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A REVIEW ON :APPLICATION OF SOLAR ENERGY

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ABSTRACT

Thousands of small & medium scale solarapplications are present in India. All are facing certain problems resulting in lack of electricity, money, space,drying time, etc. In order to solve the faced problem, we are going to design the solar dryer which will focuses on reducing the drying time of food products by means of which the drying rate will be improved &this design focuses on space, time, money, energy, and other resources their it most effectively. This design reduces problems and annoyances in the work flow.

I.INTRODUCTION

Since the beginning of time, people have been fascinated by the sun. Ancient civilizations personified the sun, worshipping it as a God or Goddess. Throughout history, farming and agriculture efforts have relied upon the sun's rays to grow crops and sustain populations. Only recently, however, have we developed the ability to harness the sun's awesome power. The resulting technologies have promising implications for the future of renewable energy and sustainability. Below, we've given a brief on solar power, how it works, and what may be in store for the future of solar.

What is Solar Power?

Solar power is a form of energy harnessed from the power and heat of the sun's rays. It is renewable, and therefore a "green" source of energy.

How does it Work?

The most common way of harnessing energy from the sun is through photovoltaic (PV) panels – those large, mirror-like panels you've likely seen on rooftops, handheld solar devices, and even spacecrafts. These panels operate as conductors; taking in the sun's rays, heating up, and creating energy (and electricity).On a larger scale, solar thermal power plants also harness the power of the sun to create energy. These plants utilize the sun's heat to boil water and, in turn, power steam turbines. These plants can supply power to thousands of people. There are other ways we harness solar power. Read more about these various methods utilized today here via National Geographic. or areas that frequently experience cloudy weather, may have difficulty utilizing solar power effectively. Additionally, solar power is an expensive endeavor. The technologies often require a large amount of land, and they can be extremely costly. Scientists are hard at work to find an affordable,

efficient solution for harnessing solar power. Scientists have used solar energy to power spaceships since 1958.Most solar panels used today have an average life expectancy of between 20-40 years.

II.HISTORY

With the recent rise in energy costs many people have been looking to alternative sources of energy. One of the greatest energy sources (our sun) is readily available for the taking. We just need to be able to harness it's power. For those interested, below is a brief history of how solar power came to be.The history of photovoltaic energy (aka. solar cells) started way back in 1876. William Grylls Adams along with a student of his, Richard Day, discovered that when selenium was exposed to light, it produced electricity. An electricity expert, Werner von Siemens, stated that the discovery was "scientifically of the most far-reaching importance". The selenium cells were not efficient, but it was proved that light, without heat or moving parts, could be converted into electricity.In 1953, Calvin Fuller, Gerald Pearson, and Daryl Chapin, discovered the silicon solar cell. This cell actually produced enough electricity and was efficient enough to run small electrical devices. The New York Times stated that this discovery was "the beginning of a new era, leading eventually to the realization of harnessing the almost limitless energy of the sun for the uses of civilization."The year is 1956, and the first solar cells are available commercially. The cost however is far from the reach of everyday people. At $300 for a 1 watt solar cell, the expense was far beyond anyone's means. 1956 started showing us the first solar cells used in toys and radios. These novelty items were the first item to have solar cells available to consumers.In the late 1950's and early 1960's satellites in the USA's and Soviet's space program were powered by solar cells and in the late 1960's solar power was basically the standard for powering space bound satellites.In the early 1970's a way to lower to cost of solar cells was discovered. This brought the price down from $100 per watt to around $20 per watt. This research was spearheaded by Exxon. Most off-shore oil rigs used the solar cells to power the waning lights on the top of the rigs.The period from the 1970's to the 1990's saw quite a change in the usage of solar cells. They began showing up on railroad crossings, in remote places to power homes, Australia used solar cells in their microwave towers to expand their telecommunication capabilities. Even desert regions saw solar power bring water to the soil where line fed power was not an option!Today we see solar cells in a wide variety of places. You may see solar powered cars. There is even a solar powered aircraft that has flown higher than any other aircraft with the exception of the Blackbird. With the cost of solar cells well within everyone's budget, solar power has never looked so tempting.Recently new technology has given us screen printed solar cells, and a solar fabric that can be used to side a house, even solar shingles that install on our roofs. International markets have opened up and solar panel manufacturers are now playing a key role in the solar power industry.

III.NEED OF SOLAR ENERGY

Apart from the obvious financial benefits, there are other pertinent reasons why you should convert to using solar power instead of fossil fuels. What other reasons should you consider when going solar? Here are seven compelling reasons**.**

1. Solar Power Is Good for the Environment

The most commonly known fact about solar energy is that it represents a clean**,** green source of energy. Solar power is a great way to reduce your carbon footprint. There's nothing about solar power that pollutes mother nature. Solar power doesn't release any greenhouse gasses, and except for needing a source of clean water to function, it uses absolutely no other resources. Hence, it's safe and environmentally-friendly. Yet, people are still in doubt why solar energy is good

Solar power is self-sufficient and installing solar panels on your roof is a safe and easy path to **contribute** to a sustainable future**.** Starting on your home is a great way to show you care about the environment.

2. Solar Electricity Makes Your Home Go Off-the-Grid

Solar electricity prices serve as a great example of why there should be an increase in the use of solar energy. Traditional electricity relies heavily on fossil fuels such as coal and natural gas. Not only are they bad for the environment, but they are also limited resources. This translates into a volatile market, in which energy prices alter throughout the day

3. Solar Power Can Use Underutilized Land

You may continue to wonder why solar power. With the increasing need of solar energy, it's become easily accessible to most of us. Across countries, there are vast land that are far away from big cities or capitals, and are not used for anything at all.

With solar power, we can actually make use of the land and subsequently generate great value; solar energy provides a source of power for everyone. In this way, we don't need to use high priced land that might be better suited for other applications.

You might have heard of solar farms - panels used to harvest solar energy in large numbers. This highlights perfectly how solar power makes use of underutilized land. For instance, a 45 acre solar farm has been recently built in the UK, and it's able to power 2,500 homes**.**

4. Solar Power Causes Less Electricity Loss

Electricity needs to be transported from big power plants to end-consumers via extensive networks. Long distance transmissions equal power losses. Ever wondered what are solar panels used for? They're on your roof to get energy from the sun. Rooftop solar power is helpful in increasing electricity efficiency, considering the short distance**.** Your energy becomes domestic and as a result you're in control of your own billsand energy usage**.** Furthermore, solar power systems are durable, thus chances of service interruption are reduced.

5. Solar Power Improves Grid Security

When there are many of us switching to solar power, we are less likely to experience blackouts or brownouts. Every household in the UK that have solar cells installed, functions as a small power plant. This, in turn, provides us with a greater electricity grid security, especially in terms of natural or human-caused disasters.

6. Solar Power Creates Jobs and Economic Growth in the UK

Our national economy can be helped by solar power. The more people who opt for solar, the more needs will be for companies to install solar panels. This creates additional jobs for skilled workers, and consequently keeps the economy growing.

In 2015, for instance, the UK become the second-largest solar employer, with 35,000 people, and the continent's largest solar photovoltaic (PV) panel installation market.

7. Solar Power Is A Free Source of Energy

The sun provides us with more energy than we could ever use, and no one can monopolise the sunlight. Your solar power system will start saving money from the moment it's turned on, however, the advantages of solar power are best visible in the long-term. The longer you have your solar power system, the more you enjoy the benefits of solar technology and support the environment.

Aside from solar electricity, solar energy has a second application. We often associate solar energy with electricity, which is acquired through PV panels, but it's also possible to use the energy generated by the sun for heating purposes. This process is accomplished by deploying solar thermal systems that simply convert the sunlight into heating solutions.

The acceptance of solar technology is at hand and we can start by increasing our use of solar panels.

IV.ADVANTAGES OF SOLAR ENERGY

Solar energy is a clean and renewable energy source.

Once a solar panel is installed, solar energy can be produced free of charge.

Solar energy will last forever whereas it is estimated that the world's oil reserves will last for 30 to 40 years.

Solar energy causes no pollution.

Solar cells make absolutely no noise at all. On the other hand, the giant machines utilized for pumping oil are extremely noisy and therefore very impractical.

Very little maintenance is needed to keep solar cells running. There are no moving parts in a solar cell which makes it impossible to really damage them.

In the long term, there can be a high return on investment due to the amount of free energy a solar panel can produce, it is estimated that the average household will see 50% of their energy coming in from solar panels.

IV.DISADVANTAGES

1.Cost

The initial cost of purchasing a solar system is fairly high. Although the UK government has introduced some schemes for encouraging the adoption of renewable energy sources, for example, the Feed-in Tariff, you still have to cover the upfront costs. This includes paying for solar panels, inverter, batteries, wiring and for the installation. Nevertheless, solar technologies are constantly developing, so it is safe to assume that prices will go down in the future

2. Weather Dependent

Although solar energy can still be collected during cloudy and rainy days, the efficiency of the solar system drops. Solar panels are dependent on sunlight to effectively gather solar energy. Therefore, a few cloudy, rainy days can have a noticeable effect on the energy system. You should also take into account that solar energy cannot be collected during the night. On the other hand, if you also require your water heating solution to work at night or during wintertime, thermodynamic panels are an alternative to consider.

3. Solar Energy Storage Is Expensive

Solar energy has to be used right away, or it can be stored in large batteries. These batteries, used in off-the-grid solar systems, can be charged during the day so that the energy is used at night. This is a good solution for using solar energy all day long but it is also quite expensive. In most cases, it is smarter to just use solar energy during the day and take energy from the grid during the night (you can only do this if your system is connected to the grid). Luckily our energy demand is usually higher during the day so we can meet most of it with solar energy.

4. Uses a Lot of Space

The more electricity you want to produce, the more solar panels you will need because you want to collect as much sunlight as possible. Solar panels require a lot of space and some roofs are not big enough to fit the number of solar panels that you would like to have. An alternative is to install some of the panels in your yard but they need to have access to sunlight. Anyways, if you don't have the space for all the panels that you wanted, you can just get a fewer and they will still be satisfying some of your energy needs.

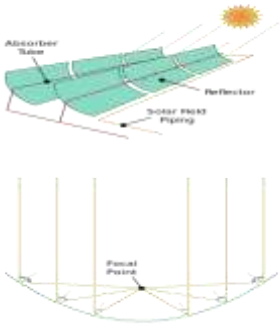
5. Associated with Pollution

Although pollution related to solar energy systems is far less compared to other sources of energy, solar energy can be associated with pollution. Transportation and installation of solar systems have been associated with the emission of greenhouse gases. There are also some toxic materials and hazardous products used during the manufacturing process of solar photovoltaic's, which can indirectly affect the environment. Nevertheless, solar energy pollutes far less than the other alternative energy sources

VI.SOLAR APPLICATIONS

Solar water heater-solar water heateris used to heat water by conversion of sunlight into heat using solar flat plate collectors. A sun-facing collector heats a working fluid that passes into a storage system for later use. This solar application is commercial as widely used for residential and some industrial applications.

Solar power plant-solar power plant uses cylindrical parabolic collectors for their uses. In this the solar energy is converted into the electricity by using lenses, mirror and tracing system. thissystem is not commercialized because it required electricity to rotate the collectors as per the sun position as well as in the rainy and cloudy days sun rays intensity is very less so efficiency becomes more less. As well as it has high cost of installation.



Solar furnace-A solar furnace is a structure that uses concentrated solar power to produce high temperatures, usually for industry. Around 3000 °C can be reach by this furnace. and this heat can be used to generate electricity, melt steel, make hydrogen fuel or nanomaterials.this is also not commercialized because they occupy large amount of space and large solar concentrated collectors are expensive.

Solar cell-it is an electrical device which converts light energy into electricity by photovoltaic effect .flat Plate collectors are used for that. solar cells are commercialized due to their many advantages like the energy can be used both to generate electricity and heat in the house.

Solar dryer-Solar dryers are devices that use solar energy to dry substances, especially food BY USING flat plate collectors. In old days the natural drying process takes time to dry the foods. But in now days by using this kind of solar dryers we can reduce drying time. Yet solar dryers are not commercial because the solar intensity changes every day like in rainy and cloudy days .so at that time we cannot get that much amount of heat t o dry the foods.

On that basis we are planning to design the solar dryer which can overcome such kind ofproblems and get commercialized the solar dryers.

VII.LOAD CALCULATIONS

Load calculation for 5 kg of fish at one time.
Normally moisture contain in fish is =80%
Dry fish moisture contain in fish =20%
Weight before drying 5 kg of water contain 4 kg
After dryness moisture is 20% measured weight is 1 kg
Remaining water contain =3kg.
Heat required for 3 kg of water= m x Cv x dT + Lv

Where,

m = mass of fish

Cv = specific heat

dT = temperature difference

Lv = latent heat of vaporization

Heat required for 3 kg of water= m x Cv x dT + Lv

=5 x 4.18 x (100-30) + 2260 x 3

=5 x 4.18 x 70 + 6780

= 8243KJ

Design consideration for kolumbi fish

Design considered on 01 may in Kolhapur

Solar intensity per day on 01 may in Kolhapur = 6.66 KJ/hr/day =23976 KJ

We can collect heat per day = 12687.3 KJ on 1 square meter per day.

VIII.CONCLUSION

Due to such kind of design of solar dryer there will be an improvement in space utilization, installation cost, energy saving, reduction of drying time. Also there will be commercialization takes place in our country which will lead to use of non degradable energy resources instead of degradable energy resources.

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