Alternative energy resource research paper sample

Environment, Electricity



There are two broad categories of energy: renewable and non-renewable sources. In describing alternative sources of energy, we shall limit ourselves to renewable sources, that is, those that cannot be depleted. Examples of renewable sources of energy include solar energy, geothermal, biomass, wind, tidal and many others. The discussion will further be biased on solar energy in this case. The purpose of choosing this alternative is to find out the energy source that is not only environmental friendly but also clean and viable.

As far as originality is concerned, solar energy has been utilized by man for thousands of years since ancient cultures used energy from the sun to get warm by starting fires with it. In addition, they kept their homes warm by use of designs of passive solar energy. For easy collection of solar heat during the day, buildings were made in such a way that walls could do the collection from the energy released at night. Scientists have also come up with various theories of origin of solar system. All of these have not been proven; it is crucial to be aware that there is no one theory for the origin and subsequent evolution of the solar system that is accepted. All theories represent models which fit some of the facts observed today, but not all". The lack of acceptable theory of scientific evolution has left us only with creation theory as Razykov et al. (2011) think, however that we must go further than this and admit that the only acceptable explanation is creation. He further claim of knowing that this is anathema to physicists as indeed it is to him, and says that we must not reject a theory that we do not like if the experimental evidence supports it (Razykov et al., 2011).

Electricity can also be produced using solar cells through photovoltaic power

generation. This is the case where solar optical energy is converted directly into electrical energy by solar cell. This is essentially a semiconductor device designed in such a way that it generates a voltage when solar radiation falls on it. Silicon (Si), cadmium Sulphide (CdS), and gallium arsenide (GaAs) are a few semiconductor materials which can be used to fabricate solar cells. Intrinsic semiconductors are doped to increase their conductivity. Photovoltaic effect takes place when a solar cell(p-n) junction is illuminated, leading to electron pole pairs being generated and electric current, I obtained which is the difference between solar light generated current, IL and the diode dark current, I_{i} , that is $I = IL - I_{i}$. The guality of the cell is maximum when the value of "Fill factor" (FF) approaches unity in accordance with the equation expressed as FF=(ImVm)/(IscVoc). This is equivalent to the product of maximum current and maximum voltage divided by the product of short circuit current and open circuit voltage. The efficiency of solar cell is, therefore, the ratio of maximum electric power output to the incident solar radiation, for example, nmax=(ImVm)/(IsAc) (Green et al., 2012). However, photovoltaic cells have low efficiency of 15%, that is, only a sixth of sunlight that strikes the cell generates electricity. Single multicrystal, many small crystals (polycrystalline) and amorphous (no crystalline) are the three state semiconductor materials prepared for fabrication of solar cells. Photovoltaic systems are categorized into stand-alone, PV hybrid, grid connected and solar power satellite. Areas where it can be applied include solar street light, home lighting system, SPV water pumping system, SPV cell for communication equipment in snow-bound areas, and sea water desalination systems (Mishra, & Bäuerle, 2012).

Tapping solar energy is associated with problems such as the requirement to install large solar collectors. Other problems include hazards to eyesight from solar reflectors, high cost in populated areas due to a large area of land required, solar photovoltaic modules posing disposal problems due to the presence of arsenic and cadmium. Solar power generators also need battery banks with inverters for storage capacity to provide power during nights. On cloudy days, this is achieved with a backup diesel generator all of which results to total system, which contains several pollutants.

As far as viability is concerned, solar energy is the best to go by from an environmental perspective. This is because 1. 5 kW PV system will keep more than 110, 000 pounds of carbon dioxide. This has been the chief greenhouse gas out of the atmosphere for over 25 years. It will also prevent the need to burn about 60, 000 pounds of coal. The use of solar also prevents acid rain, and pollution as well as no urban smog. Solar panels are also bomb proof and are durable, are modular, can be started with small systems and expanded over time. The panels are also light, hence portable. However, current cost of solar panels implies that grid interactive systems do not pay for themselves in terms of cost saving when compared with electricity from grids. As energy storage becomes a topic of issue in the cleantech sector and as the technology moves closer to financial viability, research anticipates that residential market will lead the way in uptake, leading to solar PVs phenomenal growth globally. The cost of solar PV installations has also come down in countries like German and UK over the past few years. This trend is expected to follow the same in other parts of the world, in the near future.

References

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