ENHANCEMENT THE FRESH WATER HARVESTING FROM HYBRID PV/T SOLAR STILL TECHNIQUES

Abstract

The solar energy is one of the very popular non-conventional energy. The Solar photovoltaic (PV) power generation is depending on irradiation (light energy) and heat energy (resistance). Non-conventional energy basis is maintained on all zones of expertise, particularly the variation of solar energy for numerous resolutions. The current tentative study is approved out to advance the competence of PV/T solar still with improved evaporation and compression technique. A DC power-driven blower is static inside a solitary slope solar still which growths the commotion of evaporated vapor since the salty water confidential the solar still while the condensation is enhanced with shelter chilling method. A hybrid photovoltaic/thermal (PV/T) energetic solar still and a conservative passive solar still with solo incline were designed, fabricated and investigated at three dissimilar water pits. For the advanced making of distillate water, a heater driven by solar (PV) was combined in the planned hybrid energetic still. Solar PV module was chilled by the salt water which enhance the productivity of the solar PV as well as the distillate water making. The everyday harvest from the planned hybrid energetic (PV/T) solar still is 6 times higher than the conservative passive still. This novel system of renewable energy related power and distillate water making is extremely self-supportable in the isolated zones. From the investigational learning it is clear that, the planned hybrid energetic (PV/T) solar still provides an improved complete thermal and electrical competence, that is nearly 25% higher than the conservative passive one.

Keywords: Solar Still, Active, Passive,

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Efficiency, Power, incline

I. INTRODUCTION

Overview: The important source of energy is Sun. The world is absorbed yearly 160 units of energy from solar(sun), which is 20,000 times the necessity of manhood on the World. Around of the Solar Energy reasons vaporization of water, prominent to rains and formation of rivers etc. Roughly of it is employed in photosynthesis which is important for provisions of life on world. Human has tried from time earliest to connect this endless source of energy. But has been capable to tap only a negligibly fraction of this energy till today. Photovoltaic (PV) power producing structures transform the sun's energy straight into electric power by help of contemporary semiconductor resources. PV structures harvest fresh, trustworthy power without overriding fossil fuels and are used in an extensive variety of applications. Nearly are called a "stand-alone or off-grid" scheme, which resources they are the individual source of energy to a home-based, water propel or any additional load. Stand-alone structures can be planned to operate with or without battery backup. Isolated water propels are frequently planned to operate without battery backup, meanwhile water propelled out of the ground during daytime periods can be Deposited in an allotment tank for use anytime. In difference, stand-alone home energy schemes frequently collection energy produced throughout the day in a battery bank for use at night. Stand-alone schemes are well economically when associated to replacements such as usefulness line extensions.

Equally, the client can draw required energy from the usefulness when power from the PV structure is inadequate to energy the construction's loads. Under this prearrangement, the client's regular electric convenience notice reproduces lone the net amount of power customary from the electric usefulness.

The high preliminary charges of PV connection call for a means of sizing these schemes to be capable to competition predictable loads and submissions. Sizing competitions the operator's power requirements with the suitable solar scheme's mechanisms.

1. **Solar Still:** However solar PV is active one, the consequence of high value of heat performances as one of the key drawback to increase overhead. Growth in temperature of the solar PV reasons the reduction in the competence. Solar still is a expedient which practices solar heat power for making fresh water from the salty and brackish water. The brackish or salty water (salt ~10,000 ppm) can be sanitized by the use of solar still. It may be whichever energetic solar still or passive solar still.

   The solar still can be categorized into numerous kinds related on several features. It is extensively categorized into two kind (i) Passive solar still and (ii) Energetic solar still.

2. **Passive solar still:** The passive solar still has a accepted slow evaporation procedure does not requirement any exterior source to hotness the salty water in the sink. There are numerous kinds of passive solar stills. Around of them are sole slope passive solar still, dual slope passive solar still, triangular passive solar still and pyramid passive solar still and the single slope passive solar still is shown in Figure 1.1.

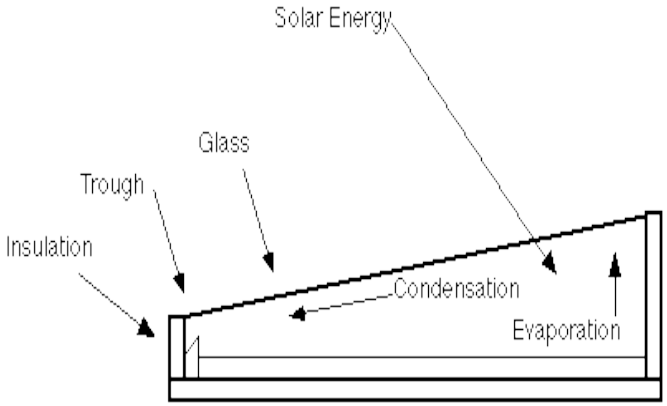

Figure 1: Single slope passive solar still

3. **Energetic solar still:** Energetic solar still practices an outside temperature source to hotness the basin salty water to evaporate. The harvest of the energetic solar still (more than 7 L/day) is moderately high than the passive solar still (around 2 L/day). The outside source of the energetic solar still is from the solar PV then that energetic solar still is called as the hybrid Photovoltaic/Thermal (PV/T) active solar still. The single slope Energetic solar still is shown in Figure 1.2.

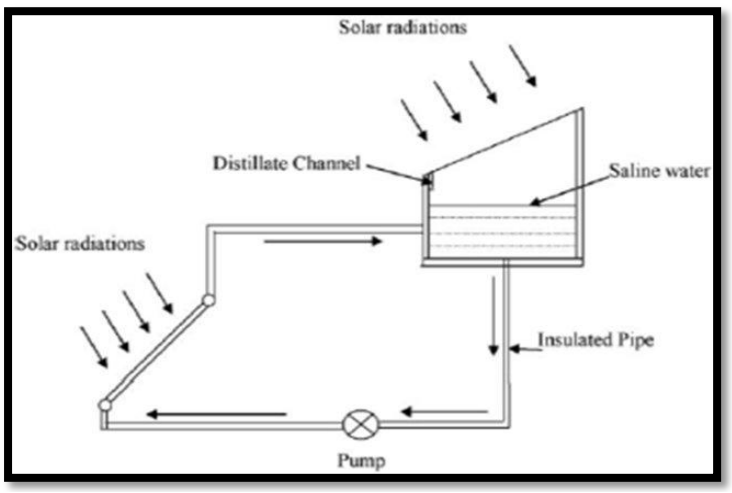

Figure 2: Single slope energetic solar still

The energetic solar still is commonly confidential as given below:

- High heat active solar still
- Pre-heated water active solar still
- Night-time making active solar still.

Related upon the strategy and construction, the solar stills are confidential as follows.

- Sole slope solar still
- Dual slope solar still and
- Inclined solar still.

4. **Sole slope solar still:** Single slope solar stills achieve improved than dual slope passive solar stills on the basis of yearly harvest, yearly energy, and yearly energy and energy financial limitations. Sole slope solar still is additional confidential into conservative sole slope solar still, opposite absorber, stepped type and with condenser category.

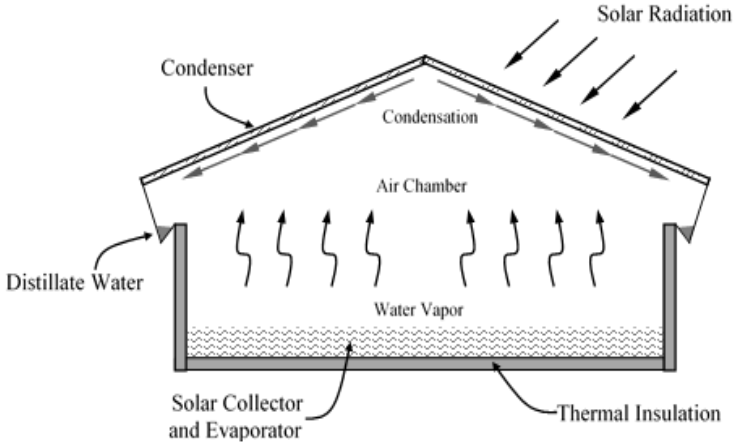

Figure 3: Dual slope solar still

5. **Dual slope solar still:** Sole slope solar stills have two slopes in its construction and its appearances similar two sole slope constructions associated together to respectively. Dual slope solar still gives improved appearance than a sole slope solar still for summer climatically circumstances. It is additional confidential into conservative and dual basin dual slope solar still. The conservative dual slope solar still is additional confidential into regular and non-regular dual slope solar still. As the term specifies, the dual basin dual slope solar still has two angles as well as two sinks in it. The duel slope solar still is shown in Figure 1.3.

6. **Inclined solar still:** Inclined solar stills have two angles in its construction and it appearances similar two sole slope constructions associated adjacent to individually other. Dual slope solar still gives improved operation than a sole slope solar still for summer climatical circumstances.

II. LITERATURE SURVEY

Freshwater is an important substance of lifespan and the atmosphere [1]. Freshwater is also existence measured as the maximum energetic healthiness hazard problem in today's ecosphere. The freshwater quantity on the world's superficial is solitary 1%, however salt water is 97% and icebergs are 2.6%. Nevertheless, the population and contamination rise with the high-tech, industrial and transportation improvement, freshwater feeding is increasing, and freshwater bases are fast declining [2]. At current, with human feeding, manufacturing and farming feeding of water is also accumulative. The consequence of this worldwide development is producing an inequality among the source and feeding. The circumstances would be inferior since supreme of the water create on world is logically mixed and requirements appropriate action to use [3]. Likewise, here is uncommon rainfall in the recompense, stony and dry sections of the world, foremost to critical groundwater deficiency. Aimed at these reasons, procurement filtered or freshwater from brine or salt

water basis, purification might be the lone resolution universally [4]. Solar still would be a key to sanitize contaminated water, where solar power is adequate. Conservative power sources to sanitize water are high cost and infrequent, but solar still is not well in cost-effective and environment responsive [2]. In remote zones where filtered water is infrequent and unobtainable, solar still may well be another resolution [5]. A solar still structure practices green power to sanitize polluted water, production it beneficial over supplementary water purification structures [6]. Solar stills practice solar power to harvest purified water and have been systematically considered and verified. Numerous investigators take experimental and acknowledged the consequence of ambient head, Air velocity, solar contribution and water deepness on the solar still functioning. Numerous identifications have talked several measures of solar stills, as well as double-basin solar still [15,16], semicircular solar still [7–10], three-way basin solar still [17], pyramid solar still [11–14], mixture solar still [18,19,24]. The purposes of this paper are to assessment dissimilar kinds of solar still has been deliberated [24].

III. METHODOLOGY OF A SOLAR STILL

The solar still is used to filtered the fresh water from the salt water. The solar still method act as two ways one is active solar still another one is passive solar still. The incline solar still tank is constructed, the higher side have 28cm and lower side have 12cm, black coating is given outside well of solar still tank which absorbed more head energy. The solar still tank-maintained three dissimilar water pits depth. The active solar still method used as waste copper and blower in of solar still tank. The waste copper is bottom of solar still tank and stores the hot particles. The blower is run by regular time interval. Both waste copper and blower increase the compression and evaporation.Solar still techniques harvesting more fresh water as compared with conventional method. The Fig 1.4 is represented as design and construction of the proposed hybrid PV/T still system.

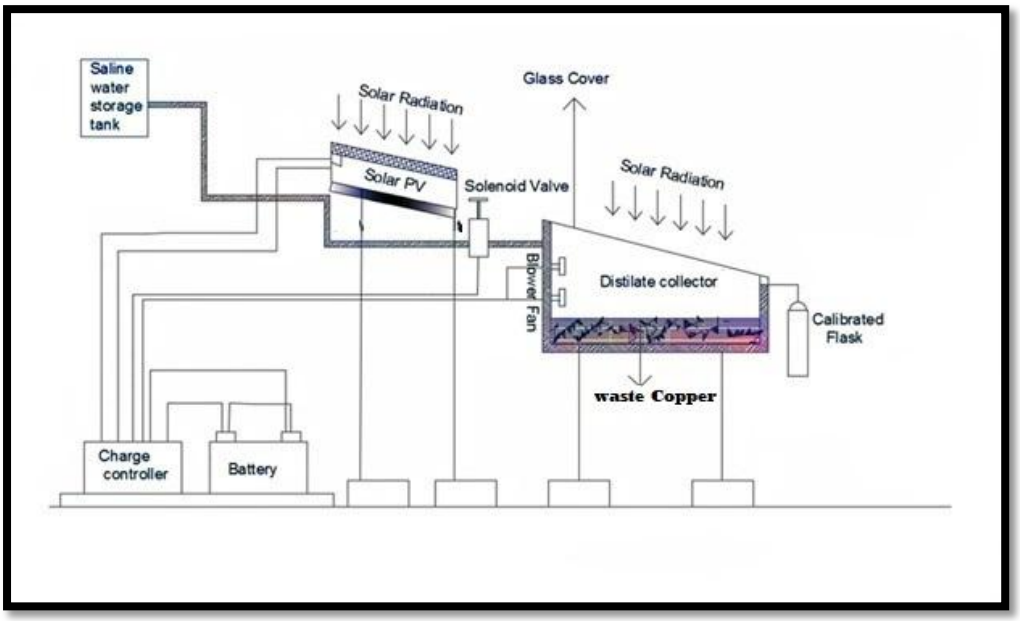

Fig 4: Schematic diagram of solar still

IV. PARAMETERS OF SOLAR STILL

In a hybrid PV/T method parameter analysis is very important because the efficiency of the system is mainly deepened on parameters. The any hybrid PV/T method should be considering some parameters like, solar irradiation, water heat, basin heat, glass heat, ambient heat, yield, output power with respect to time. The all the parameters mainly depend solar light and heat energy. The factor of irradiation is varied with respect to time. The analysis is taken by same interval of time period. Solar irradiation is attained maximum value time between 12.30 PM to 1.30 PM. The Hybrid method analysis is very suitable for summer period.

V. CONCLUSION

In the new method energetic solar still have more number advantages. The energetic solar still is very cost effective and payback period of investment also very low depends on conventional method. Here method uses the waste copper is used as energetic material and store the hot particles. The solar still have various construction related to energetic solar still with respect to high efficiency. The solar still analysis all heat parameters are increased gradually morning to afternoon and decreased gradually after afternoon to evening and night time it reduces to be zero. When run the blower the heat energy is transfer to waste copper to water. The temperature of the water is increased with respect to increases the evaporation. The outcome of the techniques is achieved to production of more fresh water.

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