Generation of Electricity using Heat and Water

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Abstract

A survey was made by the students with anonymous response which indicated that India is backing behind the uses of the alternative sources. There needs to be more efficient use of the sources and one of the alternative sources useful in future is proposed in the following paper.

Keywords

Alternative source, Electricity, Generation, Temperature difference, Survey.

1. INTRODUCTION:

52.2% says that they face electricity problems in day to day life sometimes. 20.2% says that they face electricity problems in day to day life. Rest says that they don't face electricity problems in day to day life. 55.6% says that efficiency is low in use alternative sources in India. 30% says that poor condition of sources in India. Rest says that properly used.57.8 % responses states that alternative sources are not used by them which is a huge amount. 72.6 % state that we need to have new alternative sources which are given in following paper. Followings are the usual problems in heavy rain and natural disturbances 26.5, Government Issue 34%, poor management of power stations poor service of transformers 34.5%. Poor services of transformers and every electric supply 35%, Negligence of village over growing cities 39.9%.

It converts heat energy into electricity. Main usage is to power LED lights to act as an emergency product. It could also be scaled up and used in homes where electricity is not very given. It could also be used as a battery charger or power other electronic devices.

2. METHODOLOGY

ELEMENT OF A THERMOELECTRIC COOLER-

Thermoelectric cooler from marlow act as solid-state heat pump. Each features an array of alternating n and p type semiconductors. The semiconductors of different type have complimentary peltier coefficient. The array of elements is soldered between two ceramic plates, electrically in series and thermally in parallel. Solid solution of bismuth telluride, antimony telluride and bismuth selenide are preferred materials for peltier effect device because they provide the best performance from 180 to 400k and can be made n-type and p-type.

First we are used a cheap TEC-module but it was unfortunately destroyed due to high temperatures. It was specified to handle 200 º C max temperatures but somehow I got higher temp than I measured. I ran it without load that might be the cause. I now use a 40x40mm TEG-module that produce 5.9W (4.2V/1.4A) at 180ºC difference. It has a maximum operating temp of 350ºC (180ºC cold side. It´s quite expensive though, TEGs are a bit hard to come by but I think there are cheaper ones available.

To transport away all heat and cool it with air you usually need a large heat sink or a small heat sink with a motor and fan. In this project we are use water instead. That make the construction really compact and the temperature on the "cold" side will never exceed 100ºC. Water will eventually boil but it´s easy to refill, as long as you have water.

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3. FEATURES

- 90g (without LED)
- WxH=85x78mm
- Built in voltage step-up
- Support for 3x tea lights

ASSEMBLY

Step 1: Prep Cans

●Remove labels with hot water
●Drill 54 6mm holes in one can
●De-burr sharp edges with file
●Remove varnish from cans with heat and steel wool

Step 2: Prepare aluminum distance plates

● Prepare one side of plate 1 with thermal paste
● Place plate 1 on top of an 1 (with thermal paste facing down)
  - Optional: Prepare plate 1 with thermal paste (depending on what TEC/TEG you use)
● Place the TEG module on top of plate 1
  - Optional: Prepare TEG with thermal paste (depending on what TEC/TEG you use)
  - Optional: Place a thermal resistor on top of plate 1 if you want to monitor temperature
● Place plate 2 on top of TEG
● Prepare plate 2 with thermal paste
● Place can 2 on top of plate 2
● The order is: Can1-Paste-Plate1-Paste-TEG-Paste-Plate2-Paste-Can2

Step 3: Assemble Electronics

● Connect the two cables on TEG-module to your step-up booster (check polarization)
● Connect LEDs to output of step-up booster (check polarization)

4. CONCEPT:

We are using a thermoelectric module, also called peltier element, TEC or TEG. Before we begin, we will need to brush up on how using fire to make electricity is actually possible and not just some sort of black magic. It all starts and ends with a device called the Peltier Element, which was discovered in 1821 by J.T. See beck. He observed that if two dissimilar metals are connected at two distinct points while they are held in different temperatures, then a micro voltage will develop; this discovery was aptly called the "Seebeck effect". A thermoelectric device creates voltage when there is a different temperature on each side. You have one hot side and one cold. The temperature difference in the module will start producing electricity. The physical concept when you use it as a generator it's called the Seebeck effect. Thermoelectric modules are mainly used for the opposite effect, the Peltier effect. Then you apply an electric load and it will force a heat transfer from one side to the other. Often used in smaller refrigerators and coolers.

THE PELTIER EFFECT-

Thermoelectric coolers operate according to the Peltier effect. The effect creates a temperature difference by transferring heat between two electrical junctions. A voltage is applied across joined conductors to create an electric current. When the current flows through the junctions of the two conductors, heat is removed at one junction and cooling occurs. Heat is deposited at the other junction.

The main application of the Peltier effect is cooling. However the Peltier effect can also be used for heating or control of temperature. In every case, a DC voltage is required.

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5. CONCLUSION

THERMO ELECTRIC GENERATOR FREE ENERGY USING TEMPEARTURE DIFFERENCE (Use a Peltier module to create free electricity from heat A thermoelectric generator (TEG) also called a Seebeck generator, is a solid state device that converts heat flux (temperature differences) directly into electrical energy through a phenomenon called the Seebeck effect a form of thermoelectric effect) Thermoelectric generators function like heat engines but are less bulky and have no moving part, However TEGs are typically more expensive and less efficient the electrical power and in automobiles as automotive thermoelectric generators (RTGs) to increase fuel efficiency. Another application is radioisotope thermoelectric generators which are used in space probes which has the same mechanism but use radioisotopes to generate the required he In 1821 Thomas Johann Seebeck rediscovered it a thermal gradient formed between two dissimilar conductors can produce electricity. At the heart of the thermoelectric effect is the fact the eat flow: This result in the diffusion and flow of charges comes into play.

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