

Solar Cell – Renewable Source of Energy

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Abstract: Large amount of energy is been obtained from the sun and it is utilized for all useful purposes, sun is a source of abundant energy. Small proportion of energy obtained from the sun is utilized but it provides the tremendous or large amount of energy. All over increasing energy demands is been fulfilled by the sun light reaching to the earth surface. Incident sunlight energy is converted into electrical energy by photovoltaic effects. Solar cells fabricated from Silicon are the first generation solar cells. More improvements in the efficiency of solar cell is tried to be obtained for absorption of sun radiation and its conversion in to electrical energy. This condition are tried to be obtained by the application of Thin film technology and amorphous Silicon solar cells. This article focuses on the application of solar cell as renewable source of energy.

Keywords: Solar cell, Renewable source of energy, Electrical energy.

I. INTRODUCTION

Now technology have gone to a great height and improvements in the solar cell with its efficiency is tried to obtained with the use and progressive advancement in Solar cell technology from first generation solar cells to Dye sensitized solar cells, Quantum dot solar cells and some recent technologies(1).

Renewed assessment of the working of solar cell as it has a great potential for future progress can be seen as a remarkable achievements or developments in solar cell based on photovoltaic (PV) technologies since last five years. Analysis of solar cell and its types with respect to its progress for generation of electricity and these cells and modules are based on single-crystalline GaAs, Si, GaInP and InP, multi crystalline Si as well as thin films of polycrystalline CdTe and $\text{CuIn}_x\text{Ga}_{1-x}\text{Se}_2$. PV developments of the more recently emerged lead halide perovskites together with notable improvements in sustainable chalcogenides, organic PVs and quantum dots technologies. There are different parameters which interfere with the proper functioning or the output of the solar cell in fact different types of cell and found to have an improvements in control over the optoelectronic quality of PV-relevant materials and interfaces and the discovery of new material properties. There is an appraisal for this enhanced technology of electrical energy production in current era and in future. Although accurate or revolutionary developments cannot be predicted, cross-fertilization between technologies often occurs, making achievements in one cell type an indicator of evolutionary developments in others. This knowledge transfer is timely, as the development of metal halide perovskites is helping to unite previously disparate, technology-focused strands of PV research (2,3).

Due to increase in the environmental crisis, demand for increase in the solar cell have also increased as solar cell operates on the solar energy which is completely renewable and can be obtained whenever we need or require, and this utilization of solar energy to produce electrical energy, acquiring more attention all over the countries in the world. Abundant, cheap and most promising renewable source of energy is solar energy. While high-performance solar cells have been well developed in the last couple of decades, the high module cost largely hinders wide deployment of photovoltaic devices. In the last 10 years, this urgent demand for cost-effective solar cells greatly facilitates the research of solar cells. This paper reviews the recent development of cost-effective and high-efficient solar cell technologies. Low-cost and high-efficiency perovskite solar cells is the advantage of this kind of solar cell. The development and the state-of-the-art results of perovskite solar cell technologies are also introduced (4).

About 85 percent of the world's energy needs are currently met by non-renewable fossil fuels, which have negative health and environmental repercussions. Furthermore, by 2050, global energy demand is expected to double. As a result, the development of renewable energy sources such as wind, water, and solar energy has become a pressing necessity. In 2014, renewable energy-based power generation capacity was predicted to be 128 GW, with wind power accounting for 37%, solar power for over a third, and hydropower accounting for more than a quarter. In 2014, this accounted for more than 45

percent of global power generation capacity increases, continuing a recent rising trend. Solar energy is attracting a growing number of people due to its abundance, low cost, and environmental friendliness. (4)

Renewable energy resources and non-renewable energy resources are two types of energy resources. People are focused on using less because of some negative environmental effects such as air pollution, climate change, and natural resource depletion. To generate energy, renewable energy resources are used. One of the most extensively discussed renewable energy sources is solar energy. With the increasing human population and energy demand, new technologies and advances in the energy sector are needed. To meet global energy demands and improve energy efficiency, the solar energy field will be expanded. At night, electricity cannot be generated. The typical solar cell has a significant flaw. This research focuses primarily on solar energy and addresses innovation. Solar energy technology have improved and have a bright future ahead of them (5).

The author of this article obtained from literature surveys, explained that, renewable energy is a means of meeting future and current demands. This work uses a bibliometric positioning overview to examine the state and visual map location of research in the international renewable energy and solar panel literature indexed in Scopus. The study was conducted using bibliometric methods. Using the VOS Viewer tool and the Scopus feature to analyse search results, data analysis and visualisation were performed. The information gathered was applied to 1,598 publications published between 1989 and 2020. The National University of Singapore and the Institute of India Studies were found to be the most active affiliated institutions and countries in the renewable energy and solar panel literature, according to the survey. Engineering and Energy Procedia had the greatest research in the renewable energy and solar panel literature(6).

Energy is widely acknowledged as the driving force behind global economic development. The world's energy resources can be divided into three categories: fossil energy (oil, gas, coal, and so on), nuclear energy, and renewable energy (wind, solar, geothermal, air power, biomass, hydrogen, ocean, etc). Renewable energy sources are defined as energy derived from non-fossil and renewable sources, such as wind, sun, geothermal, ocean, hydropower, biomass, and biogas, among others, in the document Directive 2009/28 / EC appendix 1. (Sholikha, 2019). The majority of the energy sources now used are finite and will run out owing to rising demand (Zoghi et al., 2017). Renewable energy development is a strategy for the government to minimise the Indonesian people's reliance on fossil fuels, particularly to meet their electricity needs (Widjaja, 2008). Abiogas, for example, is a kind of CH₄ that can be used as both a fuel and an alternative energy source. It is utilised as an alternative energy source for generating electricity, heat, and a considerable volume of LPG gas for domestic usage (Hariyanto et al., 2019). Renewable energy (Shahabi et al., 2014) is a critical, quick, and safe innovation (Mehrjerdi & Rakhshani, 2019) (Tabor et al., 2018). Renewable energy sources have numerous advantages (Abazari et al., 2020). (Corzine, 2017), renewable energy as a solution to meet future and existing needs (Cabrera-Tobar et al., 2016), to promote global energy efficiency (Alippi & Galperti, 2008), and to minimise transmission capacity requirements (Song et al., 2019). Several countries have already begun to use solar cell and advanced technology (6,7,8,9).

The National Solar Mission is a major initiative of the Government of India and State Governments. The objective of the Mission is to establish India as a global leader in solar energy. It will also constitute a major contribution by India to the global effort to meet the challenges of climate change. Solar energy systems are easily available for industrial and domestic use. Solar energy could be made financially viable with government tax incentives and rebates. India has huge solar potential because of its location between the Tropic of Cancer and the Equator, an average annual temperature that ranges from 25°C – 27.5 °C(10,11).

The Mission is to focus on setting up an enabling environment for solar technology penetration in the country. Solar energy has great potential as future energy source and also has the advantage of permitting the decentralized distribution of energy, thereby empowering people at grassroots level. Apart from augmenting the energy supply, renewable resources will help India in mitigating climate change. Solar energy systems are easily available for industrial and domestic use. Solar energy could be made financially viable with government tax incentives and rebates. India is facing an acute energy scarcity hampering its industrial growth and economic progress. It is essential to tackle the energy crisis through judicious utilization of abundant renewable energy resources. Apart from augmenting the energy supply, renewable resources will help India in mitigating climate change. India is heavily dependent on fossil fuels for its energy needs. Most of the power generation is carried out by coal and mineral oil-based power plants. Solar energy could be made financially viable with government tax incentives and rebates. Solar energy could be made financially viable with government tax incentives and rebates. Decarbonization of world's conventional energy system can be done by using clean energy i.e. solar energy. Solar energy is

clean renewable resource with zero emission. Most developed countries are switching over to solar energy as prime renewable energy source. India has huge solar potential, sunniest parts are situated in the south/east coast, from Calcutta to Madras. Solar energy systems are easily available for industrial and domestic use. The National Action Plan on Climate Change says that India has huge solar potential. Current architectural designs make provision for photovoltaic cells and necessary circuitry while making building plans. The National Action Plan on Climate Change also points out that India is a tropical country, where sunshine is available for longer hours per day and in great intensity. Changing climate has become a major concerned issue in this century. Remarkable solar cell technologies like have led the way in transforming energy sector of the globe (2,10)

II. METHODOLOGY

Solar cell – renewable source of energy is a technology which is a need of current era and this is been very clearly understood by studying various research paper and carrying out the literature surveys. Various work in carried out by different authors on the advanced technology of solar cell and its utilization for production of electrical energy. Efficiency of solar cell to generate electricity is studied and presented in this paper.

III. RESULT AND DISCUSSION

Large number of sources of energy are available like conventional and non-conventional source of energy. Solar energy is the non-conventional source of energy as it is completely renewable and inexhaustible source of energy. Non-conventional sources of energy are ecofriendly and does not result in the production of any hazardous or toxic substance as a result of its operational process. Solar energy is the primary source of energy on the earth and all the forms of energy can be tracked back in to solar energy, there is an emphasis to utilize and use the solar energy in different forms and is achieved by conversion to solar energy in to heat energy and electrical energy .The solar energy totally free as no any cost is required to utilize this energy, it is a natural source of energy and available in plenty. Conversion of solar energy in to electrical energy takes place through the solar cell and there are different advanced technology available in construction of solar cell for getting high percentage of conversion efficiency. Now everywhere large number of solar cell arranged in a series to make a solar panel are fixed at the roof part of the any construction for utilization and production of electricity and saving the cost for energy production.

IV. CONCLUSION

There is a large number of environmental and health hazards caused by the conventional source of energy production like oil, coal, petroleum and natural gases which are available in limited stock and which are not renewable source of energy as these all sources of energy once consumed cannot be replenished again. And this is a major concern and issue now a days in this country, so this can be easily removed by application of solar cell and different advanced technologies in solar cell which is a need of current era for energy production without generation of toxic and harmful by product.

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