

Importance of Solar Energy in the Modern Digital Environment

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ABSTRACT: *Solar energy is derived naturally through solar power which is received from the sun with the help of solar panels. Solar energy is a cheap, abundant, and renewable source of power. Environmental pollution can sometimes be decreased by using energy from the sun. One of the most pure and healthy sources of energy. Being a clean and sustainable source of energy, solar energy is crucial. This implies that it won't cause any harm to the planet. These days, solar energy is a widely common source of power. Many homes, businesses, workplaces, schools, and institutions use solar energy to meet their electrical needs. The energy we get from the sun and transform into thermal or electrical energy using photovoltaic cells is known as solar energy. This study focuses on the significance of solar energy in the present digital environment. The findings shows that a lot of individuals can benefit from the use of solar energy. People are unable to use it, nevertheless, due to the expensive expense of its accessories and equipment. This study conclude that individuals may utilize solar energy to the fullest extent possible for their own purposes so, the government should take some action to lower the cost of solar energy equipment's.*

KEYWORDS: *Environment, Electricity, Photovoltaic, Solar Energy, Solar Panels.*

1. INTRODUCTION

The energy present inside the form of photons in sunshine is referred to as solar energy. Without solar energy, existence on Earth would be impossible. With the aid of solar energy, all varieties of microbes and single-celled creatures emerged. These days, solar energy is a widely common source of power. Many homes, businesses, workplaces, schools, and institutions use solar energy to meet their electrical needs. The energy we get from the sun and transform into thermal or electrical energy using photovoltaic cells is known as solar energy [1]. As long as the sun is there, solar energy will always be available, making it a renewable resource. Due to the lack of toxic gases, chemicals, or fly ash created during the generation of solar energy, it is also pollution-free energy [2]. When sunlight strikes a photovoltaic cell on Earth, it produces electricity through an automated process [3].

The electricity is then stored in batteries through a chemical process which can be used to power anything from a small electrical gadget like a calculator or a road sign to a home or a large commercial establishment. Since air pollution has become a major issue in recent years, solar energy is being produced in significant quantities in many developed nations to maintain a clean atmosphere. Additionally, some nations mandated that their citizens plant trees or install solar panels on their homes' rooftops [4]. A solar power plant requires less people to operate than a thermal power plant since solar energy is not only pollution-free but also has very cheap

maintenance costs. Solar panels can also be installed on a home or office's rooftops. To eliminate pollution, which has become a major worldwide issue in recent years, we must switch from non-renewable to renewable energy sources, such as solar energy. The yearly costs of power will decrease if solar panels are installed on the roof of a home or office.

There are some drawbacks to using solar energy along with all of these benefits. Utilizing solar energy has a number of drawbacks, the first of which is the hefty initial setup cost. One requires a personal place for the batteries in order to store solar energy in significant quantities. If the solar panel's warranty time has passed and the cost of a new solar panel is excessive, one must replace the damaged panels with a new one. Since batteries store amount of electricity in chemical form, whenever batteries are broken, one must replace them, which will poison the environment chemically. The inhabitants of this planet rely on sun energy, either directly or indirectly. The energy generated by sunshine is referred to as solar energy. For the benefit of humanity, solar energy is transformed into heat or electricity.

India is using solar energy more and more these days. The second-largest population in the world is found in India. In India, a tremendous quantity of energy is utilized. Energy is a constant problem in our nation. This energy gap in India may be filled by solar energy. A contemporary way to harness the power of the sun is through solar energy. Solar energy has a variety of benefits. Solar energy may limit the usage of non-renewable resources because it is an endless supply. However, solar energy is also beneficial to the environment [5]. When solar energy is used, no hazardous gases are released into the environment. Once more, solar energy has a big potential for energy production. So that it can meet the global need for energy. On the other side, solar energy has significant drawbacks as well. First of all, only during the daytime can solar energy be created. It is impossible to generate the necessary amount of solar energy on a cloudy day.

By the end of the twenty first century, the world's energy demand is expected to have tripled. Due to reasons including rising energy prices, declining energy supply, expanding environmental concerns, etc., an increasing proportion of alternative fuels will be required to meet future energy demands. Finding enough sustainable energy for the future is therefore humanity's most difficult challenge. Renewable energy sources like solar, wind, biomass, etc., may be significant in the world energy economy.

1.1. Solar Panels:

Solar energy is the power that the Sun radiates to the Earth, first as electromagnetic radiation and subsequently predominantly as visible light. Solar energy was created about a century ago. In the past, solar energy was employed to create streams that were then used to power machines. The photovoltaic effects, which was discovered by Edmond Becquerel, enabled the solar electric energy from sunshine to be conserved [6]. The solar panel absorbs the sun's energy and transforms it into electricity, which is subsequently utilized to power electrical loads. These solar panels consist of a number of separate solar cells that are made up of several layers of silicon, phosphorous, and boron. Solar panels absorb photons, which results in the generation of electric current [7]–[9]. This causes energy to be released, which impacts the solar panel's surface and

causes electrons to be thrown out of their atomic orbits and discharged into the electric field produced by the solar cell. The free electrons are drawn in by the directed current as a result. The photoelectric effect is the general term for this entire process. A typical home has more than enough roof space to accommodate the required number of solar panels and produce enough solar electricity to meet the demands.

1.2. Working of Solar Panels:

In order to utilize the special qualities of solar cells and produce power, they are mounted on solar panels. Individual cells experience the photovoltaic effect when they take in photons from the Sun, which causes the cell to produce an electric current. An inverter transforms the direct current produced by a solar panel into alternating current. A photovoltaic system is created by combining these two technologies. The ideal orientation for a solar panel installation is chosen such that the solar panel faces the application's most suitable direction. Though it isn't always the case, this is often done to produce the most energy per year.

2. DISCUSSION

Solar energy is among the natural energy resources that humans receive from the Sun directly. Humans have depended on the Sunlight for cooking as well as drying garments since the beginning of time. But nowadays, energy from the sun is used in a wide range of products since it is the most practical and affordable renewable source. Direct the using sunlight, or solar energy, is possible for a number of industrial and commercial applications, including solar cooling, hot water heating, and power generation [10], [11]. The fact that solar power generation is a clean alternatives to electricity produced using fossil fuels, with no danger of electricity price increases, no air or water contamination, and no hazards to our population health, is crucial given the rising concern about climate change.

2.1. Benefits of Solar Energy:

Solar energy is produced by the sunrays and may be transformed into electricity or heat. The sun's energy is always accessible to us for free, and because to technological advancements, we can now use even more of it. The growing cost of energy is one of today's biggest concerning problems. As Earth's resources are being exhausted, energy prices are rising. Fortunately, technology has made new natural resources available, including solar energy. Despite the fact that energy consumption is increasing, there are things that every homeowner can do to cut expenses and benefit the environment. Some of the benefits people get from the solar energy are shown in Figure 1.

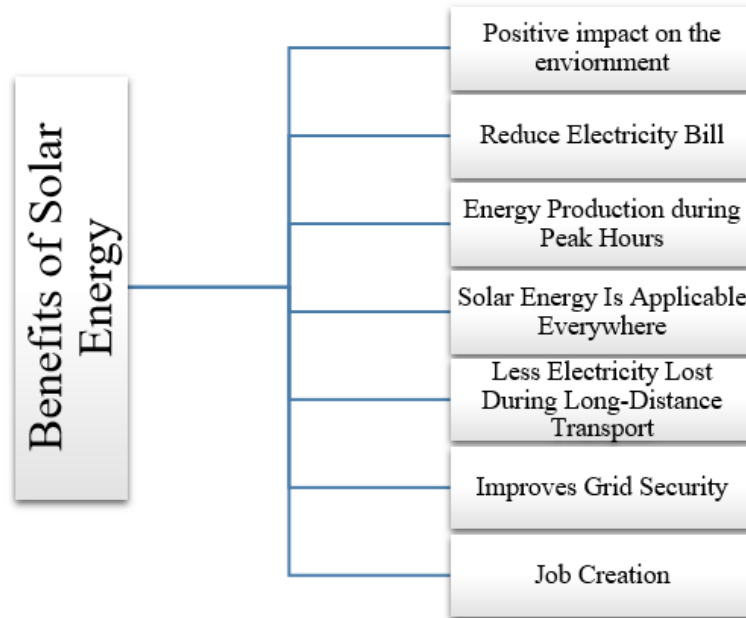


Figure 1: Depicts the Benefits of Using Solar Energy.

Solar costs should be cut in half by 2030 according to the solar industry's extremely defined cost-reduction roadmaps. Higher-efficiency modules are already being developed; they can provide 1.5 times as much power as currently available, comparably sized modules thanks to a technique known as tandem silicon cells. These will have a significant effect moving forward. Additionally, there are industrial advances in the works that will lower the quantities of pricey components required in the creation of solar cells, including silicon and silver, as well as breakthroughs like bifacial modules, which enable panels to absorb solar energy from both sides. The best way to incorporate solar energy into our homes, places of work, and power systems is the other significant breakthrough. Better power electronics and more extensive usage of inexpensive digital technology are the results of this. The continuing change of the energy sector is being driven by urgent requirements and appealing prospects as shown in Figure 2.

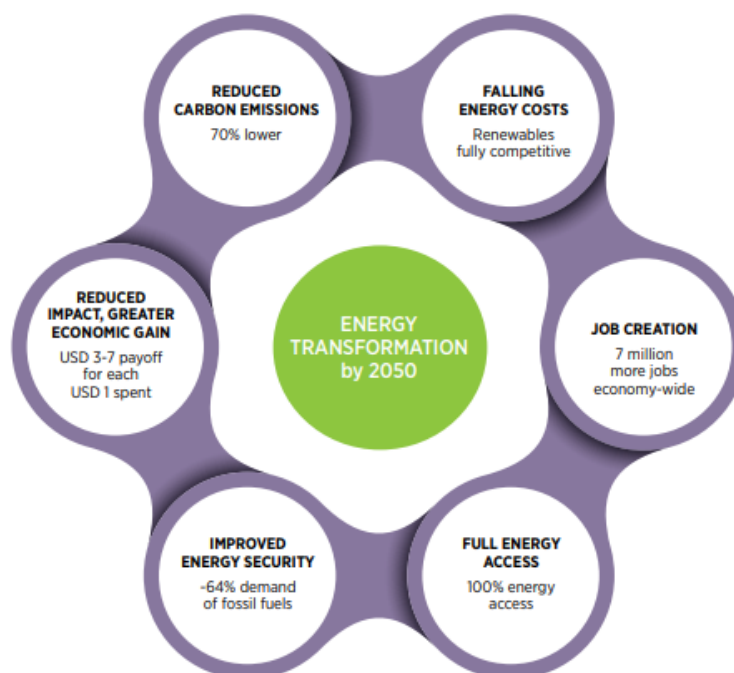


Figure 2: Representing the Current Energy Change Which is Being Driven by Urgent Requirements and Appealing Prospects.

The Sun is the cleanest source of energy for renewable sources. It can assist power our home and company in a variety of ways. Photovoltaic solar panels use the sun's energy to generate electricity. Using photons from sunshine, electrons are activated in the silicon cell during this process. Renewable energy is provided by this power. In the majority of solar systems, the solar panels are installed on top of the homes. An excellent site won't have any shadow, especially between the hours of 9 am and 3 pm. Installation that faces south offers the system's greatest potential. A few things need to be considered while installing solar panels, such as keeping trees away from the home to ensure that sunlight can reach the panels and that they are used to their greatest potential.

Solar energy is a secure substitute that can take the place of present fossil fuels like coal and gas, which pollute the air, water, and land when used to generate power. The World Wildlife Fund also known as World Wide Fund (WWF), for Nature, points out that the production of power from fossil fuels damages forests, reduces agricultural productivity, and pollutes the atmosphere, resulting in acid rain and billions of dollars in lost revenue globally. Thousands of liters of water combined with chemicals are used in fracking in the United States, polluting the water utilized and neighboring water sources as well as causing earthquakes. Nuclear power has ruined the environment by contaminating the air, water, and land. These risky, harmful effects of utilizing traditional fossil fuels will be avoided by employing solar energy.

3. CONCLUSION

Solar energy is the electromagnetic and visual kinds of energy that the Sun provides to the planet. This light is transformed into electricity by solar panels, which are then utilized to power electrical loads. The procedure may be carried out both on a solar-powered and large-scale. Future generations will be dependent on solar energy. It is an inexpensive, environmentally friendly, and safe choice. Additionally, it is replenishable, making it a renewable source of energy. Therefore, it does not contribute to pollution. To conserve our planet Earth, people must thus attempt to use energy from the sun increasingly.

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