

Pros and cons of solar power engineering essay



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Solar power is the changing or converting sunlight into electricity, either directly using photo voltaic, or indirectly using concentrated solar power (CSP). Or, solar power is electricity generated from the level natural energy contained within the sun’s rays (solar radiation).

Energy from the sun that is converted into thermal or electrical energy; “ the amount of energy falling on the earth is given by the solar constant, but very little use has been made of solar energy”

Commercial CSP plants were first developed in the 1980s, and the 354 MW SEGS CSP installations is the largest solar power plant in the world. The 80 MWSarnia Photovoltaic Power Plants in Canada, is the world’s largest photovoltaic plant. Experimental approaches to solar power include concentrated photovoltaics systems, thermovoltaic devices, and space-based solar power.

It is a versatile source of renewable energy that can be used in an amazing number of applications, providing power for everything from cars and boats to houses and spacecraft. Solar power is also clean and pollution-free.

Solar power is an intermittent energy source, meaning that solar power is not available at all times, and is normally supplemented by storage or another energy source, for example with wind power and hydropower.

People from all walks of life have benefited from the energy derived from the sun in one way or the other.

History

Human civilization has always used the energy of the Sun as far back as they have existed on this planet. Solar energy-power from the sun-is free and inexhaustible.

The ancient Greek and Native Americans were the first to use solar power to their benefit, dating back as early as 400BC. Native Americans and the ancient Greek built their houses into the side of hills to take advantage of the heat storage from the sun during the day that would then be released during the night. The Romans took their knowledge of the sun being a source of energy as they were the first people to use glass windows to trap the warmth of the sun in their homes.

While many people were benefitting from solar power it wasn't until 1776 that the first solar collector was built. This collector was built by a gentleman named Horace de Saussure. His collector was cone shaped and would boil ammonia that would then perform like refrigeration and locomotion. This first solar power collector attracted much interest in the scientific community through the 19th century.

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 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.

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.

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 were basically the standard for powering space bound satellites.

Today we see solar cells in a wide variety of places. 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.

Applications of solar power

The most obvious and realistic choice is solar energy, is important to adopt some kind of alternative source of power generation before we run out of current sources which produce electricity for us at present. Solar energy is available in abundant amount on earth and shifting our electricity

requirements on solar energy is most likely to be the option in coming future.

Solar plants have already start providing electricity to us on different levels and scales. Solar power gadgets or huge solar power arrays are seen producing massive amount of electricity for domestic and commercial areas. Solar power usage is not constant throughout the world. Developed countries more obviously have larger solar power consumption than developing countries.

Solar Applications can be divided into three categories for understanding them better. Solar applications are available in sectors like Residential, Commercial, Industrial and Agriculture. Let's discuss these sectors in detail and know what work has been done in given sectors.

Residential solar power :

There are numerous solar powered based devices available in market which are used in residential sector, products like solar power heater, geezer, outdoor garden lights, battery chargers etc. These days' entire homes can be powered by solar energy. Appropriate solar cells type is used and joined together in modules. These modules of cells are mounted on the roof of the home for direct exposure to the sun light. This sun light is then converted into electricity using solar cells and then transfer into electric system of the house. There are systems available which hold battery backups and store the access amount of energy. This energy can be used when conventional electricity is out.

Industrial Solar Power :

Solar energy is been in use in industry and provides multiple industrial applications, especially when power is required in remote locations. Solar power can be useful in such industrial applications where small kilowatt energy is required. Some examples of remote location solar powered applications are TV Station, Radio broadcasting towers, repeater stations, radio telephones etc. Solar power also facilitated electricity in transportation signalling system. Transportation system includes navigation systems, light houses in oceans, runway lights on airports, security camera in dark etc. Such applications where electricity load is high, solar power can prove cost effective by configure hybrid electric power systems, that joints photovoltaic solar power system with small generators that operates on fuel or natural gas. Solar power is highly reliable and can work on locations where conventional electricity is not reachable. Space is one of the examples for it. Satellites are powered by solar power from the day first when first satellite was launched in space Solar car is another most sophisticated application of solar energy. PV is installed on the surface of the car which converts sun light into electricity to power up a car. Such cars are not yet available for use in market, but they are bound to come for launch commercially very soon in future.

Commercial Solar Power

Commercial building like offices, school, clinics, community halls, hospitals etc can also take advantage from solar energy electrification. In office buildings, glass/glass PV modules can provide cover over atria, which provide

shaded light inside the building. PV systems can also be installed on vertical wall office building in several ways, Curtain wall system, and rain screen over cladding etc.

Advantages of solar power:

There are countless advantages associated with Solar Power Energy. Uses for solar energy are not just for humans to take advantages from but it is amazingly useful for environment as well. Lets' go through several advantages of solar energy.

The major advantage is that the power that is derived from the sun is absolutely free and it will omnipresent as long as there is the presence of sun in this universe.

The most unique and best feature of solar energy is its abundance in quantity available to our mother earth, if we use it to maximum levels it is not going to go anywhere until next five billion years.

Solar energy plants are available for both small scale energy requirements and for larger scale energy requirements; it cops the market for both residential and industrial requirements.

Solar energy can is easily be provided in rural areas where conventional electricity is not present already or it may cost more to setup electric grid station. It is cost effective to use solar energy generation methodologies in such rural areas.

Solar power plants can also be connected to existing source of power generation to form hybrid system to boost energy requirements during sunny, hot and dry day.

Solar power plants are normally very flexible. Solar cell modules or arrays comes in different shapes and sizes, it can be fixed on land or can be mounted on roof tops for maximum sun light exposure. Solar cell modules can also be fixed on glass skylights or vertical walls.

Solar panels now come equipped with such devices which converts DC output from solar panels into AC for consumption. This way residential and commercial business owner can reduce their conventional electricity bills which are increasing day by day.

Net metering is another impressive advantage of using solar energy. Net metering is term which refers to selling energy to conventional grid station in cases of excess production using solar panels. This way electricity bills are reduced by sending electricity back to grid station.

Solar power panels are durable and do not require much maintenance, once in while cleaning of solar cell modules will be it. Average life time of solar power panels are up to 20 to 25 years, which justify the initial cost of solar panel.

Solar power systems are soundless, efficient and without any pollution. Solar panels are capable of connecting with other type electric generators for instance gas turbines, wind, hydro etc. Batteries can also be charges for constant electricity supply.

Larger solar power panels can help in meeting the demands of new power generation sources. These panels are easy to develop than other power generation plants. Solar power panels are very easy to expand, all is require adding up solar cell modules into it and it will start producing more electricity.

Solar power systems are very friendly to environment and do not pollute it in anyway, they do not have any by product only electricity is produced. When solar electricity is used in place of energy generated by fossil fuels for meeting needs like lightening homes, office buildings, pumping of water etc, it will reduce amount of carbon-monoxide, greenhouse gasses and other pollution emitted into air. The more electricity from solar panels is used the more it is benefited for environment to reduce impurities from our atmosphere.

Solar electric system can be useful in employment through out the world. It has already benefited US economy by producing jobs in US solar electricity companies.

The other major advantage of the solar energy and its systems is that it will last for lifetime and hence the homeowner will not be needed to shelve money from his pocket for the maintenance of these systems.

We all should step ahead for solar electricity, create opportunities by exporting solar electric system to developing countries, reduce the usage of conventional electricity and protect global environment and reduce global warming phenomenon.

Disadvantages of solar power:

There are some disadvantages associated with solar electric systems.

Solar power panels initial cost is very high, this factor discourage solar electric system to spread widely and rapidly through out the world.

Cost for solar panels may vary from location to location but estimated cost to run computer with other small electric appliances can cost up to 700 \$ to 1000 \$. Whereas to lighten up the entire house can cost 15000\$ to 25000\$ depending on the demand.

Rural and remote areas which lack in conventional electricity are best suited for solar energy consumption but it solar electric system initial cost higher than using fossil fuels generated electricity.

One other disadvantage of solar electric system is that they need whole lot of space of implant panels, sometimes on land and more often of roof top.

Solar panels are always require to directly face the sun to produce electricity constantly, if panels are not facing sun it will vary in producing watts.

Since solar cells arrays and modules are exposed directly to the sun, different rays like Ultraviolet rays can slowly deteriorate the surface of the panels, dust, wind, and rain can also effect the over all performance of solar power panels