Power Generation module design based on dual usage solar dish concentrator

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Abstract— *In today's life the folks face several drawback one in every of this, the productions of electricity isn't up to demand. within the folks area unit suffering from power cut drawback the most objective of our project is to supply power and warmth energy by exploitation single reflector. In previous days they're used differing kinds of collectors to gather the power and warmth energy the most important disadvantage is it's needed more room and conjointly they cannot store the warmth energy for an extended time. during this project is we are able to use parabolic solar furnace collector (PSDC) to gather the warmth and photons in single setup and conjointly store the warmth for an extended time by exploitation part ever-changing material (PCM). during this project overcome previous technique and to achieving most quantity of sun lightweight by trailing the system exploitation MPPT trailing technique and conjointly ready to} able to rotate 3600 rotation this can be one in every of the rationale for economical power production.*

Keywords— Parabolic solar dish collector (PSDC), Phase change material (PCM), Maximum power point tracking (MPPT)

1. INTRODUCTION

At a gift state of affairs there's additional demand for power within the government not able to solve this drawback and non-renewable energy sources area unit getting to end attributable to that there's additional stress to supply the ability up to the demand within the main objective of our project is to equal those demand by generating the ability that is required by the individual home. This method is additional appropriate for domestic purpose since we want solely most of (2 or 3) unit current per day and conjointly we want heat water for bathing and domestic usage. If those restricted quantity of power area unit generating our self thus we tend to no would like of EB power.

2. PRINCIPLES OF ENERGY PRODUCTION

The temporal distinction of energy supply and energy wants created necessary to the event of storage system. particularly in afternoon season the temporal energy of the sun lightweight is high so, we've got to store the surplus quantity of energy to within the specific storage system and improve the potency.

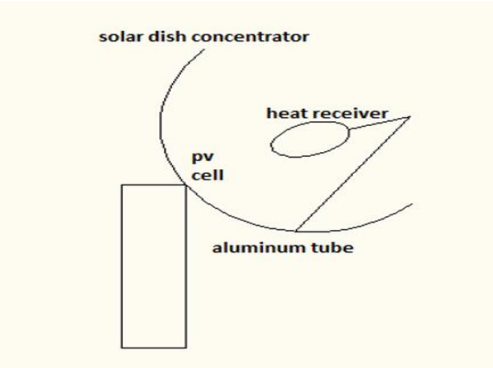


Fig 1 Parabolic solar dish collector.

To coming up with the parabolic solar furnace collector to gather each heat and power. PSDC comprises within the PV atomic number 14 coting and outdoors the Al tube windings within the PV atomic number 14 coting to convert the sunshine energy into power and Al tube to current the oil within the quantity of oil gets heat. And to protective the each heat and power exploitation separate storage system like Li particle battery and tank. During this system additional compact for the domestic.

3. BLOCK DIAGRAM

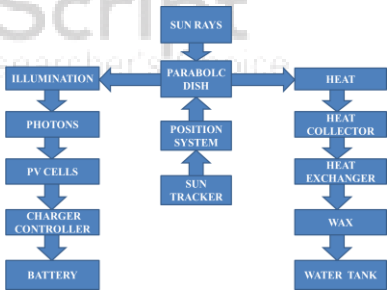


Fig 2 Block Diagram

4. SUN RAYS

The common span between the planet and therefore the sun is one AU (about a hundred and fifty,000,000,000m) then the sun rays area unit reaching their earth surface taking (8-min) interval. A sun rays is absolutely shaped of electromagnetic wave within the electromagnetic wave is travel at a speed of roughly (3.0 x 10^8 m/s) in vacuum. Within the numerous forms of electromagnetic wave area unit emitted by the sun that is X-rays, Gama rays, UV-rays, infrared and visual lights. We'll solely see the visible radiation et al. we will not see owing to visible radiation is brightness of the sun within the visible radiation, UV-rays, infrared solely fall on the planet surface and X-rays, Gama rays area unit mirrored (or) attenuated by part itself X-rays and Gama rays area unit generating the warmth and mixer to different radiations. Illumination is that the product of the visible radiation and warmth is that the product of the infrared and ultraviolet illumination. We tend to area unit focusing the each heat and illumination exploitation

parabolic solar furnace concentrator (PSDC) and protective their output on an individual basis. Within the potency output relies on sun radiation.

5. COMPONENT ANALYSIS

Considering following this elements facilitate to coming up with the parabolic dish solar furnace concentrator..

A.Metal Disc

Metal disc area unit shown in fig (c) comprises the PV cell and Al tube. Within the PV cell area unit coated at within the disc and therefore the outside of the disc enclosed by associate degree Al tube.

B.Heat Receiver

Metal disc centrally centered to the receiver. Receiver manufactured from copper material. Sun radiation mirrored within the cell and is concentrated towards the central receiver. Within the receiver collected the quantity of warmth and therefore the heat is transfer to the tank.

C.Sun huntsman

Sun huntsman consists of the LDR sensing element within the sensing element placed on the disc. sensing element to observe the variation of the sun lightweight to allow the knowledge to the controller system within the controller system to manage the dc motor. Dc motor to show the overall system supported the sun radiation. Within the sun huntsman to attain the utmost quantity of sun radiation falls on the system and improves the potency.

6. SYSTEM OPERATION

The operating principles of the PSDC, within the quantity of sun radiation fall on the complete system within the entire system are heated. a number of the radiation is mirrored towards the central heat receiver thus we tend to area unit focusing the mirrored rays exploitation heat receiver. PV cell convert the sunshine energy into power and therefore the heat is collected by the current oil within the oil transfer the warmth at the tank.

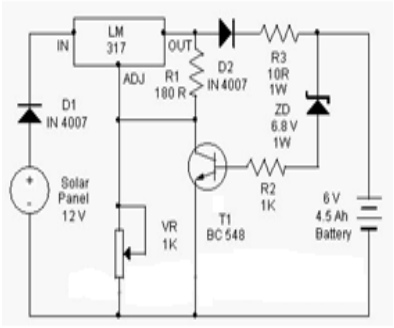
7. PROPERTIES OF SOLAR CELL

Fig. 3 Properties of solar cell

Consider the fig.3 represent the characteristics of the cell within the cell 100% didn't absorbent material the sun lightweight thus me quantity of reflections is there so we tend to also are focusing the reflective radiation by exploitation the warmth receiver..

8. BATTERY CHARGER CONTROLLER

Fig.4. Battery charger controller



Considering the fig.4 represent the device controller circuit, within the controller circuit to controls the output voltage of the cell and furthermore on stop the battery from over voltage. Cell output voltage is oscillated attributable to climate changes thus we tend to area unit exploitation this charge controller circuit to stop the battery and once the battery return saturation region charge method is finished.

9. BATTERY

We are using 6V, 1.5A, 4AH battery to store the electrical energy. Two batteries are serially connected and store the electricity.

10. HEAT COLLECTOR

Considering the fig.6 represent the warmth gathering medium, within the main role of warmth receiver and Al tube winding is parabolic concentrator is centrally centered to the warmth receiver mirrored sun radiation fall on the warmth receiver thus it'll kind heat and conjointly the concentrator panel is heated thus we tend to area unit collect this quantity of warmth by exploitation the Al tube winding. each heat receiver and Al tube heat is collected by current oil within the current oil gets the warmth energy and this heat transfer to the tank.

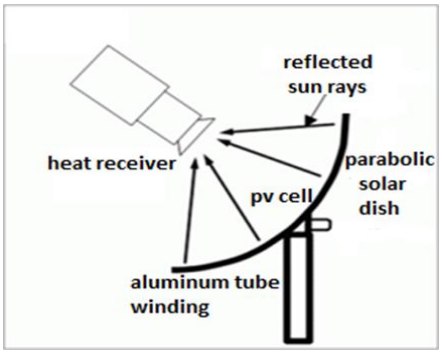


Fig 5 Parabolic solar dish collector

Considering the fig.5 represent the quantity of collected heat is transferred to the tank by exploitation this device. Device consists of water and outlet is completely immerged

within the tank current oil goes to water to outlet that the heat is transferred to the tank. We tend to area unit exploitation Al device to exchange the warmth.

12. PCM TECHNIQUE

PCM suggests that natural process material that is employed to withstanding the quantity of warmth in long period. Material consist 2 sorts, PCM tank with inner core and PCM tank with inner balls. The PCM with inner core is chosen for this method. The good thing about the tank provided with the inner core is that the simple golf shot of the natural process material. Paraffin is appropriate by the physical and chemical properties and therefore the paraffin area unit getable at low value.

13. FUNCTIONS OF PCM

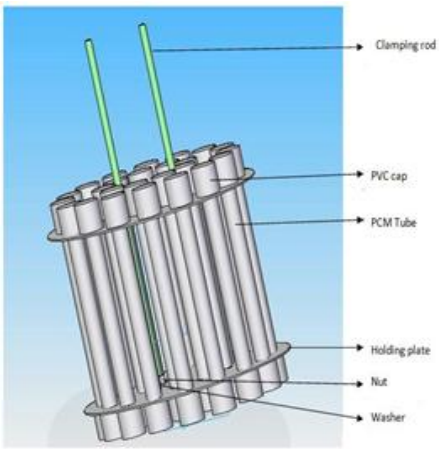


Fig. 6 Heat exchanger

Considering the fig.6 represent the functions of the PCM. PCM system comprises the Al core area unit organized within the order of circular kind and therefore the Al tube within crammed by a wax within the PCM tubes area unit immerged within the tank. Whenever the warmth is transfer to the tank PCM wax are melded charge the quantity of warmth in day time. Throughout getting dark the charged PCM heat is discharge to the tank thus we tend to area unit withstanding the tank heat in long period.

14. WATER TANK

We are choosing 20L water tank for this project and this is suitable for immerged both heat exchanger and PCM arrangement. And we are experimentally result 5.5 % withstanding the water temperature in night time. In this project applicable for all domestic water tank. we tend to area unit selecting 20L tank for this project and this can be appropriate for immerged each device and PCM arrangement and that we area unit by experimentation result five.5 the concerns withstanding the water temperature in getting dark.

15. PHOTO GRAPHIC VIEW OF PSDC

We tend to area unit done a epitome model of this project, there in epitome model we've got used silver plate for concentrator purpose and plastic tube for winding the rear facet of the concentrator and PVC pipe, 12V dc motor and kit wheel arrangement for MPPT trailing system.

16. CONCLUSION

This parabolic solar furnace concentrator for power generation may be a new method of harvest the ability in with efficiency and is eco-friendly within the major advantage is to satisfy the individual home required and additional compact in size. This can be unambiguously applicable all domestic homes. If this method enforced all told home thus mechanically scale back the EB power consumption and possible to given the ability provide to EB we tend to didn't rely the govt. power provide resources. we tend to area unit severally done our domestic work owing to while not power we tend to didn't do something. {one day|at thus me point in the future or some unspecified time in the future} the non-renewable sources area unit finished so we wish to utilize the renewable energy resources. Save the non-renewable energy resources follow to use renewable energy resources and living eco-friendly.

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