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Solar Power: The Ultimate Source of Energy

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"WE HAVE PROVED THE COMMERCIAL PROFIT OF SUN POWER IN THE TROPICS AND HAVE MORE PARTICULARLY PROVED THAT AFTER OUR STORAGE OF OIL AND COAL ARE EXHAUSTED THE HUMAN RACE CAN RECEIVE UNLIMITED POWER FROM THE RAYS OF THE SUN"

Abstract

As we know that one day fossil fuels will end, a need to find alternative fuels. Renewable energy is considered an alternative to fossil fuels and nowadays it attracts much attention. Among renewable energy sources, solar is the most important because it is available in all parts of the world. Also, this energy source is used in various industries including agriculture and it can be used in cultivating crops. Other applications of solar energy include irrigation, drying products, and ventilation niche.

Keywords: Fossil fuels, Solar Energy, Solar panels, energy, Solar based machines, Agriculture Agro Industries, environment, eco friendly technology

Introduction

The energy sector has a direct impact on the economic development of a country. Nowadays, 85-90% of the world's primary energy is produced from fossil fuels. There is limited storage of fossil fuels and one of the important reasons for recession in the world's economy. To solve the problem of the decreasing economy and the energy sector's related issues, all the world is focusing on an effective utilization of renewable energy resources like solar, wind, thermal and hydro. Fossil energy supplies became available about 200 years ago. In addition, shortages of cropland, fresh water, fossil energy (fertilizers and irrigation), and biological resources plague agricultural production in many parts of the world.

Solar Energy Technologies

There are two ways to convert solar energy into electrical energy a system using photovoltaic technology and another that uses solar capture heating systems. In the photovoltaic system, the sun rays are converted directly to electricity by semiconductors. In the method of heating, electrical power via the thermodynamic processes, with help of heat exchange equipment, can be converted to mechanical energy.



(Solar energy in Agriculture)

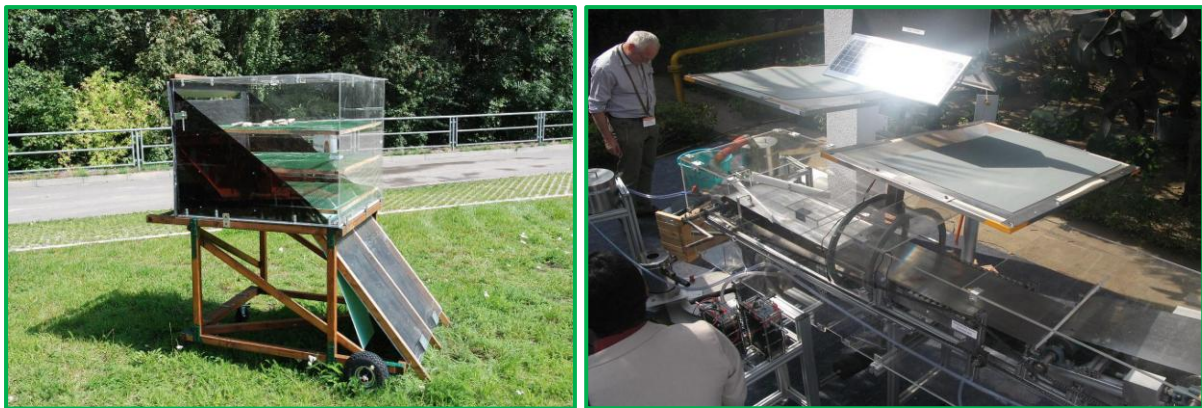
Solar photovoltaic (PV) cells were invented at Bell Labs in the United States in 1954, and they have been used in space satellites for electricity generation since the late 1950s. In this technology, solar rays collected via small plates that semiconductors photovoltaic, are converted into electricity. Solar cells are the most common type of flat panels where the light is immediately brought to semiconductor and is converted to electricity. Yet, in the concentrator cells, first the sunlight is guided via the reflector, concentrated, and then the solar cell connects together. Power cells and solar modules may be enough only to charge the battery and to build a system with output significantly requires that modules that work together and at the same time. Given that solar cells are connected together and making modules, also the modules for creating the appropriate voltage and current.



(Solar photovoltaic panels providing green energy for agricultural growth)

Solar Dryer

Preservation of food through drying is one of the oldest and the most widespread methods that can be used to enhance the strength of the food. Drying food is removing the moisture so that the product can be stored for a long time and reducing the speed of chemical reactions, drying increases shelf life of the product. In addition, reducing the weight and volume of materials and facilitates transportation and storage of products. In the case of drying, in addition to preventing the loss, the marketing can be controlled at sensitive times. Using the sun for dry crops and grain is one of the oldest used applications of solar energy. Solar dryers protect grain and fruits and vegetables, reduce losses, dry faster and more uniformly, and produce a better quality product than open-air methods. Solar-drying technology offers an alternative, which can process the vegetables and fruits in sanitary conditions to national and international standards and with zero energy costs. It saves energy, time, occupies less area, improves product quality, makes the process more efficient and protects the environment. Much research has been conducted about the dryer that Kiebling has listed 66 different solar dryers, A review on the new technologies, models and experimental investigations of solar dryers has been presented by Ramana.



(Solar dryer)

Ventilation Systems for Agricultural Applications

The application of PV can be the best choice because in the event of a grid power breakdown, PV will take over to supply power, hence potentially saving thousands of birds. Direct current motors can also operate directly with PV power and eliminate the use of inverters. The Taiwanese government increases benefits for livestock farmers who use solar energy to generate electricity specifically for pig farms to attract other farmers to build solar farms. A final report on Delaware's poultry farms reveals the economic and technical aspects of PV application for poultry farming. It also reports that PV offers additional benefits, such as security of supply, and economic and environmental advantages over grid electricity supply and conventional energy sources

Solar Home

Seamlessly photovoltaic building that has been worn and has become one of the most popular homes. And it is used more in areas where there is not electrical grid. Photovoltaic panels are installed on the roof or walls to get sunlight. Solar energy is produced in the same location and can also save additional energy. This technology is cheaper and promising and more power can be produced for home. Shown figure is a model configured to indicate photovoltaic energy. For areas where electricity grids are not very useful, it helps the region supply with the fewest problems of electricity.



(Building integrated photovoltaic system)

Solar Cooker

Solar cookers are systems of clean energy, available and inexpensive sun that is used for cooking food. A solar cooker inhabited radiant heat by rays focusing it on a surface or locking it in a greenhouse space. Rather it should be used for cooking. In the developed countries about 90% of household energy consumption is devoted to cooking. These systems can do almost everything like an electric rice cooker or gas stove, such as roasting, brewing, cooking, frying or reheating refrigerated cool foods, including cases that are possible with the solar cooker. Hence solar cookers are in two forms, direct and indirect. The direct solar cooker consists of an insulated box with transparent window, through which the sunlight enters. It is the most developed and it is for home cooking. In the indirect stove fluid is used for heat transfer from the collector to a baking sheet.



(Solar cooker)

Solar Water Heater Systems

Water heaters are one of the most common applications of solar energy for home and industrial applications and similar solar dryers, water heating systems are also available in natural convection and forced convection scheme and shows one water heater Solar water heaters are divided into two categories: direct and indirect. In direct water heaters, water is consumed in the current collector, becomes hot and then is consumed, but in the indirect water heater, the water consumed is used for heating a fluid.

In general, in solar water heaters, in order to use hot water when not benefitting from the sun, the hot water is stored in the reservoir. In some solar water heaters, a water tank is installed above the collector and hot water for natural convection is stored in the tank. To the water heater said thermo syphon.



(Solar water heater)

Solar Water Pump

A solar water pump is an application of photovoltaic technology which converts solar energy into electricity to run the pumping system thereby, replacing erratic grid supply and pollution-causing diesel-powered versions. The solar water pump is powered by solar modules that helps draw surface or groundwater out for irrigation. Solar pumps are useful where grid electricity is unavailable or impractical, and alternative sources (in particular wind) do not provide sufficient energy.



Solar water pump

Solar Greenhouse

The greenhouse is a structure that nowadays is used in agriculture to grow plants with the best quality. Recently, solar energy is used for heating greenhouses so that such greenhouses are known as solar greenhouses and the solar energy can be used to provide light to the greenhouse. A very good step would be to reduce the need for fossil fuels used for heating. After the oil crisis in 1973, researchers tried to find a convenient and simple solution for the use of solar energy in the greenhouse. Overall, solar energy is used in greenhouses in three forms. In the greenhouse, the construction method is carried out so as to provide the

maximum use of solar radiation during the day and lead to the lowest energy losses during the night in greenhouses. Another type known as greenhouse is called greenhouse active (Active), and it uses the pickers and transfer heated fluid, in heating greenhouses. In the third kind of greenhouses photovoltaic cells are used so that the solar radiation energy become Electrical and then it is used in greenhouses.



(Solar greenhouse)

Solar Vehicles

A solar vehicle or solar electric vehicle is an electric vehicle powered completely or significantly by direct solar energy. Usually, photovoltaic (PV) cells contained in solar panels convert the sun's energy directly into electric energy. The term "solar vehicle" usually implies that solar energy is used to power all or part of a vehicle's propulsion. Solar power may be also used to provide power for communications or controls or other auxiliary functions.



Solar vehicles are not sold as practical day-to-day transportation devices at present, but are primarily demonstration vehicles and engineering exercises, often sponsored by government agencies

- **Biggest problem with solar energy:** Intermittency. One of the biggest problems that solar energy technology poses is that energy is only generated while the sun is shining. That means nighttime and overcast days can interrupt the supply.
- **Why solar energy is not popular:** The available power grid infrastructure was built to work with consistent power generation levels and these grids may not be able to cope with the inconsistency of solar energy. Another factor that reduces the competitiveness of solar energy is how often electricity is produced; also known as its capacity factor.
- **Solar the future:** Photovoltaics (PV) and concentrating solar power are likely to continue to grow rapidly—National Renewable Energy Laboratory (NREL) projects solar energy could provide 45% of the electricity in the United States by 2050 if the energy system is fully decarbonized—and technology costs are projected to be continued...
- **Solar Energy & Health aspects:** Electricity from solar panels and transmission to the power grid emits extremely weak electromagnetic fields. Exposure to the low - level electromagnetic fields has been studied extensively, and there is no evidence that it is harmful to human health, according to the World Health Organization (WHO).

☐ **Solar pannel in cloudy weather:** Photovoltaic panels can use direct or indirect sunlight to generate power, though they are most effective in direct sunlight. Solar panels will still work even when the light is reflected or partially blocked by clouds. Rain actually helps to keep your panels operating efficiently by washing away any dust or dirt.

Conclusion

The solar energy can be found in the farthest corners of the world and it can be developed to electric power production and agriculture. Using solar energy can do the majority of cases related to agriculture. In addition, due to the reduction fossil fuel energy can inexpensively Gremlin. Also uses solar energy in agriculture can land that is unusable into the greenhouse or shed for breeding animals converted in areas outside city. On foregoing, the use of solar energy is an investment for the future because we can use it for a long time. In addition, a company can use this method to create, build panels and install them. This creates jobs and helps the economy.

Advantages of Solar Power

☐ **Renewable Energy Source.** Among all the benefits of solar panels, the most important thing is that solar energy is a truly renewable energy source.

☐ **Reduces Electricity Bills.**

☐ **Diverse Applications.**

☐ **Low Maintenance Costs.**

☐ **Solar energy can be used in agriculture to saving money, increasing self-reliance, and reducing pollution.** Solar heat collectors can be used to dry crops and warm homes, livestock buildings, and greenhouses.

Disadvantages of Solar Energy

☐ **Cost,** The initial cost of purchasing a solar system is fairly high. ...

☐ **Weather-Dependent.** Although solar energy can still be collected during cloudy and rainy days, the efficiency of the solar system drops. ...

☐ **Solar Energy Storage Is Expensive.** ...

☐ **Uses a Lot of Space.** ...

☐ **Associated with Pollution.**

References

1. M.Pimentel and M. KarpensteinMachan. "Energy use in agriculture: an overview."Cigr, vol.1, pp.1-32, 1999.
2. M. I. Hussain. "Utilization of solar energy in agricultural machinery engineering." Journal of Biosystems Engineering, vol. 40, no. 3, pp. 186192, 2015.
3. K. Bataineh & Y. Taamneh,"Review & recent improvements of solar sorption cooling systems," Energy Build, vol. 128, pp. 22–37, 2016.
4. Smith."Revisiting solar power's past. Technology Review." pp. 38–47, July, 1995.
5. A. Sharma and C. Chen. "Nguyen VL. Solarenergy drying systems a review." Renewable and Sustainable Energy Reviews, vol. 13, pp. 1185–210, 2009.
6. N.M. Nahar and P. Gupta. "Energy conservation potential for solar cookers in arid zones of India." Energy, vol. 16, pp. 965-969 1991.
7. M. Grafiadellis and S. Kyritsis. "Heating greenhouses with solar energy." Acta Hort. Vol. 115, pp. 553-560 ILO, 1986.