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Evaluation of energy need to finding the number of panels needed

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ABSTRACT

Energy The ability to accomplish work. Work is accomplished when objects are movedObjects moved can be very small, e.g. molecules, atoms, electrons, or protons or they can be much larger objects. When forces act on objects and perform work, energy is converted from one form to another (note the law of conservation of energy).Energy resources are broadly classified as:Conventional energy resources (fossil fuels and nuclear) Non-conventional energy resources or renewable resources(solar, biomass, wind, hydro, geothermal, ocean etc)Polycrystalline solar panels are also mad from silicon. However, instead of using a single crystal of silicon, manufacturers melt many fragments of silicon together form the wafers for the panel. Polycrystalline solar panels are also referred to as “multi-crystalline,” or man crystal silicon. Because there are many crystals in each cell, there is to less freedom for the electrons

Key Words: Non-conventional energy resources.

INTRODUCTION

Energy and development Modern energy = an engine of developmentEssential for meeting basic human needs - improving social welfare - achieving economic development. Energy demandaccess to media communication including distance, learning, and transport, essential for micro-enterprise development, providing clean water, lighting to extend activities after dark, large industrial applications, improving health sectors e.g. Refrigerators for drugs, agricultural productivity, access to energy is essential for improved agricultural methods and irrigation, increased comfort by mobile phone charging, tv sets, and computersphotovoltaics: this comes from the greek word; photo, phot which means light and volt which means electricity. Thereforephotovoltic means light electricity, it’s the process of directly converting light into electricity. A simple photovoltaics example is solar-powered calculators, which use a small photovoltaic cell to power the calculator.Irradiance; the rate at which radiant energy is incident

on a surface per unit area of surface, solar irradiance integrated over a period of time is called solar irradiance (total power from a radiant source falling on a unit area)

irradiation; is the measure of solar energy density incident per unit area on a surface - determined by integration of irradiance over a specified time, usually an hour or a day.insolation; is a term used to represent solar energy irradiation. Irradiance and irradiation; both apply to all components of solar energy the quantities depend on location, weather conditions and time of the year, also they depend whether the surface of interest is shaded or horizontalSolar thermal power is used for heating water. It's a simple technology; the panel on your roof are the collectors of sunlight, thus heating up the liquid in the tubes which is then transported into your cylinder ready for use.Module power (pmax) =280wSolar module definition: also called solar panels, a solar module is a single photovoltaic panel that is an assembly of connected solar cells. The solar cells absorb sunlight as a source of energy to generate electricity. An array of modules are used to supply power to buildingsopen circuit voltage (voc) =39.01vThe open-circuit voltage, voc, is the maximum voltage available from a solar cell, and this occurs at zero current. The open-circuit voltage corresponds to the amount of forward bias on the solar cell due to the bias of the solar cell junction with the light-generated current.short circuit voltage (isc) =9.20aA short circuit is an abnormal connection between two nodes of an electric circuit intended to be at different voltages. This results in an electric current limited only by the equivalent resistance of the rest of the network which can cause circuitDamage, overheating, fire or explosion.Maximum power voltage (vmpp) =31.81vThevmpp is the voltage when the power output is the greatest. It is the actual voltage you want to see when it is connected to the mppt solar equipment (like an mppt solar charge controllerOr a grid-tie inverter) under standard test conditions short circuit voltage (isc) =9.20aA short circuit is defined as a connection between two nodes that forces them to be at the same voltage. In an 'ideal' short circuit, this means there is no resistance and thus no voltage drop across the connection. InReal circuits, the result is a connection with almost no resistance.maximum power current (impp) =8.81aThe current at which maximum power is produced by a solar panel • maximum system voltage =1000vdcIt means you can string a lot of panels in series, to make a high voltage array, for powering a grid-tie inverter. A year ago, 600v was the common voltage, the inverters run up to 500v input, for less amps and less loss. (20 panels in series is only 4 amps, but 550v) protection class =ii; there may be several pv strings connected in parallel to achieve higher currents and subsequentlyMore power. Pv systems that

have three or more strings connected in parallel need to have each string protected.overcurrent protection rating (a) =15An overcurrent protective device must be able to withstand the destructive energy of short-circuit currents maximum power voltage (vmpp) =31.81vThevmpp is the voltage when the power output is the greatest. It is the actual voltage you want to see when it is connected to the mppt solar equipment (like an mppt solar charge controllerOr a grid-tie inverter) under standard test conditions short circuit voltage (isc) =9.20aA short circuit is defined as a connection between two nodes that forces them to be at the same voltage. In an 'ideal' short circuit, this means there is no resistance and thus no voltage drop across the connection. InReal circuits, the result is a connection with almost no resistance. Maximum power current (impp) =8.81aThe current at which maximum power is produced by a solar panel • maximum system voltage =1000vdcIt means you can string a lot of panels in series, to make a high voltage array, for powering a grid-tie inverter. A year ago, 600v was the common voltage, the inverters run up to 500v input, for less amps and less loss. (20 panels in series is only 4 amps, but 550v) protection class =ii; there may be several pv strings connected in parallel to achieve higher currents and subsequentlyMore power. Pv systems that have three or more strings connected in parallel need to have each string protected. overcurrent protection rating (a) =15;An overcurrent protective device must be able to withstand the destructive energy of short-circuit currents

OBJECTIVE OF THEWORK

It has been shown that increasing the panel size increases battery life, particularly in a climate with frequent cloudy conditions.

With the cost of solar panel capacity falling but the cost of batteries slowly increasing, it makes good economic sense to increase the panel size by 20% to 30% over the minimum.

This can dramatically improve the reliability of the system during cloudy weather and can greatly extend the life of the battery. This reduces the cost over time as battery replacements are now the most expensive component in a home PV system.

Result:-

A battery is needed because the appliances use electricity at different times and at different rates than the panels produce.

• For the system to work properly, the battery should be deep-discharge and large enough to store enough energy to operate the appliances at night and on cloudy days.

• Also, for the battery to last a long time, it should not be discharged too much or too often.

• Remember; battery life depends on how much discharge occurs before recharging.

• So another way of sizing a battery is that the battery should be large enough so that one day's use of the appliances will discharge it no more than one-fifth of its full charge.

• The rule for battery size is to install a battery with at least five times as much capacity as needed to operate the appliances for one day.

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