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***Solar Energy and electricity consumption
awareness***

By

Department of Physics



Solar Energy and electricity consumption *awareness*

Brief note



Nowadays, energy has been seen as a basic need of human life. Scientist has divided energy into several kinds of it but mainly is renewable and non-renewable energy sources. Non-renewable energy sources are the one like fossil fuels which require long time to regenerate, however the renewable energy sources are always available in a huge amount. The renewable energy resources such as oil, gas and coal are limited globally due to the overconsumption and expected to be increased continuously in future. As a result, the renewable energy resource becomes the fastest growing power generation sources. The predicted energy consumption in 2050 will be as much as 50 TW. Therefore the question is how to supply energy for all this; certainly the answer is not fossil fuels due to the limited storage. Even if the available fossil fuel

is infinite, the damage of burning fuel causes environmental pollution. To overcome all these issue one has to focus on renewable energy resources. Researchers are now trying to harvest solar, biogas, water and air reserves. Solar energy is one of the most promising sources who have the brightest future. In addition, solar energy is the abundantly available and economically compactable energy source on earth. The earth receives 5×10^{21} KJperyear from sun. This energy is 15000 times larger than annual energy demand of the world. Therefore, more attention has been paid to solar energy and its wide application.

There are various generations of solar cells depending upon the development based on the reduction of cost is briefed below.

The first generation is based on the Si-wafer technology which is a commonly dominant since the material is abundant on the earth's crust. These solar cells are highly stable with very good performance till date. Silicon solar cells are made up from either single or polycrystalline wafers. Till date, the best efficiency for silicon solar cell in research laboratory is demonstrated 26.3 %. However, to achieve such record efficiency, high purity silicon along with the sophisticated instruments is needed. As silica is abundant but the cost requires to obtain pure silicon is huge which makes the final produce very expensive. The second generation of solar cell is based on the thin film solar cells (TFSC). Basically thin films are the layers of material ranging from nm to several micrometers. In TFSC, the materials used as absorber of thickness less than $5 \mu\text{m}$ which is sufficient to absorb the sunlight. The third generation solar cells are the emerging technologies and could become commercial in future either by achieving low cost and high efficiency. The examples for third generation solar cells includes dye sensitized solar cells, organic solar cells and perovskites solar cell/

The basic structure for thin film solar cells are composed of different layers of materials.

- a. Buffer layer:
- b. Absorber layer:
- c. Window layer:
- d. Antireflection coating:
- e. Metal contact:

The effective way to use the solar energy in the form of electricity is to create solar cells. Solar devices are the one which can generate voltage upon the exposure of light. It works on the principle of photovoltaic effect which was discovered by Becquerel in 1839. Quantitatively the power delivered from solar cells is termed into power conversion efficiency which is nothing but the power extracted per incident solar energy.

Social Commitments

- **Awareness Regarding Energy Crisis, Pollution & Environmental Friendly Energy Sources**
- **Popularization of Renewable Energy Sources through lectures and demonstrations**
- **People are encouraged to install hot water system, use of Solar cooker, solar lantern etc.**
- **Creating health & environmental awareness among the rural women**
- **Imparting training to rural women specially use of solar cooker & solar lantern**
- **Guidance to farmers for installing gobar gas plants as well as maintenance and repairs.**

Actual Photograph of lectures taken by staff during farmers meet



Actual photographs taken (2019-20) during visit to nearby village peoples



Actual photographs taken (2018-2019) during visit to nearby village peoples

