without cable or wire.

B. DETAILED INSTRUCTIONS FOR USING THE WIRE SIZE CALCULATOR

Step 1 - The first step is to decide on the voltage for your system: 12, 24, or 48 volts. The main issue is the wire size needed for the (usually) fairly long run to the Solar Panels. Simply stated, the higher the voltage, the smaller the wire size that is needed to carry the current. The formula P=E*I says that the wattage/power P is equal to the voltage E times the current I in a circuit. So, you can see that as the voltage goes up the current goes down since E*I always = P. (More details on formulas are available under Watt & Power). Less current means smaller (less expensive) wire. So, as a

general rule, you would normally choose a higher system voltage. The only reason not to would be if you planned on using lots of 12 volts DC only equipment. Also, keep in mind that whatever system voltage you decide on 12, 24, or 48, all of your equipment must work on this voltage. If you choose 24 volts for example, your solar panels, charge controller, inverter, and battery bank will all need to be 24 volts. By playing with the numbers in the Wire Size Calculator you can get an idea of what voltage will be best for your system.

Step 2 - Next, enter the maximum amps/amperage that your solar panels will produce. This will be the rating of one panel times the number of panels in your array. If you put two 12 volt panels in series to increase the voltage to 24 volts, you would count the two panels as one. The same would be true if wiring two 24 volt panels to equal 48 volts. The reason for this is that in a series circuit the voltage increases, but the current or amperage stays the same. More details on this are available under Battery Wiring Diagrams which explains series and parallel wiring. For example: 10 solar panels rated at 5 amps at 12 volts. You want a 24 volt system so you wire 2 panels in series to make 24 volts. You do this 5 times. The 5 pairs will be wired in parallel where the current adds to give you 5 sets times 5 amps per set equals 25 amps. Enter the 25 as the maximum amps your wires need to carry.

Step 3 - This is the distance in feet from your solar panels to the charge controller and battery bank location. Even though you will actually be running 2 wires, one negative & one positive, do NOT double the distance. The Wire Size Calculator assumes this and does it for you in the calculation.

Step 4 - The loss you will get in the transmission of the electrical power from your solar panels to your equipment location is due to the resistance of the wire. This cannot be avoided. A common practice is to use 3, 4, & 5 percent figures for 12, 24, and 48 volt systems respectively. I like the 3 percent choice for all systems, but even 5 percent is not too bad. The Wire Size Calculators' answers are based on copper wire using the standard AWG (American Wire Gauge) sizes. Also note that 00, 000, and 0000 gauges (generally referred to as 2/0, 3/0 and 4/0 are progressively larger in size and are represented in the Wire Size Calculator as -1, -2, and -3. If you enter numbers that would result in sizes larger than -3 (pretty darn big), you will get an error message to that effect. In this case, the best response would be to increase system voltage (resulting in less current required) or/and increase the percent of loss.

C. GROUNDING

Grounding is a method of giving electricity the most effect way to return to ground via the service panel. You see current flows from the panel to the outlet or device to power it up. The neutral wire is the return path for unused current. The ground wire is an additional path for electrical current to return safely to ground without danger to anyone in the event of a short circuit. In that instant, the short would cause the current to flow through the ground wire, causing a fuse to blow or a circuit breaker to trip.

Ground wires used on power tools, vacuums, and other portable devices are made much safer when they incorporate the use of a third prong, thus a ground connection. Often people do an unthinkable act of cutting off the ground tab of an extension cord or power tool. This usually happens when the outlet being used has no ground, thus a polarized plug.

IV. EXPERIMENTAL RESULT

In this grid tied solar system without battery and battery backup we used highly reliable wiring. This wire has good transmission rate of energy with minimum losses. In this we used black and red dc wire for negative and positive as per the standard. Also this wiring is provide the connection for the different component in the system. In this system we used 16solar panel and each panel has 72 cells in which each cell produce the near about the 4.2 volt. This reading measured on the inverter display which produce near about 5kw or overall system

V. CONCLUSION

Solar Photovoltaic and thermal power plants will play an important role in the overall energy supply. The grid parity is likely to be achieved around 2017-2020.

Solar radiation data is available from several sources including satellite simulations. The data collection and simulation is a complex procedure and can have inaccuracies varying from 3 to 20%. The most reliable data is ground measured with accurate instruments.

The performance (Capacity utilization factor) CUF depends on several factors including the solar radiation, temperature, air velocity apart from the module type and quality, angle of tilt(or tracking), design parameters to avoid cable losses and efficiencies of inverters and transformers. There are some inherent losses which can be reduced through proper designing but not completely avoided.

The modules show degradation in power output through years of operation. It is observed that quality modules is very important in determining the extent of degradation. The improvements in technology and quality assurance have reduced this degradation considerably. Several manufacturers are proposing extended warranties although with a safety of margins. Based on the results of past studiesand trends, one can fairly assume degradation of maximum 0.5% per year from 3rdyear of deployment. This can also be compensated by addition of 5 KW of modules per year from 4th year to 24th year of operation requiring an expenditure of Rs.4 to 4.5 lakhs per year at current market rates.

REFERENCES

1. Daily Electricity Generation Report, Bangladesh Power DevelopmentBoard, April 10, 2011.
2. Developments in Renewable Energy Technology (ICDRET), 2009Print ISBN: 978-1-4244-6012-0.
3. Institute of Electrical and Electronics Engineers (IEEE), IEEE1547, Standard for Interconnecting Distributed Resources with Electric Power System.
4. Solar Energy Grid Integration Systems - "SEGIS": Concept Paper, Sandia National Laboratories, Albuquerque, NM, October 2007.
5. R. Messenger and J. Ventre, Photovoltaic Systems Engineering, 3rd ed. Boca Raton, FL: CRC Press, 2010