

Solar Energy

Created: Monday, 29 August 2011 05:20 | Published: Monday, 29 August 2011 05:20 | Written by [Super User](#) | [Print](#)

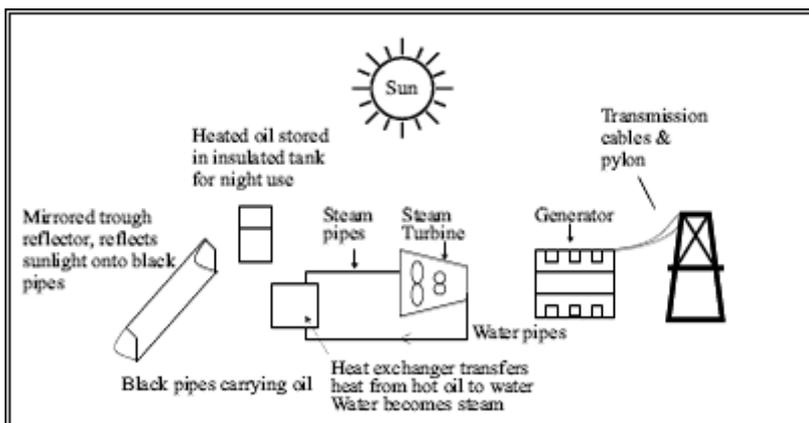
Introduction to Solar Energy

Solar energy uses the heat of the sun to produce electricity. The heat of the sun is concentrated using mirrors. This heat either creates steam which is used to drive a turbine that in turn drives a generator (as per fossil fuel generation), or is used to drive an air engine (an engine that uses expanding air to obtain motion) that drives a generator. Photovoltaic panels convert sunlight directly into electricity.



The sun transmits electromagnetic energy, or solar radiation. The amount of electromagnetic energy that reaches the earth is equal to one billionth of the total solar energy generated, which is equivalent to about 420 trillion kilowatt-hours. We use this solar energy every day in many different ways. When we hang laundry outside to dry in the sun, we are using the solar heat to do the work of drying our clothes. Plants use solar light to make food, animals eat plants for food, and as we learned, decaying plants and animals hundreds of millions of years ago produced the coal, oil, and natural gas that people use today.

What is Solar Energy?

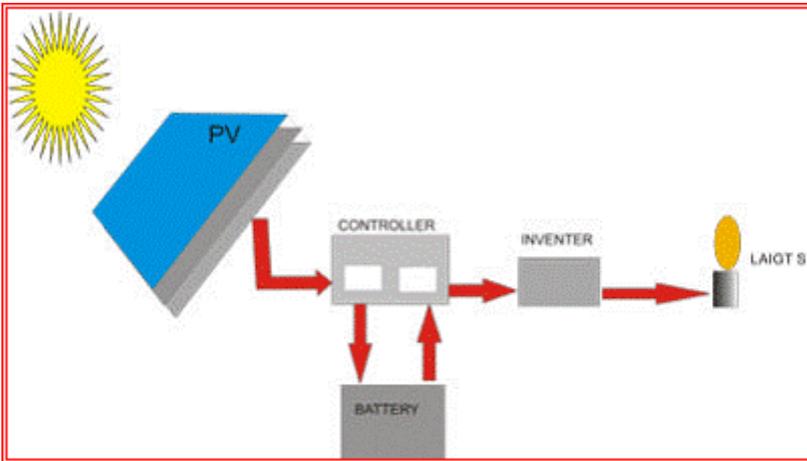


Solar energy is an alternative energy source that

involves harnessing the radiant light energy emitted by the sun and converting it into electrical current. However, one can also think of solar energy as primary instead of alternative. Scientists estimate that 1,000 times more energy reaches the earth's surface from the sun every single year than could be produced by burning all the fossil fuels mined and extracted during that same year. Without solar energy, the earth's temperature would drop precipitously, and the surface would become so cold and dark that the conditions that nourish life and humanity would cease. However, fossil fuels are currently the primary sources of energy that people use for economic activities. Since the middle of the 20th century, it has become much easier to harness and utilize solar energy, which has made it possible for homes and businesses to make economic use of this renewal energy source rather than relying solely on more conventional means of generating power.

What is Solar Power?

Every day the sun radiates, or sends out, an incredible amount of energy. The sun radiates more energy in a single second than people have used since the beginning of time! Solar power is the conversion of the sun's light into [electricity](#), either directly or by using [photovoltaics](#) (PV). The energy of the sun originates from within the sun itself, which, like other stars, is a big ball of gases consisting mostly of hydrogen and helium atoms.



Photovoltaics

Photovoltaics are solid state semiconductor devices that convert solar light into electricity. They are usually made of silicon with traces of other elements. Solar cells are prepared with particular materials called semiconductors. Silicon is presently the most generally used semiconductor for this purpose. When light hits the photovoltaic cell, a certain share of it is absorbed inside the semiconductor material. This means that the energy of the absorbed light is given to the semiconductor. One benefit of photovoltaic panels is that they have no moving parts; they are therefore relatively easy to maintain.

Power unfastens electrons, permitting them to run freely. Solar cells have one or more electric fields that act to compel electrons that have been unfastened by light absorption to flow in a specific direction. This flow of electrons generates a current, and, when metal links are fastened to the top and bottom of a Photovoltaic cell, the current can be drawn for external use.

Advantages of Solar Energy

Greatly reduced pollution

Solar energy is cleaner, more renewable, and more sustainable than gas, oil, and coal, and is therefore less damaging to the environment. It does not pollute our air by releasing carbon dioxide, nitrogen oxide, sulphur dioxide, or mercury into the atmosphere as many traditional forms of electrical generations do.

Nonetheless, the many advantages of solar energy are still shadowed by some disadvantages. That's just a necessary paradox of life.

Greatly reduced contribution to global warming

One of the greatest advantages of solar energy of course is that it releases no carbon dioxide, methane or other emissions that warm the atmosphere. However, any manufacturing and installation of solar appliances is necessarily accompanied by some of those emissions.

Infinite energy resource

Solar energy is not a finite resource as fossil fuels are. While the sun exists, it constantly produces all the energy we can use. Solar energy does not require any fuel. It is not affected by the supply and demand of finite fuel and therefore, unlike for example gasoline, is not subjected to ever-increasing prices

Low running costs

With prices of traditional fuels increasing, the cost advantages of solar energy are becoming obvious. After the appliance is installed, solar energy is free.

Health and safety benefits

In some poorer countries where people have used kerosene and candles for domestic heating and lighting, there are consequently high incidents of respiratory diseases and impaired eyesight. Kerosene heating accidents have also burned many people and homes. Solar energy overcomes these problems, especially with excess energy stored for nighttime use.

Easy Maintenance

Most solar cells and solar power generation set ups require little or no maintenance because they have no moving parts. This is in stark contrast to other clean sources of energy such as wind and water turbines which have moving parts and are prone to breakdowns. In comparison, solar cells have a long lifetime and can continue to produce clean energy with minimal maintenance.

Want to know more about solar energy?[Click here](#) to schedule a live session with an eAge eTutor!

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Reference links:

- http://en.wikipedia.org/wiki/Photoelectric_effect
- http://en.wikipedia.org/wiki/Solar_panel
- http://www.clean-energy-ideas.com/articles/pros_and_cons_of_solar_energy.html

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