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A Review of Hybrid Solar Panel with Efficiency Improvement

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Abstract-It is big issue energy facing in several country because tremendous amount of population increase The best of solution of energy then we can move towards the solar energy best source .In this project we will discuss about we can combined PV/T system in install in same panels .we can get electricity as well as hot water as output so can reduced the cost of the system. we also modify the system in such way that efficiency of the system is improve with help of cooling water tank .As known that when temperatures is increases voltage will be drop so that we can get voltage must be constant.

Keywords-PV/T solar panel, efficiency, temperature

1. INTRODUCTION

A hybrid PV/Thermal (PVT) system, in which heat from the PV panel is removed by a working fluid, can simultaneously convert solar energy into electrical and thermal energy. Compared with separate PV or thermal systems, the hybrid solar panel has several advantages, including high total energy conversion efficiency, low cost, and small installation areas. Solar PVT applications can provide heat and electricity. To achieve high efficiency and significant amounts of power and heat from PVT systems, PV module should be cooled, particularly in areas with hot and humid climate. Thus, the overall efficiency of solar panel is improved. Temperature fluctuations in the base fluid (water) of PVT are significantly less than those in the air-based PVT collectors, which are subjected to varying solar irradiance levels. Over the past decades, various PVT systems or collectors that use water as working fluid for heat removal have been numerically and experimentally studied PV-T technology provides a particularly . They heat and electricity is required at the same time. The energy sector is in transition worldwide because of increasing demand for energy; significantly fluctuating oil prices; stronger desire for energy supply security and independence; and in response to sustainability, conservation and environmental considerations.

2. BACKGROUND

The following are the three different types of seed sowing which are used in past few years.

The combined solar panels provide abilities of a solar panel and an water cooler. This means that it can warm water for the household or where the hot water is essential, and produce electricity at the same time. This mixture gives a higher total effect of output per panel. This combination also provides upwards of 20% more produced energy. A traditional solar panel converts near about 15% of the energy from the sun to energy. The remaining power – most often in the form of heat remains unused full. This has a negative impact on the execution of the panel on impact and long time. In the mixture on the Lists of components hybrid panel, the energy is used for the heating of water on the back of the panel.A hybrid solar panel produces electricity and hot water simultaneously. The combination of both technologies allows better use of the irradiation, producing more energy per surface than the both technologies separately.

3. LITERATURE REVIEW

Technology used for efficiency improvement of solar panel:

Solar panel efficiency depends on various factor such as solar intensity (brighter the sunlight, the more there is for the solar cell to convert), temperature, dust which decreases the efficiency of panel etc.

Following methods are used to improve efficiency of solar panel:

3.1 Solar Tracker

Solar tracker is directly move toward the sun. These devices change their beginning throughout the day to follow the sun's path to optimize energy capture. In photovoltaic systems, trackers help small the angle of incidence between the revenue light and the panel, which rises the amount of energy the installation generate.

3.1.1 Types of Tracker

1. Single-axis tracker
2. Dual-axis tracker

Single-axis solar trackers swing on one axis moving back and forth in a single direction. Dual-axis trackers continually face the sun because they can drive in two various directions. Dual-axis tracking is typically used to orient a mirror and redirect sunlight along a fixed axis towards a stable receiver. Because these trackers follow the sun vertically and horizontally they help obtain greatest solar energy generation. There are also various methods of driving solar trackers. Passive trackers move from a compressed gas fluid drive to one side or the other. Motors and gear trains direct active solar trackers by means of a controller that replay**.**The system receives sunlight on to the cadmium sulphide (CDS) photovoltaic cells where the CDS reacts as the main solar tracking

sensor. The sensor feed back to the FPGA controller by using an analog-to-digital (A/D) converter. The processor is the main control core and adjusts the two-axis motor so that the platform is optimally placed for efficient electricity generation. Selecting a solar tracker depend on system size, electric rates, land constraints, government incentives, latitude and weather. Utility-scale and large projects usually use horizontal single-axis solar trackers, in other end dual-axis trackers are mostly used in smaller residential applications.

3.1.2 Advantages

The use of solar trackers can increase electricity production by around a third, and some claim by as much as 40% in some regions, compared with modules at a fixed angle. In any solar application, the conversion efficiency is improved when the modules are continually adjusted to the optimum angle as the sun traverses the sky.

3.1.3 Disadvantage

Adding a solar tracking system means added more equipment, moving parts and gears that will require regular control and repair or exchange of broken parts. If the solar tracker system breaks down when the solar panels are at a top angle, the loss of production until the system is work again can be substantial.

3.2 Dust Cleaning

Effect of dust on the of solar PV panel:The electrical parameters of solar panel are responding to the dust density so it is very essentials to give auto cleaning mechanism to remove the dust particles from the surface of the panel in order to ensure high performance. Dust is the lesser acknowledged factor that significantly influences the performance of the PV installation. Due accept sunlight from go the solar cells in your pv panels. Due to this solar panels efficiency reduced.Following methods are used to clean dust from solar panel.

3.2.1 Rugged Robot

Deserts are sunny, so they're ideal for solar energy. But they're also very soiled, so solar panel efficiency reduces. (lose about 0.4-0.8% in efficiency per day). But hosing panels down with water in the center of an arid area is problematic on so many levels. And anything that demands a lot of human labor in the middle of a remote desert where temperatures can go over 122 degrees Fahrenheit during the day. These are the problems that the NO-water Mechanical Automated Licking Device (NOMADD) robot from Saudi Arabia is trying to solve.The little robots are connected on tracks along rows of panels, and at least once a day they pass over the panels, cleaning them with a brush designed and without any water expected. This make a big difference over manual cleaning which only happens every week or two most of the time. A single NOMADD can clean a row of panels about 600 feet long, with plans to improve that to 900 feet. Because each row of panels has its own NOMADD robot, they can work in similar and it doesn't take longer to clean a gigantic solar farm. The NOMADD is not a cleaning solution developed in mild conditions. It is asystem designed, developed and tested in Saudi Arabia for the harshest desert conditions.

3.2.2. Self-Cleaning

The self-cleaning technique wasprocessed by Boston University professor use in rovers another machines sent to space missions to the moon and to Mars. The technology involves the deposition of a transparent, electrically sensitive material on glass or on a pellucid plastic sheet that cover the panels. Sensors monitor dust levels on the surface of the panel and strength the material when dust concentration reaches a critical level. The electric ions send a dust-repelling wave cascading over the surface of the material, lifting away the dust and travel it off of the screen's edges. Within two minutes, the process removed about 90 percent of dust on a solar panel. The network reportedly requires only a small amount of the electricity generated by the panel for it to work Coating the surface of solar cells can increase their efficiency and reduce maintenance costs, especially for large-scale installations. Self-cleaning solar panels would be especially effective in large installations. The desert environments where many of these installations reside often challenge the panels with dust storms and little rain. Currently, only about 4 percent of the world's deserts are used in solar power harvesting. Conventional methods of cleaning solar panels usually involve large amounts of water which is costly and scarce in such dry areas.

3.2.3.Robotic Vacuum Cleaner

Coating the surface of solar cells can rise their efficiency and decrease maintenance cost particularly for large-scale installations. Self-cleaning solar panels would be particular emphatic in large installations. The desert environments where many of these foundations reside often challenge the panels with dust storms and little rain. Currently, only about 4 % of the world's deserts are used in solar power harvesting. Conventional technology of cleaning solar panels usually participate large amounts of water which is expensive and scarce in such dry areas.

4. OUR PROPOSED SYSTEM

Hybrid Solar Panel:

The hybrid panel combines the abilities of a solar panel and an air heater. This means that it can heat water for the household, and produce electrical power at the same time. This combination gives a higher total effect of output per panel. This combination also provides upwards of 20% more produced power. A traditional solar panel converts approx. 15% of the energy from the sun to power. The remaining energy – most often in the form of heat remains unused. This has a negative effect on the performance of the panel on effect and lifetime. In the combination on the hybrid panel, the energy is used for the heating of water on the back of the panel.

Hybrid solar panels produce electricity and hot water simultaneously. The combination of both technologies allows better use of the irradiation, producing more energy per surface than the both technologies separately.

Figure 4.1 :- Working Model of The System

5.CONCLUSION

This systems utilized in large applications in various fields such as space heating, domestic and industrial water heating, distillation of water and drying as well as electricity generation. As the thermal collector integration also provides simultaneous cooling of the PV system during electricity generation, it enables the efficiency of the system to be increased as compared to conventional methods. This project deals with PV panels and thermal collectors, which are the main components of PV/T systems, and discusses the advantages of the system. Advanced of photovoltaic-thermal combination, regardless of whether single fluid or a combination of fluids are used, have increased provide the overall efficiency of the system and electrical yield from the PV module by reducing operating temperature of the solar PV panel.

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